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Ground Investigations Ireland

Royal Canal Urban Greenway

DBFL

Ground Investigation Report

July 2020

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DOCUMENT CONTROL SHEET

Project Title	Royal Canal Urban Greenway
Engineer	DBFL
Client	Fingal County Council
Project No	9025-10-15
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	DRAFT	M Sutton	A Mcdonnell	F McNamara	Dublin	17 July 2020
B	DRAFT	M Sutton	A Mcdonnell	F McNamara	Dublin	31 July 2020

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APPENDICES

Appendix 1	**Investigation Location Plan**
Appendix 2	**Slit Trench Records**
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Appendix 4	**Diamond Hand Drilled Core Records**
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Appendix 7	**Laboratory Testing**
Appendix 8	**Geophysics Report**

1.0 Preamble

On the instructions of DBFL Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between February and June 2020 at the site of the proposed Cycleway along the Royal Canal from the Kildare / Fingal Co. Council boundary to the 12th Lock at the Old Navan Road in Dublin 15, Co. Dublin.

2.0 Overview

2.1. Background

It is proposed to construct a Greenway (Shared Pedestrian and Cycle Route) along the Royal canal. The majority of the Greenway will be constructed on the existing towpath with some sections utilising private land, public roads and parks along the canal route. The existing towpath is generally grassed with some sections surfaced in hardcore or tarmacadam.

The existing towpath between Castleknock Station and Coolmine Station is narrow and there are two route options for the proposed greenway, one on the north and one on the south of the canal. For the southern side option the Greenway would require construction of a cantilevered boardwalk from the original narrow towpath to give the required width. The option on the northern side would pass partly through a public park and require two bridges one to cross the canal to the west of Castleknock station and one to cross an area that was once a quarry.

The majority of the proposed construction is envisaged to consist of conventional pavement make up along with structures including bridges or cantilevered boardwalks. Some pilling may be required depending on the location and design of the structures along the chosen route.

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 for this project included the following:

- Visit project site to observe existing conditions
- Carry out 47 No. Slit trenches to a maximum depth of 1.5m BGL
- Carry out 3 No. Rotary Core Boreholes to a maximum depth of 23.20m BGL
- Carry out 11 No. Hand diamond drilled Cores to a maximum depth of 0.5m BGL
- Carry out 18 Angled Rotary Core Boreholes from a barge on the Canal to a maximum depth of 5.5m.
- Carry out Plate load and TRL probe testing at slit trench locations to determine CBR value
- 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.

3.1. Slit Trenching

The slit trenches were excavated using a 3T tracked 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 soil was slowly stripped using a spotter on the trench to alert the driver if any services were seen, to avoid damage to any underlying services. The slit trenches 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 are presented on the slit trench / trial pit records which are provided in Appendix 2 of this Report.

3.1. Diamond Drilled Hand Cores.

Pavement coring techniques using man portable equipment was used to carry out coring on sections of the towpath that were too narrow to allow a conventional drilling rig to access. This technique was utilised along the narrow section of the southern towpath from Coolmine station eastwards to approximately 500m west of Caslteknock Station. Cores were recovered using a 75mm diamond rotary core drill 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 cores were logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling and reinstatement. The core records are provided in Appendix 4 of this Report.

3.2. 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.
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 5 of this Report.

3.3. Angled Rotary Boreholes from Canal

The angled boreholes were drilled from a Spud Barge supplied by Ocean Crest Marine (OCM). The spud barge consists of 6 pontoons linked together to make up a floating platform that the T44 drilling rig could work from. Two legs mounted externally on the platform have hydraulic jacks that lower that legs to rest on the base of the canal and provide extra support for the floating platform during drilling works. The T44 rotary drilling rig was loaded on to the platform using a crane located next to Castleknock Train Station. The platform was moved into the specified borehole locations with the use of a small boat.
The rotary boreholes were completed at the locations shown on the location plan in Appendix 1. Drilling was undertaken into the canal bank at angles of between 10 to 60 degrees from horizontal. The angle of drilling at each location was determined by barge access and the towpath height above canal water level. These records can be found provided in Appendix 6 of this Report.

3.4. Geophysics

A geophysical investigation was undertaken to map the depth to the bedrock along a 1090 m section of the towpath on the southern side on the Royal Canal between Coolmine and Castleknock Station. The survey was undertaken by Apex Geophysics and involved collection of 20 seismic refraction profiles and one ERT profile. A full description of the techniques used and the results of the survey are provided in the geophysics report in Appendix 8 of this report.

3.5. Surveying

The Slit trench 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. Due the tree cover along the section of the canal between Coolmine and Castleknock station the investigations locations along this section were surveyed by Murphy Survey using a combination of total station and GPS systems. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.6. Insitu Plate Bearing Test

The plate bearing tests were carried out using a 305mm diameter plate at the slit trench 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 3 of this Report.

3.7. TRL Dynamic Cone Penetrometer

The TRL DCP tests were carried out at locations specified by the Consulting Engineer to determine a CBR design value for the design of external pavements. The testing was carried out at specified depths within the Slit Trenches. 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 3 of this Report.

3.8. 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 pH and sulphate testing was carried out by Element Materials Technology Laboratory in the UK.
Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), hydrometer, tests were carried out in NMTL's Geotechnical Laboratory in Carlow.
Rock strength testing including Point Load (Is_{50}) and Unconfined Compressive Strength (UCS) testing was carried out in Pro Soils Geotechnical Laboratory in the UK.
The results of the laboratory testing are included in Appendix 7 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 variable across the site and are generally comprised;

- Topsoil/Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits

- Bedrock

TOPSOIL / SURFACING: Topsoil was encountered in all of exploratory holes along the western end of the proposed route between ST01 to ST20, and was present to a maximum depth of 0.20m BGL.
From ST21 moving east Slit trenches encountered either Topsoil, Tarmacadam or Gavel Surfacing. ST23, ST24, ST26, ST28, ST30 ST32, ST34 encountered surfacing consisting of sandy angular to sub angular fine to course Gravel to depths of between 0.1m and 0.19m BGL placed on top of Geotextile.
ST21, ST22 and ST49 to ST52 were carried out in existing paved sections of the towpath and encountered Tarmacadam to a depth of 0.06 and 0.12mBGL. ST40 to ST41, undertaken along Sheepmoor Lane, also encountered Tarmacadam to depths of 0.05 and 0.08m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil/Surfacing in the majority of the slit trenches and were present to a depth of between 0.2m and 1.5m BGL. These deposits were described generally as *brown sandy slightly gravelly CLAY.* Cobbles and boulders were encountered where noted on the exploratory hole logs. In some slit trenches the made ground *contained occasional fragments of concrete, red brick, glass, ceramic, wood and plastic* as noted on the exploratory hole logs.

COHESIVE DEPOSITS: Cohesive deposits were generally encountered beneath the Made Ground and were described typically describes as *brown sandy gravelly CLAY.* The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs. The strength of the cohesive deposits was typically firm in the majority of the exploratory holes and in some locations increased to firm to stiff or stiff with depth.

GRANULAR DEPOSITS: Granular deposits were generally not encountered within the exploratory holes but were encountered within rotary borehole RC24 and was typically described as either G*rey brown clayey gravelly fine to coarse SAND or sandy fine to coarse GRAVEL,* however there was limited recovery in these materials.
Based on the SPT N values from RC24 the deposits are typically dense.

BEDROCK: Rotary coring was undertaken between Coolmine and Castleknock Station on the northern and southern banks of the canal. The majority of the angled rotary cored boreholes (excluding RC06, RC16 RC19, RCH04 and RCH09) generally recovered Medium strong to very strong grey/dark grey fine to medium grained LIMESTONE with calcite veins. This is typical of the Calp Formation, which is noted on the geological mapping at the proposed site.
The rock level deepens towards Castleknock Station towards the eastern end of the section reflected in RC06, RCH09 and RC16 that did no encounter rock. This was confirmed in RC24 and RC28 that drilled vertically from the towpath to depths of 23.20m and 17.20 BGL respectively without encountering rock.
At the location of RCH04 and RC06 rock was also not encountered and this has been interpreted as being a possible fault zone.

The geophysical survey undertaken suggests the bedrock is generally between 0.5 and 3.5m deep between boreholes RCH01 and RCH08 and deepens significantly within the range 2.5m to 25mBGL between RCH08 to RC28.
The total core recovery is good, typically 100% with some of the uppermost runs dropping to 80 or 90%. The SCR and RQD both vary across the site likely due to the weathering at the specific location. In some areas core was recovered as non-intact. Generally the angled cores drilled towards the Castleknock end of the section of towpath encountered rock more highly weathered rock while more competent rock was encountered towards Coolmine Station which corresponds with where rock outcrops are exposed along the banks of the canal.
It should be noted that at Slit trench locations ST21, ST23, ST24, ST26, ST28, ST30 refused between depths of 0.3m and 1.4m BGL on presumed rock.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred. Slit trenches were typically terminated on encountering groundwater. 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.

4.3. Laboratory Testing

4.3.1. 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 6% and 60% generally with fines contents of 17% to 72%.

4.3.1. 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.

4.3.1. Rock Laboratory Testing

The rock testing carried out on samples recovered from the boreholes reported Unconfined Compressive Strength (UCS) values ranging between 13.6 and 63.7 MPa while the point load testing gave Is50 values ranging between 2.87 to 8.93 MPa. The Is_{50} results correlate to the UCS values using a factor of approximately 20, giving values of 57.4 MPa and 178.6 MPa. These results correlate to the strength descriptions ranging between of Weak to Very Strong and confirming the variability of this stratum and the

descriptions on the logs. The average of the UCS testing and associated correlated values from the point loading suggest the limestone rock is typically medium strong to strong.

The results from the completed laboratory testing is included in Appendix 7 of this report.

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. External Pavements

The proposed pavements are recommended to be designed in accordance with the CBR test results included in the Appendix 3 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.

5.3. Foundations for Small Structures or Chambers

It is anticipated that small structures or chambers may be required along the route of the prosed cycle way. An allowable bearing capacity of 50 kN/m^2 is recommended for conventional strip or pad foundations on the firm cohesive deposits that are encountered in the majority of the slit trenches along at the canal between a depths of 0.3m and 1.5m BGL.
The possibility for variation in the depth of the made ground along the route 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.

In any part of the site, should part of a foundation be on rock we would recommend that all the foundations of the structure in question be lowered to the competent rock stratum to avoid differential settlement.

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.

5.4. Foundations for Bridge Structure

It is understood the route option being considered along the northern side of the canal between Coolmine and Castleknock Station will require a bridge across the canal to the west of Castleknock station.
Due to the high loading anticipated, the presence of softer cohesive / made ground deposits and the practicality of excavating traditional foundations next to the canal, piled foundations are recommended and may be more economically advantageous for the proposed structure. The type, size and depth of the pile foundations should be confirmed by a specialist piling contractor based on the loading from the proposed structure.

Conventional foundations may be considered, once the design has been finalised and further investigation would be required at specific locations when designs have been progressed further.

5.5. Foundations for Cantilever Structure

It is understood that the route option along the southern side of the canal between Coolmine and Castleknock station will require a cantilevered platform where the existing towpath is narrow. Along this section of the canal, the depth to rock is generally shallow but does vary at depths of between 0.5 and 3.5m BGL with an average of 1.0m BGL. This is based on a geophysical survey and should be used as a guide and depths taken with caution. The vertical drilling from the tow path using hand held equipment was unable to prove depth to rock, however rock was generally recovered in the angled holes drilled in this section, (RCH01 to RCH08), that were drilled at a height of between approximately 1.5m and 4.5m below the towpath level.

Due to the presence of variable made ground / Cohesive deposits it is recommended that the structure be founded on rock. A bearing capacity in the of 1000kN/m2 is achievable for conventional foundations on the limestone rock however it may be more economically advantageous and practical to utilise piles. If piles are proposed the type, size and depth of the pile foundations should be confirmed by a specialist piling contractor based on the loading from the proposed structure.
The proposed route option along the Southern side of the canal will be in close proximity to the Maynooth line railway that is constructed on an embankment next to the canal. This will require assessment of the embankment stability to determine if the construction of the greenway would have an effect on the existing railway construction.

5.6. 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, Deposits will require to be appropriately battered or the sides supported due to the low strength of these deposits.
The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations.

Excavations in the upper cohesive and weathered rock deposits are expected to be excavatable with conventional excavation equipment, with zones of more intact bedrock below this depth requiring rock breaking techniques.
Based on the fracture spacing, the rock strength testing and Pettifer & Fookes (1994) Revised Excavatability Graph, the Calp Limestone ranges from hard digging to hard ripping, however the zones recovered as non-intact should be easy to hard digging. The 3T excavator was generally was not able to able to excavate into the rock where encountered at slit trench locations.
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.

The recommendations provided in this report should be verified in the design of the proposed Greenway, 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 - Investigation Location Plan



- Rotary Cored Boreholes
- Angled Boreholes
- Hand Cored Boreholes
- Slit Trench

Client:

Project Code:
9025-08-19

Project Title:
Royal Canal Urban Greenway

Drawing Title:
Map 1 - Investigation Locations

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- Rotary Cored Boreholes
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Client:

Project Code:
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Project Title:
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Drawing Title:
Map 2 - Investigation Locations

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Project Code:
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Project Title:
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Drawing Title:
Map 3 - Investigation Locations

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Drawing Title:
Map 4 - Investigation Locations

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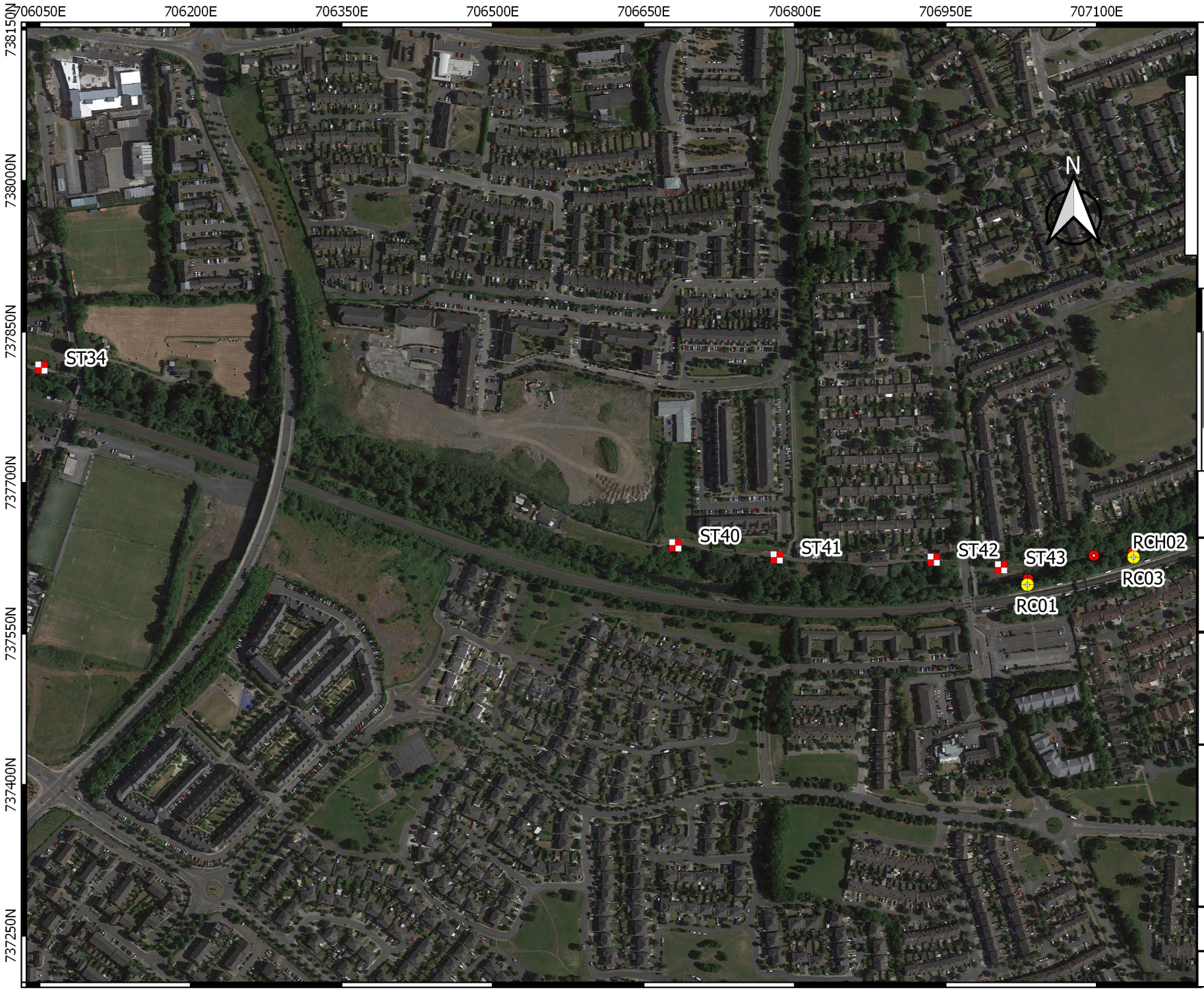
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Map 5 - Investigation Locations

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Hand Cored Boreholes
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Map 6 - Investigation Locations

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- Hand Cored Boreholes
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Map 7 Coring locations

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Rotary Cored Boreholes
Angled Boreholes
Hand Cored Boreholes
Slit Trench

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Project Title:
Royal Canal Urban Greenway

Drawing Title:
Map 8 - Investigation Locations

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- Rotary Cored Boreholes
- Angled Boreholes
- Hand Cored Boreholes
- Slit Trench

Client:

Project Code:
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Project Title:
Royal Canal Urban Greenway

Drawing Title:
Map 9 Coring locations

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Rotary Cored Boreholes
Angled Boreholes
Hand Cored Boreholes
Slit Trench

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Project Code:
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Project Title:
Royal Canal Urban Greenway

Drawing Title:
Map 10 Coring locations

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- Rotary Cored Boreholes
- Angled Boreholes
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- Slit Trench

Client:

Project Code:
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Project Title:
Royal Canal Urban Greenway

Drawing Title:
Map 11 Coring locations

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0 25 50

Drawn By:	Date:
MS	06/07/2020

707850E

708000E

738000N



- Rotary Cored Boreholes
- Angled Boreholes
- Hand Cored Boreholes
- Slit Trench

Client:

Project Code:
9025-08-19

Project Title:
Royal Canal Urban Greenway

Drawing Title:
Map 12 Coring locations

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APPENDIX 2 – Slit Trench Records

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST01
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.10m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 56.62	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 701691.1 E 737019.3 N	**Dates** 27/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				56.47	0.15	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and plastic fragments. Gravel is angular to subangular fine to coarse		
					(0.35)			
0.50	B			56.12	0.50	Soft to firm greyish brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.40)			
				55.72	0.90	Firm grey slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.60)			
1.50	B		Water strike(1) at 1.50m.	55.12	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST01

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST02
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.20m (L) x 0.30m (W) x 1.30m (D)	**Ground Level (mOD)** 56.84	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 701854.9 E 737004.8 N	**Dates** 27/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				56.69	0.15	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse		
					(0.35)			
0.50	B			56.34	0.50	Firm greyish brown slightly sandy gravelly CLAY with some angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.80)			
1.30	B		Water strike(1) at 1.30m.	55.54	1.30	Complete at 1.30m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.30m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST02

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST03
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.20m (L) x 0.35m (W) x 1.50m (D)	**Ground Level (mOD)** 56.86	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702041.6 E 736923.7 N	**Dates** 27/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				56.71	0.15	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse		
0.50	B				(0.50)			
				56.21	0.65	Firm greyish brown slightly sandy gravelly Clay with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse. Possible Made Ground		
					(0.85)			
1.50	B			55.36	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST03

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST04
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.20m (L) x 0.45m (W) x 1.35m (D)	**Ground Level (mOD)** 56.77	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702212.8 E 736820.8 N	**Dates** 27/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				56.62	0.15	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse		
0.40	B				(0.50)			
				56.12	0.65	Firm greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse. Possible Made Ground.		
					(0.70)			
1.30	B		Water strike(1) at 1.30m.	55.42	1.35	Complete at 1.35m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.30m BGL as fast seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST04

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST05
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.20m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 56.86	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702398.9 E 736765.6 N	**Dates** 27/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				56.76	(0.10) 0.10	Brown slightly sandy gravelly TOPSOIL		
					(0.50)	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse		
0.50	B			56.26	0.60	Firm greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse. Possible Made Ground.		
					(0.90)			
1.50	B			55.36	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST05

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST06
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.00m (L) x 0.40m (W) x 1.20m (D)	**Ground Level (mOD)** 56.66	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702591.8 E 736796.1 N	**Dates** 27/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				56.56	(0.10) 0.10	Brown slightly sandy gravelly TOPSOIL		
				56.36	(0.20) 0.30	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic fragments. Gravel is angular to subangular fine to coarse		
0.50	B			56.16	(0.20) 0.50	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.70)	Stiff greyish brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.20	B		Water strike(1) at 1.20m.	55.46	1.20	Complete at 1.20m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.20m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST06

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST07
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.30m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 57.13	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702733.1 E 736855.3 N	**Dates** 20/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				56.98	0.15	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic, glass, plastic and red brick fragments. Gravel is angular to subangular fine to coarse		
0.30	B				(0.45)			
				56.53	0.60	Firm brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse		
					(0.70)			
			Water strike(1) at 1.20m.					▽1
				55.83	1.30	Firm to stiff greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.20)			
1.50	B			55.63	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.20m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST07

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST08
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.20m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 57.64	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702863.4 E 736986.2 N	**Dates** 20/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Dark brown slightly sandy gravelly TOPSOIL		
				57.49	0.15	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse		
					(0.30)			
				57.19	0.45	Firm brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse		
0.50	B				(0.65)			
				56.54	1.10	Stiff greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		▽1
			Water strike(1) at 1.30m.		(0.40)			
1.50	B			56.14	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.30m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST08

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST09
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 57.51	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 702973.7 E 737152.6 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Dark brown slightly sandy gravelly TOPSOIL		
				57.36	0.15	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse		
0.40	B				(0.30)			
				57.06	0.45	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.55)			
				56.51	1.00	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subrounded cobbles and occasional boulders. Gravel is angular to subrounded fine to coarse		
					(0.50)			
1.50	B		Water strike(1) at 1.50m.	56.01	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST09

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST10
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.00m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 57.10	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703085.2 E 737321 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Dark brown slightly sandy gravelly TOPSOIL		
				56.95	0.15	MADE GROUND: Dark brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse		
					(0.30)			
0.50	B			56.65	0.45	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.65)			
				56.00	1.10	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subrounded cobbles and occasional boulders. Gravel is angular to subrounded fine to coarse		
					(0.40)			
1.50	B			55.60	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST10

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST11
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.20m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 56.95	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703193.8 E 737487.4 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Dark brown slightly sandy gravelly TOPSOIL		
				56.80	0.15	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse		
0.40	B				(0.45)			
				56.35	0.60	Firm greyish brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles and occasional boulders. Gravel is angular to subrounded fine to coarse		
					(0.70)			
				55.65	1.30	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subrounded cobbles and occasional boulders. Gravel is angular to subrounded fine to coarse		
					(0.20)			
1.50	B		Water strike(1) at 1.50m.	55.45	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST11

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST12
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.60m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 57.73	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703304.4 E 737653 N	**Dates** 24/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly sandy gravelly TOPSOIL		
				57.53	0.20	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse		
0.40	B				(0.40)			
				57.13	0.60	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.70)			
				56.43	1.30	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.20)			
1.50	B			56.23	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST12

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST13
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.60m (L) x 0.35m (W) x 1.50m (D)	**Ground Level (mOD)** 57.49	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703419.6 E 737819.6 N	**Dates** 24/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.39	(0.10) 0.10	Brown slightly sandy gravelly TOPSOIL		
						MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic and glass fragments. Gravel is angular to subangular fine to coarse		
0.50	B				(0.60)			
				56.79	0.70	Firm greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles and boulders. Gravel is angular to subrounded fine to coarse		
					(0.80)			
			Water strike(1) at 1.40m.					▽1
1.50	B			55.99	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.40m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST13

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST14
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.10m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 57.18	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703536.7 E 737977.1 N	**Dates** 24/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.08	(0.10) 0.10	Brown slightly sandy gravelly TOPSOIL		
0.40	B				(0.50)	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional plastic and glass fragments. Gravel is angular to subangular fine to coarse		
				56.58	0.60	Firm greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.90)			
1.50	B			55.68	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST14

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST15
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.50m (L) x 0.35m (W) x 1.50m (D)	**Ground Level (mOD)** 57.59	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703668.7 E 738134.1 N	**Dates** 21/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				57.44	0.15	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional plastic fragments. Gravel is angular to subangular fine to coarse		
0.40	B				(0.35)			
				57.09	0.50	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.80)			
				56.29	1.30	Stiff greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.20)			
1.50	B		Water strike(1) at 1.50m.	56.09	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST15

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST16
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 59.01	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703856.3 E 738303.8 N	**Dates** 20/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly gravelly sandy TOPSOIL		
				58.86	0.15	MADE GROUND: Brown slightly sandy gravelly CLAY with occasional angular to subangular cobbles and occasional ceramic and plastic fragments. Gravel is angular to subangular fine to coarse		
0.50	B				(0.60)			
				58.26	0.75	Firm greyish brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.75)			
1.50	B			57.51	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST16

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST17
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 59.74	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 703994.1 E 738372.4 N	**Dates** 21/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Brown slightly gravelly sandy TOPSOIL		
				59.54	0.20	MADE GROUND: Brown slightly sandy gravelly CLAY with occasional angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
					(0.40)			
0.50	B			59.14	0.60	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.60)			
				58.54	1.20	Stiff greyish brown slightly sandy gravelly CLAY with occasional angular to subangular cobbles. Gravel is angular to subrounded fine to coarse		
					(0.30)			
1.50	B			58.24	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST17

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST18
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 58.57	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 704148.6 E 738395.1 N	**Dates** 21/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				58.47	(0.10) 0.10	Dark brown slightly gravelly sandy TOPSOIL		
0.20	B				(0.60)	MADE GROUND: Brown slightly gravelly slightly sandy Clay with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
				57.87	0.70	Firm greyish brown slightly sandy gravelly CLAY with some angular to subangular cobbles and occasional boulders. Gravel is angular to subrounded fine to coarse		
					(0.80)			
1.50	B			57.07	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST18

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST19
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 58.31	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 704342.9 E 738347.4 N	**Dates** 21/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Dark brown gravelly sandy TOPSOIL		
				58.11	0.20	Firm brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse		
0.50	B				(0.50)			
				57.61	0.70	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subangular cobbles and occasional boulders. Gravel is angular to subrounded fine to coarse		
					(0.80)			
1.50	B			56.81	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST19

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST20
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 57.75	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 704532.9 E 738284 N	**Dates** 02/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy gravelly TOPSOIL		
				57.60	0.15	MADE GROUND: Grey slightly sandy gravelly Clay with some angular to subrounded cobbles, occasional boulders and occasional ceramic, glass, metal and red brick fragments		
0.50	B				(1.15)			
				56.45	1.30	Greyish brown sandy clayey subangular to rounded fine to coarse Gravel with occasional subangular to subrounded cobbles		
					(0.20)			
1.50	B		Water strike(1) at 1.50m.	56.25	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
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Site Royal Canal Urban Greenway			**Trial Pit Number** ST21
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.80m (L) x 0.50m (W) x 1.40m (D)	**Ground Level (mOD)** 58.29	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 704721.9 E 738230.4 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				58.23	0.06	TARMACADAM		
				58.19	0.10	MADE GROUND: Grey sandy angular fine to coarse Gravel.		
					(0.60)	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, occasional red brick fragments and rootlets. Gravel is angular to subangular fine to coarse		
0.50	B							
				57.59	0.70	Brownish grey sandy clayey angular to subrounded fine to coarse GRAVEL with occasional angular to subrounded cobbles and boulders		
					(0.70)			
1.40	B			56.89	1.40	Obstruction: Presumed Rock		
						Complete at 1.40m		

Plan

Remarks

Trial Pit terminated at 1.40m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST21

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST22
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 1.80m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)**	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 704896.2 E 738170.2 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					0.06	TARMACADAM		
					0.10	MADE GROUND: Grey sandy angular fine to coarse Gravel.		
					(0.70)	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders, rootlets and fragments of glass and red brick. Gravel is angular to subangular fine to coarse		
0.80	B				0.80	Stiff greyish brown slightly sandy gravelly CLAY with occasional angular to subangular cobbles. Gravel is angular to subrounded fine to coarse		
					(0.70)			
1.50	B				1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST22

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST23
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.40m (D)	**Ground Level (mOD)** 58.11	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 704953.6 E 738142.6 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	MADE GROUND: Grey sandy angular to subangular fine to coarse Gravel		
				57.96	0.15			
				57.95	(0.16)	Geotextile		
				57.81	0.30	MADE GROUND: Greyish brown slightly gravelly slightly sandy Clay with occasional angular cobbles and rootlets. Gravel is angular to subangular fine to coarse		
0.50	B				(0.50)	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
				57.31	0.80	Stiff dark grey slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
					(0.60)			
1.40	B			56.71	1.40	Obstruction: Presumed Rock		
						Complete at 1.40m		

Plan

Remarks

Trial Pit terminated at 1.40m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST23

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST24
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.30m (D)	**Ground Level (mOD)** 59.42	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705141.9 E 738066.3 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				59.32	(0.10) 0.10	MADE GROUND: Grey sandy angular to subangular fine to coarse Gravel		
				59.31	0.11 (0.19)	Geotextile		
				59.12	0.30	MADE GROUND: Brown slightly gravelly slightly sandy Clay with occasional angular cobbles and some rootlets. Gravel is angular to subangular fine to coarse		
0.40	B					Stiff brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
					(1.00)			
1.30	B			58.12	1.30	Obstruction: Presumed Rock		
						Complete at 1.30m		

Plan

Remarks

Trial Pit terminated at 1.30m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST24

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST25
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 7.00m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 62.23	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705296.4 E 738014.5 N	**Dates** 02/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	Dark brown slightly sandy gravelly TOPSOIL		
				61.98	0.25	MADE GROUND: Brownish grey sandy clayey angular to subrounded fine to coarse Gravel with some angular to subangular cobbles		
0.60	B				(0.85)			
				61.13	1.10	Firm brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse. Possible Made Ground.		
					(0.40)			
1.50	B			60.73	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST25

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST26
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.20m (L) x 0.50m (W) x 0.40m (D)	**Ground Level (mOD)** 58.68	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705326.9 E 737993.3 N	**Dates** 05/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	MADE GROUND: Grey sandy angular fine to coarse Gravel		
				58.53	0.15	Geotextile		
				58.52	0.16			
					(0.24)	Firm brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse Obstruction: Presumed Rock		
0.40	B			58.28	0.40	Complete at 0.40m		

Plan

Remarks

Trial Pit terminated at 0.40m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST26

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST27
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 8.00m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 61.72	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705534.2 E 737945.8 N	**Dates** 02/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Dark brown slightly sandy gravelly TOPSOIL		
				61.52	0.20	MADE GROUND: Grey sandy clayey angular to subrounded fine to coarse Gravel with some angular to subangular cobbles		
					(0.60)			
0.60	B			60.92	0.80	MADE GROUND: Brownish grey sandy clayey angular to subrounded fine to coarse Gravel with frequent angular to subangular cobbles and occasional boulders		
					(0.60)			
				60.32	1.40			
					(0.10)	Firm greyish brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse		
1.50	B			60.22	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST27

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST28
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.30m (D)	**Ground Level (mOD)** 58.84	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705520.4 E 737941.3 N	**Dates** 05/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.19)	MADE GROUND: Grey sandy angular fine to coarse Gravel		
				58.65	0.19	Geotextile		
				58.64	0.20	Stiff brown slightly sandy gravelly CLAY with frequent angular cobbles. Gravel is angular to subangular fine to coarse		
0.50	B				(1.10)			
1.30	B			57.54	1.30	Obstruction: Presumed Rock		
						Complete at 1.30m		

Plan

Remarks

Trial Pit terminated at 1.30m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST28

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST29
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 62.15	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705687.7 E 737929.2 N	**Dates** 28/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	Brown slightly sandy gravelly TOPSOIL		
				61.90	0.25			
					(0.30)	Firm brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
0.50	B			61.60	0.55			
					(0.95)	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
1.50	B		Water strike(1) at 1.50m.	60.65	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST29

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST30
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.40m (D)	**Ground Level (mOD)** 59.71	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705714.9 E 737895.8 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	MADE GROUND: Grey sandy angular fine to coarse Gravel		
				59.56	0.15	Geotextile		
				59.55	0.16	Firm brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
0.50	B				(0.54)			
				59.01	0.70	Stiff dark brownish grey slightly sandy gravelly CLAY with occasional angular cobbles and boulders		
					(0.70)			
1.40	B			58.31	1.40	Obstruction: Presumed Rock		
						Complete at 1.40m		

Plan

Remarks

Trial Pit terminated at 1.40m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST30

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST31
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m (L) x 0.60m (W) x 1.50m (D)	**Ground Level (mOD)** 63.55	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705898.2 E 737880.3 N	**Dates** 02/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	Dark greyish brown slightly sandy gravelly TOPSOIL		
				63.35	0.20	MADE GROUND: Dark grey sandy slightly clayey angular to subangular fine to coarse Gravel with frequent angular cobbles		
0.50	B				(0.45)			
				62.90	0.65	Firm brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse		
					(0.85)			
1.50	B			62.05	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST31

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST32
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.00m (D)	**Ground Level (mOD)** 60.30	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 705911.5 E 737846.6 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	MADE GROUND: Grey sandy angular fine to coarse Gravel		
				60.15	0.15	Geotextile		
				60.14	0.16	Stiff dark grey slightly sandy gravelly CLAY with occasional angular cobbles and boulders. Gravel is angular to subangular fine to coarse		
0.50	B				(0.84)			
				59.30	1.00	Obstruction: Presumed Rock		
						Complete at 1.00m		

Plan

Remarks

Trial Pit terminated at 1.00m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST32

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST33
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 63.87	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 706007.1 E 737852.9 N	**Dates** 28/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	Brown slightly sandy gravelly TOPSOIL		
				63.57	0.30			
0.50	B				(1.20)	MADE GROUND: Greyish brown slightly sandy gravelly Clay with frequent angular to subangular cobbles and occasional boulders. Gravel is angular to subangular fine to coarse		
1.50	B			62.37	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST33

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST34
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 0.90m (D)	**Ground Level (mOD)** 60.88	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 706051.6 E 737813.4 N	**Dates** 04/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.14)	MADE GROUND: Grey sandy angular fine to coarse Gravel		
				60.74	0.14	Geotextile		
				60.73	0.15	Firm brown slightly sandy gravelly CLAY with some angular to subrounded cobbles and occasional boulders		
0.50	B				(0.75)			
0.90	B		Water strike(1) at 0.90m.	59.98	0.90	Complete at 0.90m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 0.90m BGL as fast seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST34

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST40
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 4.40m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 65.26	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 706681.3 E 737636.8 N	**Dates** 10/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				65.21	0.05	TARMACADAM		
					(0.11)			
				65.10	0.16	MADE GROUND: Grey sandy angular fine to coarse Gravel		
0.50	B				(0.94)	MADE GROUND: Greyish brown slightly sandy gravelly Clay with frequent angular cobbles and occasional boulders. Gravel is angular to subangular fine to coarse		
				64.16	1.10	Firm brown slightly gravelly slightly sandy CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse		
					(0.40)			
1.50	B			63.76	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST40

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST41
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 65.14	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 706782.1 E 737624.9 N	**Dates** 10/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				65.06	(0.08) 0.08	TARMACADAM		
						MADE GROUND: Grey sandy clayey angular to subangular fine to coarse Gravel with occasional angular to subangular cobbles		
0.50	B				(0.52)			
				64.54	0.60	Firm brown slightly gravelly slightly sandy CLAY with occasional subangular cobbles. Gravel is angular to subrounded fine to coarse		
1.00	B				(0.70)			
				63.84	1.30	Stiff brown slightly sandy gravelly CLAY with some angular to subangular cobbles and occasional boulders. Gravel is angular to subangular fine to coarse		
1.50	B			63.64	(0.20) 1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST41

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST42
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.40m (W) x 1.10m (D)	**Ground Level (mOD)** 65.51	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 706938 E 737622.6 N	**Dates** 10/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				65.43	(0.08) 0.08	TARMACADAM		
				65.36	(0.07) 0.15	MADE GROUND: Grey sandy angular fine to coarse Gravel		
					(0.45)	MADE GROUND: Greyish brown slightly sandy gravelly Clay with occasional angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
0.80	B			64.91	0.60	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subangular cobbles. Gravel is angular to subangular fine to coarse		
				64.41	(0.50) 1.10	Complete at 1.10m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST42

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST43
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m (L) x 0.50m (W) x 1.35m (D)	**Ground Level (mOD)** 61.98	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707004.9 E 737615 N	**Dates** 03/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	Dark brown slightly sandy gravelly TOPSOIL		
				61.73	0.25	Firm brown slightly gravelly slightly sandy CLAY with occasional rootlets. Gravel is angular to subrounded fine to coarse		
0.40	B				(1.10)			
1.30	B			60.63	1.35	Obstruction: Presumed Rock		
						Complete at 1.35m		

Plan

Remarks

Trial Pit terminated at 1.35m BGL due to obstruction on presumed rock
Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST43

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST44
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 5.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 60.26	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707599.1 E 737880.7 N	**Dates** 06/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy slightly gravelly TOPSOIL		
				60.11	0.15	MADE GROUND: Greyish brown slightly sandy gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of red brick.		
0.50	B				(0.65)			
				59.46	0.80	Firm brownish grey slightly sandy gravelly CLAY with some angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.70)			
1.50	B			58.76	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST44

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST45
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 5.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 59.39	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707696.1 E 737925.4 N	**Dates** 06/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	Brown slightly sandy slightly gravelly TOPSOIL		
				59.24	0.15	MADE GROUND: Greyish brown slightly sandy slightly gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of ceramic and red brick.		
0.50	B				(0.95)			
				58.29	1.10	Firm brownish grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse		
					(0.40)			
1.50	B		Water strike(1) at 1.50m.	57.89	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as fast seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST45

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST46
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 5.00m (L) x 0.40m (W) x 1.50m (D)	**Ground Level (mOD)** 59.37	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707730.4 E 737938.9 N	**Dates** 06/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				59.27	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL		
						MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of ceramic, plastic, red brick and wood		
0.50	B				(1.20)			
				58.07	1.30			
					(0.20)	Firm greyish brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse		
1.50	B		Water strike(1) at 1.50m.	57.87	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as fast seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST45

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST47
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.00m (L) x 0.50m (W) x 1.50m (D)	**Ground Level (mOD)** 57.38	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 708092.9 E 738012.3 N	**Dates** 03/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.28	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL		
					(0.30)	MADE GROUND: Grey slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of glass and red brick		
				56.98	0.40			
0.50	B					Firm brown slightly gravelly slightly sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					(1.10)			
1.50	B			55.88	1.50			
						Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST47

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST48
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.50m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 57.16	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 708236.6 E 738045 N	**Dates** 03/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	MADE GROUND: Grey sandy slightly clayey angular to subangular fine to coarse Gravel with occasional angular cobbles		
0.50	B			56.66	0.50	MADE GROUND: Greyish brown slightly sandy gravelly Clay with occasional angular to subrounded cobbles and occaisonal fragments of red brick		
				56.16	(0.50) 1.00	Firm brown slightly gravelly slightly sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
1.50	B		Water strike(1) at 1.50m.	55.66	(0.50) 1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST48

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST49
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 4.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 55.48	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 708473.2 E 738136.5 N	**Dates** 09/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				55.42	0.06	TARMACADAM		
					(0.12)			
				55.30	0.18	MADE GROUND: Grey sandy angular fine to coarse Gravel		
0.50	B				(1.12)	MADE GROUND: Brown slightly sandy gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of plastic and red brick		
				54.18	1.30	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse		
					(0.20)			
1.50	B		Water strike(1) at 1.50m.	53.98	1.50	Complete at 1.50m		▽1

Plan

Remarks

Trial Pit stable
Groundwater encountered at 1.50m BGL as slow seepage
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST49

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST50
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 2.20m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 57.13	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 708480.7 E 738099.1 N	**Dates** 05/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				57.04	(0.09) 0.09	TARMACADAM		
						MADE GROUND: Grey sandy angular fine to coarse Gravel		
					(0.41)			
0.50	B			56.63	0.50	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subrounded fine to coarse		
					(1.00)			
1.50	B			55.63	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST50

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST51
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 4.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 56.43	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 708600.4 E 738154.4 N	**Dates** 09/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				56.37	0.06	TARMACADAM		
					(0.14)			
				56.23	0.20	MADE GROUND: Grey sandy angular fine to coarse Gravel		
						MADE GROUND: Brown slightly sandy gravelly Clay with frequent angular cobbles, occasional boulders, and occasional fragments of red brick		
0.50	B							
					(1.00)			
				55.23	1.20	Firm greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles and boulders. Gravel is angular to subrounded fine to coarse		
					(0.30)			
1.50	B			54.93	1.50	Complete at 1.50m		

Plan

Remarks

Trial Pit unstable notes as side wall spalling
No groundwater encountered during excavation
Trial Pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	PC	9025-08-19.ST51

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Site Royal Canal Urban Greenway			**Trial Pit Number** ST52
Machine : 3T Tracked Excavator **Method :** Trial Pit	**Dimensions** 3.00m (L) x 0.45m (W) x 1.50m (D)	**Ground Level (mOD)** 57.03	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 708583.1 E 738123.1 N	**Dates** 06/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.12)	TARMACADAM		
				56.91	0.12			
					(0.18)	MADE GROUND: Dark grey sandy angular fine to coarse Gravel		
				56.73	0.30			
0.50	B				(0.70)	MADE GROUND: Brown slightly sandy gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of plastic, red brick and wood		
				56.03	1.00			
					(0.50)	Firm brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles and boulders. Gravel is angular to subrounded fine to coarse		
1.50	B			55.53	1.50			
						Complete at 1.50m		

Plan

Remarks

Trial Pit stable
No groundwater encountered during excavation
Trial Pit backfilled upon completion

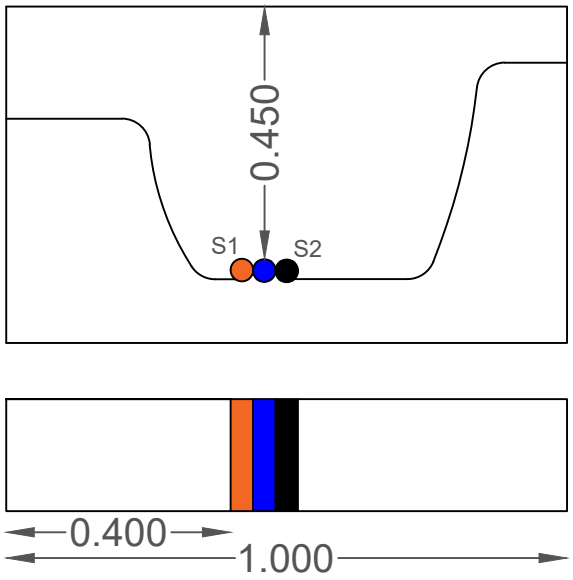
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E 701691.061
N 737020.414
Z 56.602

ST01

A



B

E 701691.103
N 737021.369
Z 56.530

DATE OF EXCAVATION : 27/02/20

From (m)	To (m)	Description
0.00	0.20	Brown slightly gravelly slightly sandy TOPSOIL
0.20	0.50	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders and occasional ceramic fragments.

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 3)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	701690.933	737020.734	56.143
S2 (End of Services)					701690.907	737020.810	56.154

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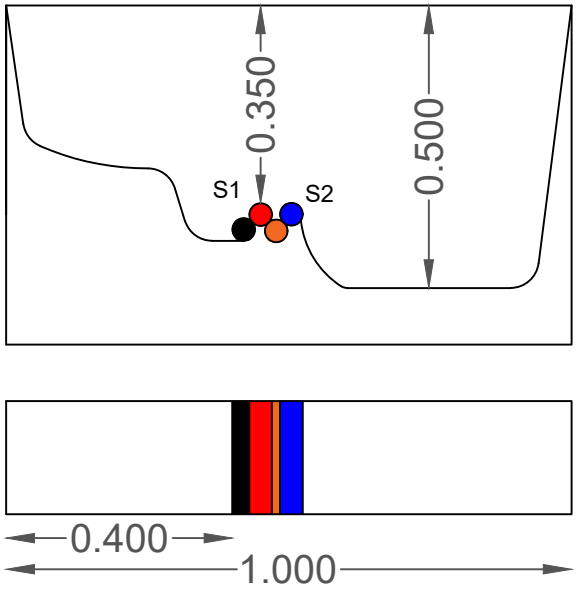
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 01
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 701854.172
N 737006.017
Z 56.795

ST02

A



B

E 701854.549
N 737006.855
Z 56.797

DATE OF EXCAVATION : 27/02/20

From (m)	To (m)	Description
0.00	0.10	Brown slightly gravelly slightly sandy TOPSOIL
0.10	0.50	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders and occasional ceramic fragments.

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	701854.521	737006.39	56.416
S2 (End of Services)					701854.507	737006.447	56.458

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

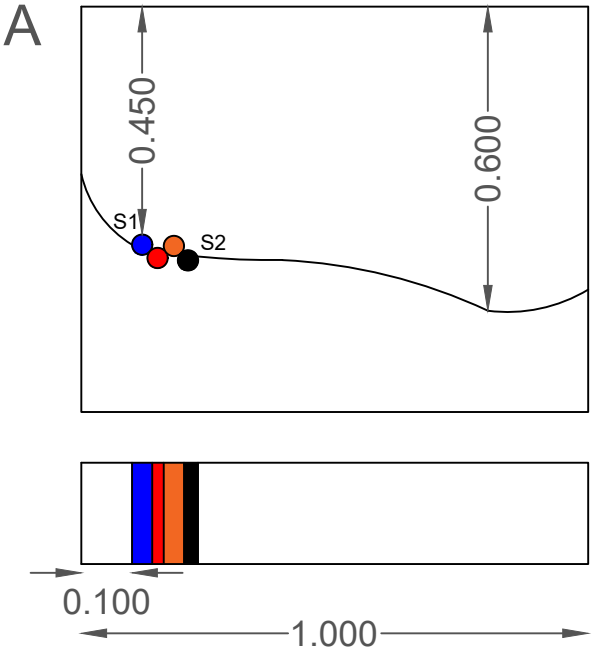
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 02
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702040.920
N 736924.750
Z 56.829

ST03

E 702041.549
N 736925.544
Z 56.791



From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.60	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders and occasional plastic fragments.

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702041.170	736924.720	56.435
S2 (End of Services)					702041.221	736924.801	56.421

DATE OF EXCAVATION : 27/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

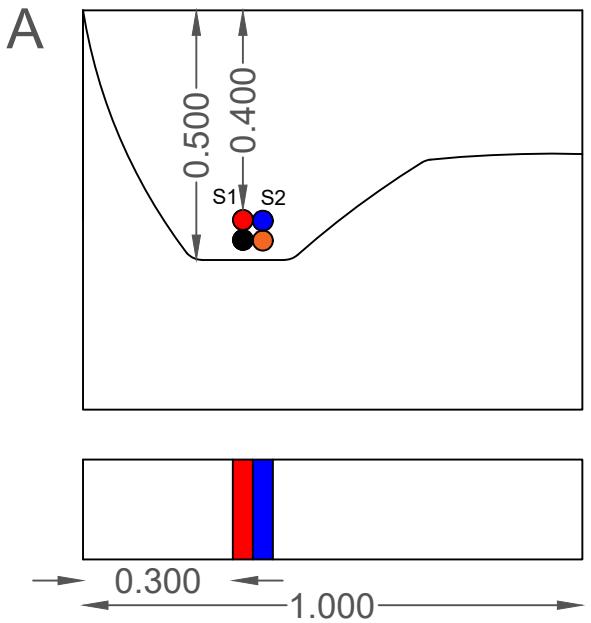
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 03
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702212.662
N 736821.394
Z 56.733

ST04

E 702213.131
N 736822.357
Z 56.774



From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.50	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders and occasional plastic fragments.

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702213.067	736821.69	56.413
S2 (End of Services)					702213.102	736821.747	56.424

DATE OF EXCAVATION : 27/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

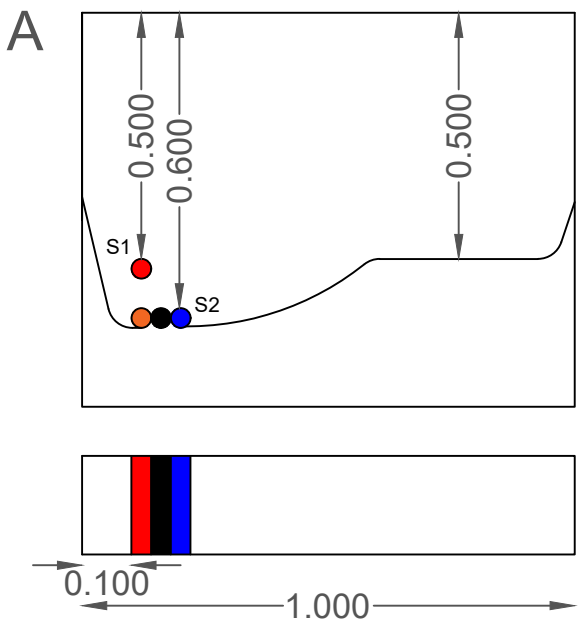
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 04
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702398.860
N 736766.371
Z 56.825

ST05

E 702398.986
N 736767.275
Z 56.833.



From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.60	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders and occasional ceramic, glass and plastic fragments.

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702399.107	736766.370	56.317
S2 (End of Services)					702399.174	736766.505	56.259

DATE OF EXCAVATION : 27/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

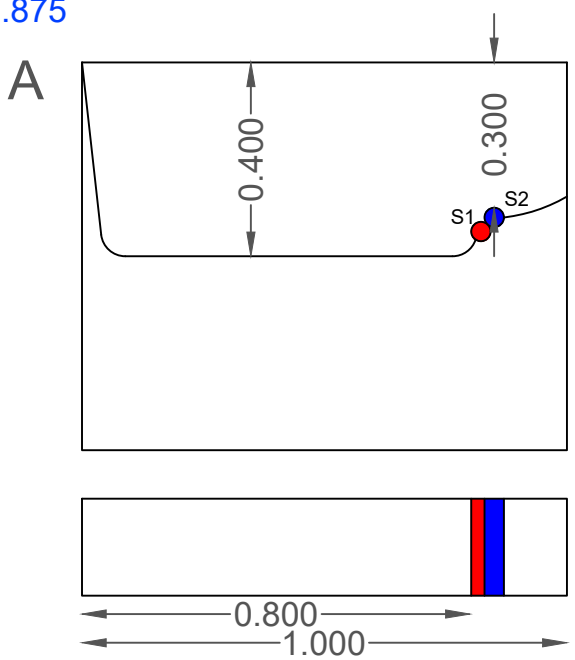
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 05
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702591.595
N 736796.875
Z 56.521

ST06

E 702591.291
N 736797.372
Z 56.637



From (m)	To (m)	Description
0.00	0.10	Brown slightly gravelly slightly sandy TOPSOIL
0.10	0.40	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders, occasional ceramic and plastic fragments and frequent rootlets.

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 2)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702591.338	736797.249	56.338
S2 (End of Services)					702591.320	736797.236	56.387

DATE OF EXCAVATION : 26/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

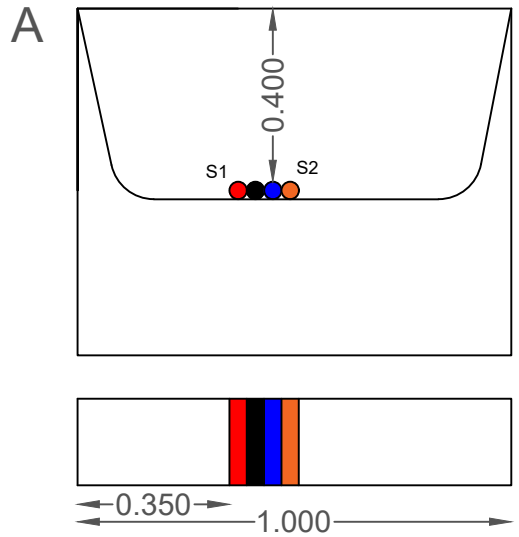
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 06
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702733.241
N 736855.764
Z 57.124

ST07

E 702732.672
N 736856.609
Z 57.139



DATE OF EXCAVATION : 20/02/20

From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.40	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders and occasional fragments of ceramic, glass, metal, plastic and red brick

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702732.820	736856.040	56.778
S2 (End of Services)					702732.796	736856.123	56.772

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

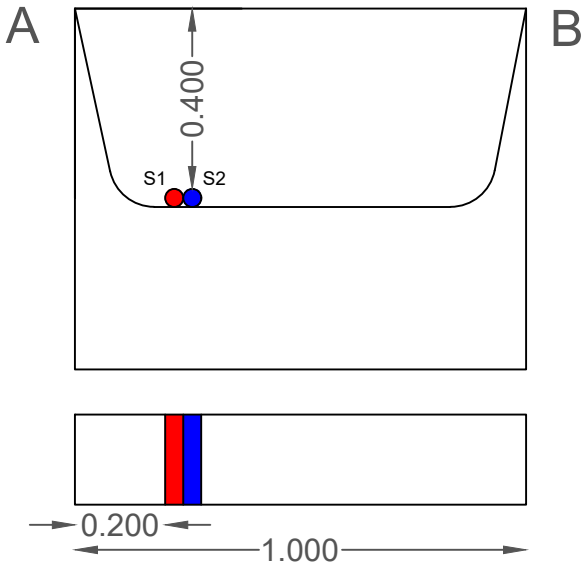
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 07
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702863.043
N 736986.609
Z 57.62

ST08

E 702862.271
N 736987.047
Z 57.781



From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.45	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of ceramic, glass and plastic

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 2)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702862.477	736986.820	57.405
S2 (End of Services)					702862.415	736986.801	57.488

DATE OF EXCAVATION : 20/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

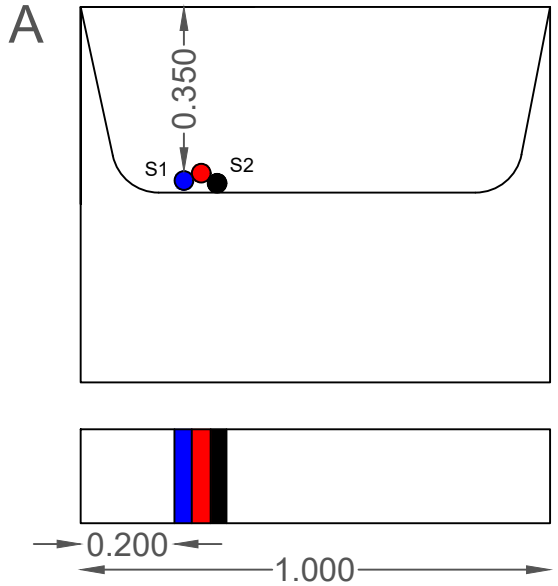
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 08
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 702973.679
N 737153.373
Z 57.482

ST09

E 702972.952
N 737153.830
Z 57.503



From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.45	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of ceramic, glass and plastic

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 3)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	702973.460	737153.318	57.080
S2 (End of Services)					702973.350	737153.354	57.076

DATE OF EXCAVATION : 25/02/20

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

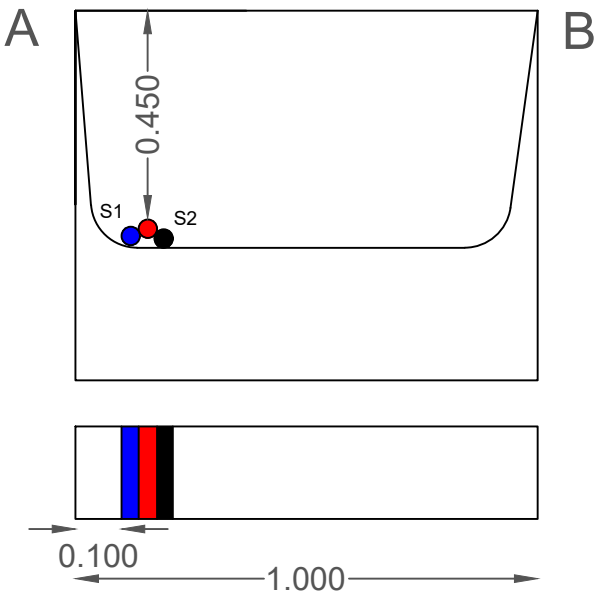
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 09
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version: No.	Date:	Drawn By:	Checked:
	Initials	Initials	Initials
	16/03/2020	PC	MS

E 703084.321
N 737321.553
Z 57.028

ST10

E 703083.392
N 737322.026
Z 57.151



DATE OF EXCAVATION : 25/02/20

From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.45	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of plastic

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 3)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	703084.292	737321.779	56.646
S2 (End of Services)					703084.226	737321.804	56.688

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

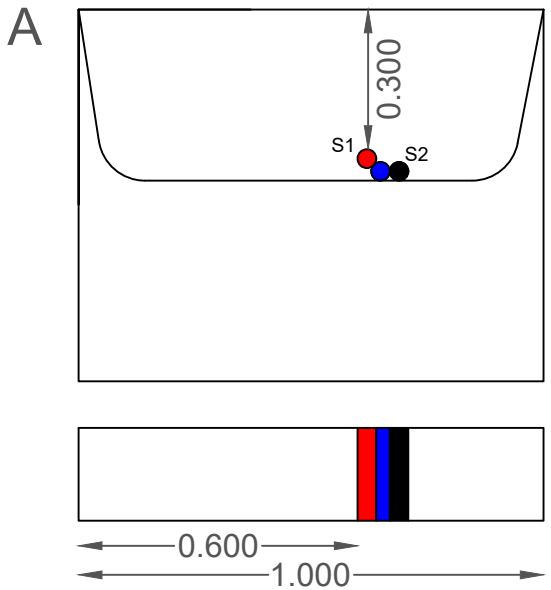
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 10
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 703193.429
N 737488.426
Z 56.946

ST11

E 703192.634
N 737489.096
Z 56.946



DATE OF EXCAVATION : 25/02/20

From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.45	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of plastic

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 3)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	703192.944	737488.629	56.642
S2 (End of Services)					703192.901	737488.651	56.615

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

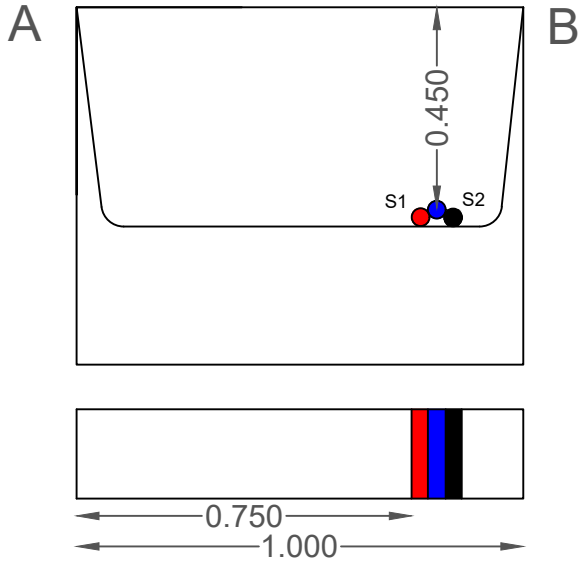
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 11
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 703304.118
N 737653.236
Z 57.664

ST12

E 703303.295
N 737653.894
Z 57.801



DATE OF EXCAVATION : 24/02/20

From (m)	To (m)	Description
0.00	0.15	Brown slightly gravelly slightly sandy TOPSOIL
0.15	0.45	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of plastic and glass

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 3)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	703303.412	737653.668	57.279
S2 (End of Services)					703303.344	737653.760	57.274

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

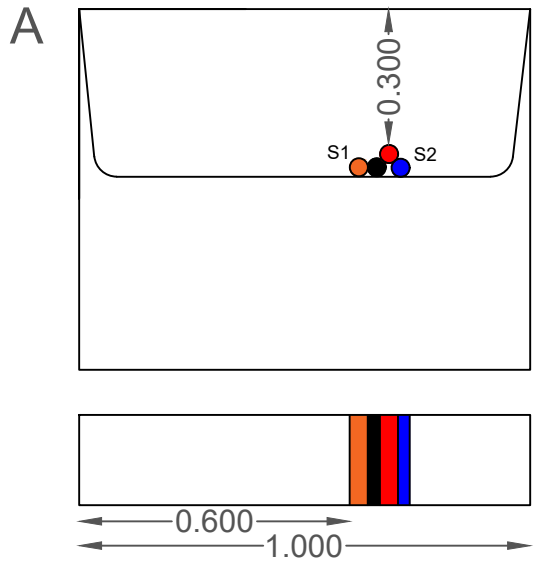
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 12
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 703419.394
N 737819.828
Z 57.535

ST13

E 703418.689
N 737820.465
Z 57.585



DATE OF EXCAVATION : 24/02/20

From (m)	To (m)	Description
0.00	0.10	Brown slightly gravelly slightly sandy TOPSOIL
0.10	0.35	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of plastic and glass

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	703418.992	737820.015	57.256
S2 (End of Services)					703418.899	737820.108	57.272

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

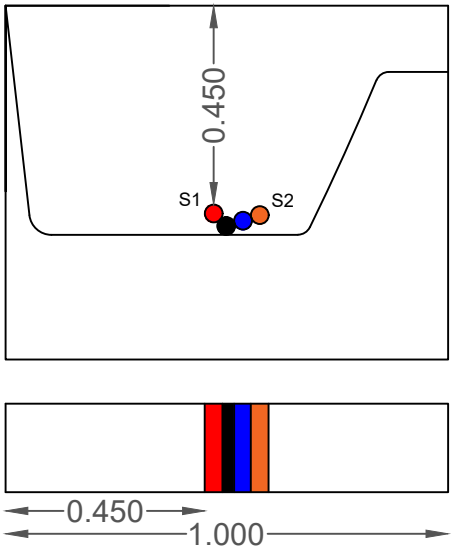
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 13
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

ST14

E 703536.140
N 737977.670
Z 57.157

A



B

E 703535.505
N 737978.360
Z 57.118

DATE OF EXCAVATION : 24/02/20

From (m)	To (m)	Description
0.00	0.10	Brown slightly gravelly slightly sandy TOPSOIL
0.10	0.50	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of ceramic

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 4)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	703535.774	737977.861	56.701
S2 (End of Services)					703535.687	737977.887	56.711

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

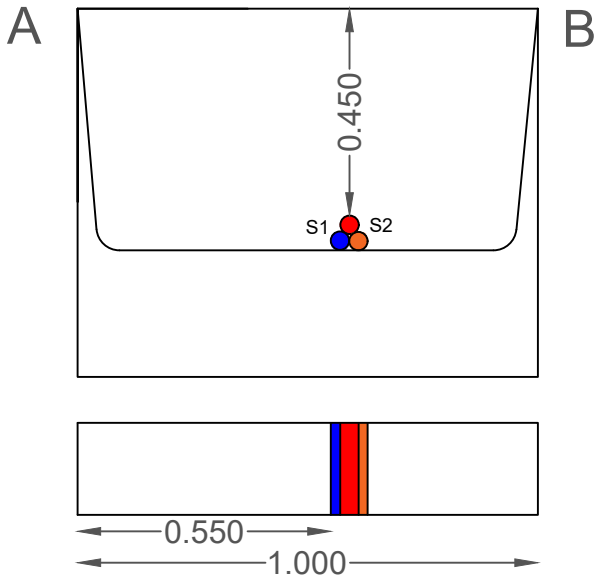
PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 14
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

E 703667.399
N 738134.983
Z 57.685

ST15

E 703666.694
N 738135.647
Z 57.676



DATE OF EXCAVATION : 21/02/20

From (m)	To (m)	Description
0.00	0.10	Brown slightly gravelly slightly sandy TOPSOIL
0.10	0.50	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional fragments of plastic

Surface from/to		Surface Type
0.00	1.00	Grass

Service No. (Bank of 3)	ø (m)	Material	Utility	Angle to trench	Easting	Northing	Elevation
S1 (Start of Services)	0.04	PVC	Fibre Optic	90	703667.146	738135.547	57.164
S2 (End of Services)					703667.078	738135.547	57.168

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

PROJECT:	Royal Canal Urban Greenway
DRAWING No.:	9025-08-19 ST 15
DATE:	February / March 2020
CLIENT:	DBFL Consulting Engineers
SCALE:	NTS @ A4

Version:	Date:	Drawn By:	Checked:
No.	Initials	Initials	Initials
	16/03/2020	PC	MS

Royal Canal – Trial Pit and Slit Trench Photographs

ST01





Royal Canal – Trial Pit and Slit Trench Photographs

ST01





Royal Canal – Trial Pit and Slit Trench Photographs

ST01



Royal Canal – Trial Pit and Slit Trench Photographs

ST02





Royal Canal – Trial Pit and Slit Trench Photographs

ST02





Royal Canal – Trial Pit and Slit Trench Photographs

ST02



Royal Canal – Trial Pit and Slit Trench Photographs

ST03





Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

ST04





Royal Canal – Trial Pit and Slit Trench Photographs

ST04





Royal Canal – Trial Pit and Slit Trench Photographs

ST05





Royal Canal – Trial Pit and Slit Trench Photographs

ST05





Royal Canal – Trial Pit and Slit Trench Photographs

ST06





Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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Royal Canal – Trial Pit and Slit Trench Photographs

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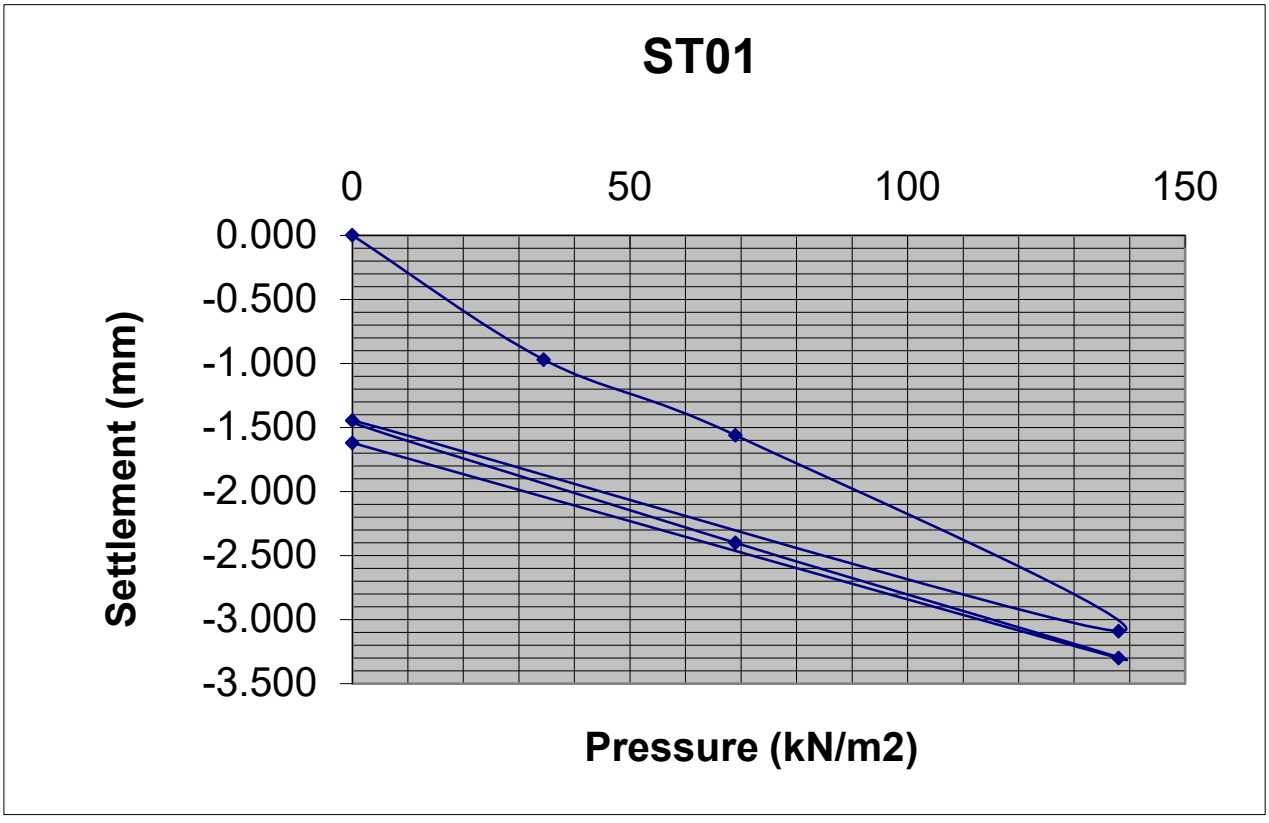
APPENDIX 3 – Plate Load Test and TRL probe Records

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.970
69	-1.560
138	-3.090
0	-1.445
69	-2.400
138	-3.300
0	-1.620

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and plastic fragments
CONTRACT NO.	9025-08-19		
DATE	27/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST01	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **20.10 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **32.84 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.75 %**

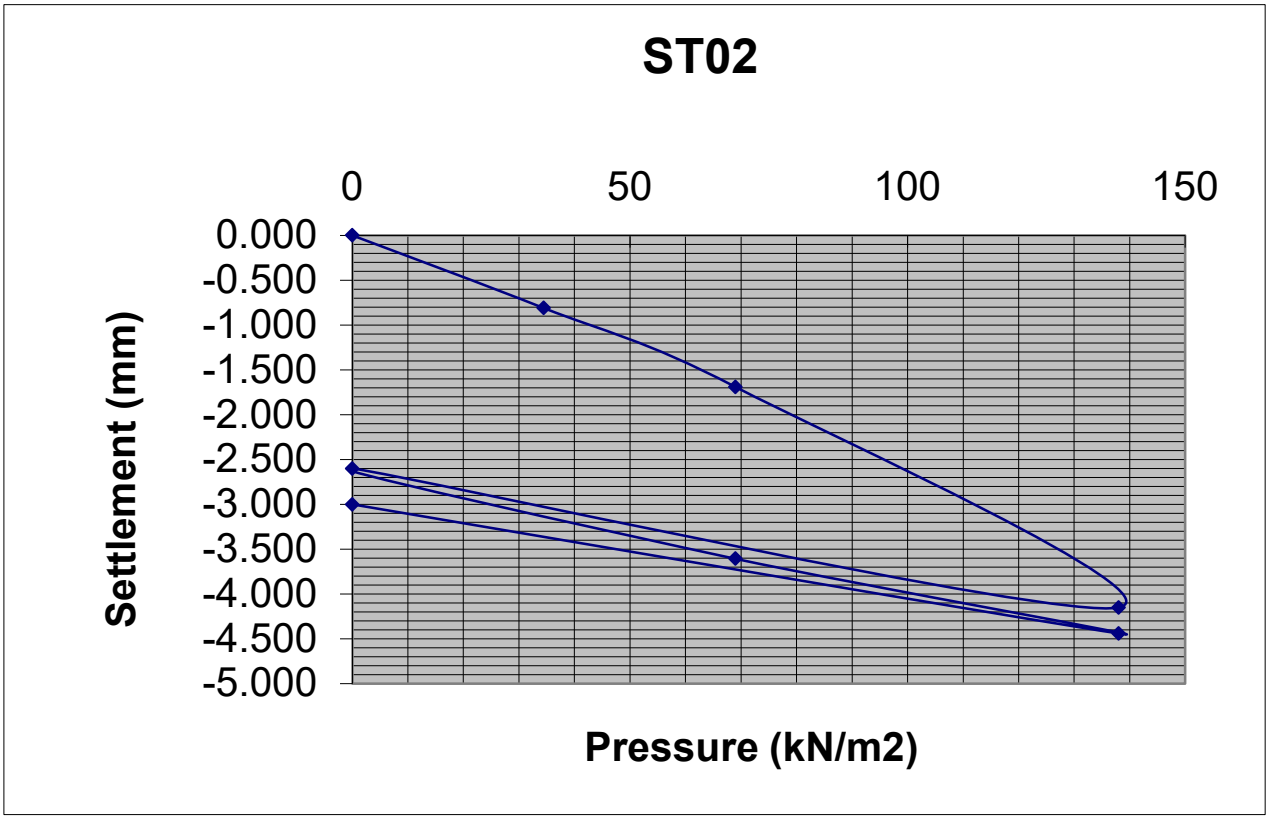
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **4.09 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.810
69	-1.690
138	-4.150
0	-2.600
69	-3.605
138	-4.440
0	-3.000

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and red brick fragments
CONTRACT NO.	9025-08-19		
DATE	27/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST02	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **18.56 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **31.20 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.52 %**

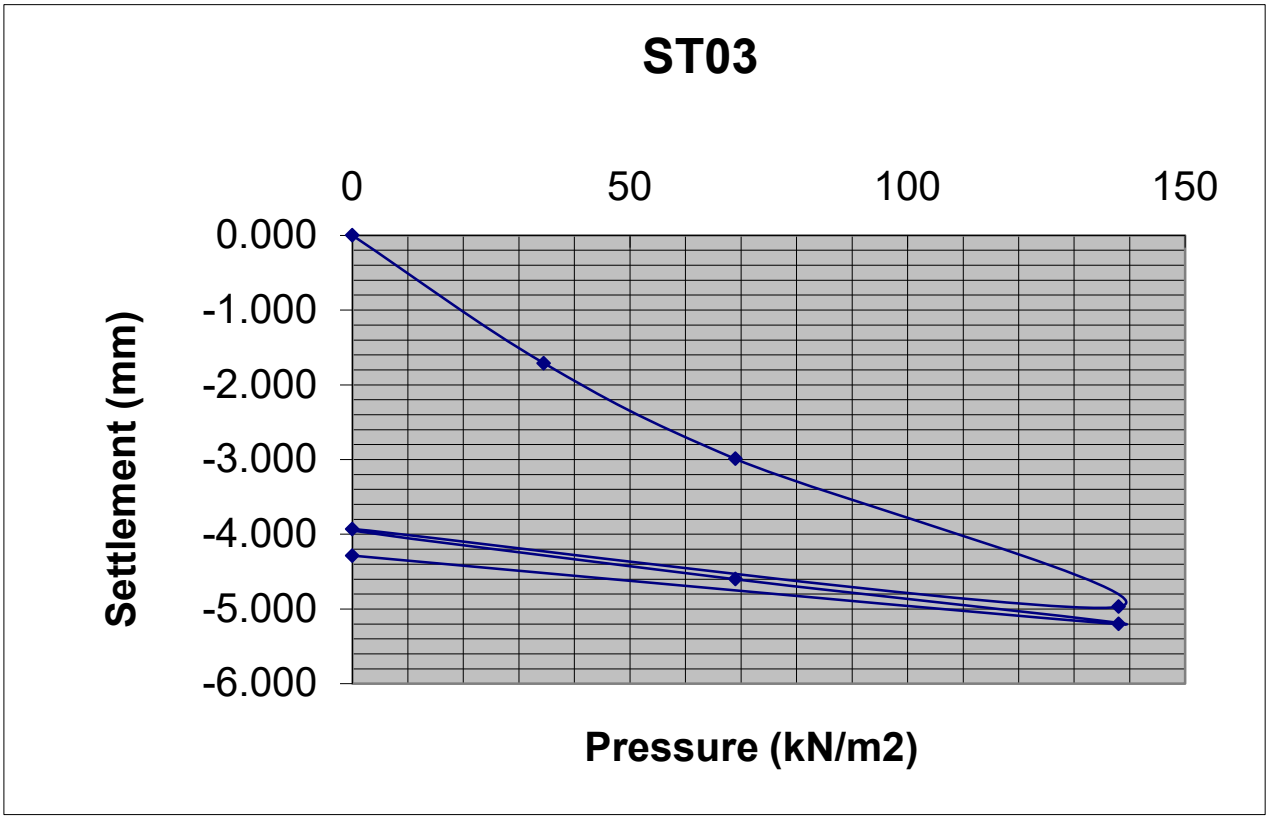
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.75 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.710
69	-2.990
138	-4.970
0	-3.930
69	-4.600
138	-5.200
0	-4.285

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse.
CONTRACT NO.	9025-08-19		
DATE	27/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST03	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **10.49 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **46.81 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.57 %**

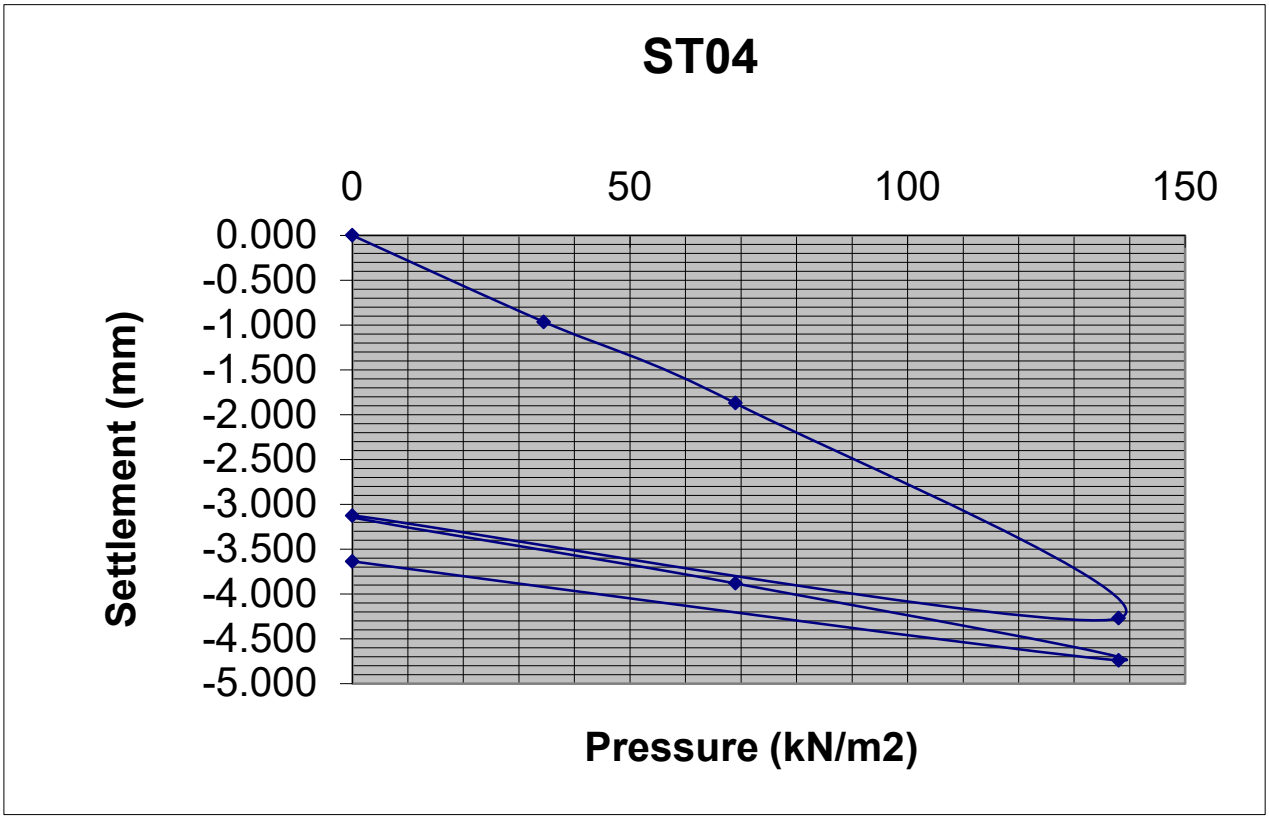
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **7.57 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.965
69	-1.870
138	-4.270
0	-3.125
69	-3.880
138	-4.740
0	-3.635

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	27/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST04	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **16.77 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **41.54 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.28 %**

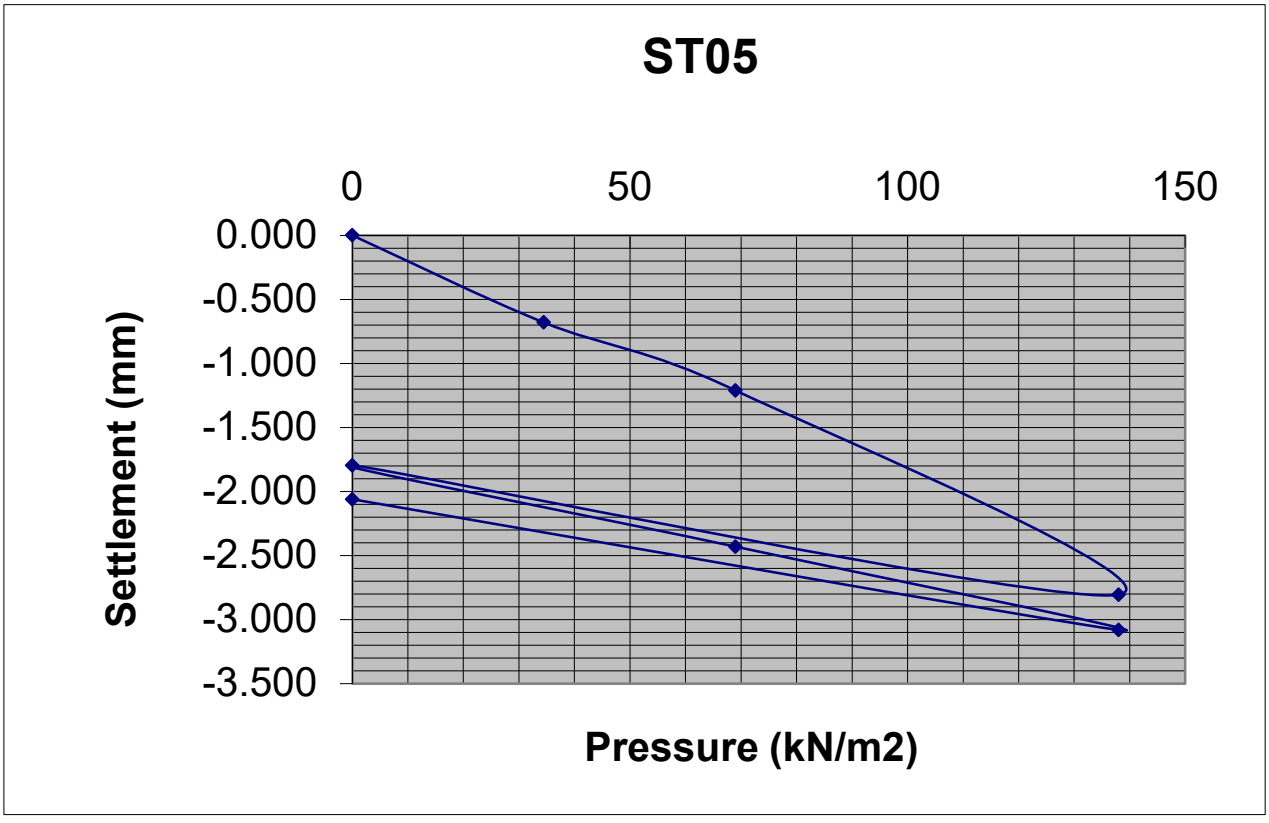
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **6.15 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.680
69	-1.210
138	-2.805
0	-1.795
69	-2.430
138	-3.080
0	-2.060

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and red brick fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	27/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST05	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **25.92 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **49.39 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **2.72 %**

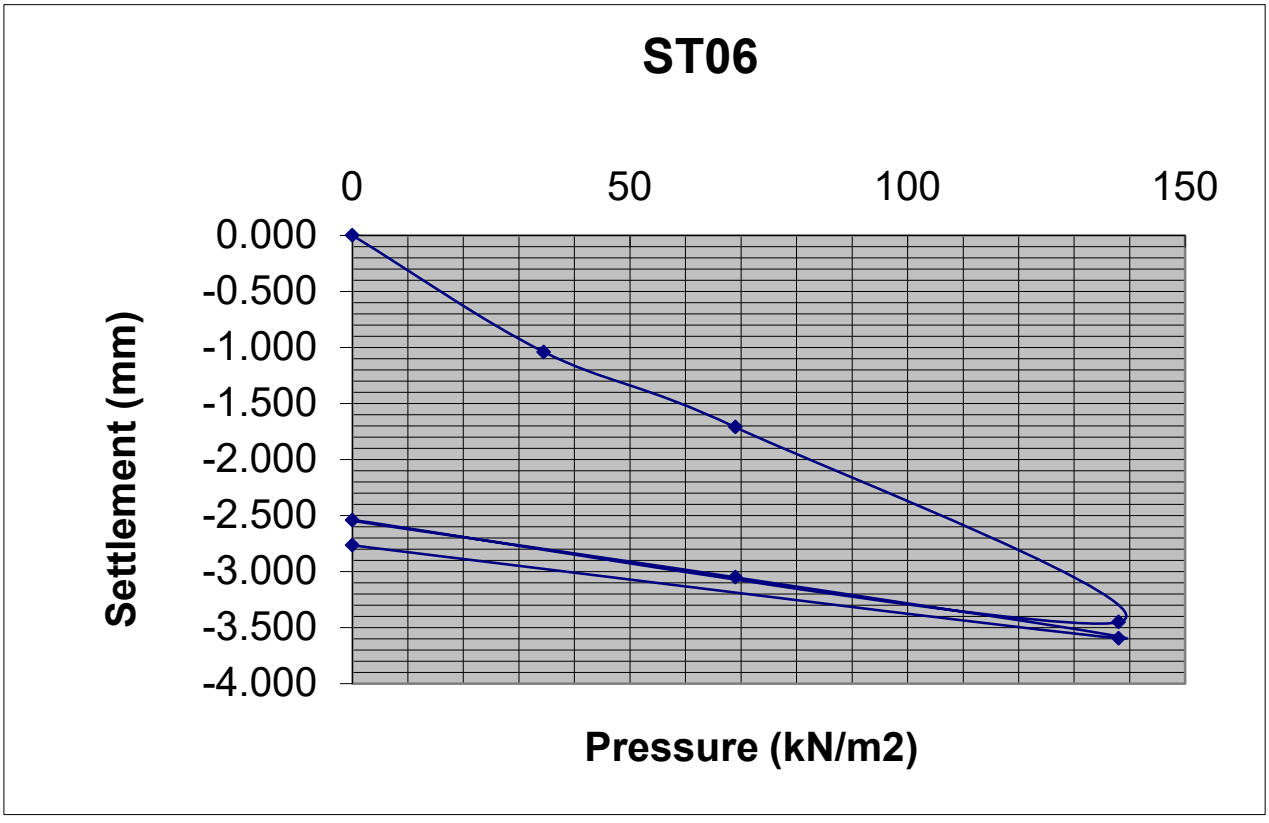
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **8.31 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.040
69	-1.710
138	-3.450
0	-2.540
69	-3.050
138	-3.595
0	-2.765

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly gravelly slightly sandy CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	27/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST06	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **18.34 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **61.49 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.49 %**

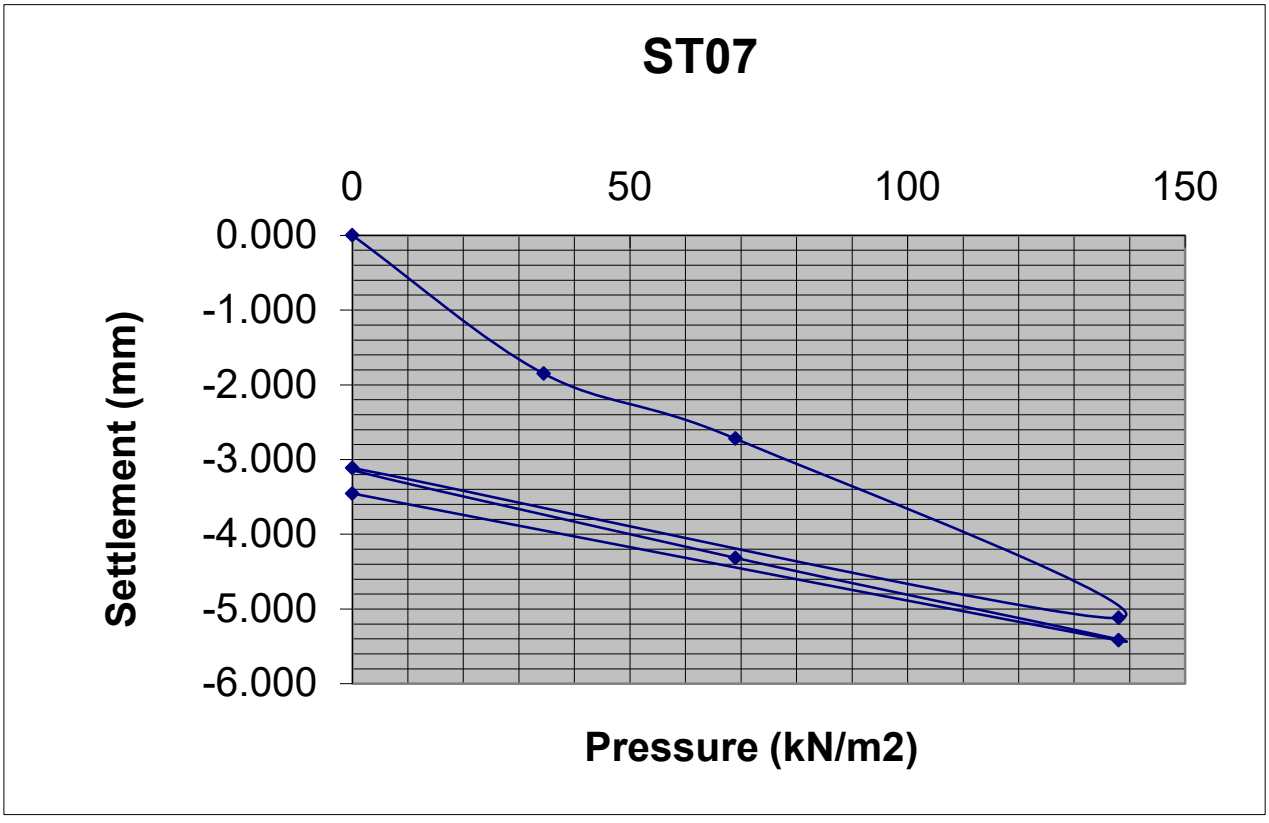
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **12.14 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.850
69	-2.720
138	-5.120
0	-3.115
69	-4.315
138	-5.420
0	-3.455

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic, glass, plastic and red brick fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	20/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST07	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **11.53 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **26.13 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.67 %**

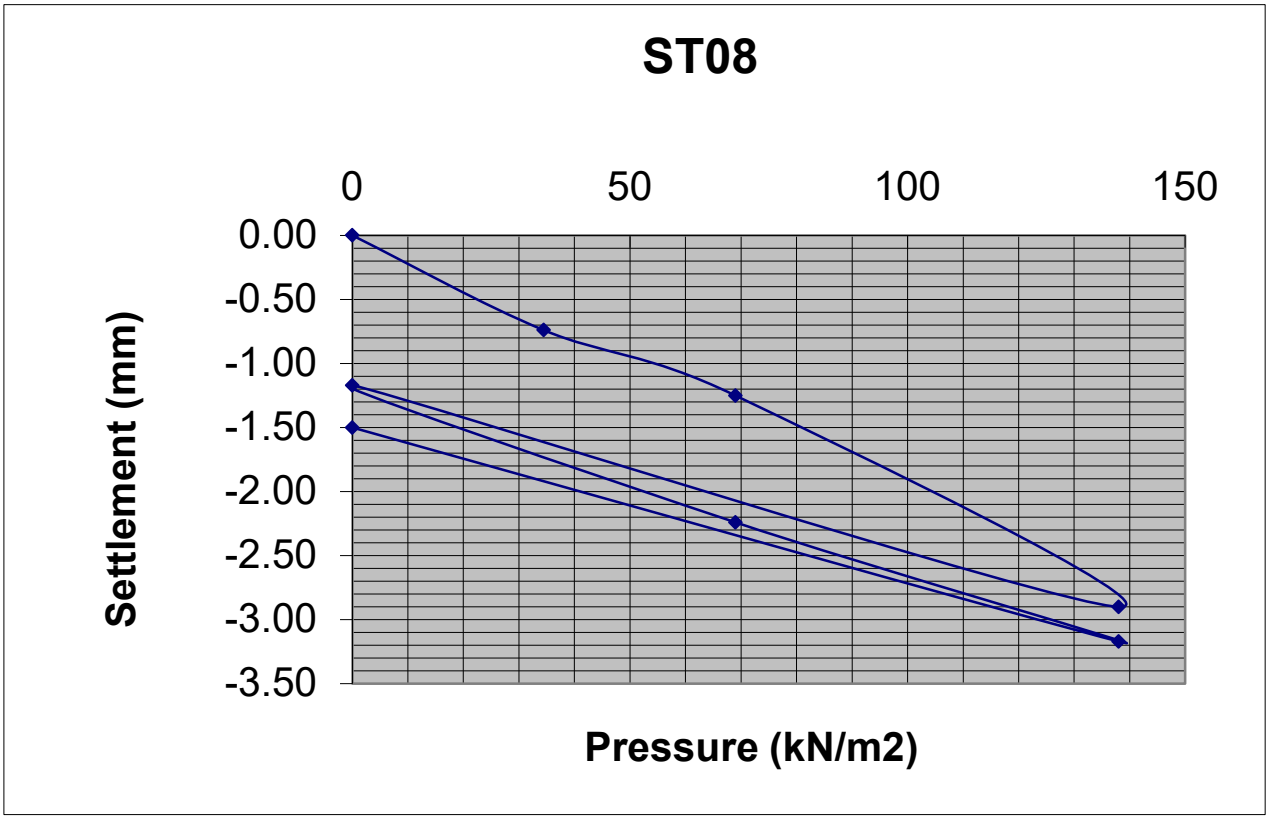
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.76 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.00**
34.5	-0.74
69	-1.25
138	-2.90
0	-1.17
69	-2.24
138	-3.17
0	-1.50

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	20/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST08	**DEPTH**	0.45m BGL



Modulus of subgrade reaction, K (Initial) = **25.09 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **29.31 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **2.57 %**

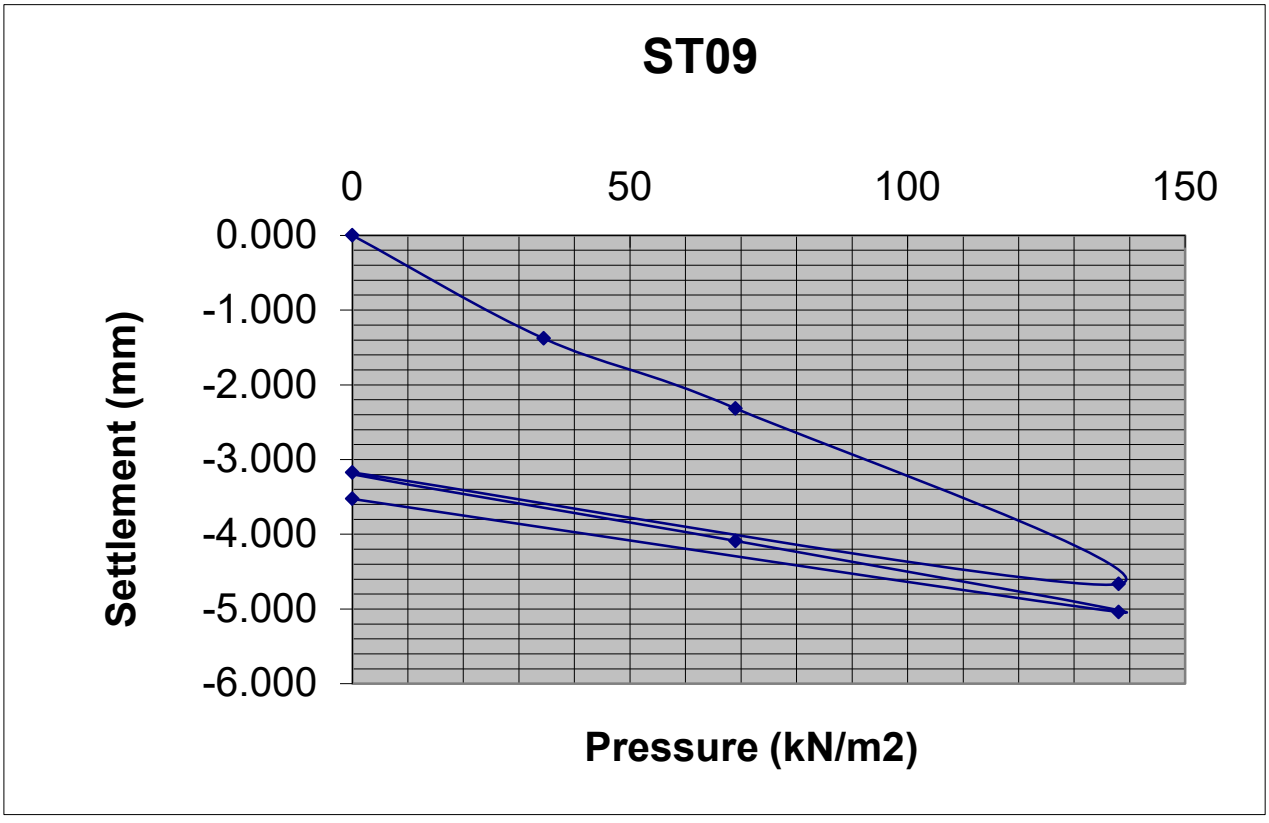
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.36 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.380
69	-2.315
138	-4.665
0	-3.175
69	-4.090
138	-5.040
0	-3.525

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	25/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST09	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **13.55 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **34.27 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.88 %**

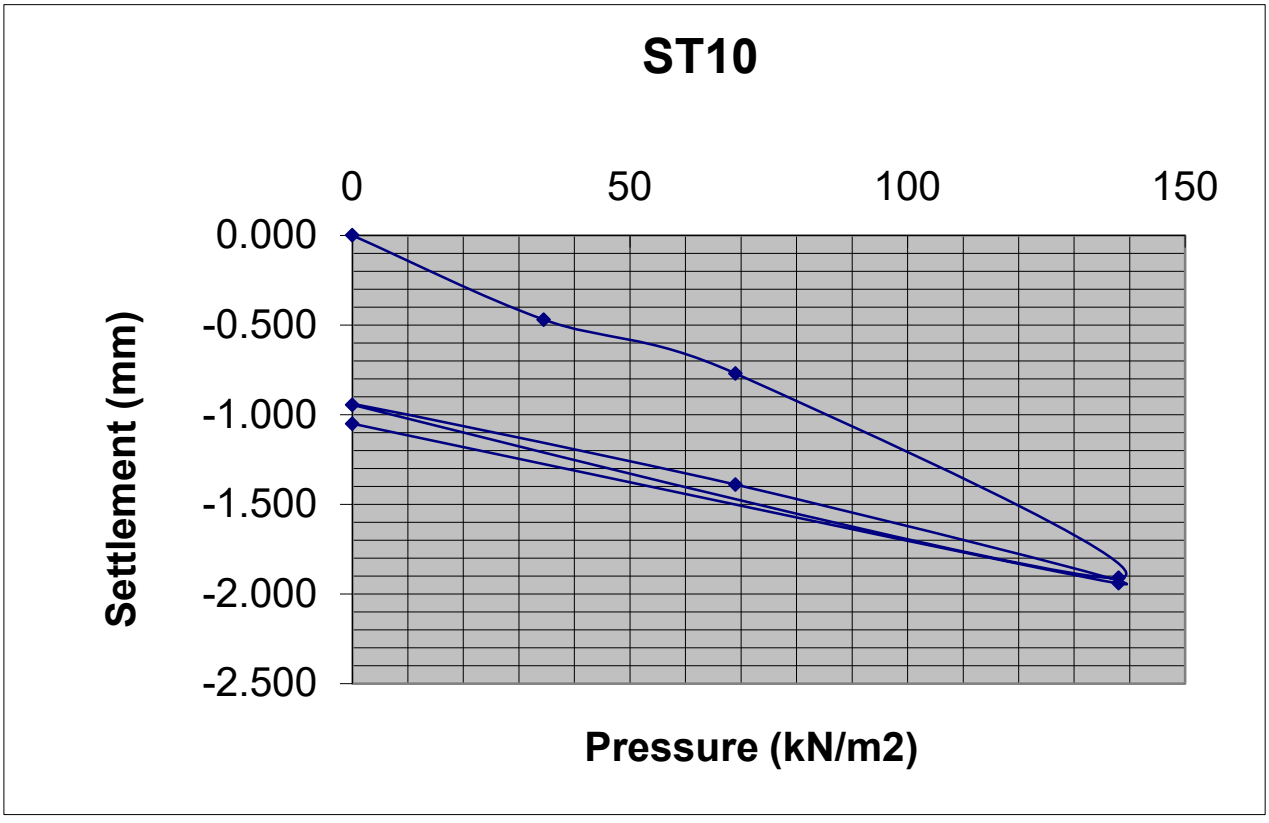
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **4.41 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.470
69	-0.770
138	-1.910
0	-0.945
69	-1.390
138	-1.940
0	-1.050

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Dark brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	25/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST10	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **40.73 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **70.47 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **5.95 %**

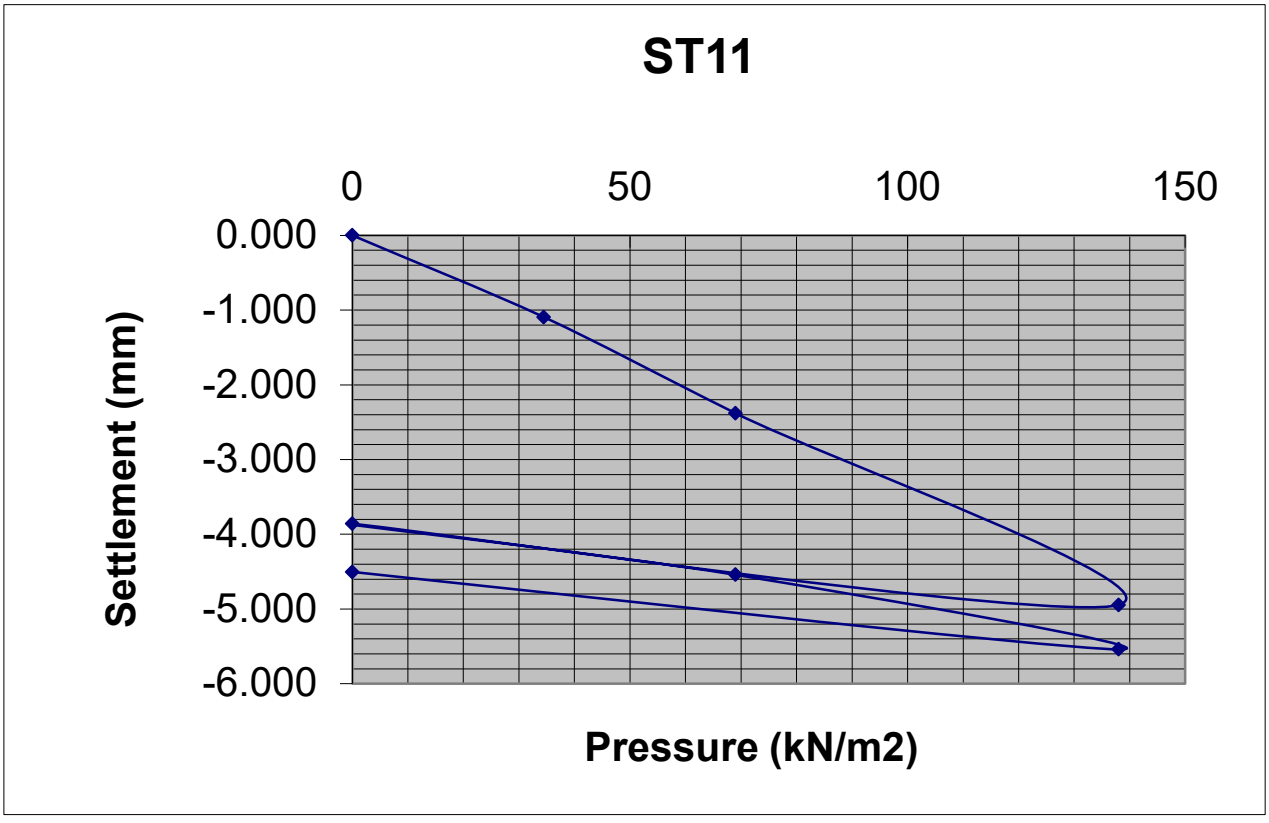
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **15.38 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.095
69	-2.380
138	-4.945
0	-3.860
69	-4.540
138	-5.540
0	-4.505

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	25/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST11	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **13.18 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **46.12 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.84 %**

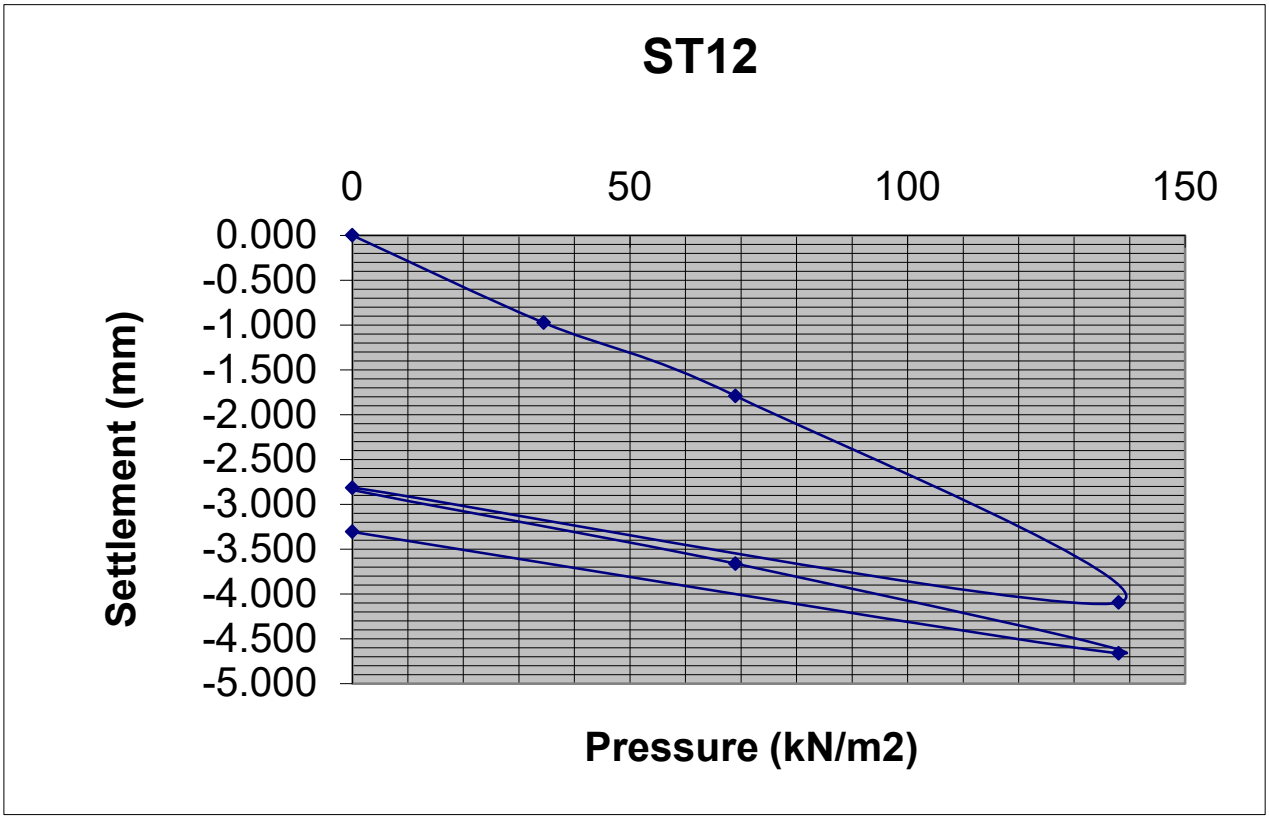
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **7.38 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.975
69	-1.790
138	-4.095
0	-2.815
69	-3.660
138	-4.660
0	-3.305

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	25/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST12	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **17.52 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **37.11 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.38 %**

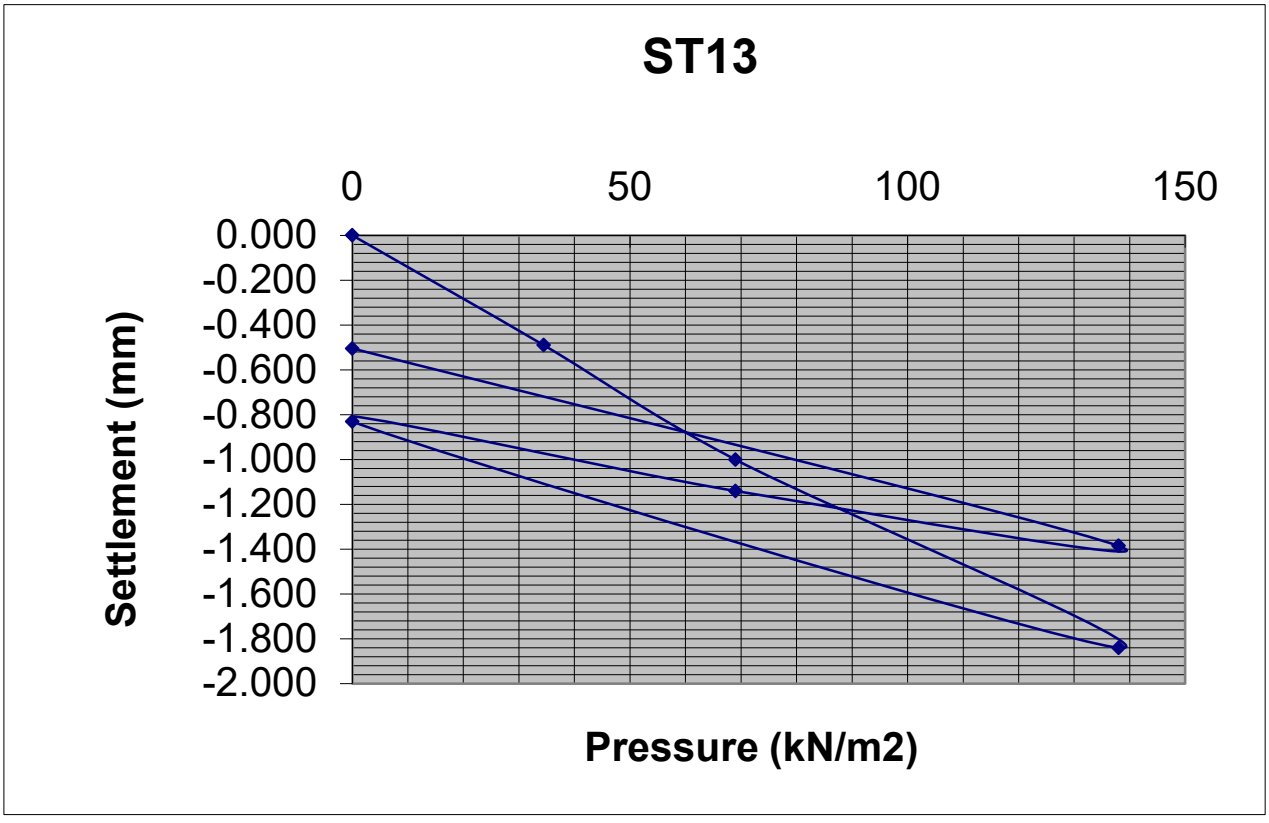
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.06 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.490
69	-1.000
138	-1.840
0	-0.830
69	-1.140
138	-1.385
0	-0.505

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional fragments of ceramic and glass. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	24/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST13	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **31.36 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **101.16 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **3.78 %**

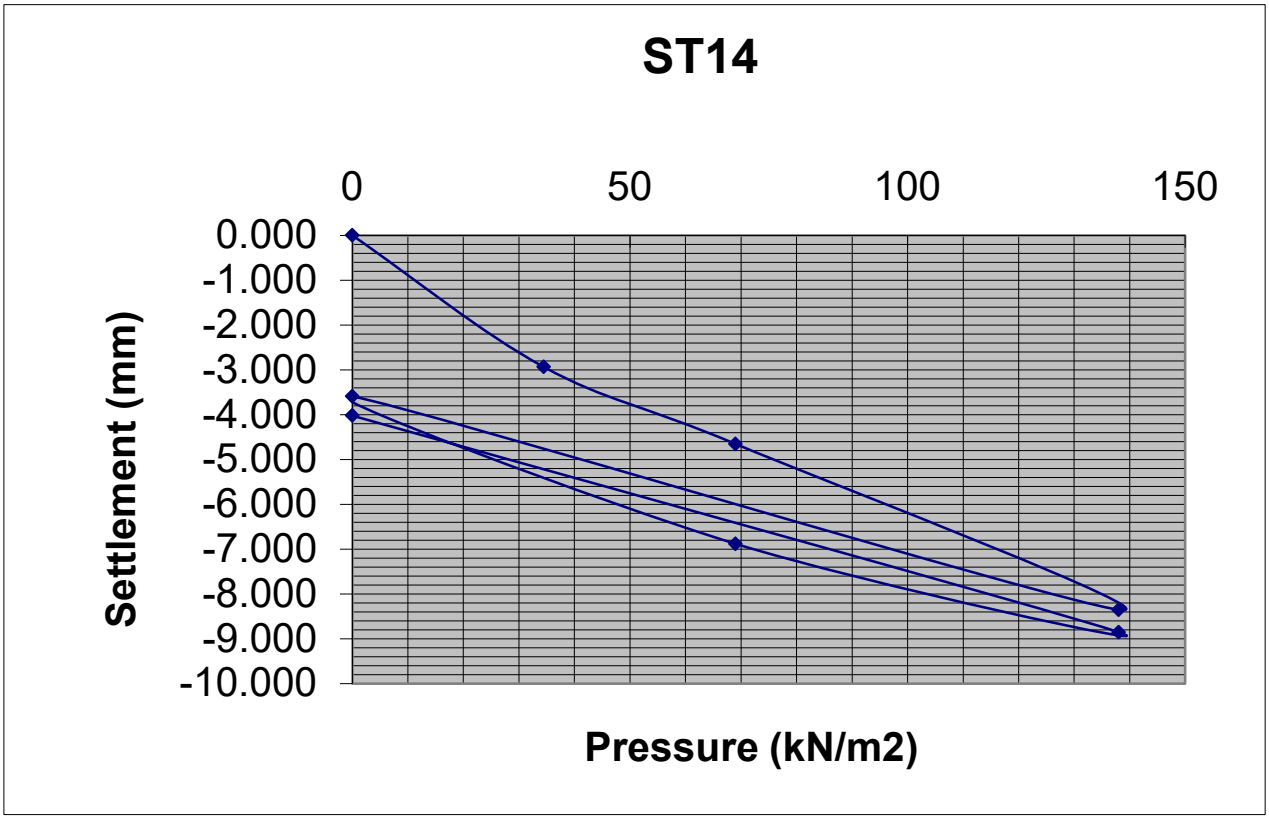
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **28.78 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.935
69	-4.650
138	-8.350
0	-3.590
69	-6.880
138	-8.850
0	-4.020

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional ceramic, glass and plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	24/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST14	**DEPTH**	0.20m BGL



Modulus of subgrade reaction, K (Initial) = **6.74 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **9.53 MN/m2/m**

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

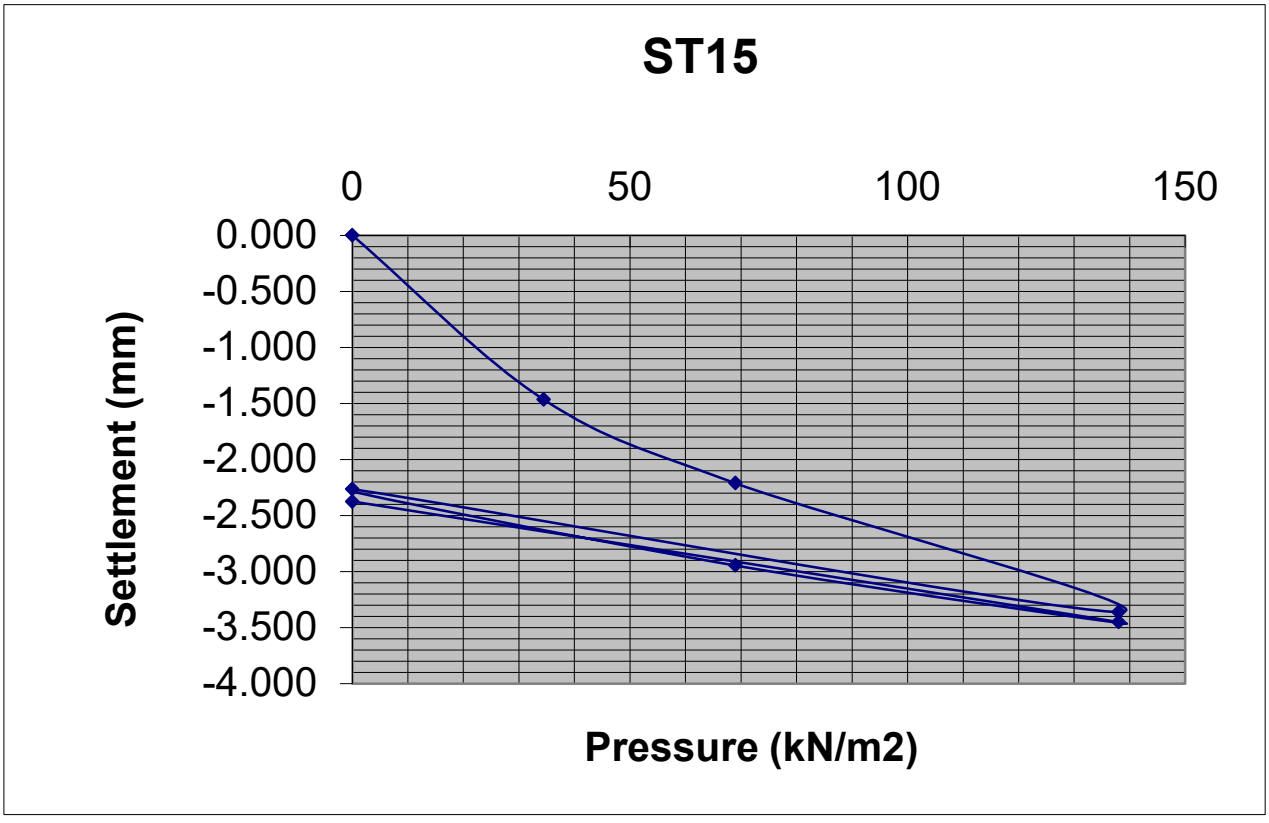
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.48 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.465
69	-2.210
138	-3.360
0	-2.265
69	-2.945
138	-3.450
0	-2.375

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular to subangular cobbles, occasional boulders and occasional plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	21/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST15	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **14.19 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **46.12 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.96 %**

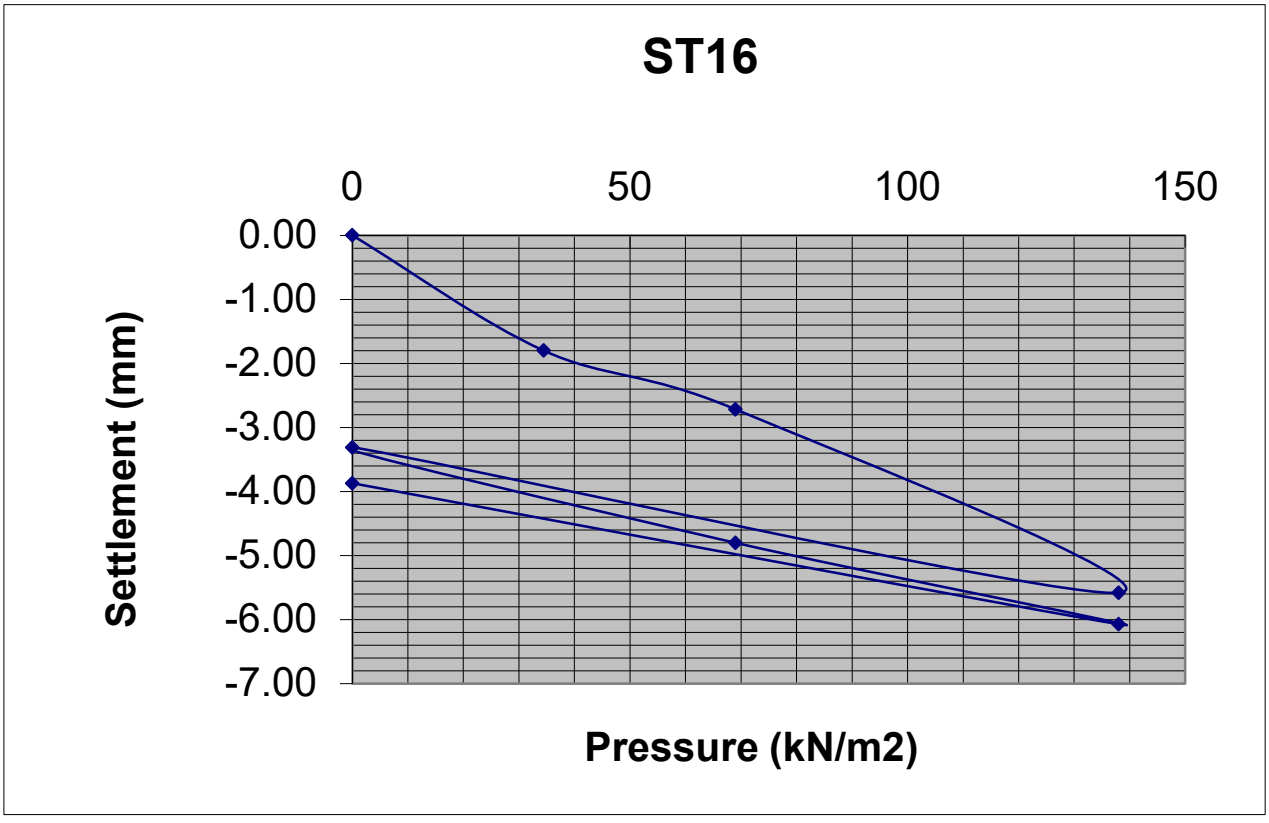
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **7.38 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.00**
34.5	-1.80
69	-2.72
138	-5.58
0	-3.31
69	-4.80
138	-6.07
0	-3.87

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles and occasional ceramic and plastic fragments. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	20/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST16	**DEPTH**	0.25m BGL



Modulus of subgrade reaction, K (Initial) = **11.55 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **21.05 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.67 %**

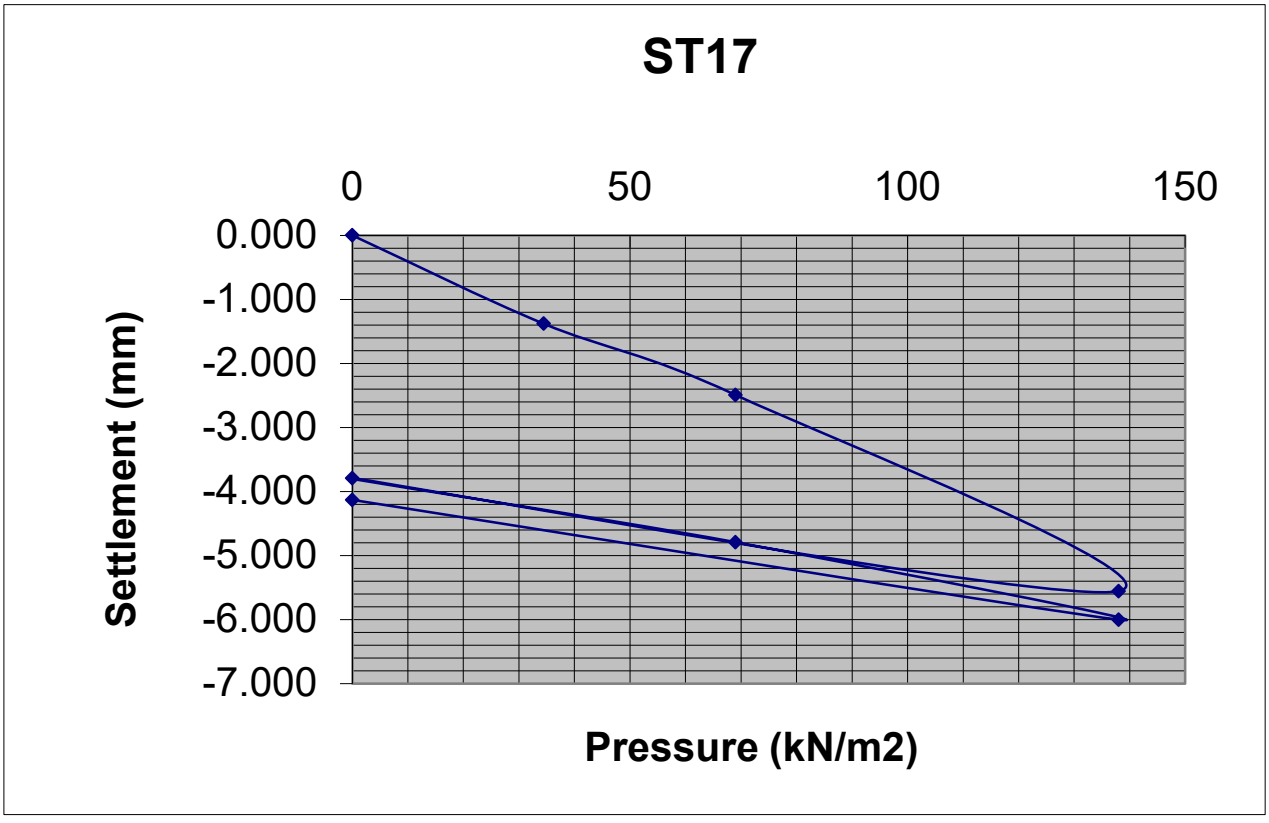
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.89 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.380
69	-2.490
138	-5.555
0	-3.790
69	-4.790
138	-6.000
0	-4.130

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	21/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST17	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **12.59 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **31.36 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.78 %**

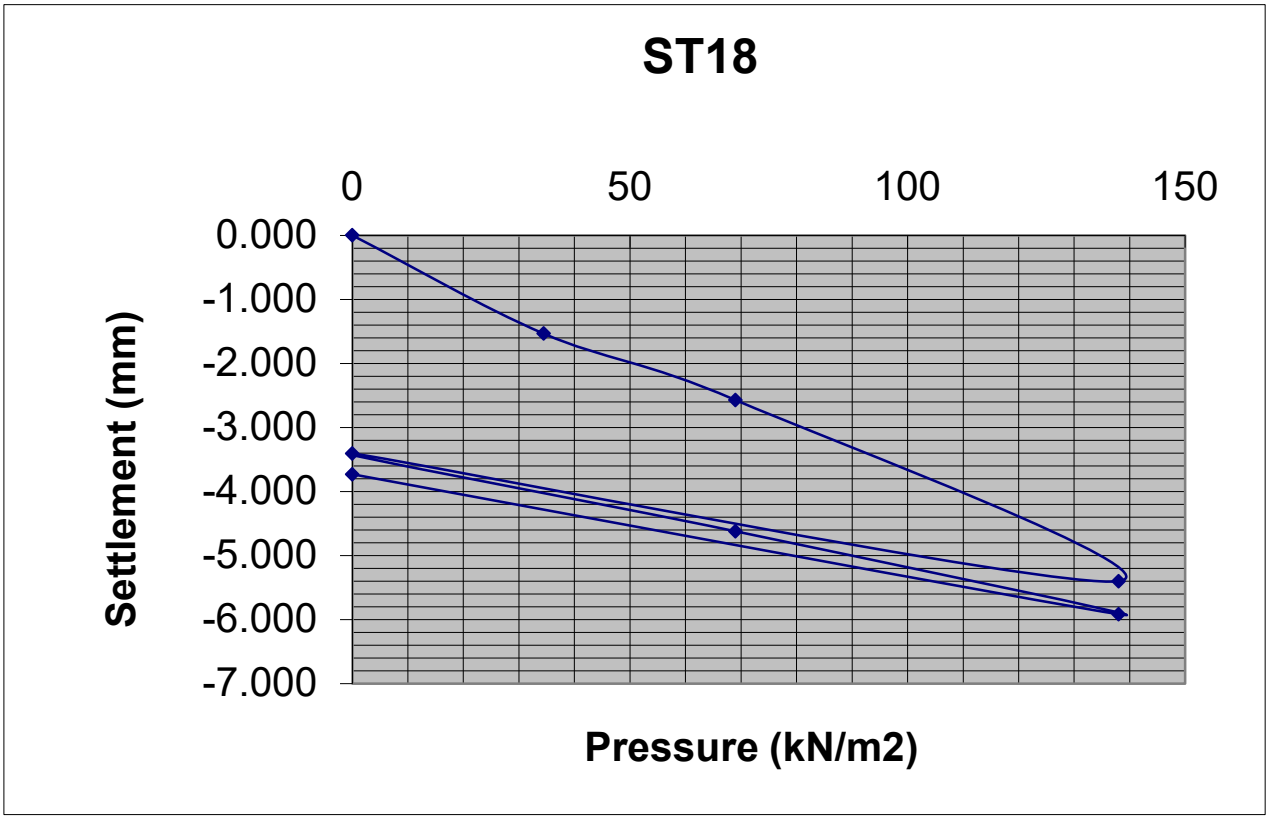
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.78 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.535
69	-2.570
138	-5.400
0	-3.405
69	-4.620
138	-5.915
0	-3.730

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly gravelly slightly sandy Clay with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	21/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST18	**DEPTH**	0.20m BGL



Modulus of subgrade reaction, K (Initial) = **12.20 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **25.81 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.74 %**

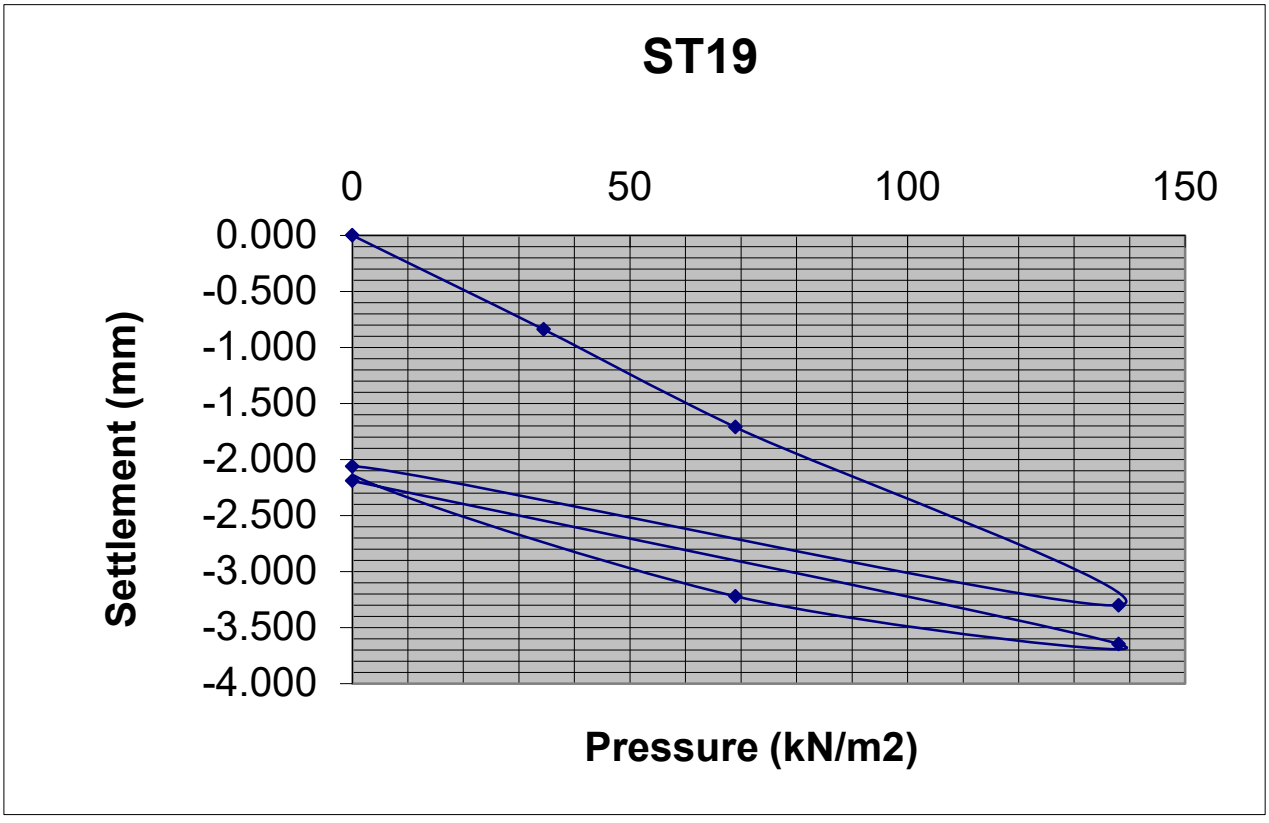
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.70 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.840
69	-1.710
138	-3.300
0	-2.060
69	-3.220
138	-3.645
0	-2.190

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	21/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST19	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **18.34 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **27.03 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.49 %**

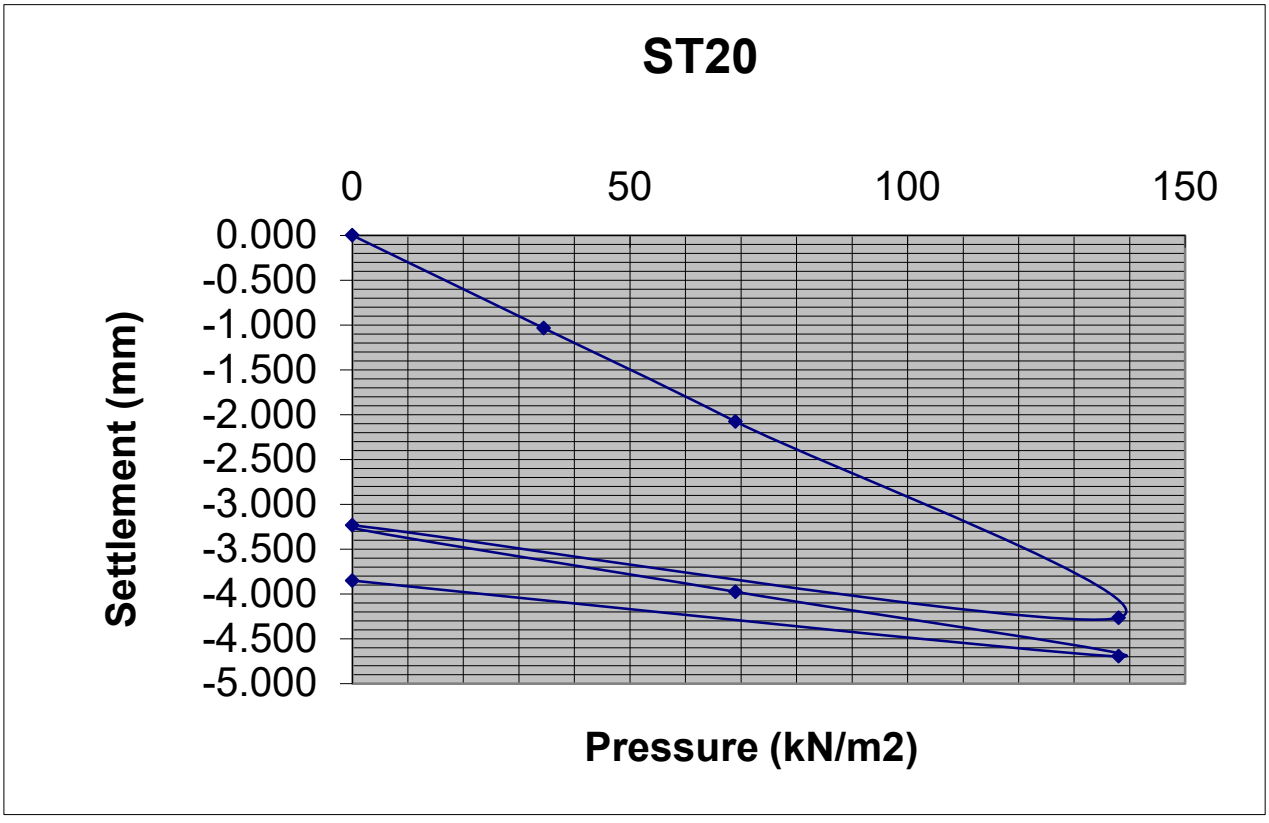
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.92 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.035
69	-2.075
138	-4.265
0	-3.235
69	-3.975
138	-4.695
0	-3.850

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Grey slightly sandy gravelly Clay with some angular to subrounded cobbles, occasional boulders and occasional ceramic, glass, metal and red brick fragments
CONTRACT NO.	9025-08-19		
DATE	02/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST20	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **15.11 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **42.38 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.07 %**

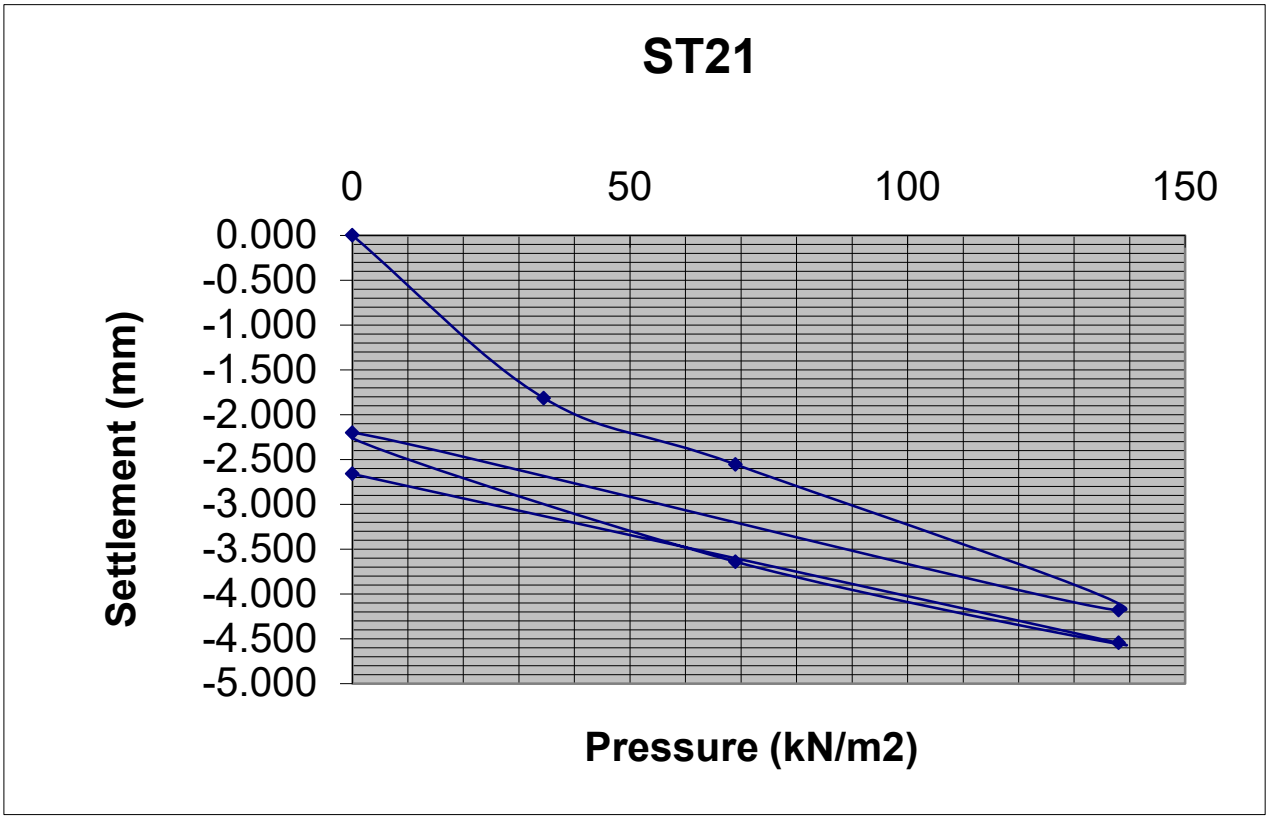
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **6.37 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.815
69	-2.555
138	-4.180
0	-2.200
69	-3.640
138	-4.545
0	-2.660

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, occasional red brick fragments and rootlets. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST21	**DEPTH**	0.10m BGL



Modulus of subgrade reaction, K (Initial) = **12.27 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **21.78 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.74 %**

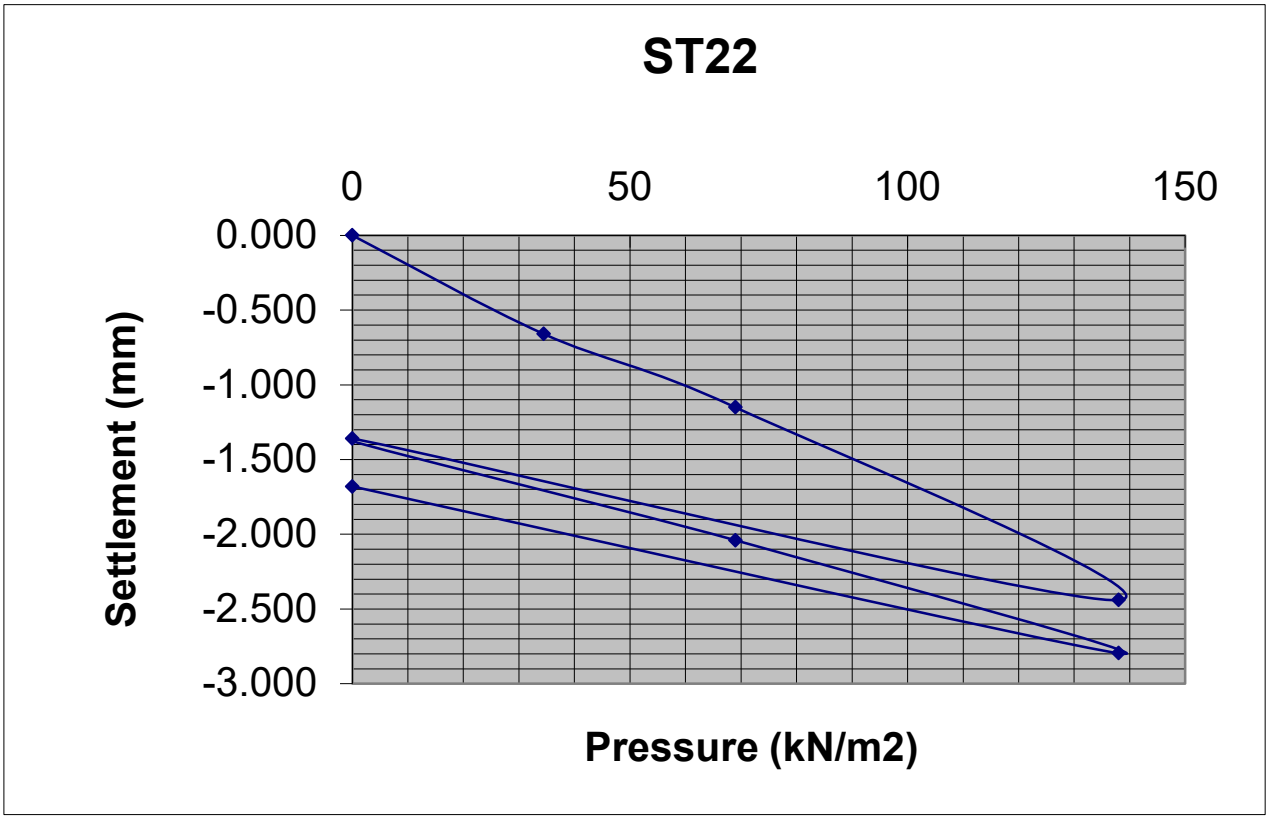
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.01 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.660
69	-1.150
138	-2.440
0	-1.360
69	-2.040
138	-2.795
0	-1.680

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Dark brown slightly sandy gravelly Clay with occasional angular to subangular cobbles, boulders, rootlets and occasional fragments of glass and red brick. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST22	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **27.27 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **46.12 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **2.97 %**

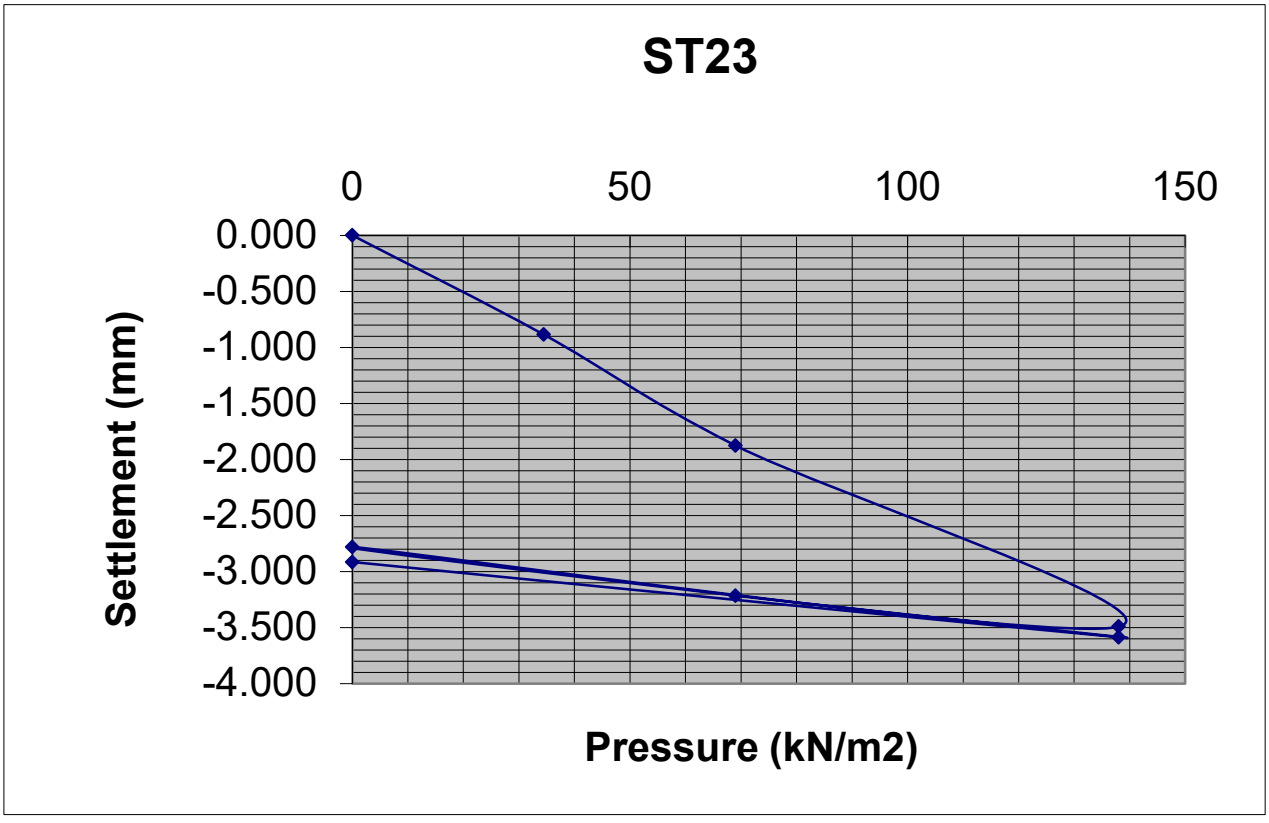
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **7.38 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.885
69	-1.875
138	-3.490
0	-2.780
69	-3.215
138	-3.585
0	-2.915

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST23	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **16.73 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **72.09 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.27 %**

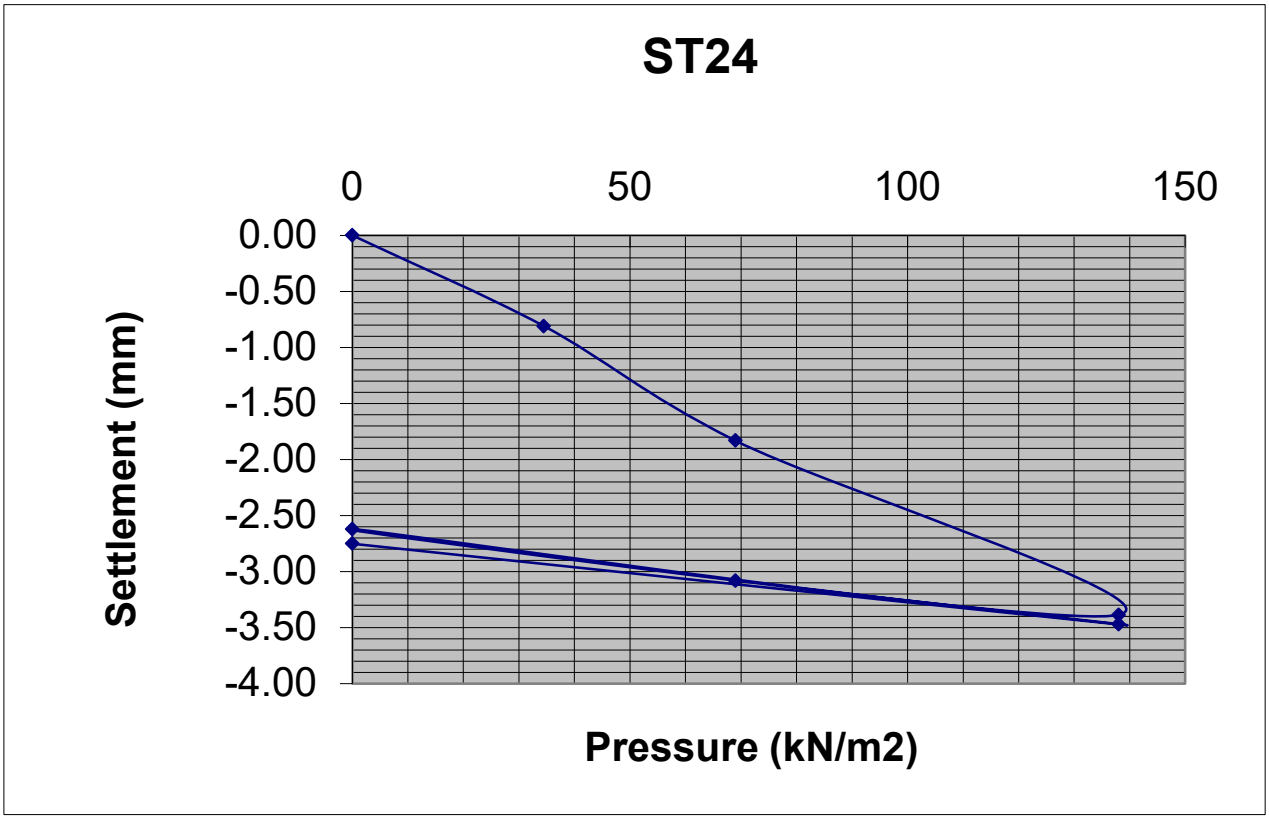
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **16.00 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.00**
34.5	-0.81
69	-1.83
138	-3.39
0	-2.62
69	-3.08
138	-3.47
0	-2.75

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Stiff brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST24	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **17.14 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **68.18 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.33 %**

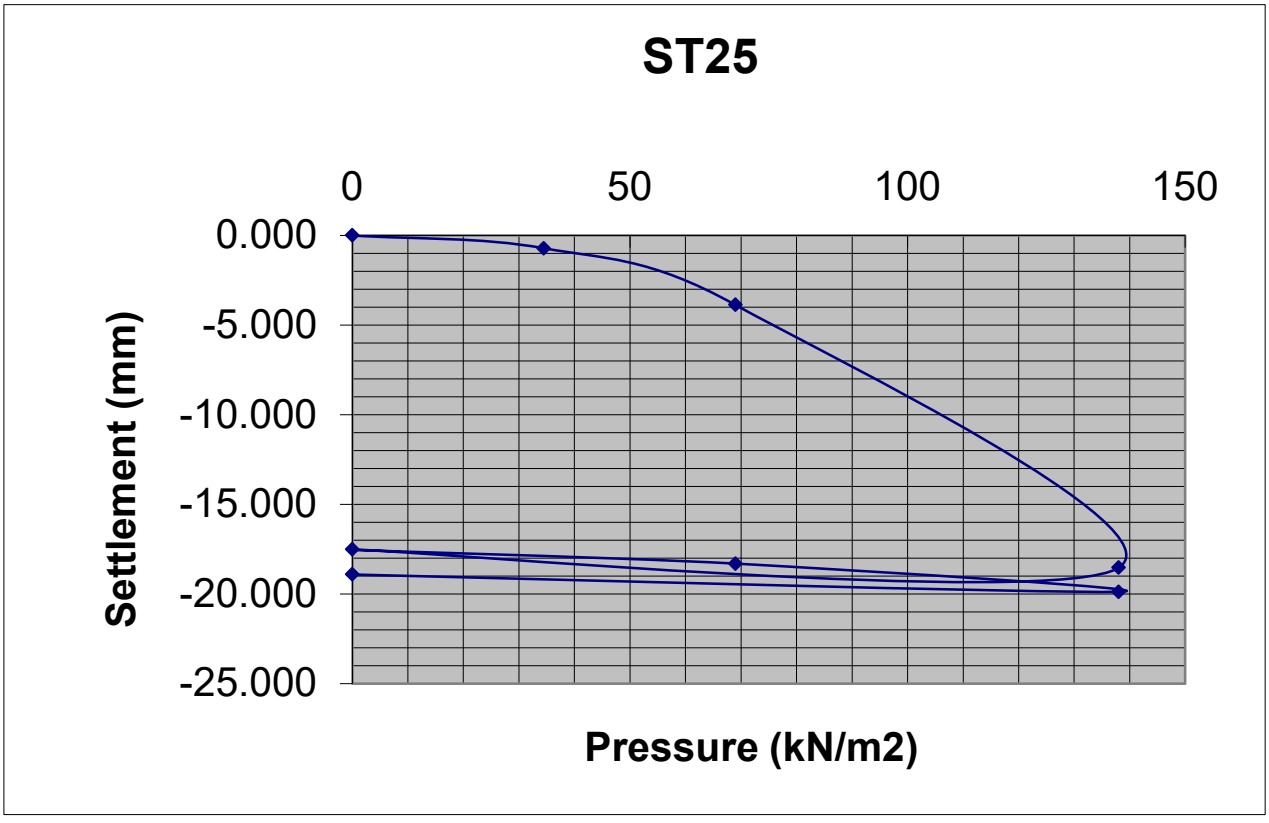
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **14.52 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.725
69	-3.870
138	-18.530
0	-17.510
69	-18.300
138	-19.875
0	-18.905

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brownish grey sandy clayey angular to subrounded fine to coarse Gravel with some angular to subangular cobble
CONTRACT NO.	9025-08-19		
DATE	02/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST25	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **8.10 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **39.70 MN/m2/m**

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

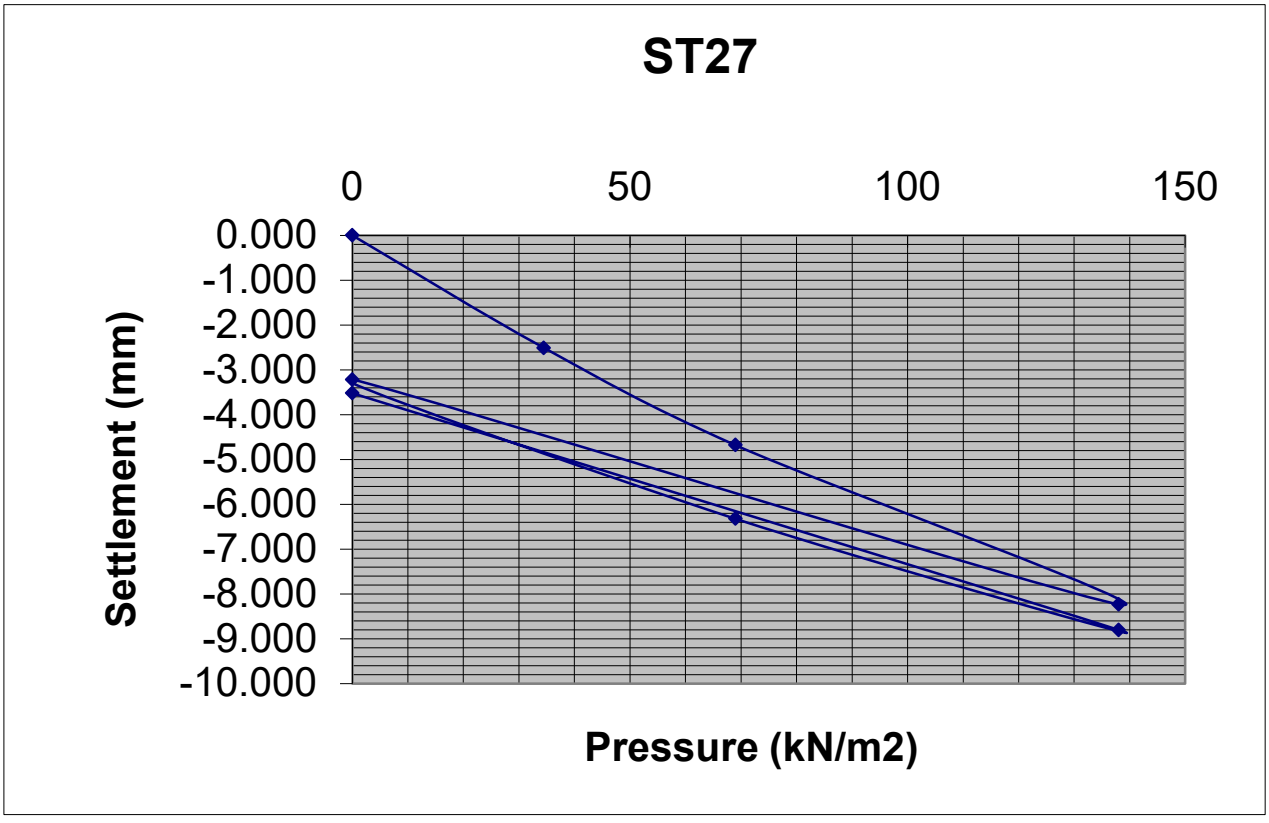
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.69 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.510
69	-4.675
138	-8.230
0	-3.215
69	-6.320
138	-8.800
0	-3.520

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Grey sandy clayey angular to subrounded fine to coarse Gravel with some angular to subangular cobbles
CONTRACT NO.	9025-08-19		
DATE	02/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST27	**DEPTH**	0.45m BGL



Modulus of subgrade reaction, K (Initial) = **6.71 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **10.10 MN/m2/m**

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

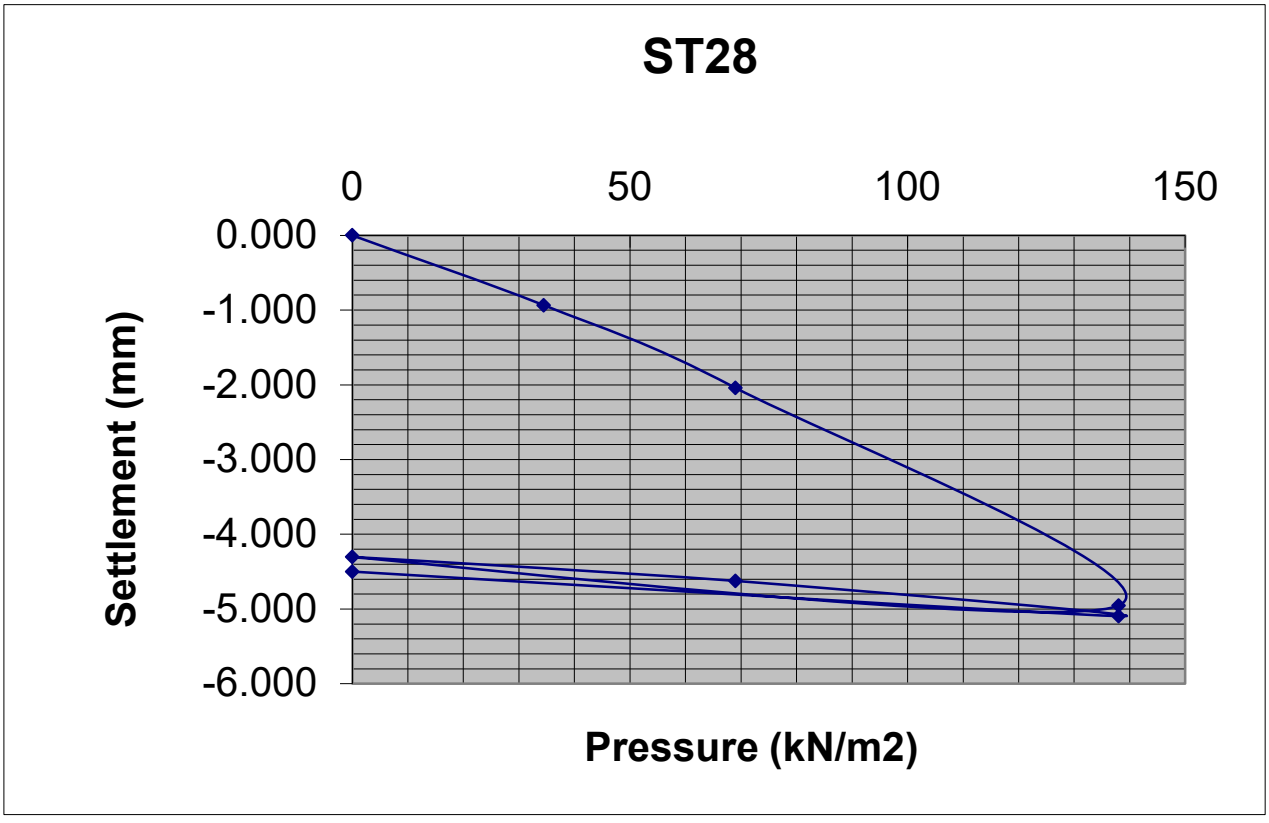
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.53 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.935
69	-2.040
138	-4.955
0	-4.305
69	-4.625
138	-5.095
0	-4.500

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Stiff brown slightly sandy gravelly CLAY with frequent angular cobbles. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	05/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST28	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **15.37 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **98.00 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.10 %**

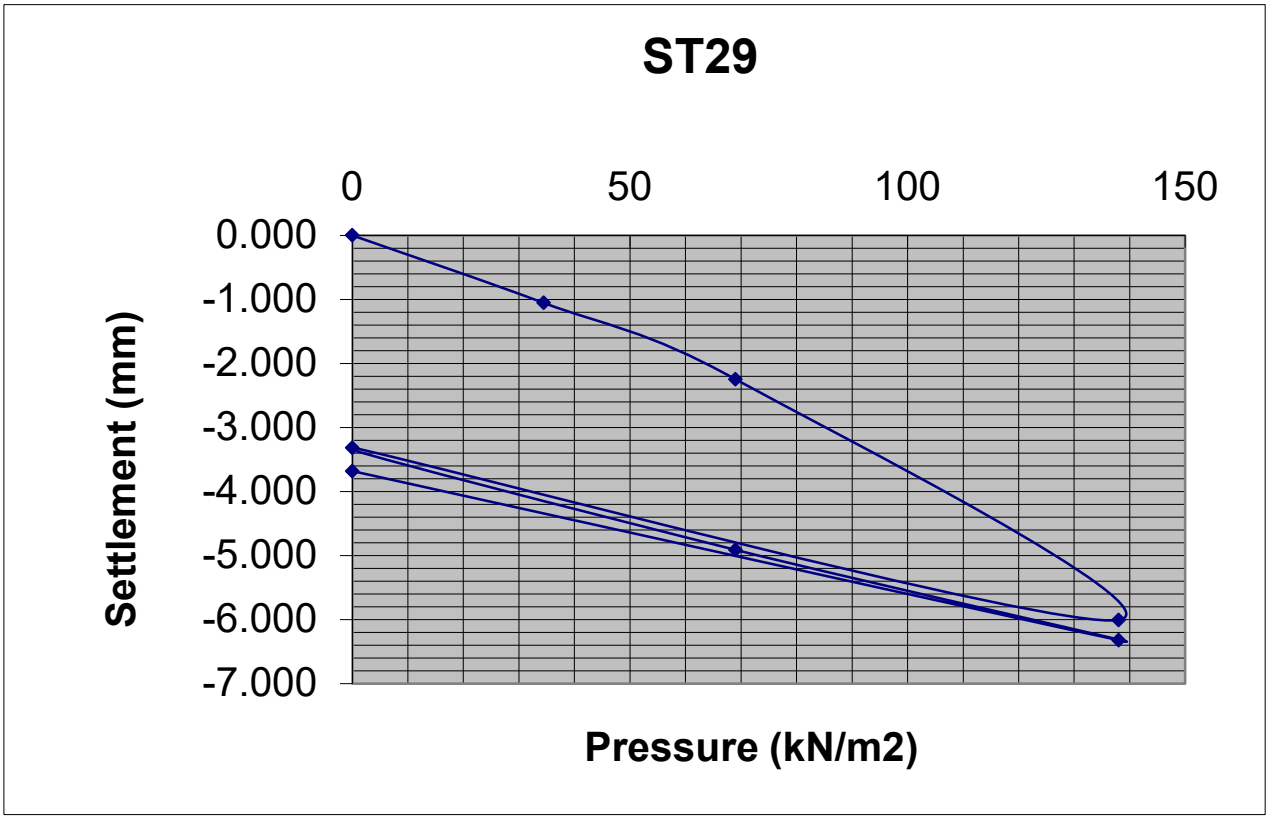
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **27.24 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.055
69	-2.245
138	-6.005
0	-3.315
69	-4.910
138	-6.320
0	-3.680

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	28/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST29	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **13.97 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **19.66 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.93 %**

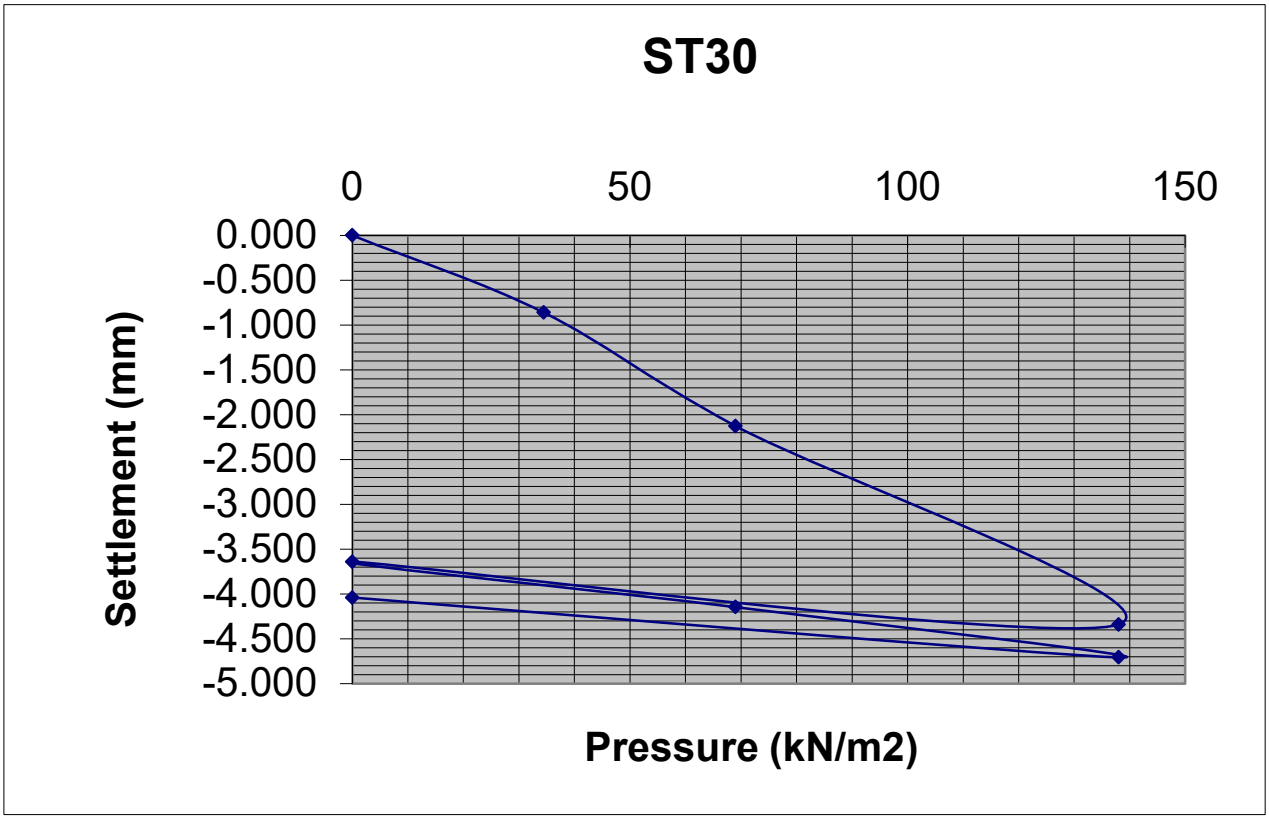
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.68 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.860
69	-2.125
138	-4.340
0	-3.640
69	-4.145
138	-4.705
0	-4.040

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST30	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **14.76 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **62.10 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.02 %**

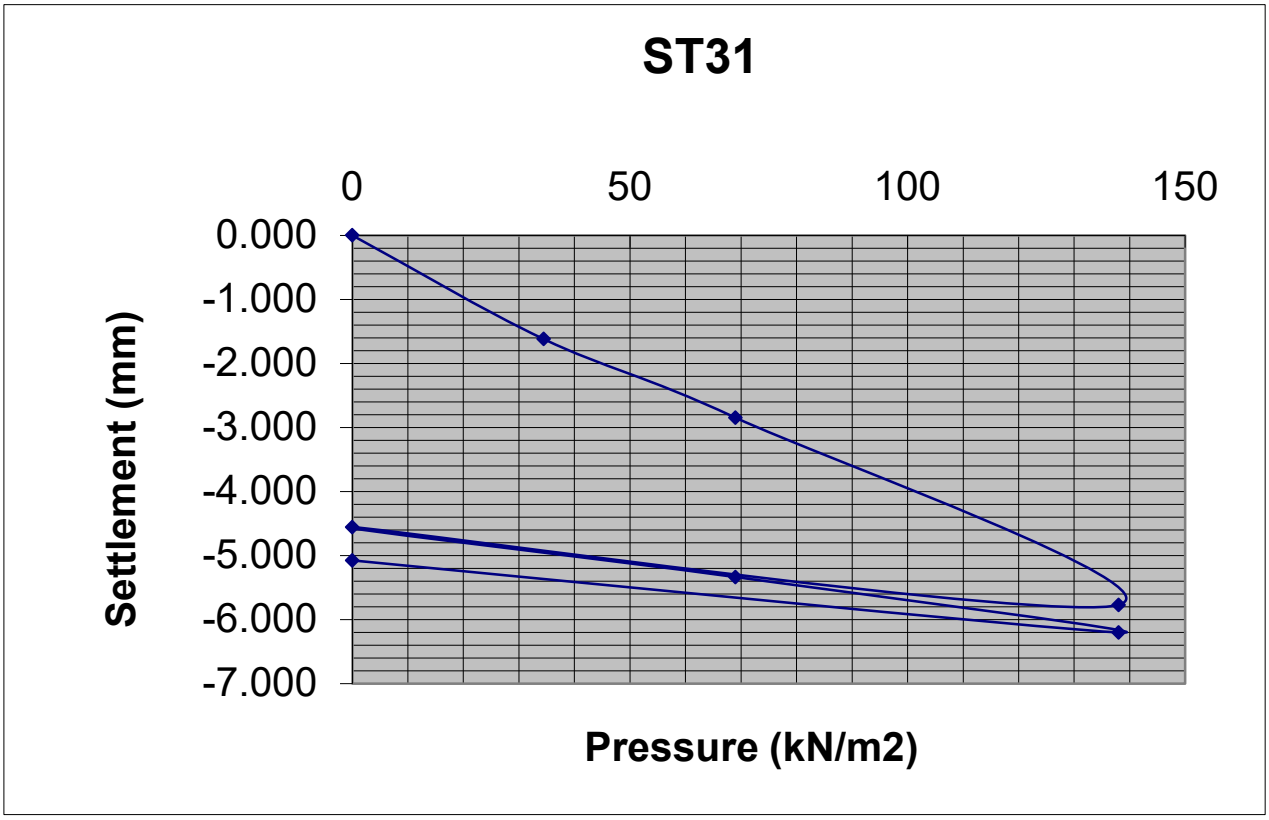
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **12.35 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.620
69	-2.845
138	-5.770
0	-4.555
69	-5.335
138	-6.200
0	-5.075

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Dark grey sandy slightly clayey angular to subangular fine to coarse Gravel with frequent angular cobbles
CONTRACT NO.	9025-08-19		
DATE	02/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST31	**DEPTH**	0.45m BGL



Modulus of subgrade reaction, K (Initial) = **11.02 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **40.21 MN/m2/m**

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

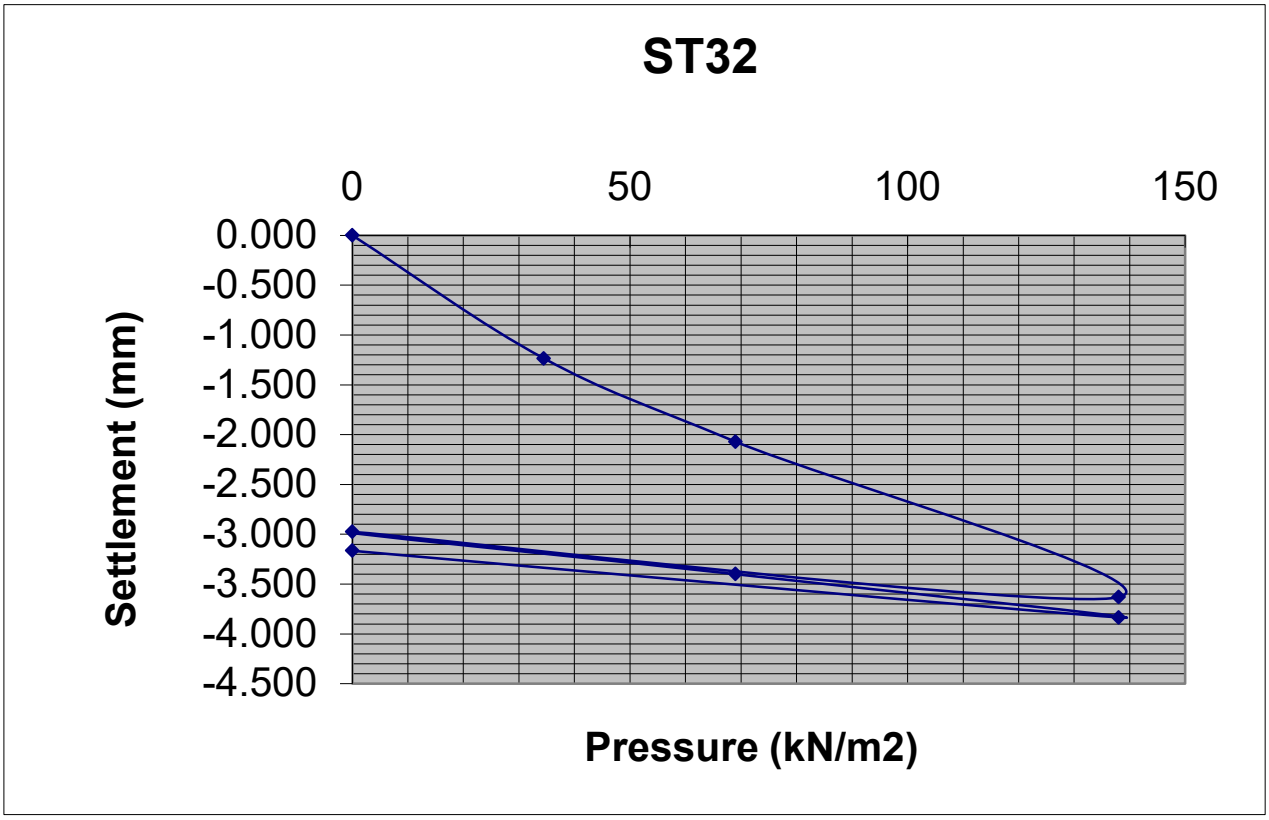
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **5.82 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.235
69	-2.070
138	-3.630
0	-2.975
69	-3.400
138	-3.835
0	-3.165

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Stiff dark grey slightly sandy gravelly CLAY with occasional angular cobbles and boulders. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST32	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **15.15 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **73.79 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.07 %**

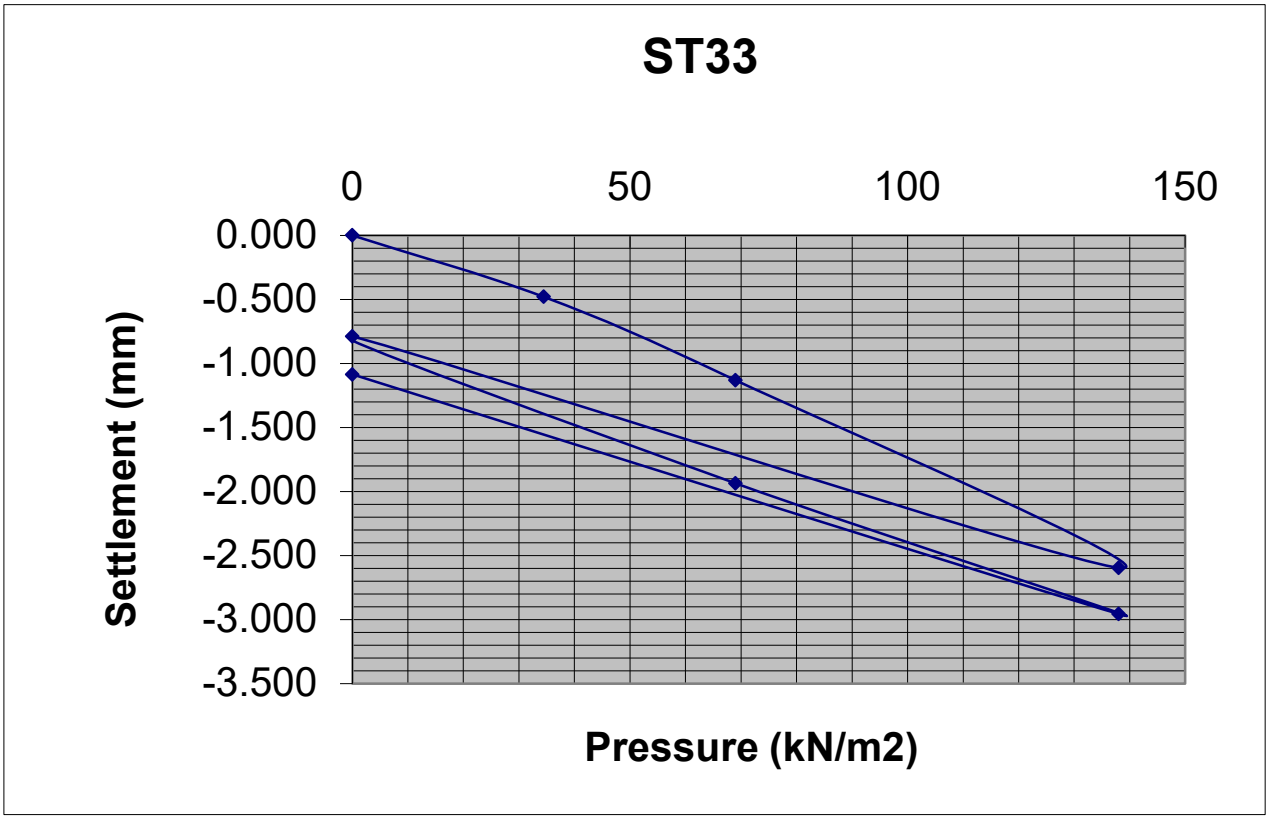
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **16.66 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.480
69	-1.130
138	-2.595
0	-0.790
69	-1.935
138	-2.955
0	-1.085

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Greyish brown slightly sandy gravelly Clay with frequent angular to subangular cobbles and occasional boulders. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	28/02/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST33	**DEPTH**	0.30m BGL



Modulus of subgrade reaction, K (Initial) = **27.75 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **27.39 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **3.06 %**

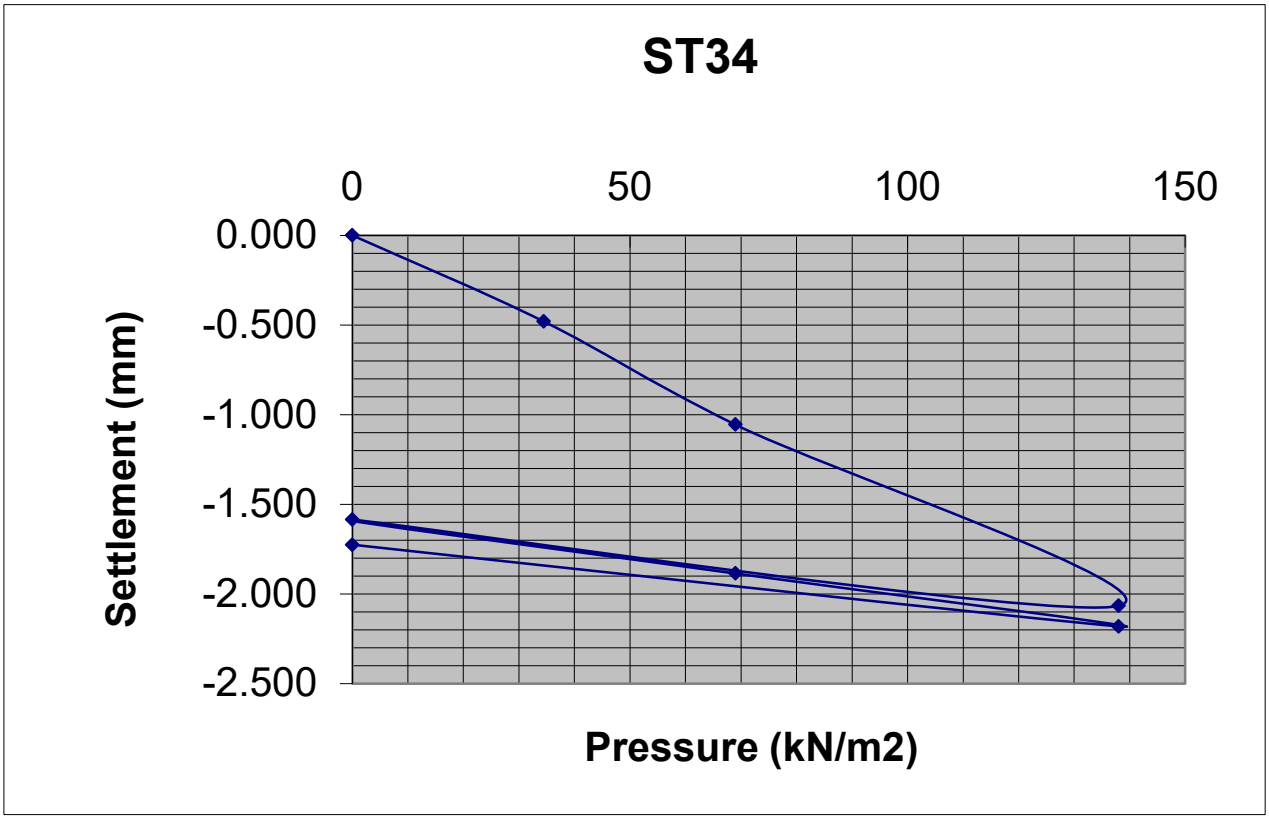
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.99 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.480
69	-1.055
138	-2.065
0	-1.585
69	-1.885
138	-2.180
0	-1.725

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly sandy gravelly CLAY with some angular to subrounded cobbles and occasional boulders
CONTRACT NO.	9025-08-19		
DATE	04/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST34	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **29.73 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **104.54 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **3.45 %**

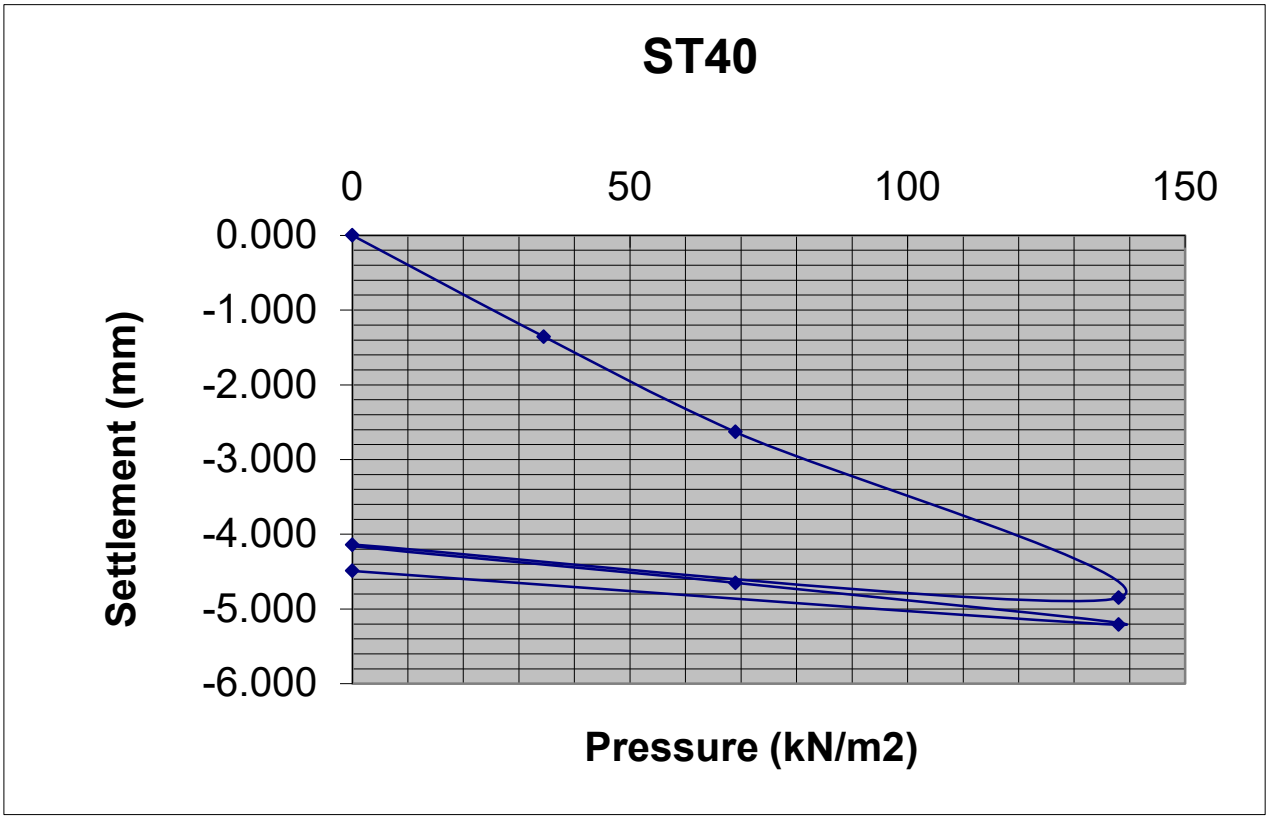
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **30.46 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.355
69	-2.630
138	-4.850
0	-4.140
69	-4.650
138	-5.210
0	-4.490

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Greyish brown slightly sandy gravelly Clay with frequent angular cobbles and occasional boulders. Gravel is angular to subangular fine to coarse
CONTRACT NO.	9025-08-19		
DATE	10/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST40	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **11.92 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **61.49 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.71 %**

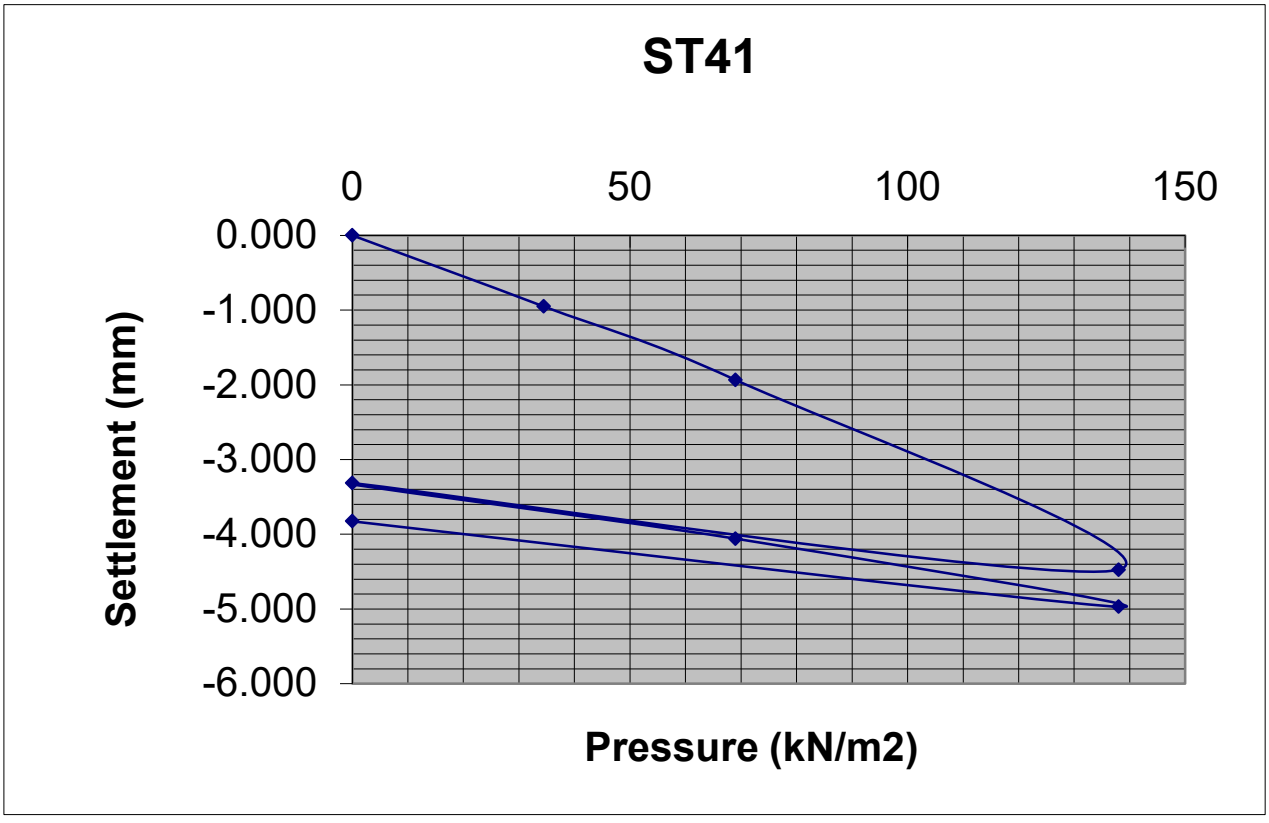
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **12.14 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.950
69	-1.935
138	-4.475
0	-3.315
69	-4.060
138	-4.970
0	-3.825

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Grey sandy clayey angular to subangular fine to coarse Gravel with occasional angular to subangular cobbles
CONTRACT NO.	9025-08-19		
DATE	10/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST41	**DEPTH**	0.45m BGL



Modulus of subgrade reaction, K (Initial) = **16.21 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **42.09 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.20 %**

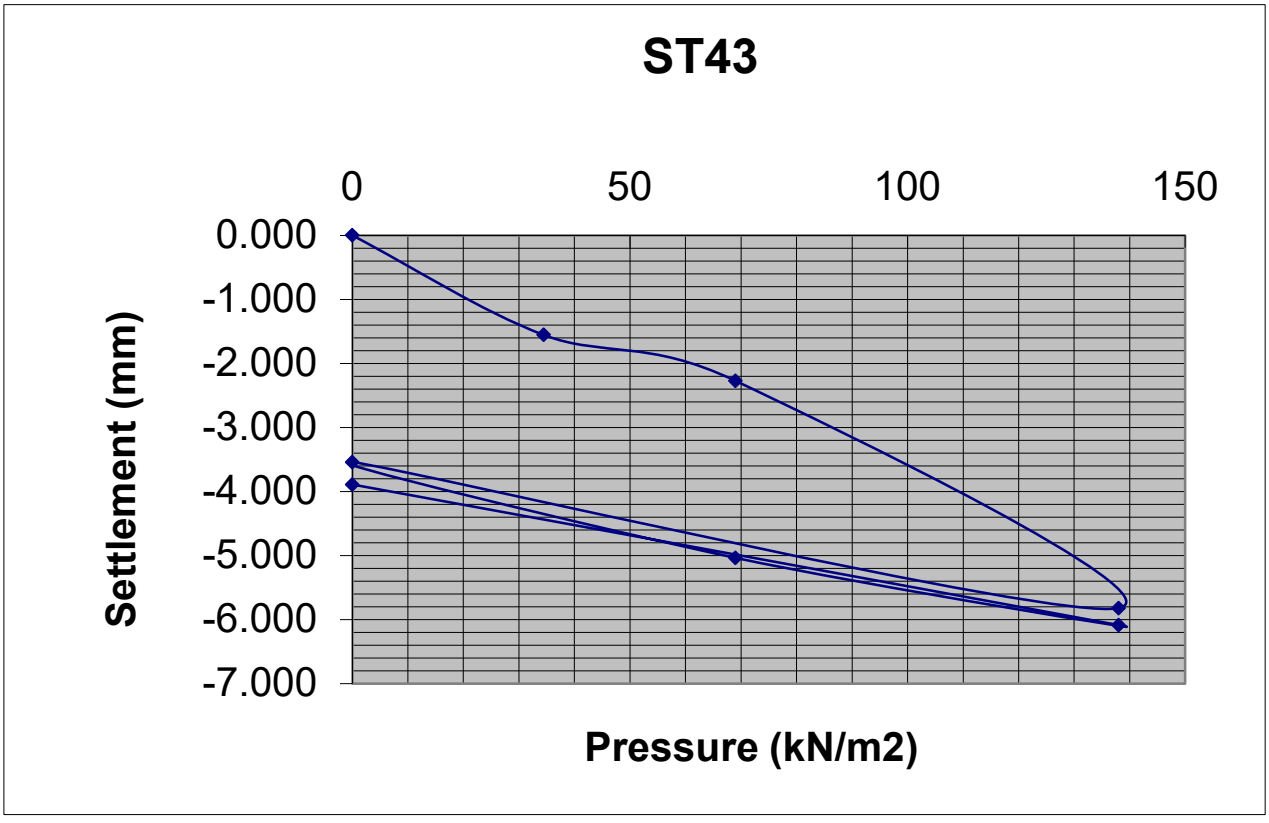
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **6.30 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.555
69	-2.270
138	-5.820
0	-3.540
69	-5.035
138	-6.085
0	-3.890

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly gravelly slightly sandy CLAY with occasional rootlets. Gravel is angular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	03/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST43	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **13.82 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **20.98 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.91 %**

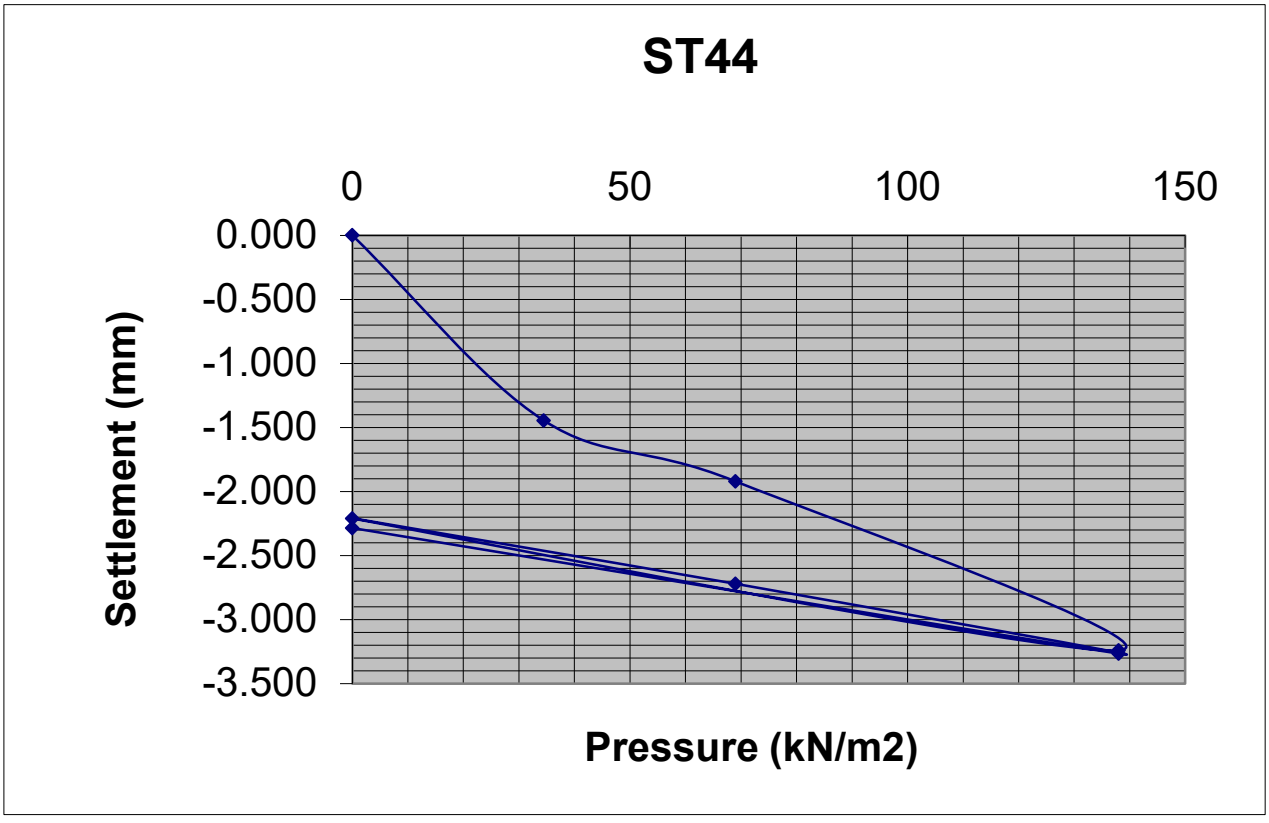
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **1.88 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.445
69	-1.920
138	-3.240
0	-2.210
69	-2.720
138	-3.265
0	-2.285

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Greyish brown slightly sandy gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of red brick.
CONTRACT NO.	9025-08-19		
DATE	06/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST44	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **16.33 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **61.49 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.22 %**

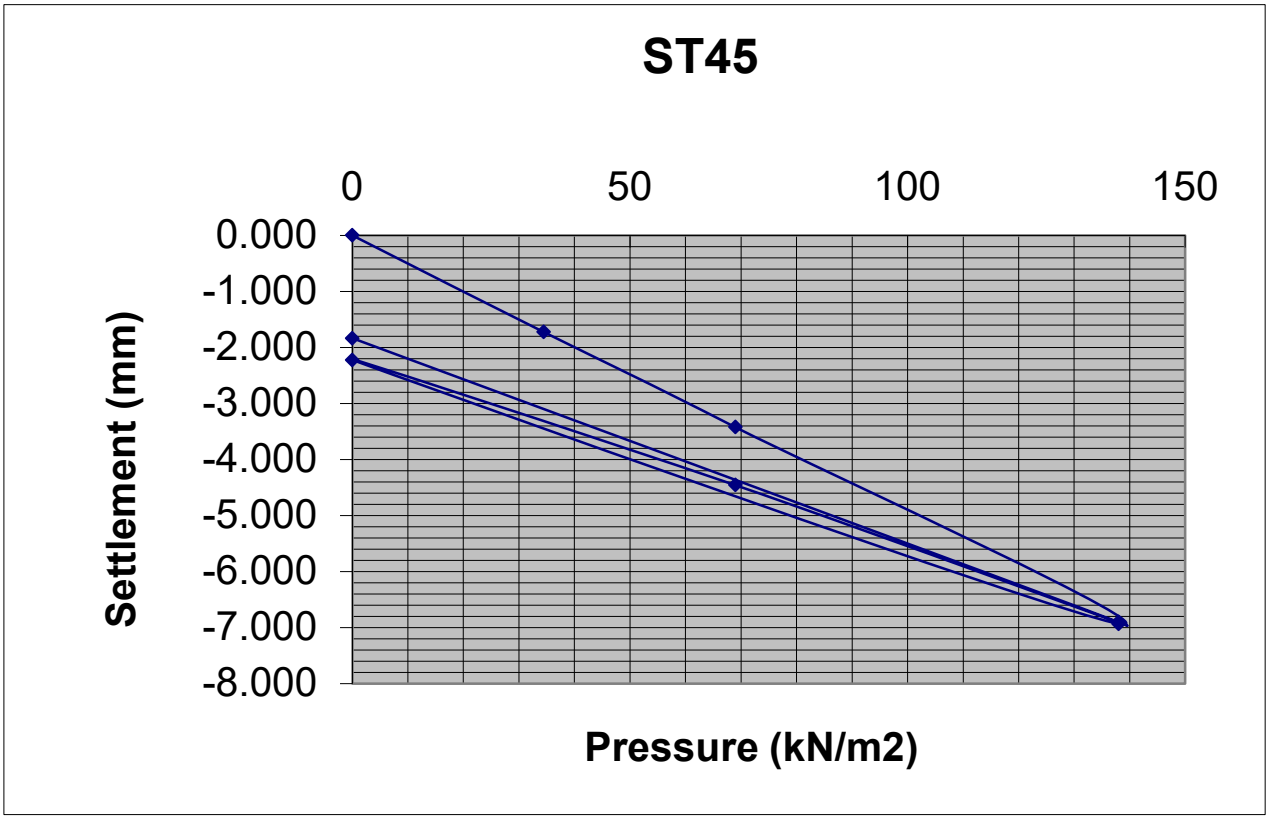
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **12.14 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.725
69	-3.420
138	-6.930
0	-2.225
69	-4.455
138	-6.900
0	-1.835

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Greyish brown slightly sandy slightly gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of ceramic and red brick.
CONTRACT NO.	9025-08-19		
DATE	06/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST45	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **9.17 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **14.06 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.45 %**

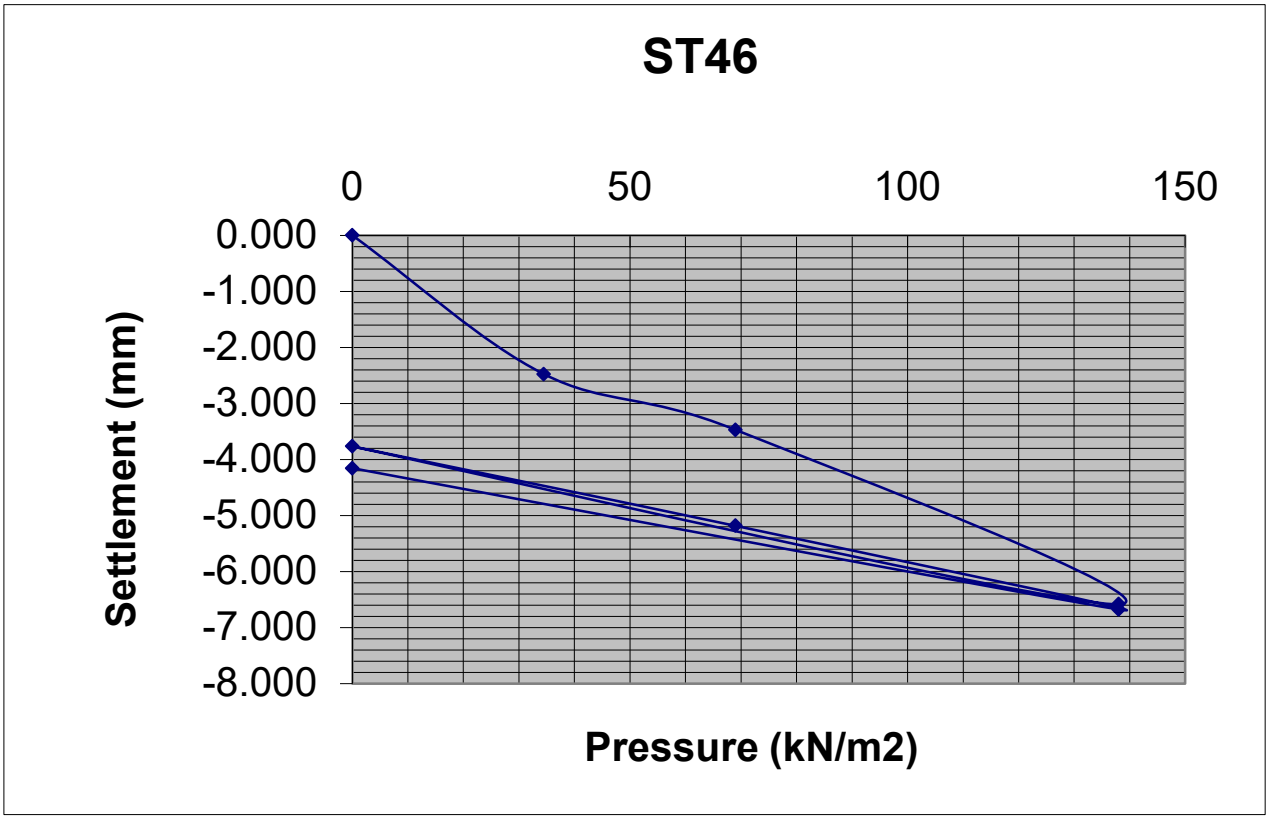
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **0.94 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-2.475
69	-3.470
138	-6.580
0	-3.765
69	-5.180
138	-6.675
0	-4.155

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Greyish brown slightly sandy slightly gravelly Clay with occasional angular to subangular cobbles and occasional fragments of ceramic, plastic, red brick and wood.
CONTRACT NO.	9025-08-19		
DATE	06/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST46	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **9.04 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **22.16 MN/m2/m**

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

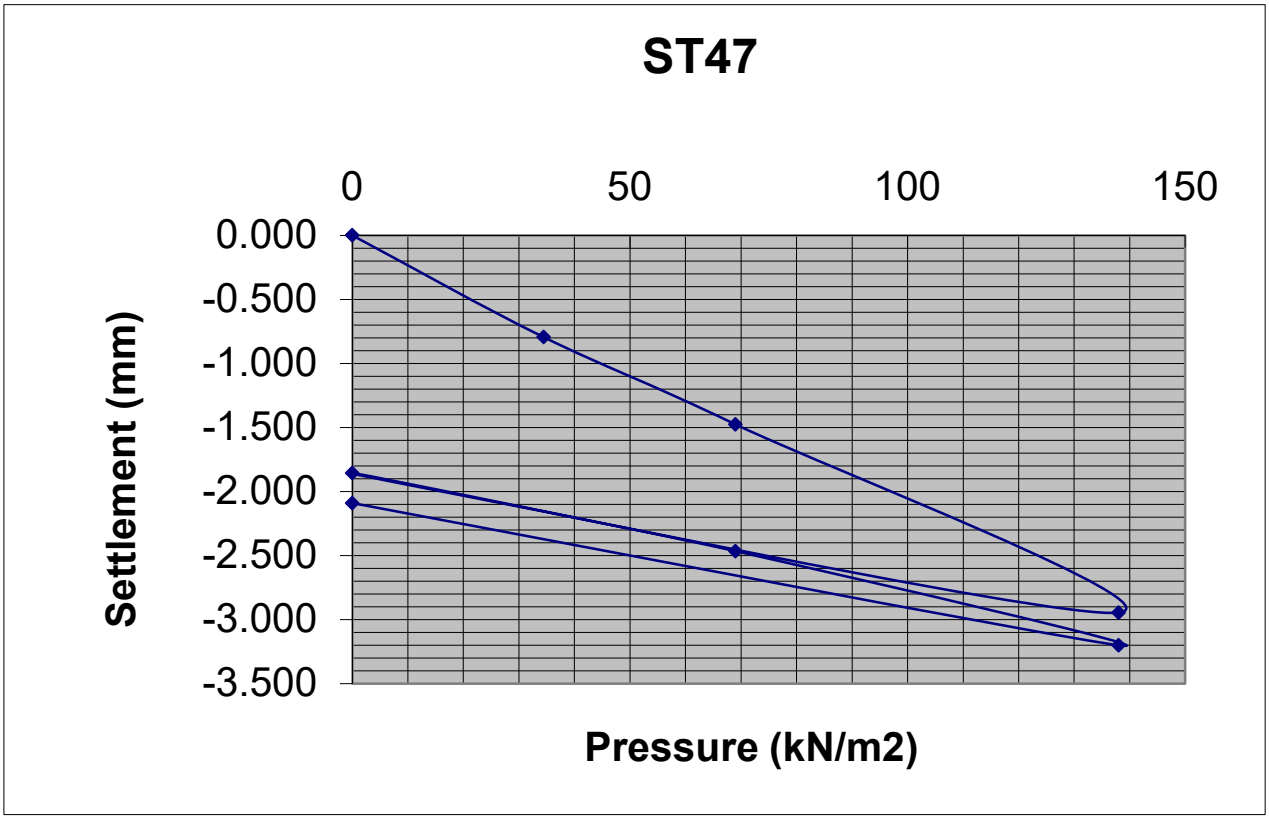
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **2.07 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.795
69	-1.475
138	-2.945
0	-1.855
69	-2.465
138	-3.200
0	-2.090

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Firm brown slightly gravelly slightly sandy CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	03/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST47	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **21.26 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **51.41 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **1.93 %**

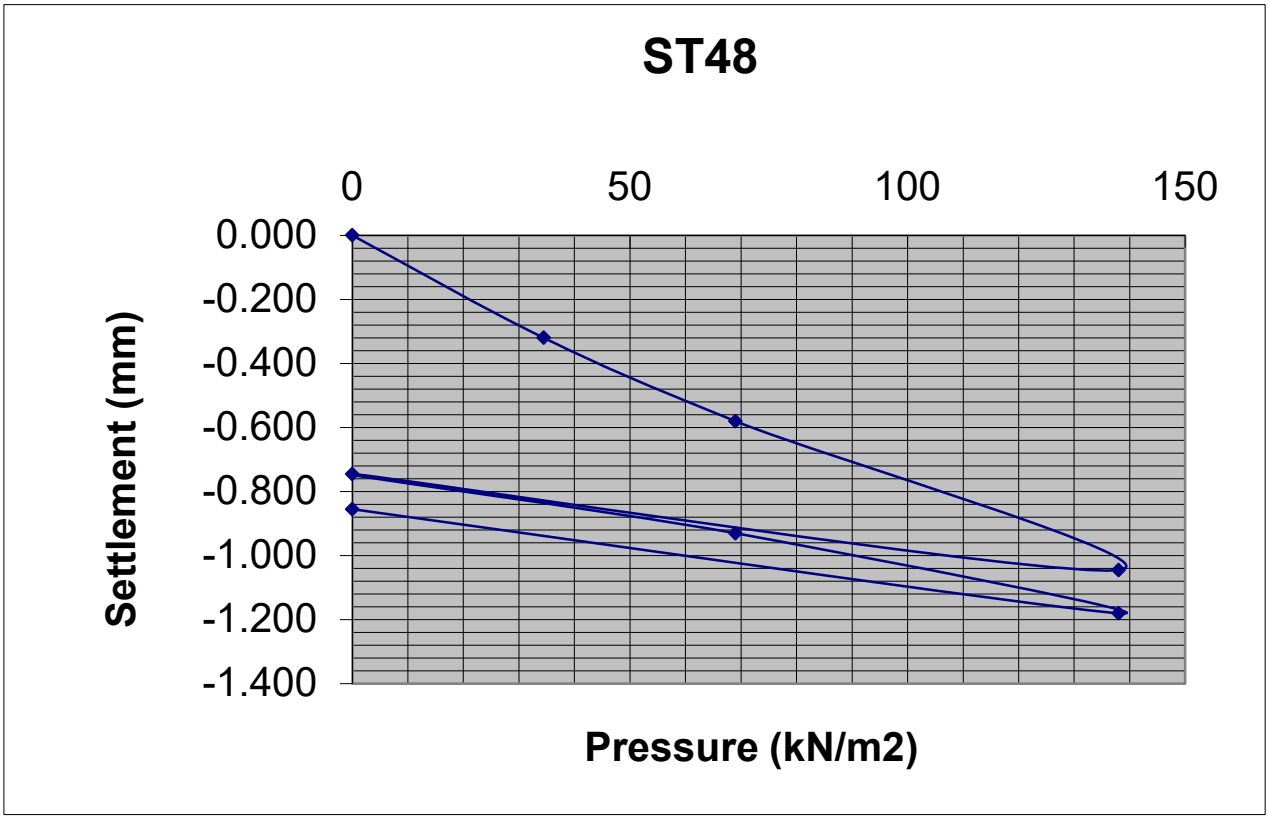
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **8.90 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.320
69	-0.580
138	-1.045
0	-0.745
69	-0.930
138	-1.180
0	-0.855

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Grey sandy slightly clayey angular to subangular fine to coarse Gravel with occasional angular cobbles
CONTRACT NO.	9025-08-19		
DATE	03/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST48	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **54.07 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **169.52 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **9.72 %**

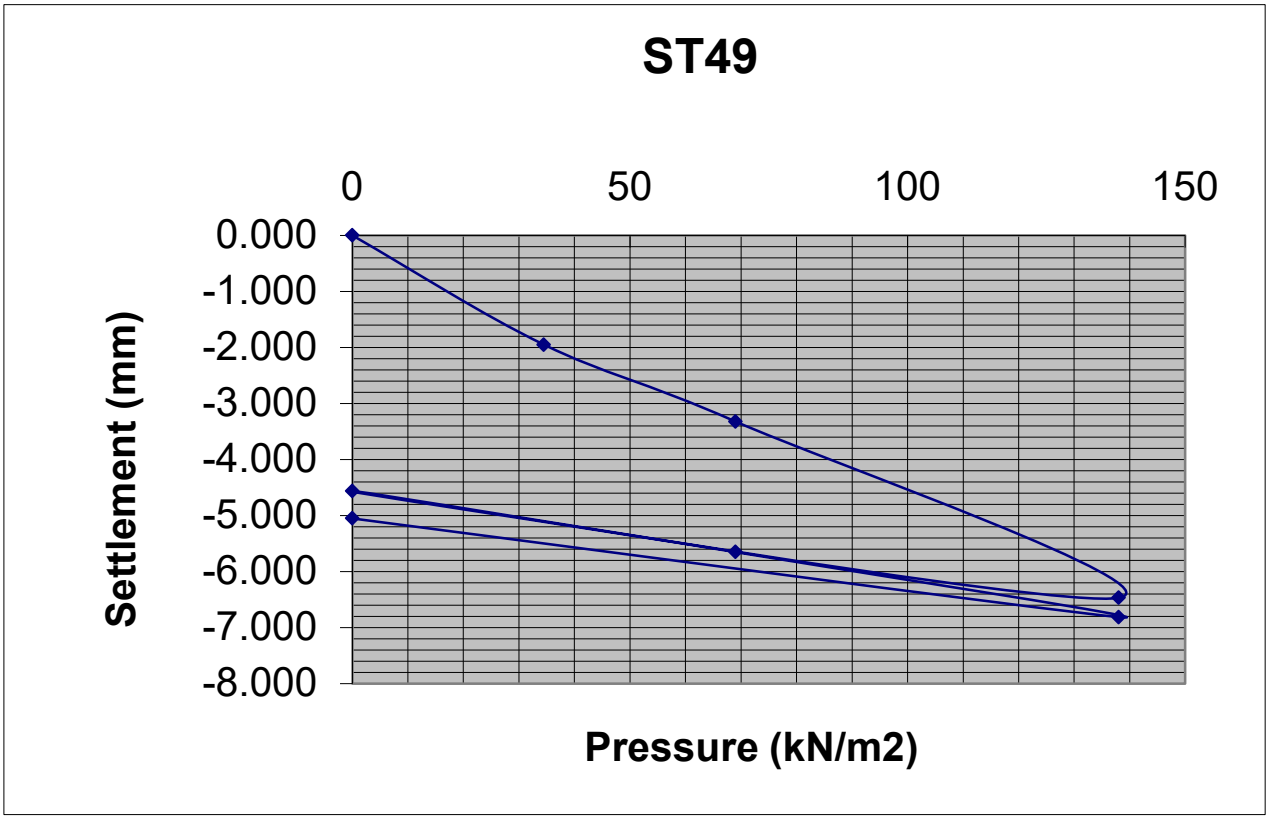
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **70.40 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.950
69	-3.320
138	-6.465
0	-4.560
69	-5.650
138	-6.810
0	-5.050

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with some angular cobbles, occasional boulders and occasional fragments of plastic and red brick
CONTRACT NO.	9025-08-19		
DATE	09/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST49	**DEPTH**	0.35m BGL



Modulus of subgrade reaction, K (Initial) = **9.45 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **28.77 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.47 %**

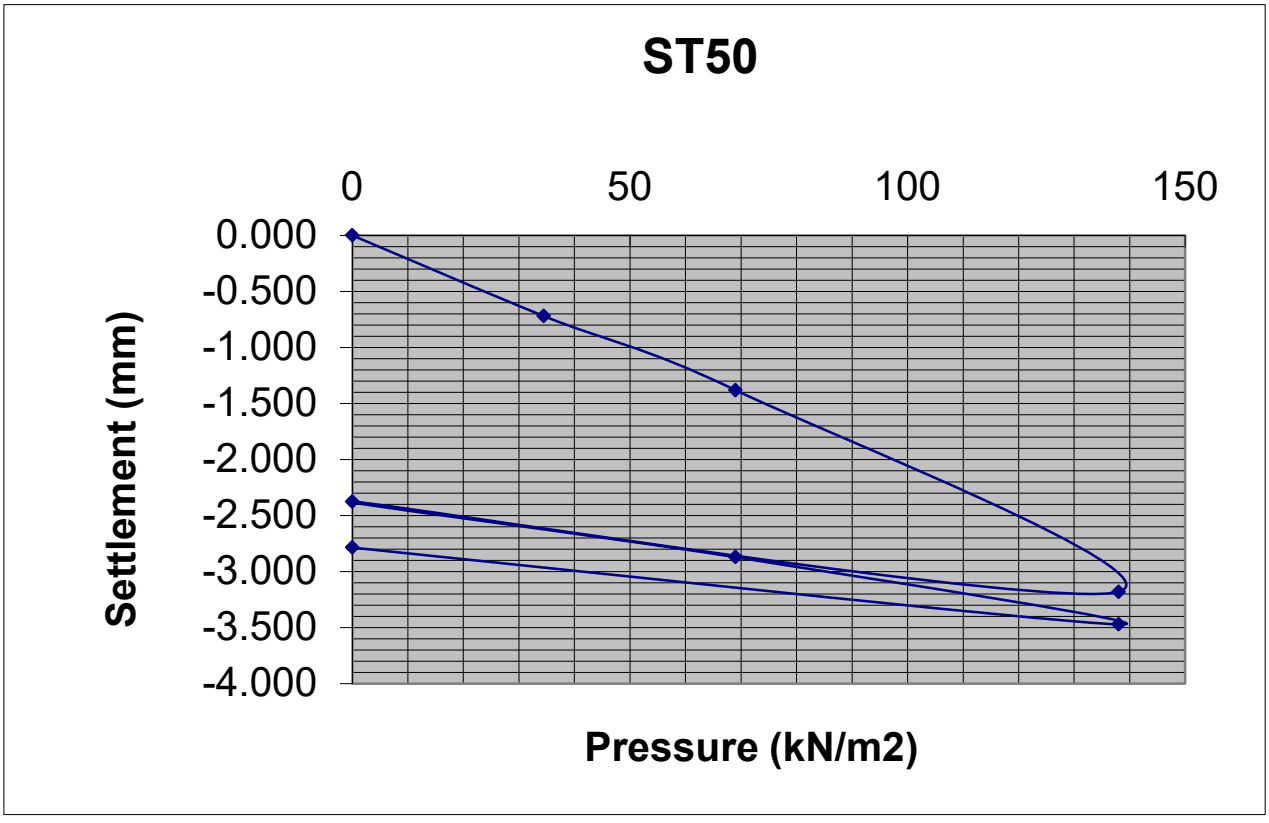
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **3.26 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.720
69	-1.380
138	-3.180
0	-2.375
69	-2.870
138	-3.470
0	-2.785

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	Stiff greyish brown slightly sandy gravelly CLAY with some angular to subangular cobbles. Gravel is angular to subrounded fine to coarse
CONTRACT NO.	9025-08-19		
DATE	05/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST50	**DEPTH**	0.50m BGL



Modulus of subgrade reaction, K (Initial) = **22.73 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **63.35 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **2.16 %**

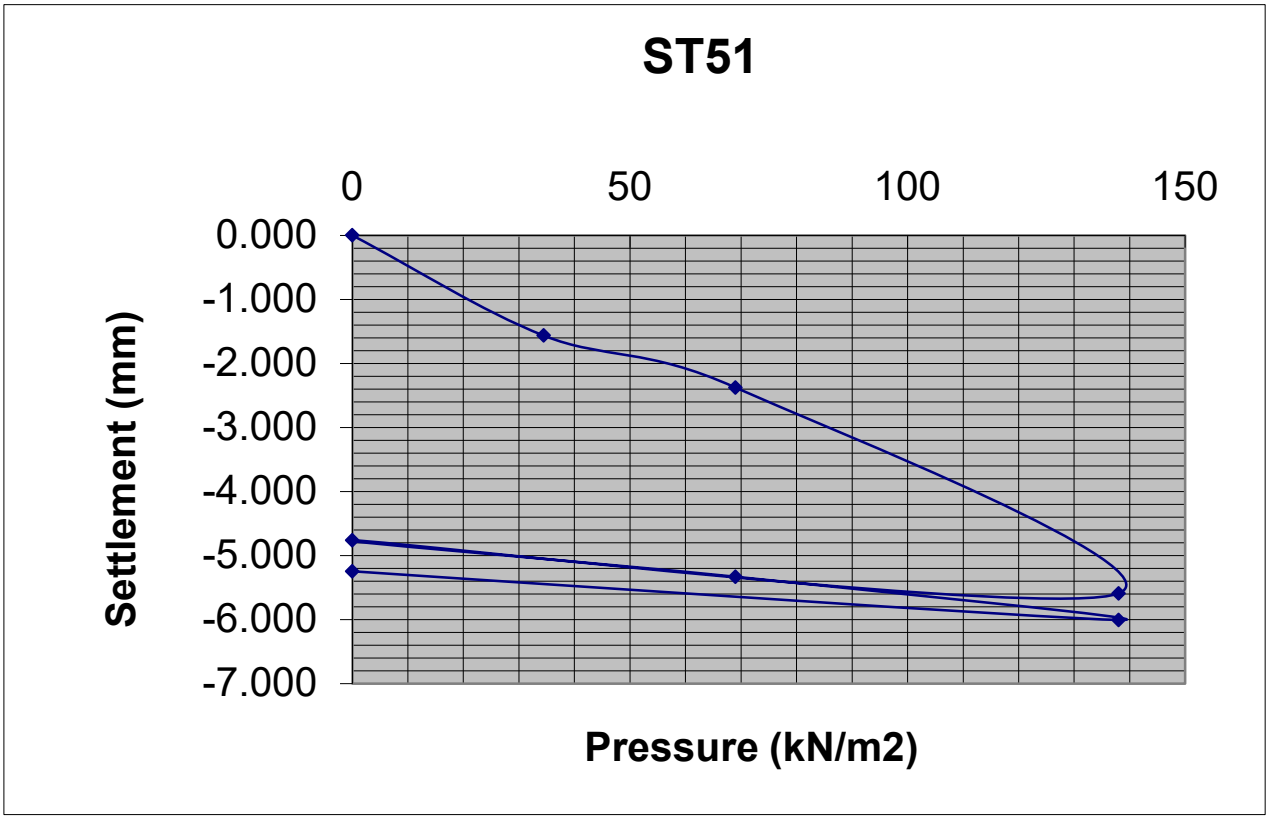
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **12.79 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-1.565
69	-2.375
138	-5.590
0	-4.760
69	-5.330
138	-6.005
0	-5.245

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with frequent angular cobbles, occasional boulders, and occasional fragments of red brick
CONTRACT NO.	9025-08-19		
DATE	09/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST51	**DEPTH**	0.40m BGL



Modulus of subgrade reaction, K (Initial) = **13.20 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **55.02 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **0.84 %**

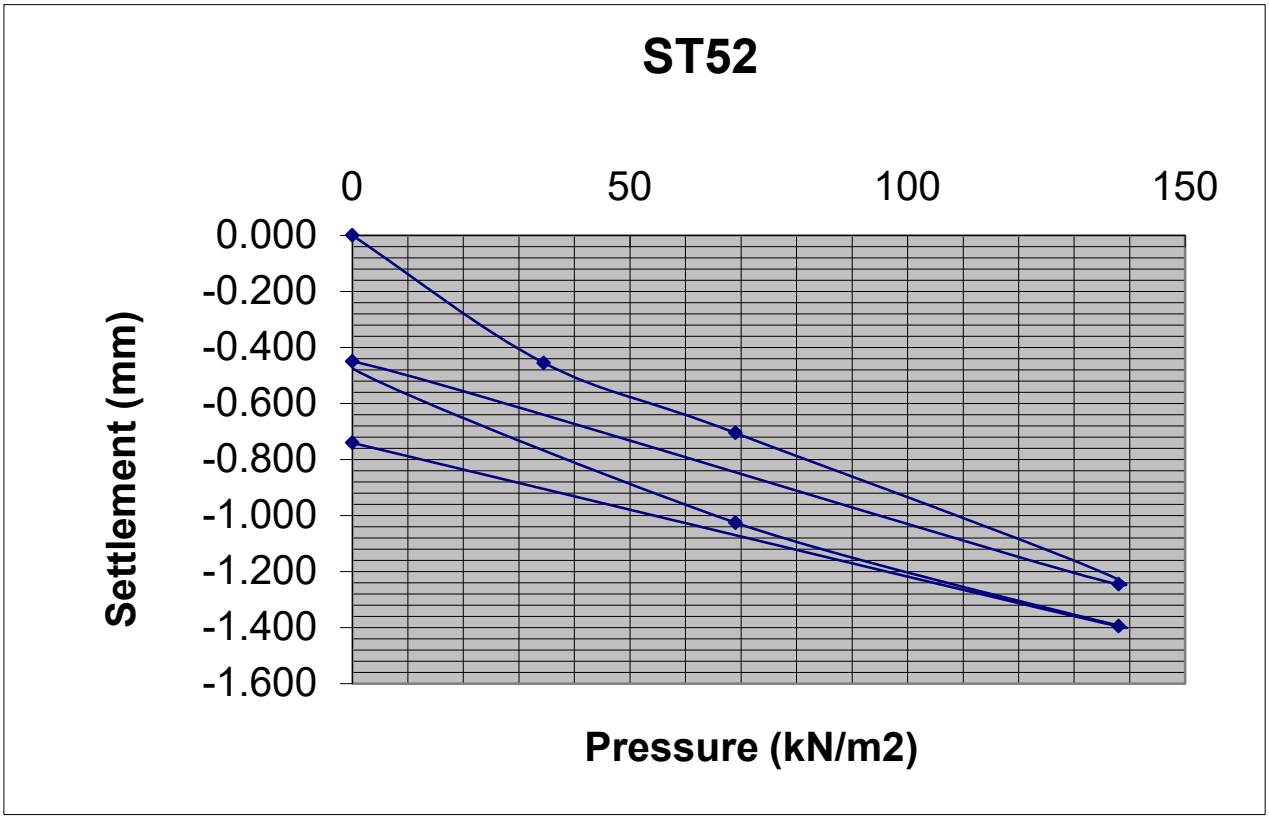
Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **10.01 %**

Royal Canal Urban Greenway

Applied Load	Gauge settlement
0	**0.000**
34.5	-0.455
69	-0.705
138	-1.245
0	-0.450
69	-1.025
138	-1.395
0	-0.740

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

LOCATION	Royal Canal	**MATERIAL**	MADE GROUND: Brown slightly sandy gravelly Clay with frequent angular cobbles, occasional boulders, and occasional fragments of red brick and wood
CONTRACT NO.	9025-08-19		
DATE	06/03/2020		
CLIENT	Fingal County Council		
PLATE DIAMETER	305mm		
TEST NO.	ST52	**DEPTH**	0.45m BGL



Modulus of subgrade reaction, K (Initial) = **44.48 MN/m2/m**

Modulus of subgrade reaction, K (Reload) = **54.54 MN/m2/m**

Equivalent CBR(initial)in accordance with HD25/94 volume7 section2 = **6.93 %**

Equivalent CBR(reload)in accordance with HD25/94 volume7 section2 = **9.86 %**

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

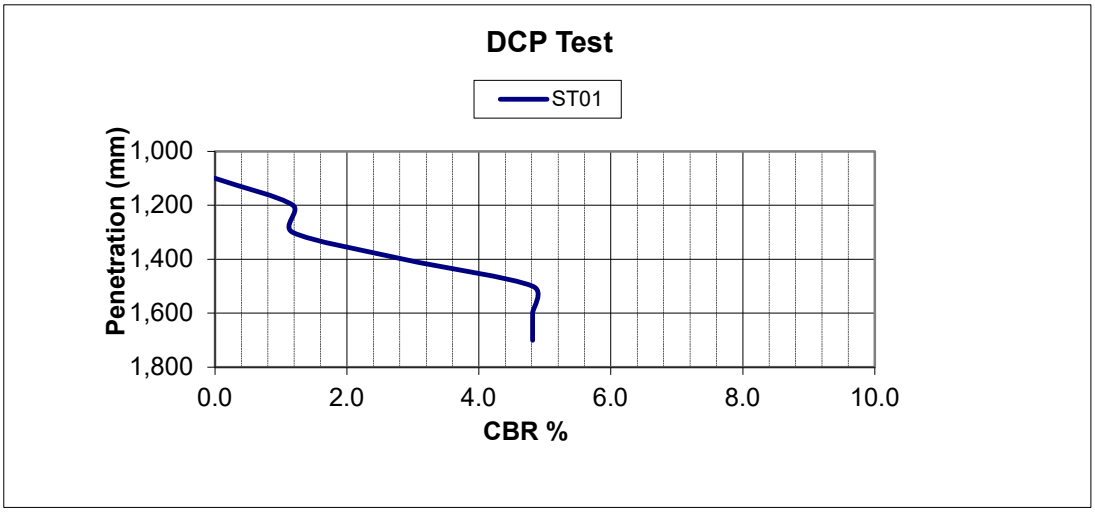
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST01
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	27/02/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	1	100.0	1.2
1,300	1	100.0	1.2
1,400	2	50.0	2.9
1,500	3	33.3	4.8
1,600	3	33.3	4.8
1,700	3	33.3	4.8

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

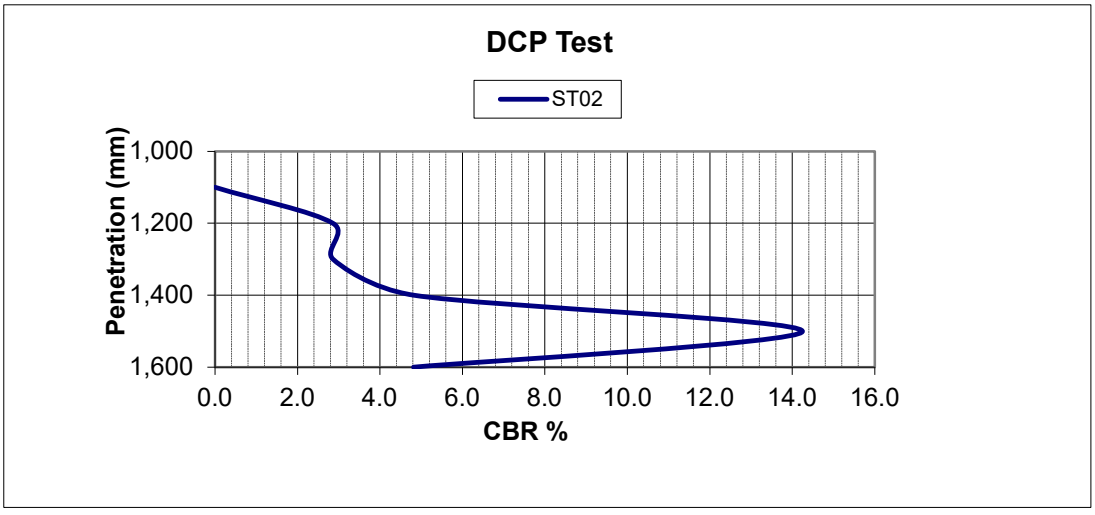
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST02
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	27/02/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	2	50.0	2.9
1,300	2	50.0	2.9
1,400	3	33.3	4.8
1,500	7	14.3	14.2
1,600	3	33.3	4.8

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

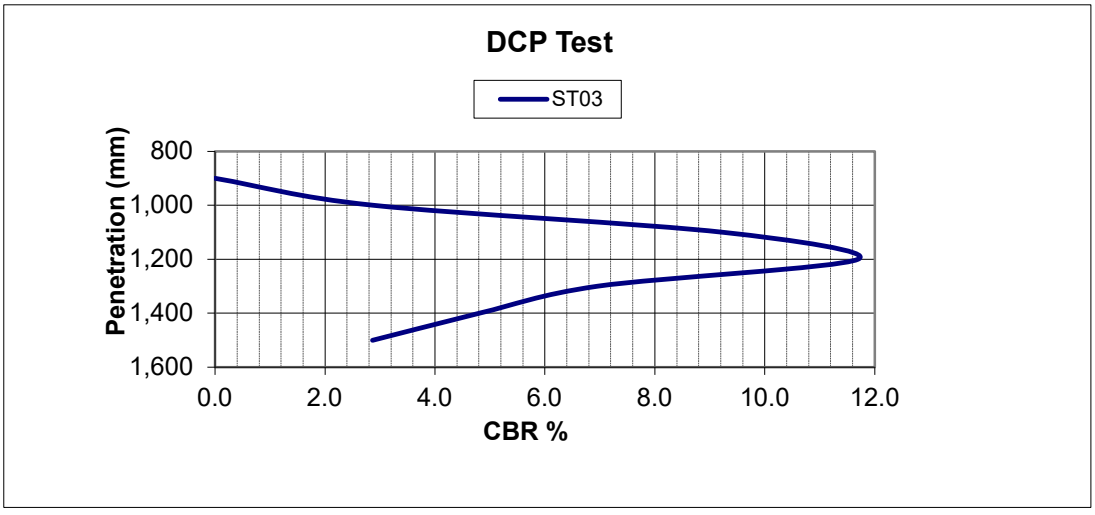
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST03
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	27/02/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	2	50.0	2.9
1,100	5	20.0	9.3
1,200	6	16.7	11.7
1,300	4	25.0	7.0
1,400	3	33.3	4.8
1,500	2	50.0	2.9

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

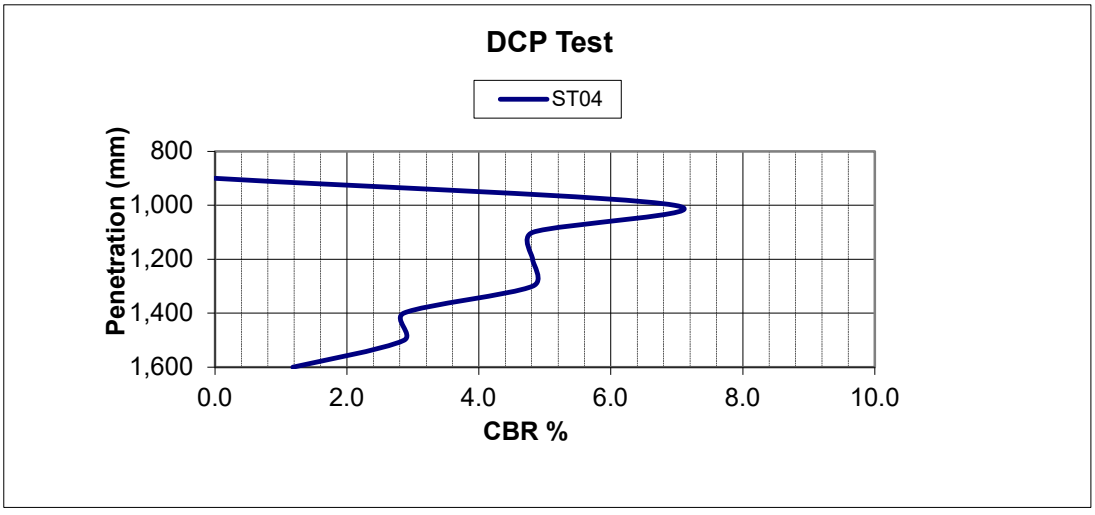
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST04
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	27/02/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	4	25.0	7.0
1,100	3	33.3	4.8
1,200	3	33.3	4.8
1,300	3	33.3	4.8
1,400	2	50.0	2.9
1,500	2	50.0	2.9
1,600	1	100.0	1.2

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



GROUND INVESTIGATIONS IRELAND
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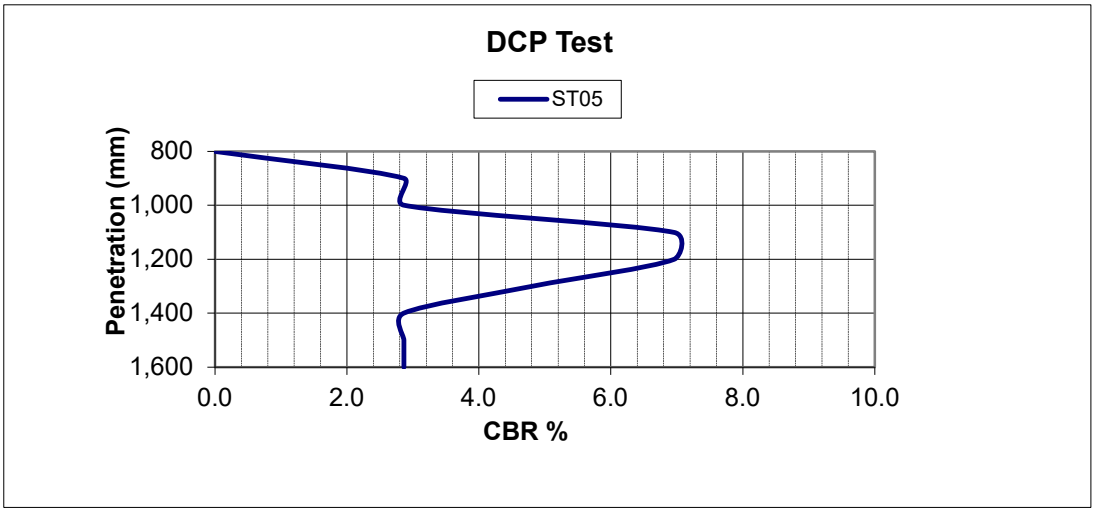
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST05
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	20/02/2020
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	-	-	0.0
900	2	50.0	2.9
1,000	2	50.0	2.9
1,100	4	25.0	7.0
1,200	4	25.0	7.0
1,300	3	33.3	4.8
1,400	2	50.0	2.9
1,500	2	50.0	2.9
1,600	2	50.0	2.9

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



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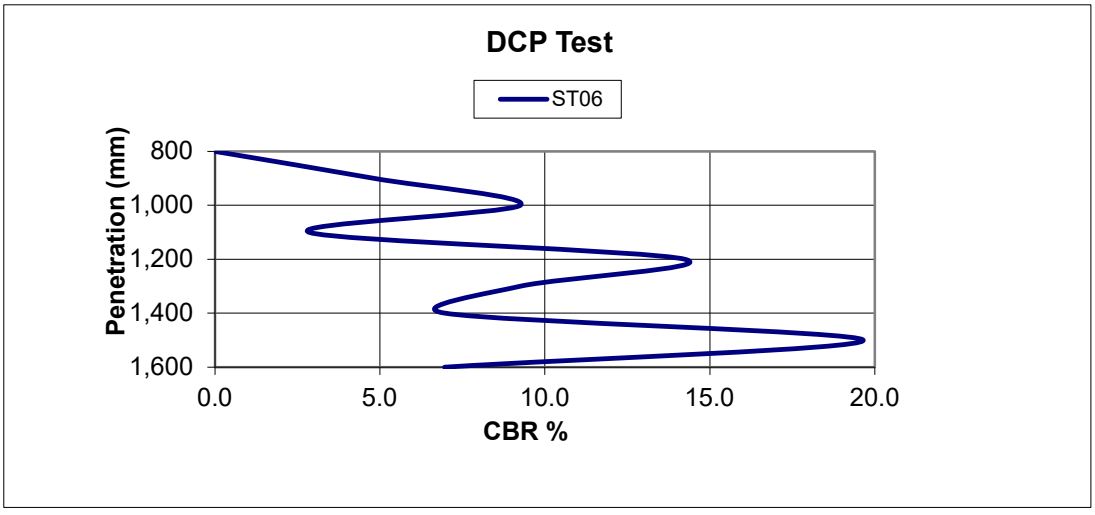
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST06
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	20/02/2020
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	-	-	0.0
900	3	33.3	4.8
1,000	5	20.0	9.3
1,100	2	50.0	2.9
1,200	7	14.3	14.2
1,300	5	20.0	9.3
1,400	4	25.0	7.0
1,500	9	11.1	19.7
1,600	4	25.0	7.0

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

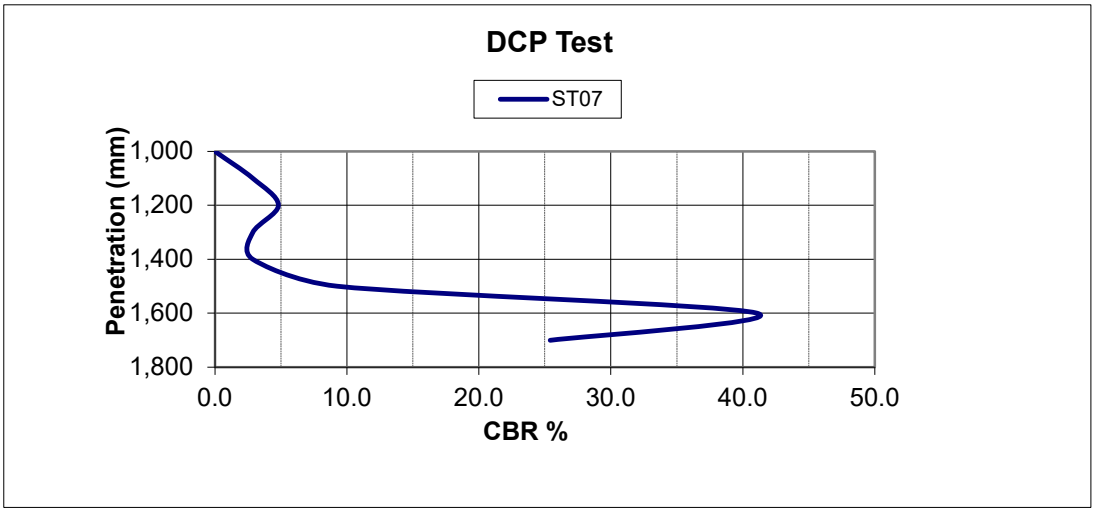
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST07
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	20/02/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	2	50.0	2.9
1,200	3	33.3	4.8
1,300	2	50.0	2.9
1,400	2	50.0	2.9
1,500	5	20.0	9.3
1,600	16	6.3	41.0
1,700	11	9.1	25.4

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

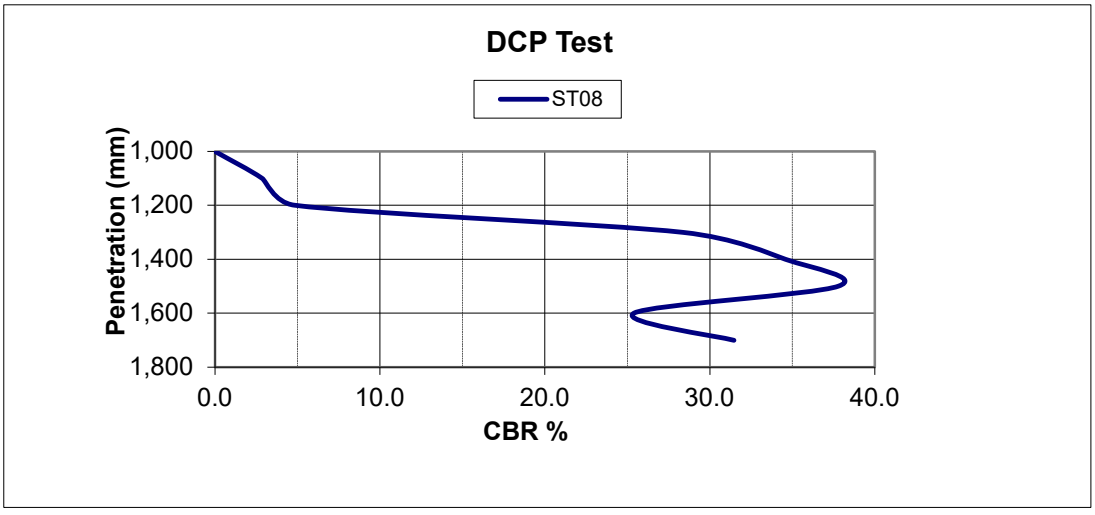
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST08
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	20/02/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	2	50.0	2.9
1,200	3	33.3	4.8
1,300	12	8.3	28.4
1,400	14	7.1	34.6
1,500	15	6.7	37.8
1,600	11	9.1	25.4
1,700	13	7.7	31.5

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

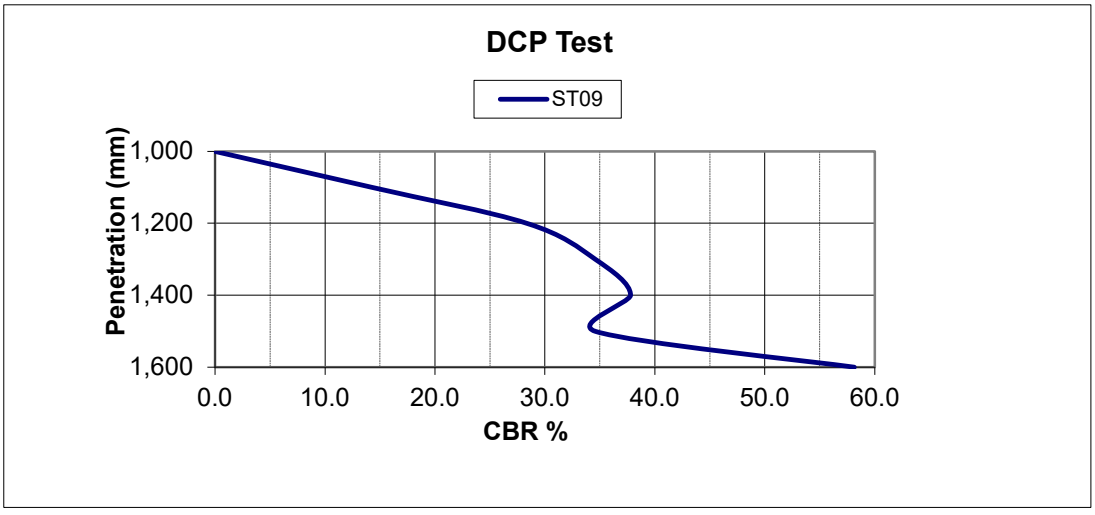
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST09
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	25/02/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	7	14.3	14.2
1,200	12	8.3	28.4
1,300	14	7.1	34.6
1,400	15	6.7	37.8
1,500	14	7.1	34.6
1,600	21	4.8	58.1

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



GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

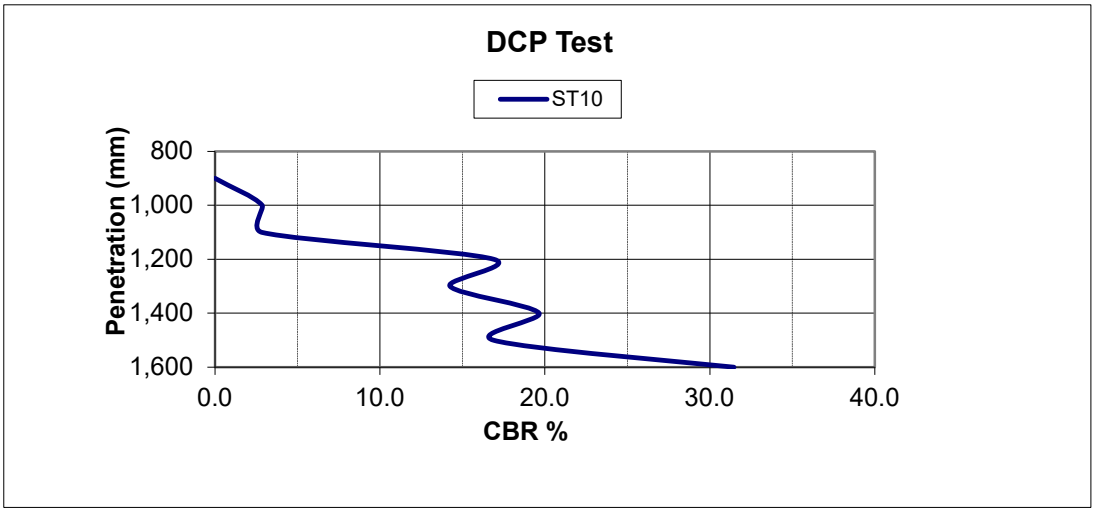
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST10
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	25/02/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	2	50.0	2.9
1,100	2	50.0	2.9
1,200	8	12.5	16.9
1,300	7	14.3	14.2
1,400	9	11.1	19.7
1,500	8	12.5	16.9
1,600	13	7.7	31.5

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



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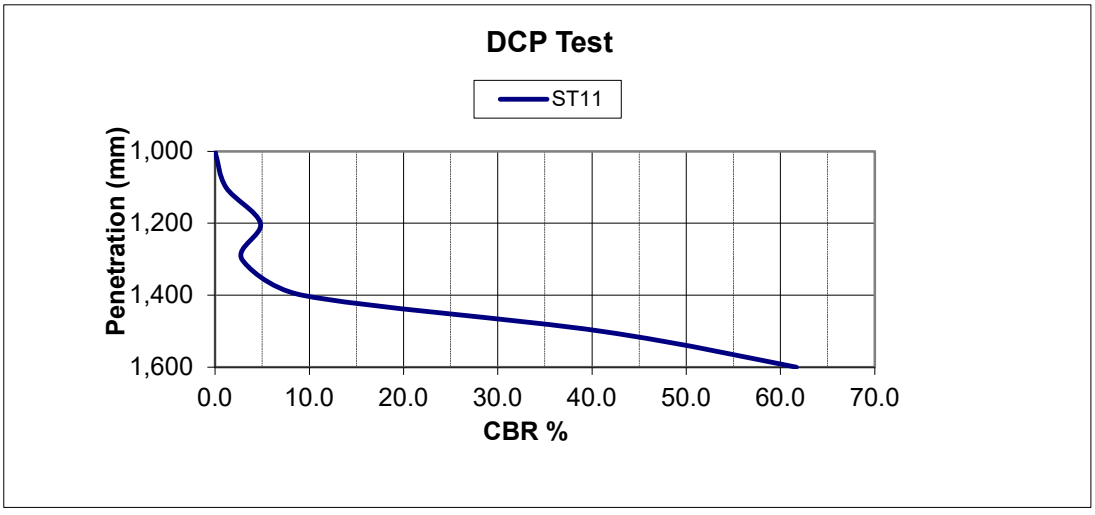
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST11
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	25/02/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	1	100.0	1.2
1,200	3	33.3	4.8
1,300	2	50.0	2.9
1,400	5	20.0	9.3
1,500	16	6.3	41.0
1,600	22	4.5	61.7

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



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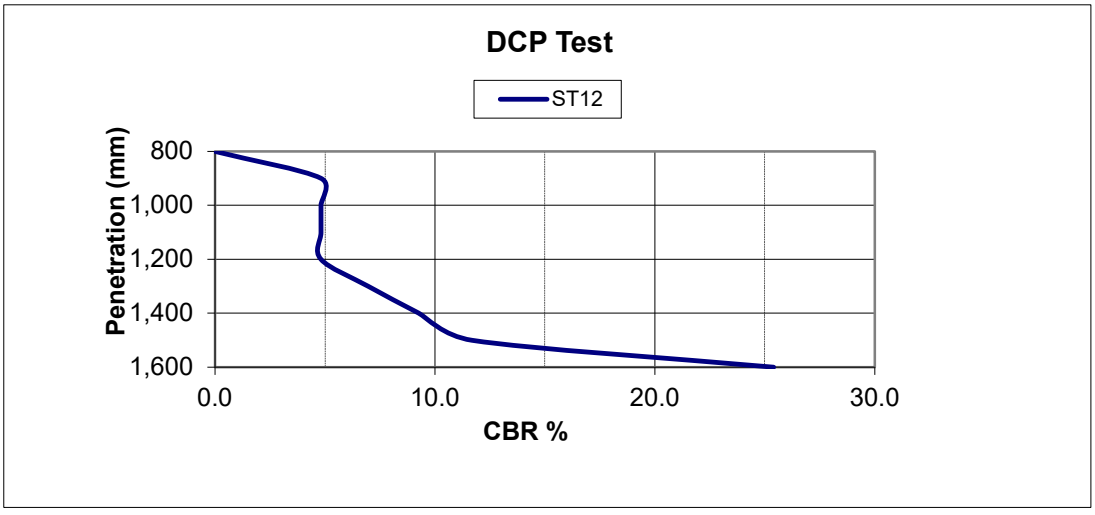
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST12
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	24/02/2020
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	-	-	0.0
900	3	33.3	4.8
1,000	3	33.3	4.8
1,100	3	33.3	4.8
1,200	3	33.3	4.8
1,300	4	25.0	7.0
1,400	5	20.0	9.3
1,500	6	16.7	11.7
1,600	11	9.1	25.4

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



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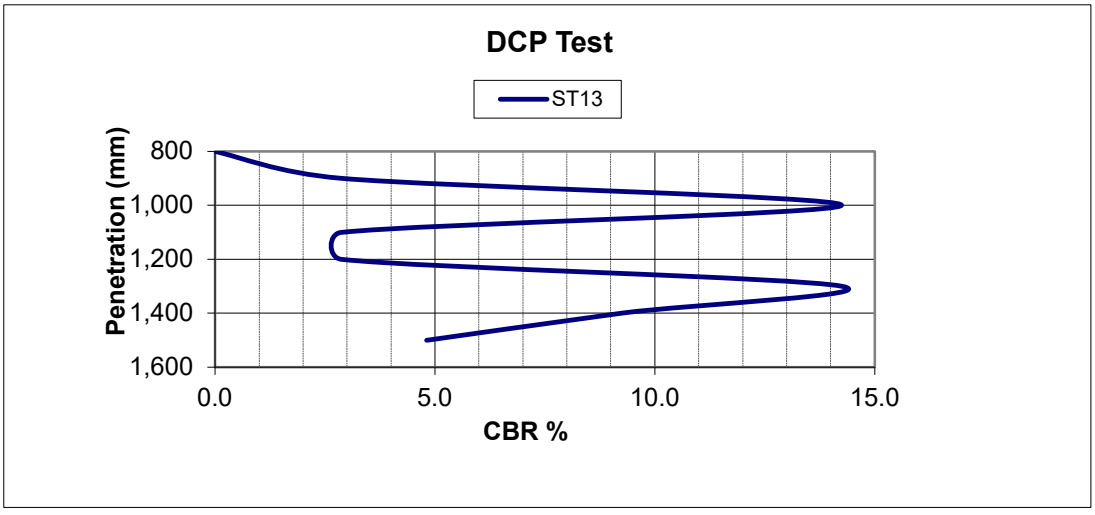
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST13
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	24/02/2020
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	-	-	0.0
900	2	50.0	2.9
1,000	7	14.3	14.2
1,100	2	50.0	2.9
1,200	2	50.0	2.9
1,300	7	14.3	14.2
1,400	5	20.0	9.3
1,500	3	33.3	4.8

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



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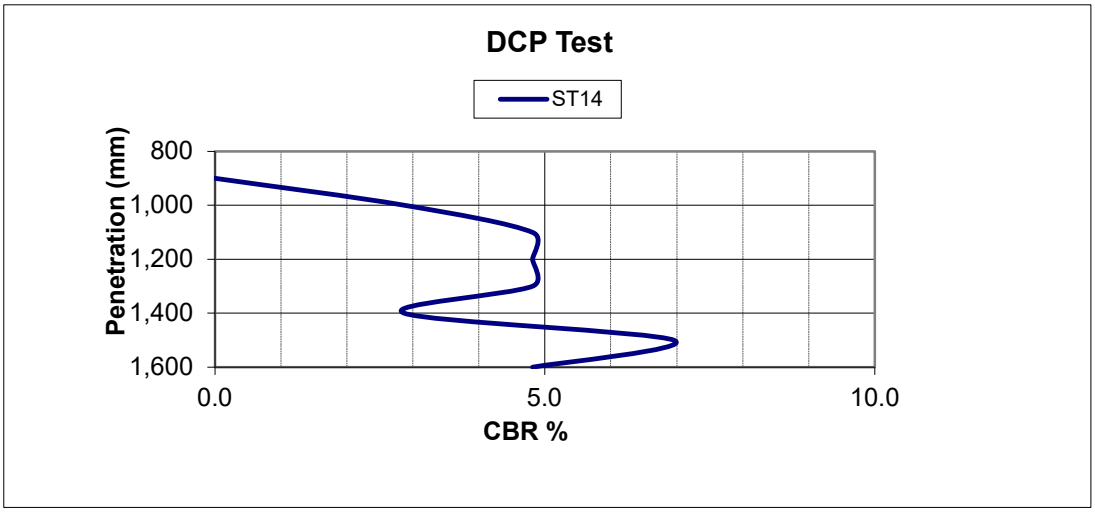
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST14
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	24/02/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	2	50.0	2.9
1,100	3	33.3	4.8
1,200	3	33.3	4.8
1,300	3	33.3	4.8
1,400	2	50.0	2.9
1,500	4	25.0	7.0
1,600	3	33.3	4.8

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



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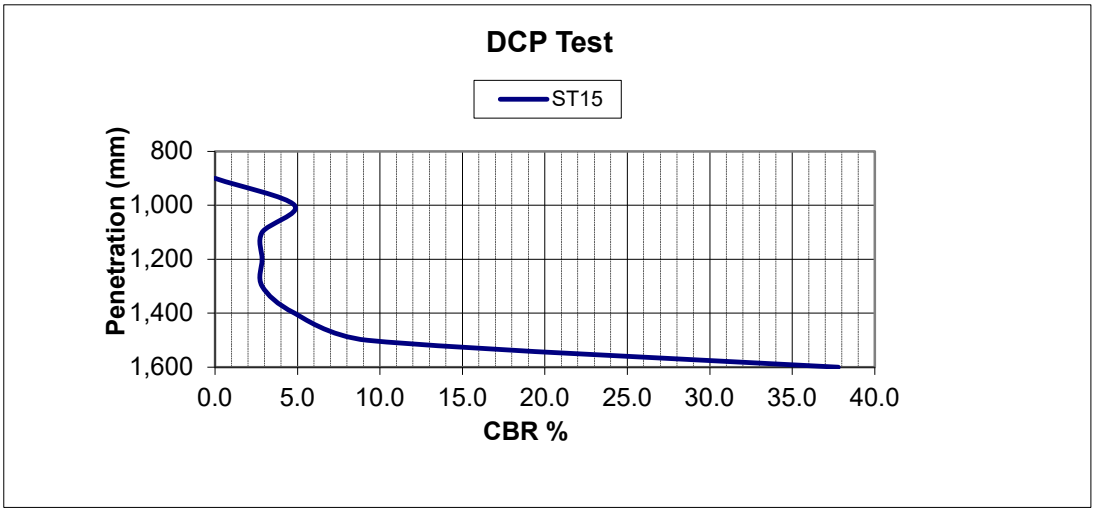
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST15
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	21/02/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	3	33.3	4.8
1,100	2	50.0	2.9
1,200	2	50.0	2.9
1,300	2	50.0	2.9
1,400	3	33.3	4.8
1,500	5	20.0	9.3
1,600	15	6.7	37.8

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



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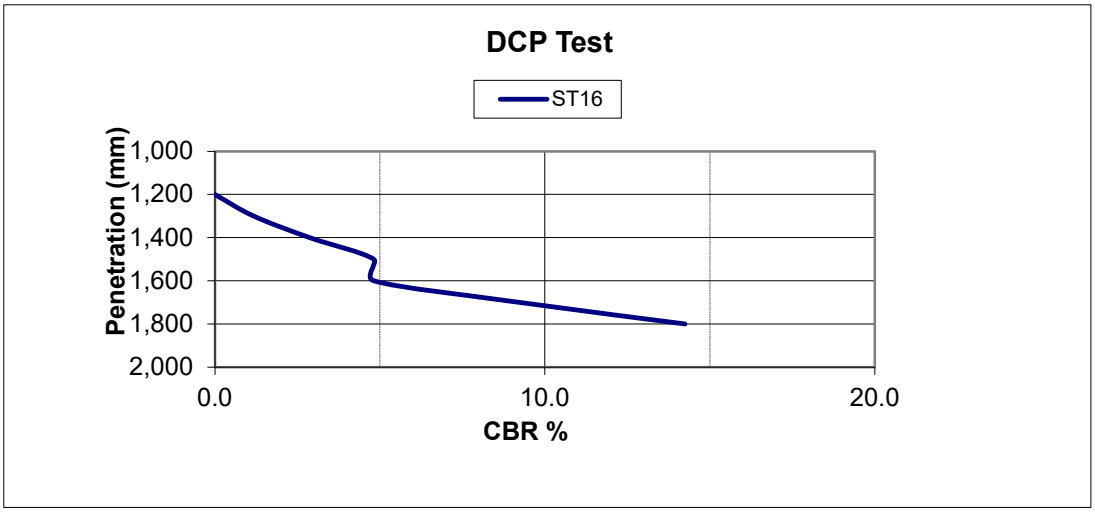
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST16
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	20/02/2020
Initial Depth	1.20m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,200	-	-	0.0
1,300	1	100.0	1.2
1,400	2	50.0	2.9
1,500	3	33.3	4.8
1,600	3	33.3	4.8
1,700	5	20.0	9.3
1,800	7	14.3	14.2

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



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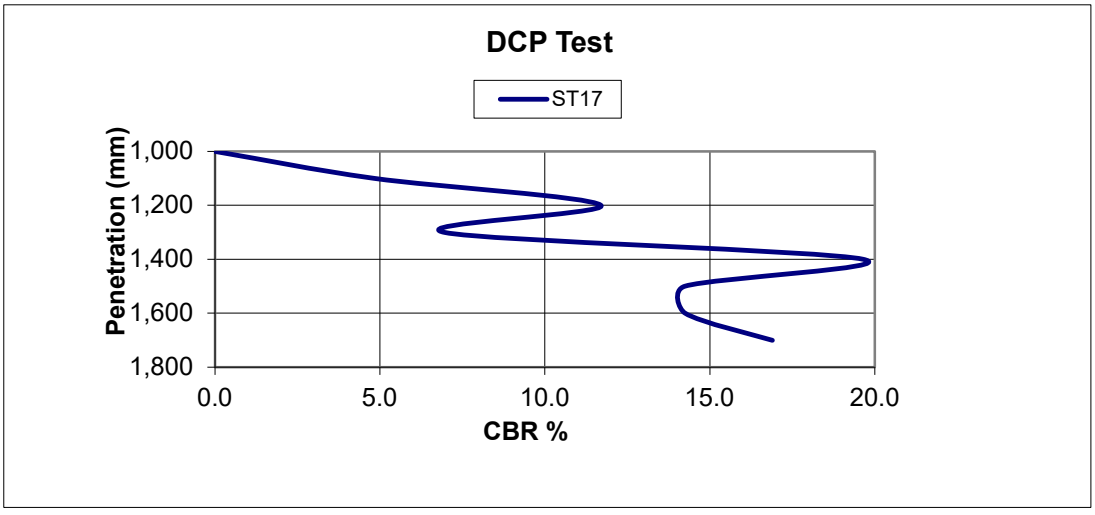
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST17
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	21/02/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	3	33.3	4.8
1,200	6	16.7	11.7
1,300	4	25.0	7.0
1,400	9	11.1	19.7
1,500	7	14.3	14.2
1,600	7	14.3	14.2
1,700	8	12.5	16.9

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



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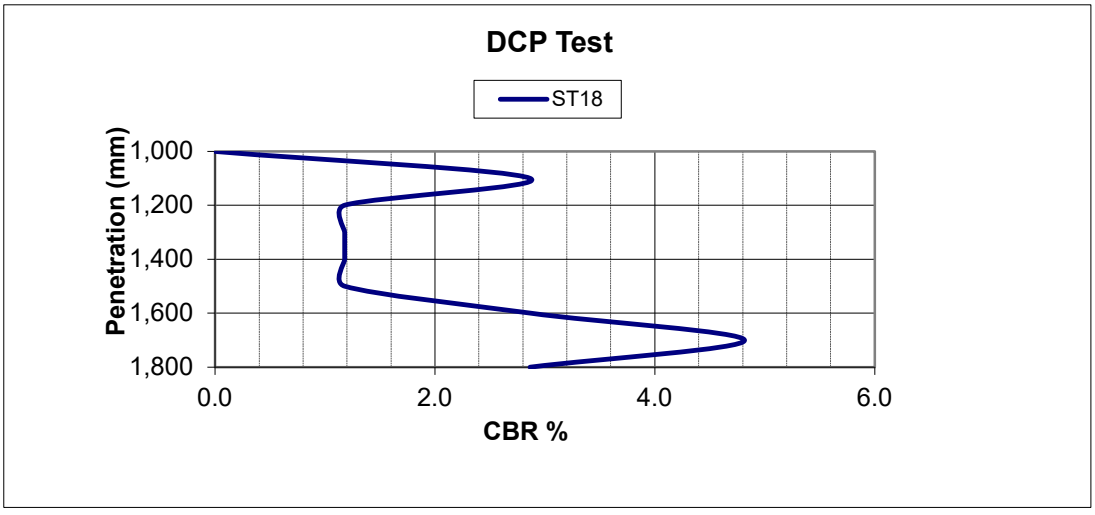
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST18
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	21/02/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	2	50.0	2.9
1,200	1	100.0	1.2
1,300	1	100.0	1.2
1,400	1	100.0	1.2
1,500	1	100.0	1.2
1,600	2	50.0	2.9
1,700	3	33.3	4.8
1,800	2	50.0	2.9

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



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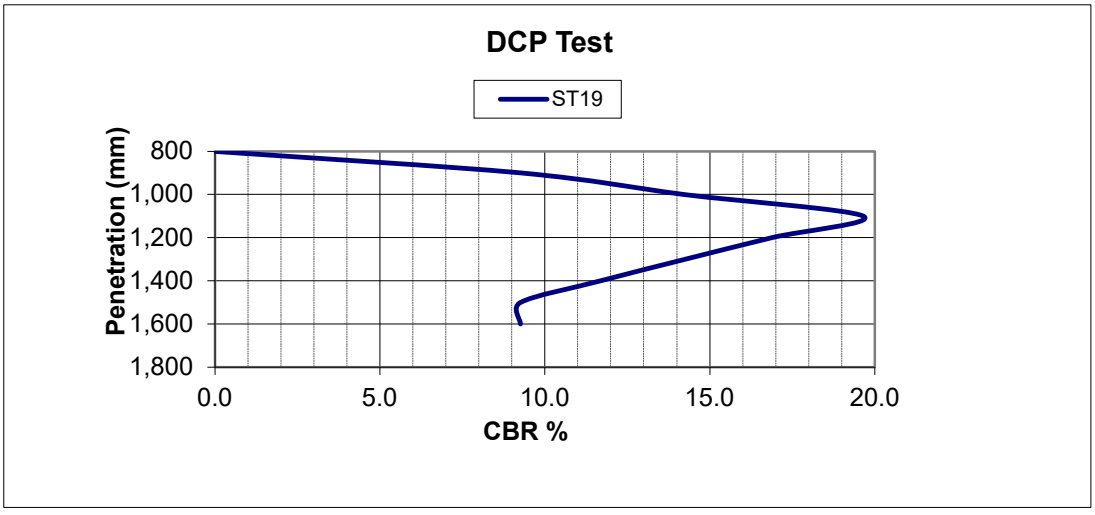
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST19
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	21/02/2020
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	-	-	0.0
900	5	20.0	9.3
1,000	7	14.3	14.2
1,100	9	11.1	19.7
1,200	8	12.5	16.9
1,300	7	14.3	14.2
1,400	6	16.7	11.7
1,500	5	20.0	9.3
1,600	5	20.0	9.3
1,700	6	16.7	11.7

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



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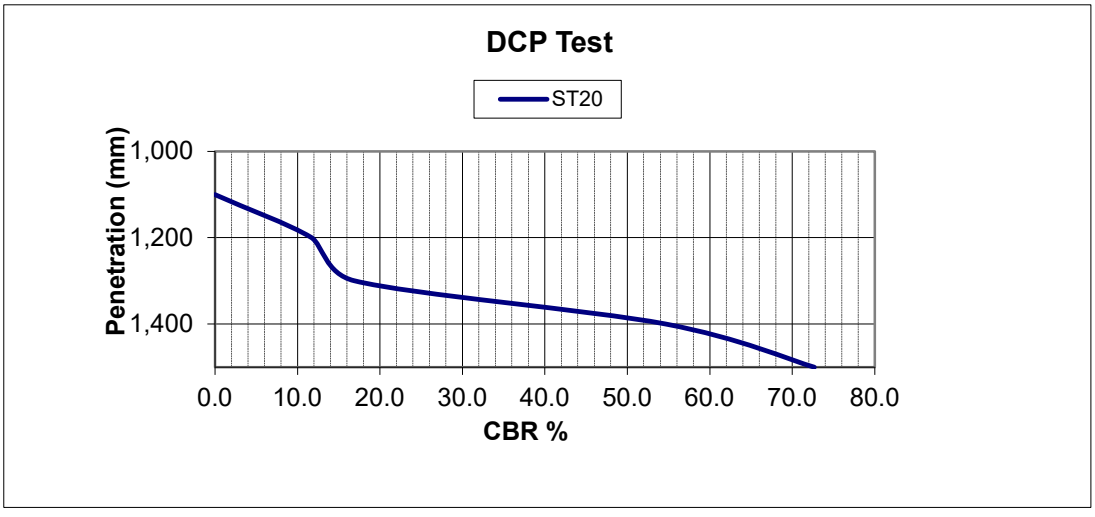
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST20
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	02/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	6	16.7	11.7
1,300	8	12.5	16.9
1,400	20	5.0	54.6
1,500	25	4.0	72.7

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



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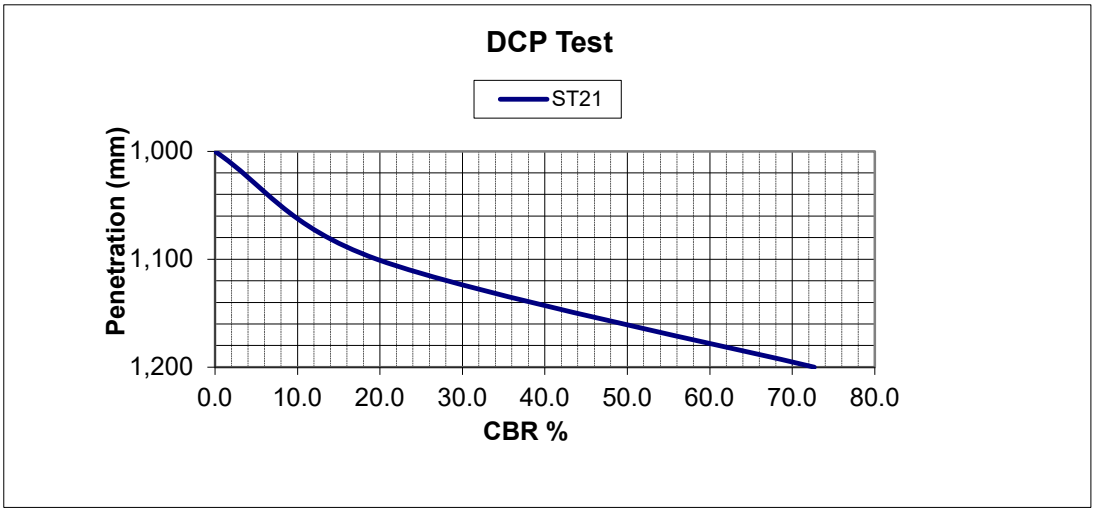
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST21
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	04/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	9	11.1	19.7
1,200	25	4.0	72.7

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



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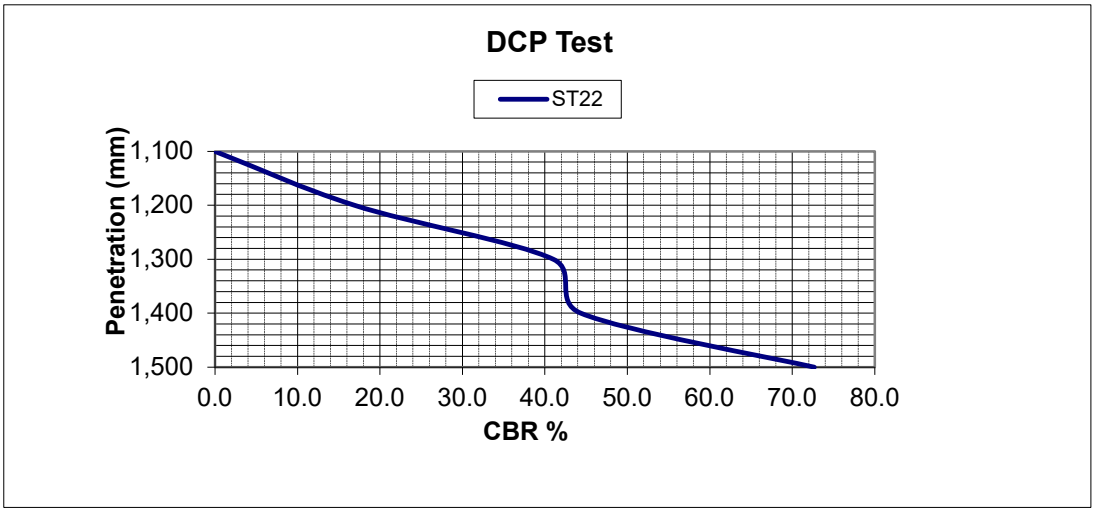
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST22
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	04/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	8	12.5	16.9
1,300	16	6.3	41.0
1,400	17	5.9	44.4
1,500	25	4.0	72.7

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



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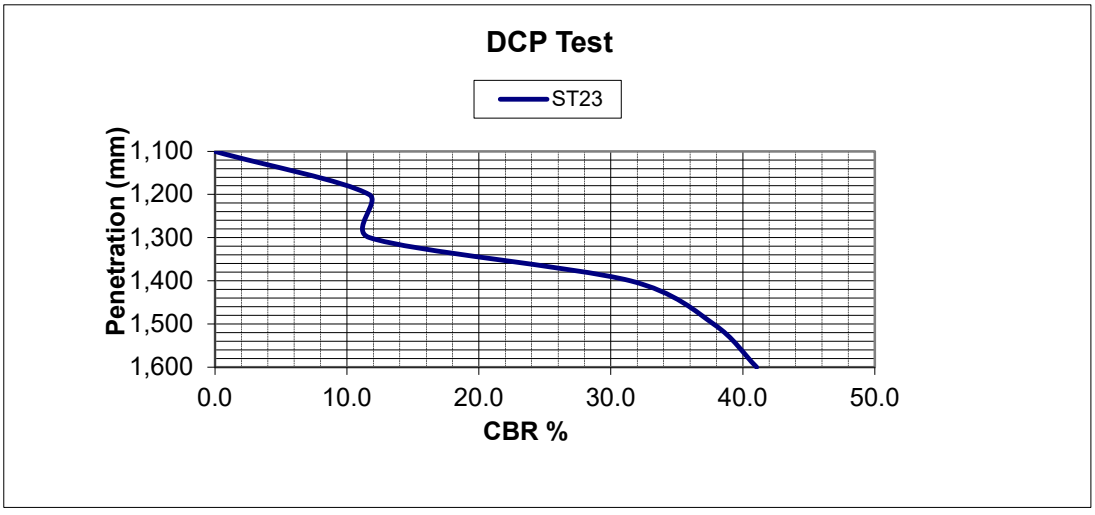
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST23
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	05/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	6	16.7	11.7
1,300	6	16.7	11.7
1,400	13	7.7	31.5
1,500	15	6.7	37.8
1,600	16	6.3	41.0

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



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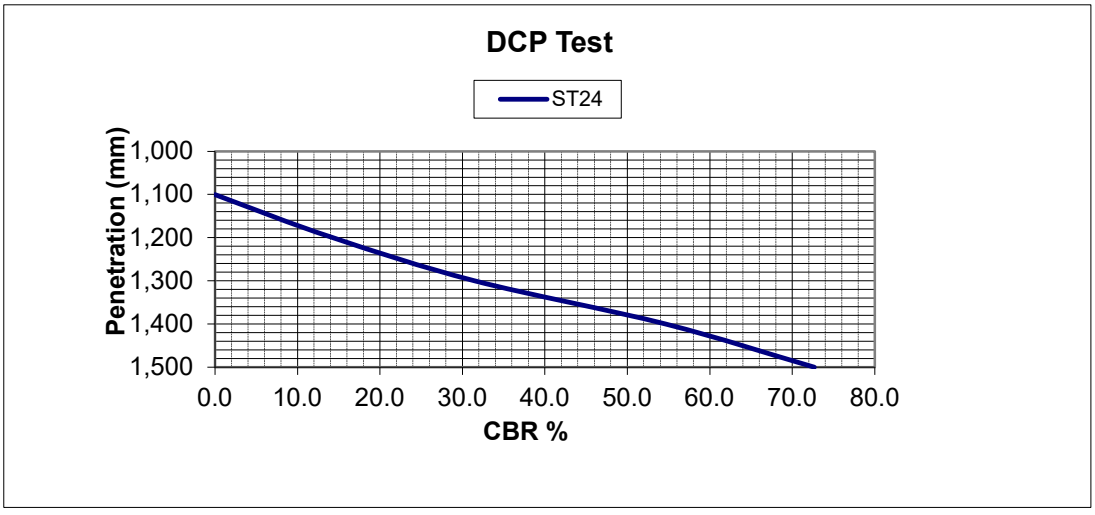
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST24
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	05/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	7	14.3	14.2
1,300	13	7.7	31.5
1,400	20	5.0	54.6
1,500	25	4.0	72.7

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



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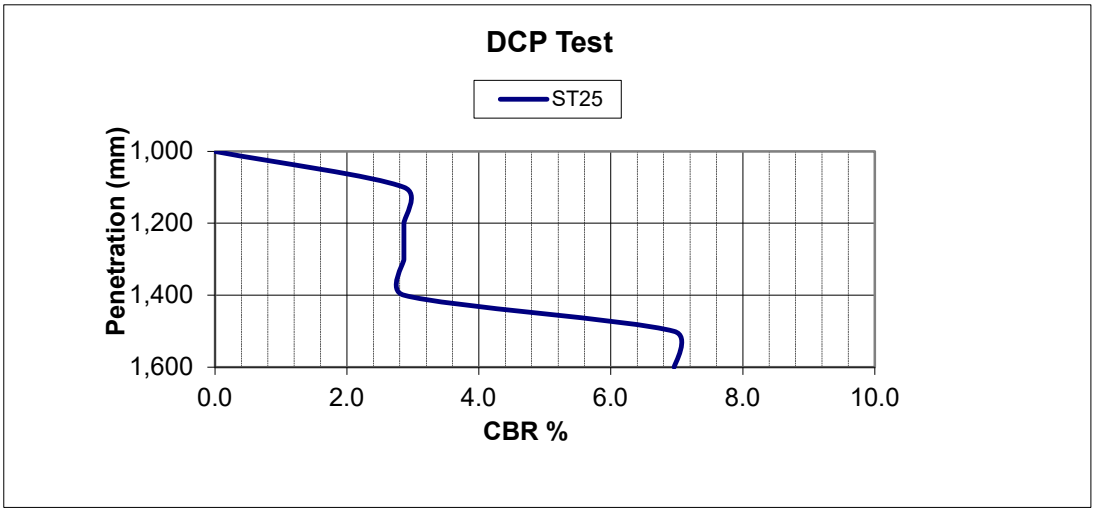
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST25
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	02/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	2	50.0	2.9
1,200	2	50.0	2.9
1,300	2	50.0	2.9
1,400	2	50.0	2.9
1,500	4	25.0	7.0
1,600	4	25.0	7.0

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



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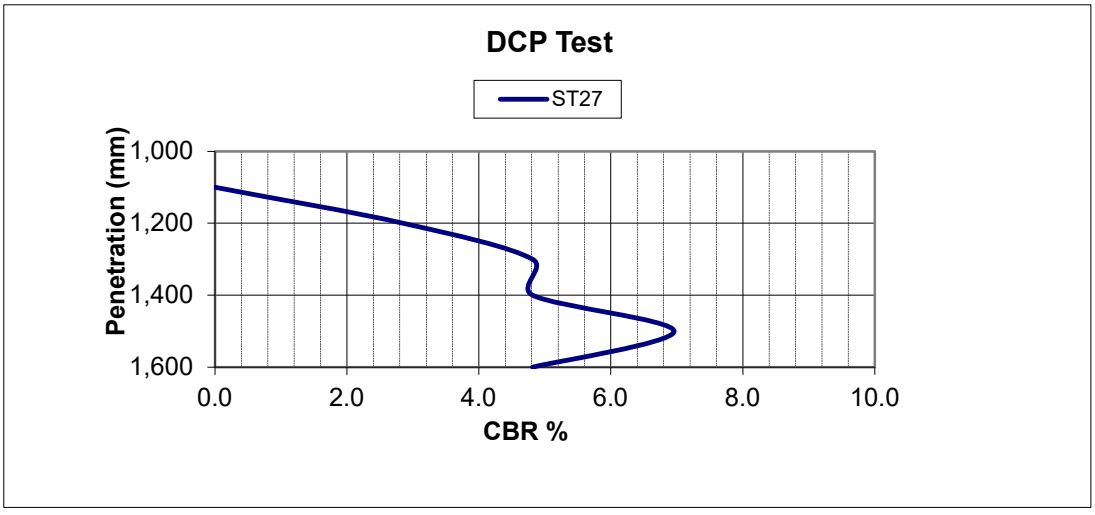
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST27
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	02/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	2	50.0	2.9
1,300	3	33.3	4.8
1,400	3	33.3	4.8
1,500	4	25.0	7.0
1,600	3	33.3	4.8

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



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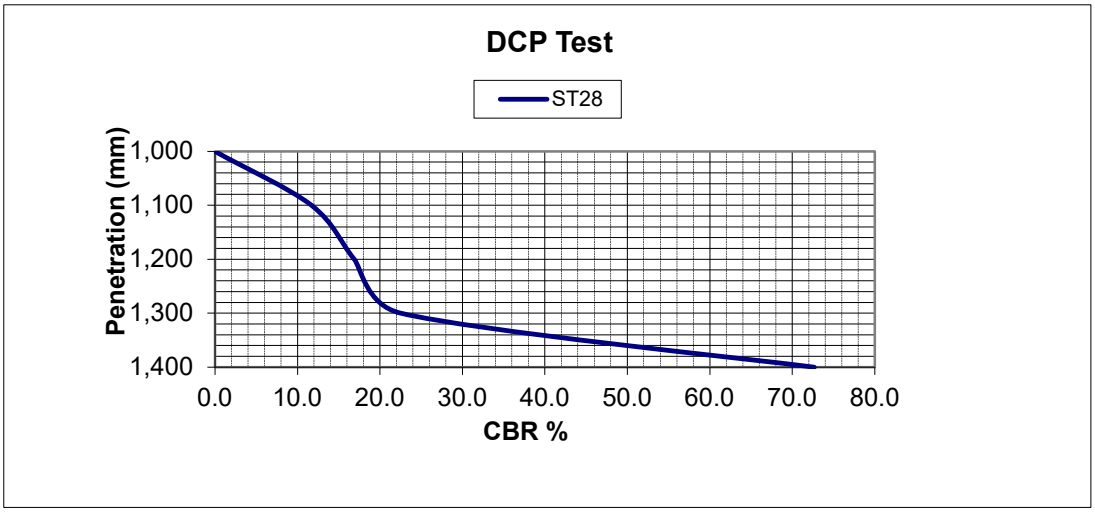
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST28
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	05/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	6	16.7	11.7
1,200	8	12.5	16.9
1,300	10	10.0	22.5
1,400	25	4.0	72.7

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



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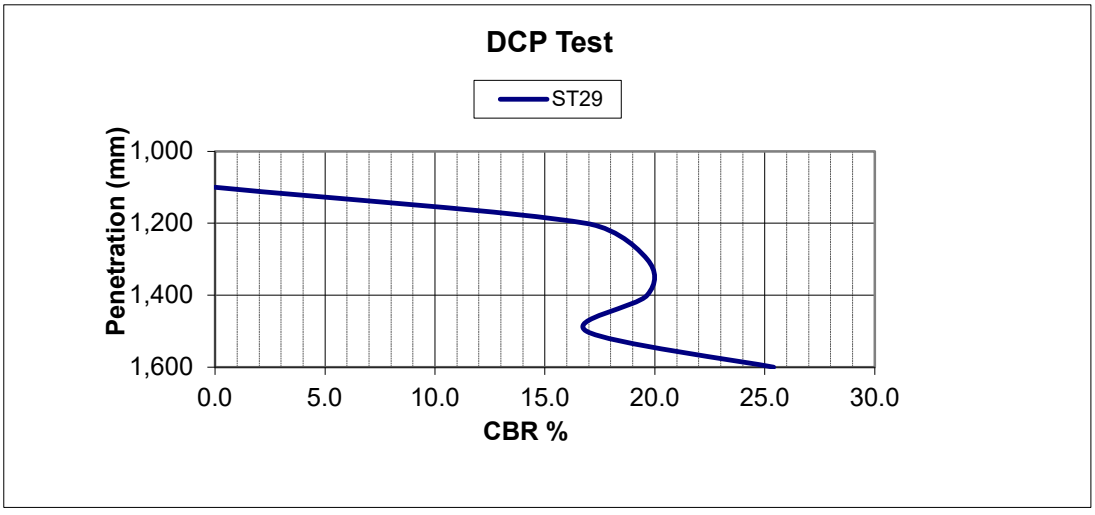
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Web: www.gii.ie

Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST29
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	28/02/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	8	12.5	16.9
1,300	9	11.1	19.7
1,400	9	11.1	19.7
1,500	8	12.5	16.9
1,600	11	9.1	25.4

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



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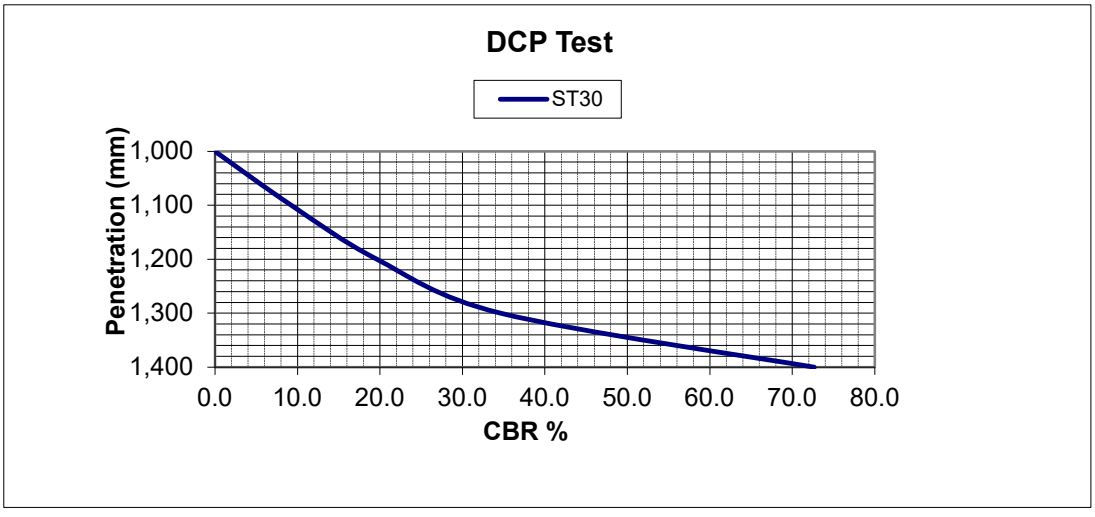
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST30
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	04/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	5	20.0	9.3
1,200	9	11.1	19.7
1,300	14	7.1	34.6
1,400	25	4.0	72.7

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



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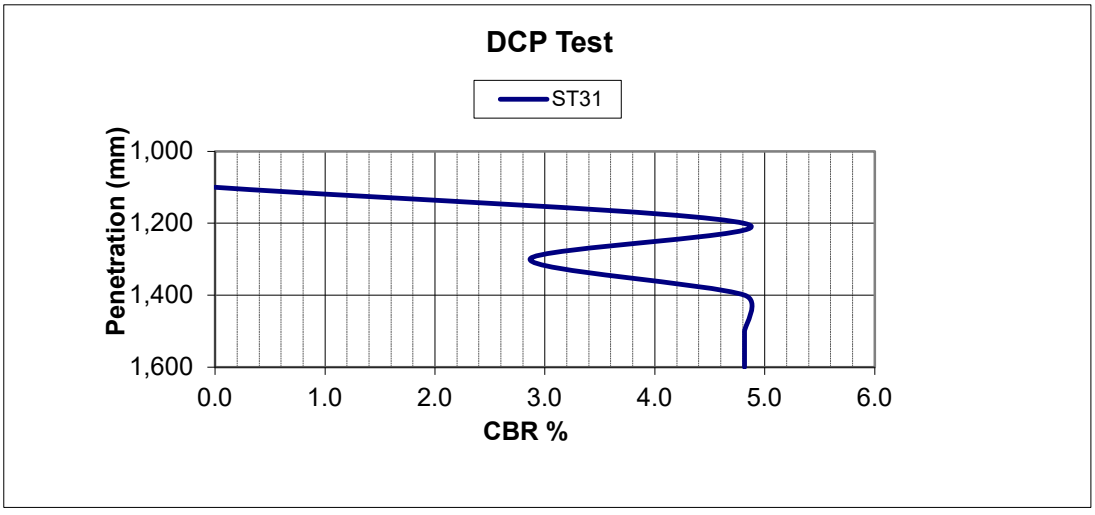
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST31
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	02/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	3	33.3	4.8
1,300	2	50.0	2.9
1,400	3	33.3	4.8
1,500	3	33.3	4.8
1,600	3	33.3	4.8

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



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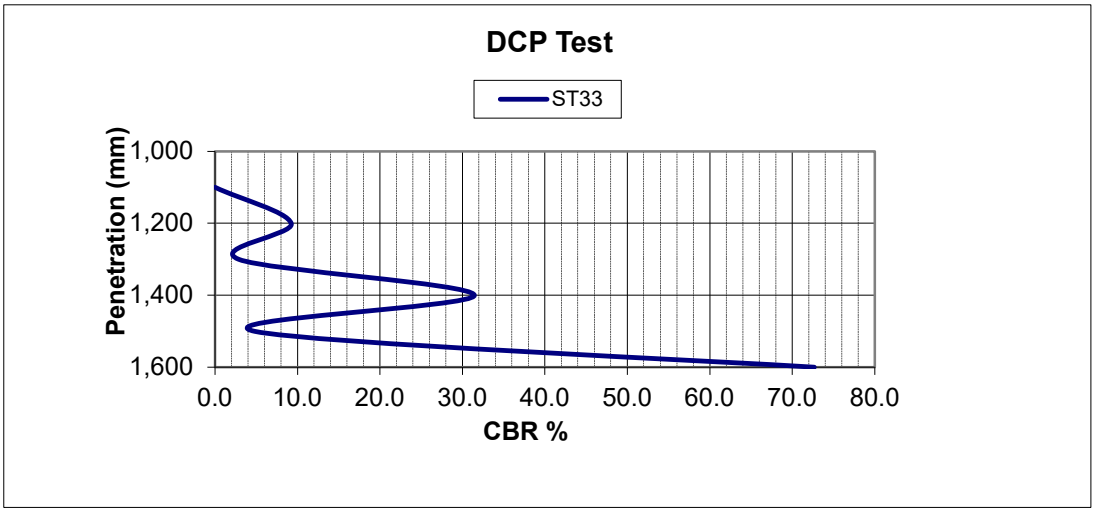
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST33
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	28/02/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	5	20.0	9.3
1,300	2	50.0	2.9
1,400	13	7.7	31.5
1,500	3	33.3	4.8
1,600	25	4.0	72.7

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



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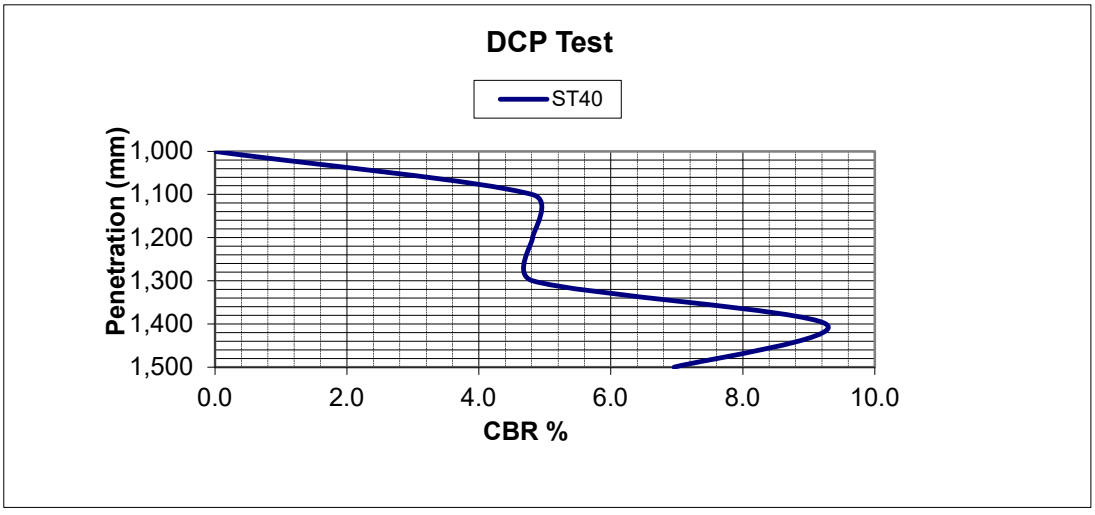
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Web: www.gii.ie

Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST40
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	10/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	3	33.3	4.8
1,200	3	33.3	4.8
1,300	3	33.3	4.8
1,400	5	20.0	9.3
1,500	4	25.0	7.0

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



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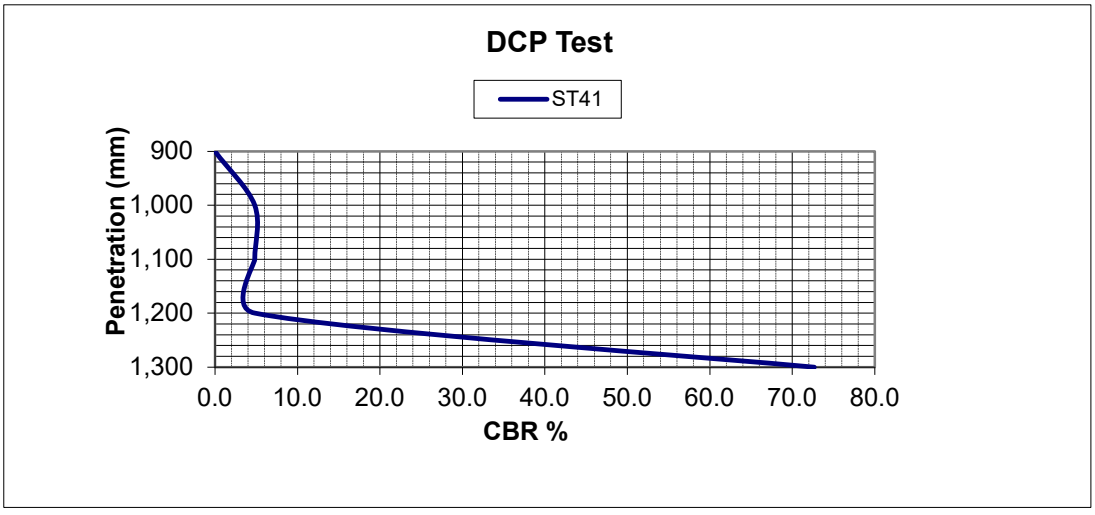
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST41
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	10/03/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	3	33.3	4.8
1,100	3	33.3	4.8
1,200	3	33.3	4.8
1,300	25	4.0	72.7

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



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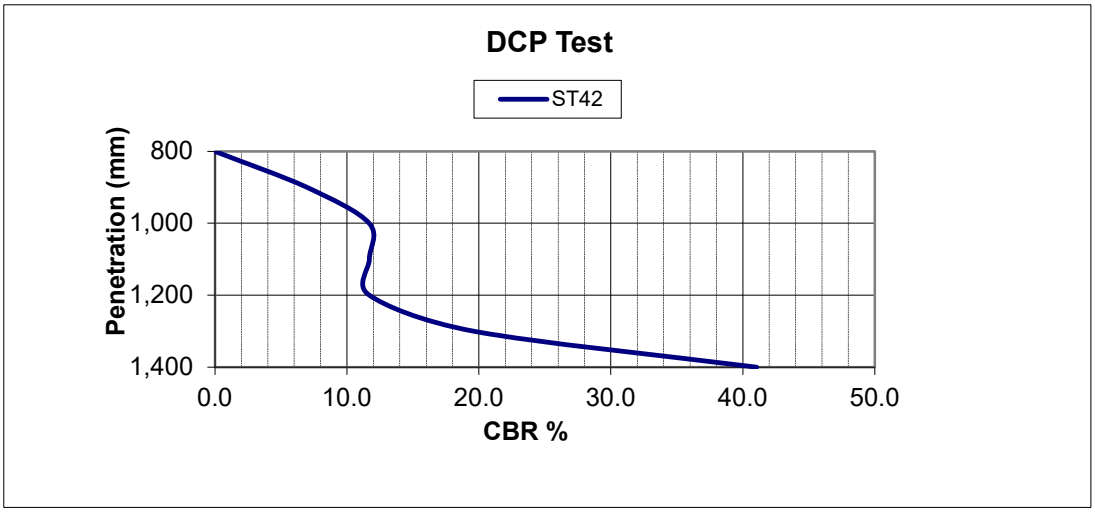
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST42
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	10/03/2020
Initial Depth	0.80m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
800	-	-	0.0
900	4	25.0	7.0
1,000	6	16.7	11.7
1,100	6	16.7	11.7
1,200	6	16.7	11.7
1,300	9	11.1	19.7
1,400	16	6.3	41.0

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



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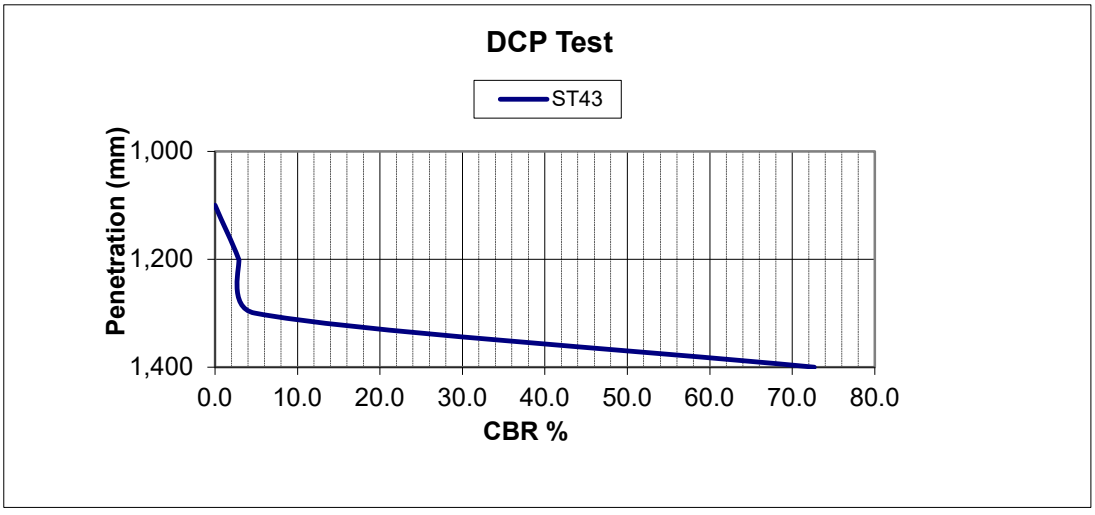
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST43
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	03/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	2	50.0	2.9
1,300	3	33.3	4.8
1,400	25	4.0	72.7

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



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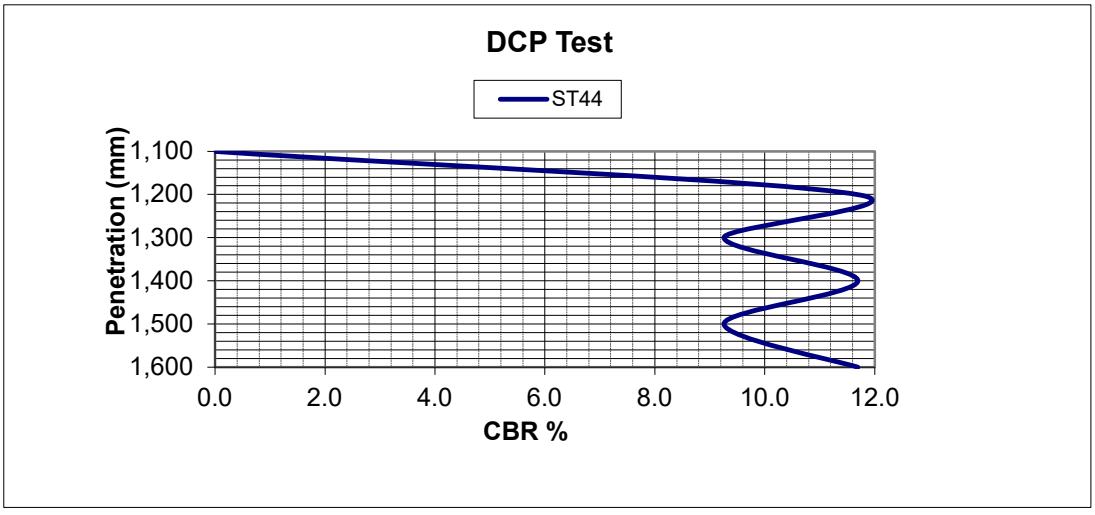
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Web: www.gii.ie

Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST44
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	06/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	6	16.7	11.7
1,300	5	20.0	9.3
1,400	6	16.7	11.7
1,500	5	20.0	9.3
1,600	6	16.7	11.7

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



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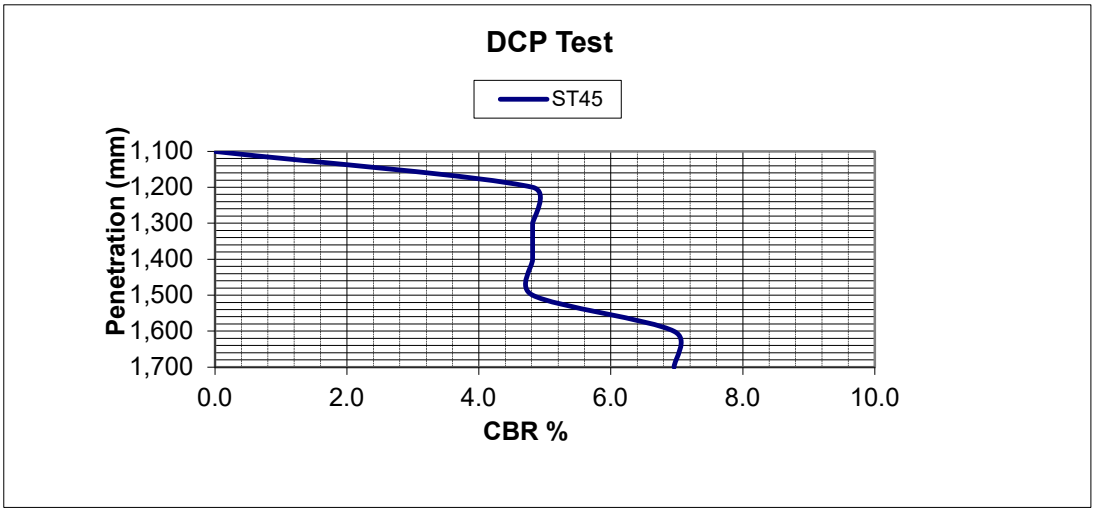
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST45
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	05/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	3	33.3	4.8
1,300	3	33.3	4.8
1,400	3	33.3	4.8
1,500	3	33.3	4.8
1,600	4	25.0	7.0
1,700	4	25.0	7.0

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



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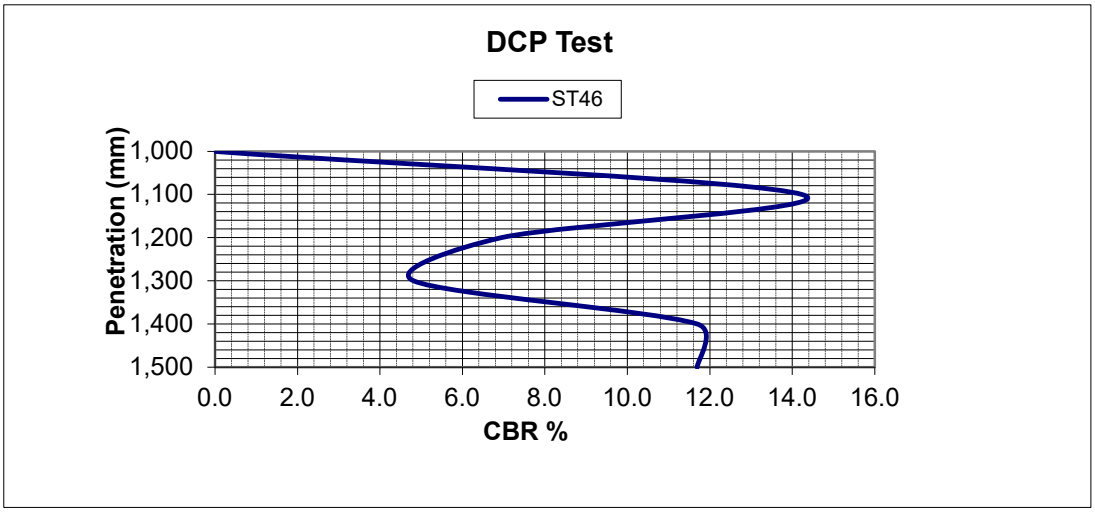
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST46
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	05/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	7	14.3	14.2
1,200	4	25.0	7.0
1,300	3	33.3	4.8
1,400	6	16.7	11.7
1,500	6	16.7	11.7

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



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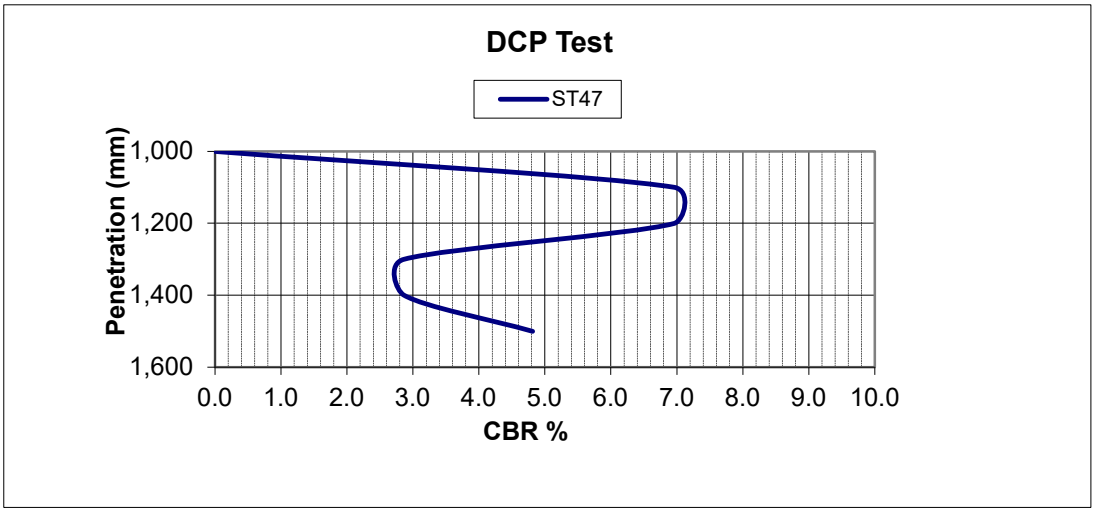
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST47
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	03/03/2020
Initial Depth	1.00m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,000	-	-	0.0
1,100	4	25.0	7.0
1,200	4	25.0	7.0
1,300	2	50.0	2.9
1,400	2	50.0	2.9
1,500	3	33.3	4.8

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



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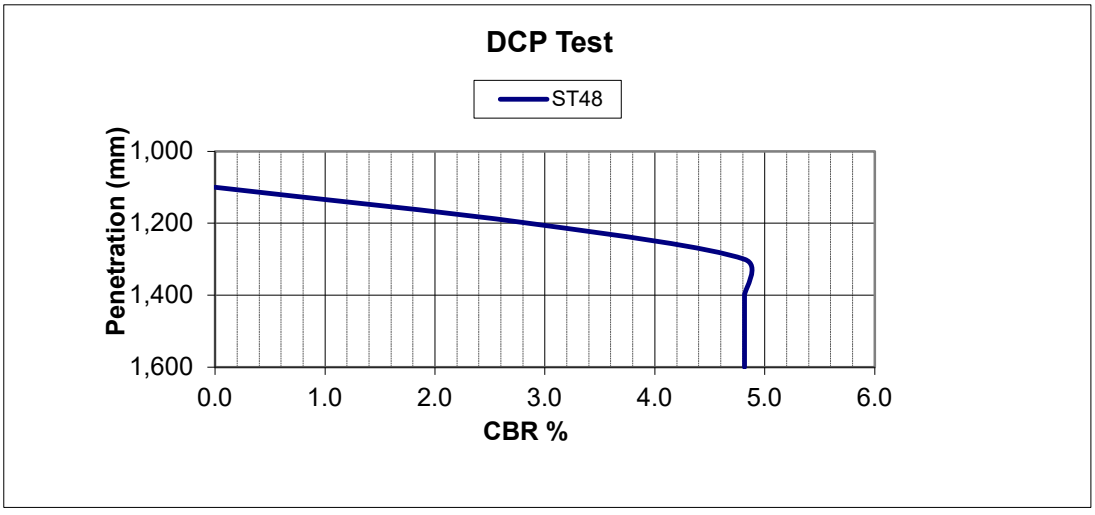
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST48
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	03/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	2	50.0	2.9
1,300	3	33.3	4.8
1,400	3	33.3	4.8
1,500	3	33.3	4.8
1,600	3	33.3	4.8

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



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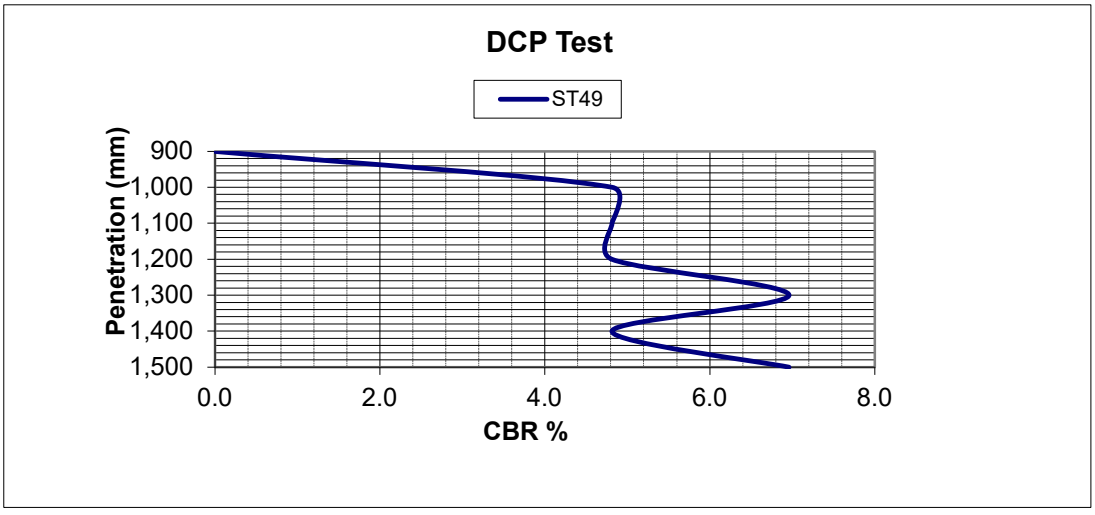
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST49
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	06/03/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	3	33.3	4.8
1,100	3	33.3	4.8
1,200	3	33.3	4.8
1,300	4	25.0	7.0
1,400	3	33.3	4.8
1,500	4	25.0	7.0

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



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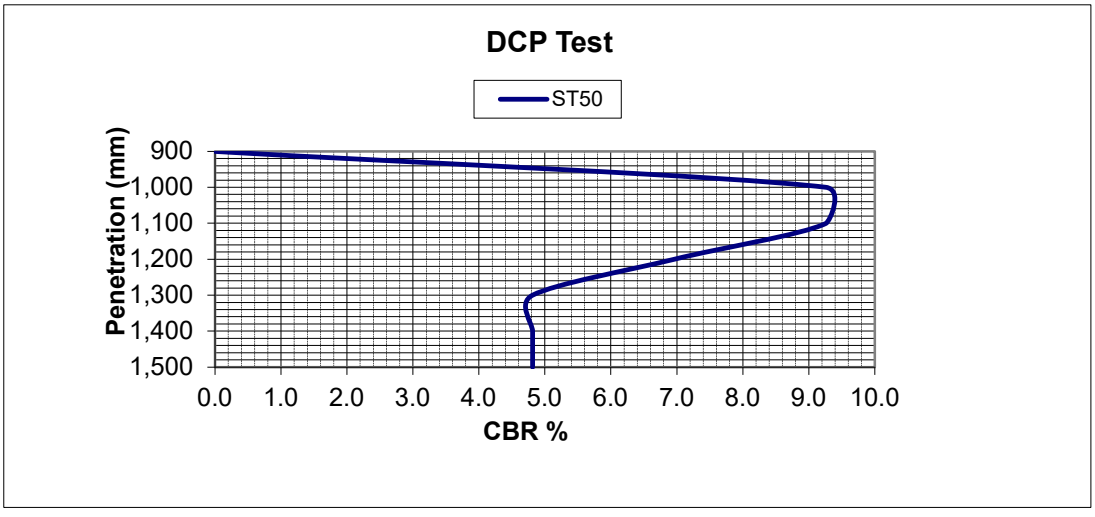
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST50
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	05/03/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	5	20.0	9.3
1,100	5	20.0	9.3
1,200	4	25.0	7.0
1,300	3	33.3	4.8
1,400	3	33.3	4.8
1,500	3	33.3	4.8

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



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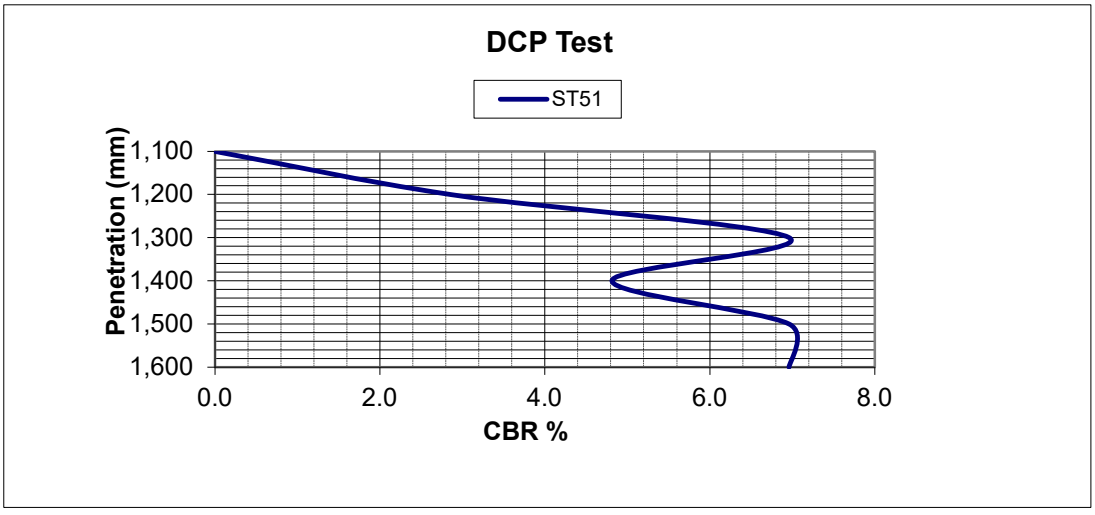
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST51
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	09/03/2020
Initial Depth	1.10m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
1,100	-	-	0.0
1,200	2	50.0	2.9
1,300	4	25.0	7.0
1,400	3	33.3	4.8
1,500	4	25.0	7.0
1,600	4	25.0	7.0

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



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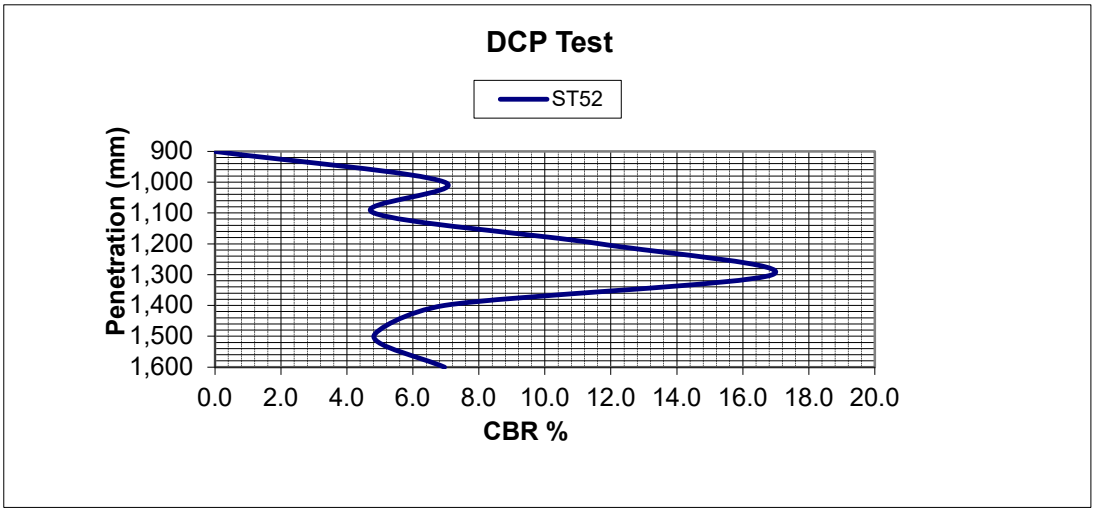
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Job Name	Royal Canal Urban Greenway	**Test Type**	Dynamic Cone Penetration Test
Job No.	9025-08-19	**Test Reference**	ST52
Engineer	DBFL Consulting Engineers	**By**	P. Cochran
		Date	06/03/2020
Initial Depth	0.90m BGL		

Depth (mm bgl)	No. of Blows per 100mm	Penetration per Blow (mm)	CBR (%)
900	-	-	0.0
1,000	4	25.0	7.0
1,100	3	33.3	4.8
1,200	6	16.7	11.7
1,300	8	12.5	16.9
1,400	4	25.0	7.0
1,500	3	33.3	4.8
1,600	4	25.0	7.0

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



APPENDIX 4 - Diamond Hand Drilled Core Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Royal Canal Urban Greenway			**Borehole Number** RC01
Machine : Concrete coriing drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 61.62	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location (dGPS) 707031 E 737598.6 N	**Dates** 26/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.50)	No recovery, Driller notes gravel and clay. Possible Made Ground		
						61.12	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling

Scale (approx)	Logged By
1:10	MS

Figure No. 9025-08-19.RC03

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Site Royal Canal Urban Greenway			**Borehole Number** RC03
Machine : Concrete coriing drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 61.40	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707136.5 E 737625.9 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.25)	COBBLES of Limestone		
						61.15	0.25	Firm greyish brown slightly sandy gravelly CLAY. Possible Made Ground		
							(0.25)			
						60.90	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC03

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Site Royal Canal Urban Greenway			**Borehole Number** RC04
Machine : Cocrete core drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 61.51	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707211.8 E 737653.4 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.15)	Grey angular fine to coarse GRAVEL		
						61.36	0.15	Grey medium strong LIMESTONE (Possible boulder)		
							(0.35)			
						61.01	0.50	Complete at 0.50m		

Remarks

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC04

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Site Royal Canal Urban Greenway			**Borehole Number** RC07
Machine : Concrete core drill **Flush :** Water **Core Dia :** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 60.48	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707303.3 E 737694.3 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.50)	Firm brown slightly sandy gravelly CLAY with occasional rootlets. Gravel is angualar to subangular fine to coarse. Possible Made Ground		
						59.98	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC07

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Site Royal Canal Urban Greenway			**Borehole Number** RC09
Machine : Concrete core drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 60.57	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707405.9 E 737743.5 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.50)	COBBLES and BOULDERS of Limestone - possible rock		
						60.07	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
No groundwater encounterduring drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC09

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Site Royal Canal Urban Greenway			**Borehole Number** RC11
Machine : Concrete core drill **Flush :** Water **Core Dia :** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 60.41	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707469 E 737771.3 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.10)	TOPSOIL		
						60.31	0.10	COBBLES and BOULDERS of Limestone - possible rock		
							(0.40)			
						59.91	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC11

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Site Royal Canal Urban Greenway			**Borehole Number** RC13
Machine : Concrete core drill **Flush :** Water **Core Dia :** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 58.83	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707565 E 737811.9 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.05)	TOPSOIL		
						58.78	0.05	Firm greyish brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is angular to subangular fine to coarse. Possible Made Ground		
							(0.30)			
						58.48	0.35	COBBLES of Limestone - possible rock		
							(0.15)			
						58.33	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC13

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Site Royal Canal Urban Greenway			**Borehole Number** RC15
Machine : Concrete coring drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 58.16	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707654 E 737849.1 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.05)	TOPSOIL		
						58.11	0.05	MADE GROUND: Greyish brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is angular to subangular fine to coarse.		
							(0.45)			
						57.66	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC15

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Site Royal Canal Urban Greenway			**Borehole Number** RC17
Machine : Concrete coring drill **Flush :** Water **Core Dia :** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 57.49	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707804.3 E 737912.4 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.50)	Firm brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is angular to subangular fine to coarse. Possible Made Ground		
						56.99	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC17

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Site Royal Canal Urban Greenway			**Borehole Number** RC20
Machine : Concrete coring drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 57.39	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707826.6 E 737922.6 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.50)	Firm brown slightly sandy gravelly CLAY with occasional cobbles and occasional rootlets and wood fragments. Gravel is angular to subangular fine to coarse. Possible Made Ground		
						56.89	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC20

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Site Royal Canal Urban Greenway			**Borehole Number** RC22
Machine : Concrete coring drill **Flush :** Water **Core Dia:** 75 mm **Method :** Rotary Cored	**Casing Diameter**	**Ground Level (mOD)** 57.30	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707853.7 E 737933.6 N	**Dates** 25/02/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.50)	Firm brown slightly sandy gravelly CLAY with occasional cobbles and occasional rootlets and wood fragments. Gravel is angular to subangular fine to coarse. Possible Made Ground		
						56.80	0.50	Complete at 0.50m		

Remarks
Refusal at 0.5m BGL. Unable to progess through overburden material.
Groundwater not encountered during drilling
Borehole backfilled on completion

Scale (approx)	Logged By
1:10	PC

Figure No. 9025-08-19.RC21

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Royal Canal Urban Greenway – Core Photographs

RC03



Royal Canal Urban Greenway – Core Photographs

RC04



Royal Canal Urban Greenway – Core Photographs

RC07



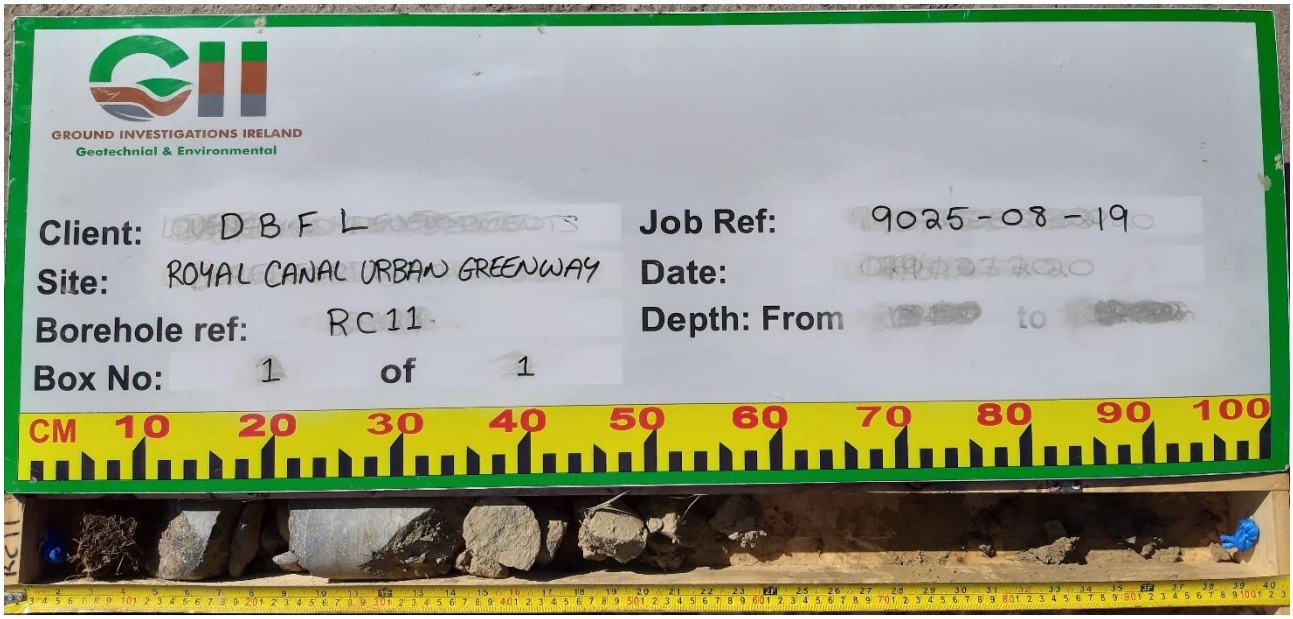
Royal Canal Urban Greenway – Core Photographs

RC09



Royal Canal Urban Greenway – Core Photographs

RC11



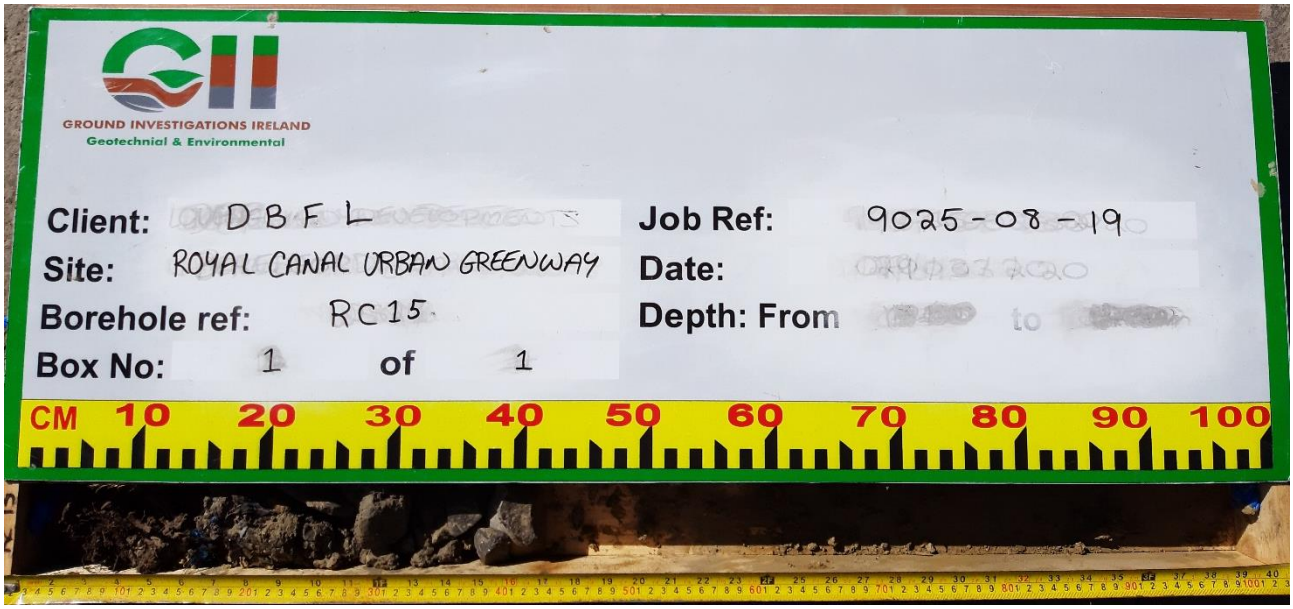
Royal Canal Urban Greenway – Core Photographs

RC13



Royal Canal Urban Greenway – Core Photographs

RC15



Royal Canal Urban Greenway – Core Photographs

RC17



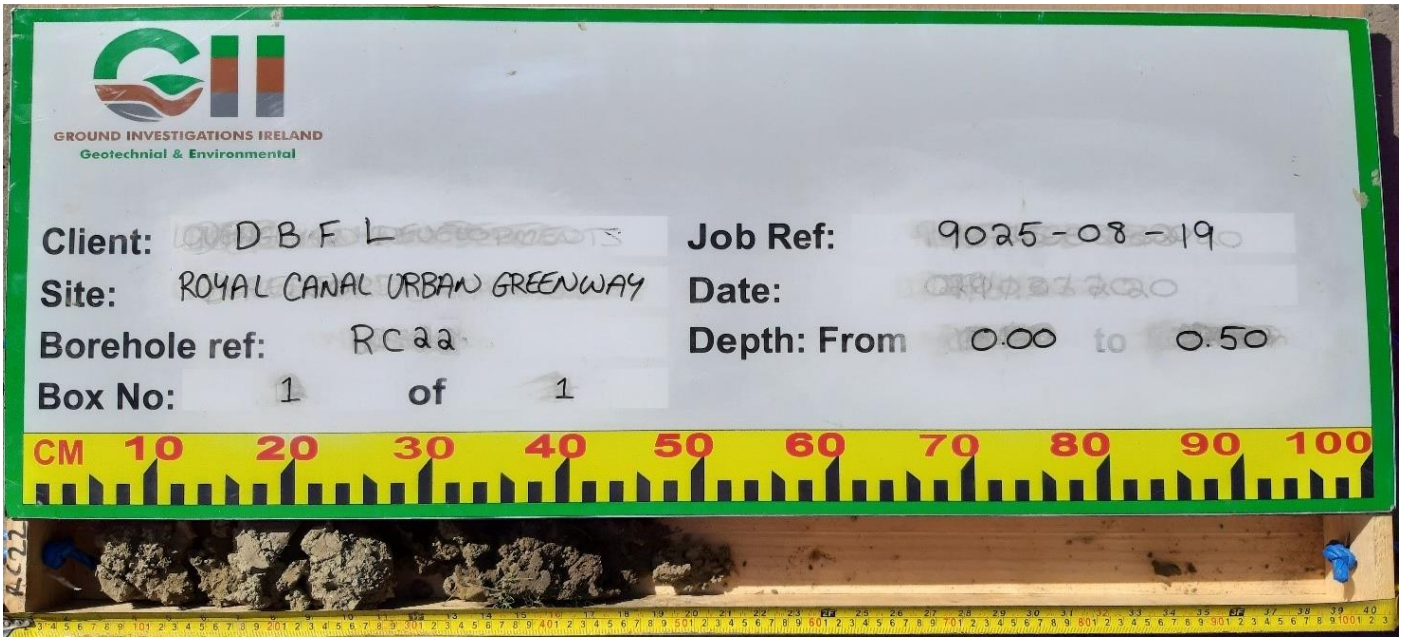
Royal Canal Urban Greenway – Core Photographs

RC20



Royal Canal Urban Greenway – Core Photographs

RC22



APPENDIX 5 - Rotary Borehole Records

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Site Royal Canal Urban Greenway			**Borehole Number** RC18
Machine : Barretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 6.0m	**Ground Level (mOD)** 59.58	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707732.3 E 737936.1 N	**Dates** 24/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						59.43	(0.15) 0.15	Brown slightly gravelly slightly sandy TOPSOIL		
	85						(0.95)	MADE GROUND: Brown slightly gravelly slightly sandy Clay with occasional plastic fragments. Gravel is angular to subangular fine to coarse		
1.00 1.00-1.45	48				3,3/3,2,2,3 SPT(C) N=10	58.48	1.10 (1.10)	Firm dark brownish grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse		
2.20 2.20-2.65	81				3,2/4,4,4,3 SPT(C) N=15	57.38	2.20 (0.40)	Firm to stiff dark brownish grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse.		
3.40-3.85					6,7/6,7,7,9 SPT(C) N=29	56.98	2.60 (1.10)	Stiff dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded		
3.70	43					55.88	3.70 (0.70)	Poor recovery - recovery consists of grey sandy clayey subangular to subrounded fine to coarse GRAVEL with occasional subangular cobbles. Driller's notes: grey slightly sandy gravelly CLAY with occasional cobbles and boulders		
						55.18	4.40 (0.80)	Poor recovery - recovery consists of stiff greyish brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse.		
5.20 5.20-5.65	28				9,13/13,14,16,7 SPT(C) N=50	54.38	5.20 (0.80)	Poor recovery. Recovery consists of very stiff grey slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse		
6.00						53.58	6.00	Complete at 6.00m		

Remarks
Borehole completed at 6.00m BGL
Borehole backfilled on completion

Scale (approx)	Logged By
1:50	PC

Figure No. 9025-08-19.RC18

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Site Royal Canal Urban Greenway			**Borehole Number** RC24
Machine : Barretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 23.2m	**Ground Level (mOD)** 57.43	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707891.1 E 737950.3 N	**Dates** 23/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	80					57.28	(0.15) 0.15	MADE GROUND: Grey sandy angular to subangular fine to coarse Gravel with occasional rootlets and wood fragments		
							(0.85)	Soft to firm dark brown slightly sandy gravelly CLAY with occasional rootlets. Gravel is angular to subangular fine to coarse. Driller's notes: Brown slightly sandy gravelly CLAY		
1.00 1.00-1.45	58				2,1/2,3,2,1 SPT(C) N=8	56.43	1.00	Firm brown slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is angular to subangular fine to coarse. Driller's notes: Brown slightly sandy gravelly CLAY		
							(1.20)			
2.20 2.20-2.65	32				2,3/3,4,8,10 SPT(C) N=25	55.23	2.20	Poor recovery - recovery consists of grey slightly sandy subangular to subrounded fine to coarse GRAVEL with occasional subangular cobbles. Driller's notes: brown slightly sandy gravelly CLAY with cobbles and boulders		
3.70 3.70-4.14	23				11,10/11,10,14,15 SPT(C) 50/290					
5.20 5.20-5.64	36				6,10/11,11,14,14 SPT(C) 50/285		(6.00)			
6.70 6.70-7.15	12				7,12/12,14,10,11 SPT(C) N=47					
8.20 8.20-8.61	0				10,10/11,14,16,9 SPT(C) 50/255	49.23	8.20	NO RECOVERY. Driller's notes: Sand over Clay		
							(1.50)			
9.70 9.70-10.10					8,14/15,17,14,4 SPT(C) 50/245	47.73	9.70	NO RECOVERY. Driller's notes: Sand and Gravel (Dense)		

Remarks
Borehole completed at 21.70m BGL.

Scale (approx)	Logged By
1:50	PC

Figure No. 9025-08-19.RC24

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Site Royal Canal Urban Greenway			**Borehole Number** RC24
Machine : Barretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 23.2m	**Ground Level (mOD)** 57.43	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707891.1 E 737950.3 N	**Dates** 23/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	0						(1.50)			
11.20 11.20-11.61	0				8,13/13,15,16,6 SPT(C) 50/255	46.23	11.20	NO RECOVERY. Driller's notes: Fine Sand (Dense)		
							(1.50)			
12.70 12.70-13.08	27				8,14/17,16,17 SPT(C) 50/225	44.73	12.70	Dense brownish grey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded		
14.20 14.70-15.08	25				5,15/17,17,16 SPT(C) 50/225					
15.70	27						(7.10)			
17.20 17.20-17.61	23				2,10/13,14,15,8 SPT(C) 50/260					
18.70 18.70-18.81	70				16,9/50 SPT(C) 25*/100 50/10	37.63	19.80	Dense brown silty fine to medium SAND		

Remarks

Scale (approx)	Logged By
1:50	PC

Figure No. 9025-08-19.RC24

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Site Royal Canal Urban Greenway			**Borehole Number** RC24
Machine : Barretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 23.2m	**Ground Level (mOD)** 57.43	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707891.1 E 737950.3 N	**Dates** 23/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.20 20.20-20.34	40				11,14/50 SPT(C) 25*/125 50/10		(1.90)			
21.70 21.70-21.80	40				21,4/50 SPT(C) 25*/90 50/10	35.73	21.70	Poor Recovery: Recovery of grey subangular to subrounded fine to coarse GRAVEL with occasional subangular to subrounded cobbles. 'Dense'		
23.20						34.23	(1.50) 23.20	Complete at 23.20m		

Remarks

Scale (approx)	Logged By
1:50	PC

Figure No. 9025-08-19.RC24

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Site Royal Canal Urban Greenway			**Borehole Number** RC28
Machine : Barretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 17.20m	**Ground Level (mOD)** 57.54	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707960.3 E 737975.8 N	**Dates** 23/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	27						(2.20)	Poor recovery - recovery consists of MADE GROUND: Grey angular to subangular fine to coarse Gravel with occasional cobbles over a soft to firm brown slightly sandy gravelly CLAY with occasional subangular cobbles. Gravel is subangular to subrounded fine to coarse. Driller's notes: Fill over brown CLAY		
2.20	53					55.34	2.20 (1.50)	Stiff dark grey slightly sandy gravelly CLAY with some cobbles and occasional boulders		
3.70	90					53.84	3.70	Very stiff dark grey slightly sandy gravelly CLAY occasional angular to subangular cobbles. Gravel is angular to subangular fine to coarse.		
5.20	77						(4.15)			
6.70	77					49.69	7.85	Very stiff greyish brown slightly sandy gravelly CLAY with occasional angular to subrounded cobbles. Gravel is angular to subrounded fine to coarse.		
8.20	73						(0.95)			
						48.74	8.80	Very stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles		
9.70						47.84	(0.90) 9.70	Recovery consists of grey subangular to subrounded fine to coarse GRAVEL with occasional cobbles over a very stiff		

Remarks
Borehole completed at 17.20m BGL.

Scale (approx)	Logged By
1:50	PC

Figure No. 9025-08-19.RC28

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Site Royal Canal Urban Greenway			**Borehole Number** RC28
Machine : Barretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 17.20m	**Ground Level (mOD)** 57.54	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707960.3 E 737975.8 N	**Dates** 23/03/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	67						(1.50)	dark brown slightly sandy slightly gravelly CLAY with occasional cobbles. Driller's notes: Dark brown slightly sandy gravelly CLAY with cobbles and boulders (very stiff)		
11.20	53					46.34	11.20 (1.50)	Very stiff dark grey slightly sandy gravelly CLAY with occasional angular to subrounded cobbles		
12.70	53					44.84	12.70 (1.50)	Very stiff dark grey slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is angular to subrounded		
14.20	67					43.34	14.20 (3.00)	Very stiff brown slightly sandy gravelly CLAY with frequent cobbles of Limestone. Gravel is angular to subrounded fine to coarse		
15.70	75									
17.20						40.34	17.20	Complete at 17.20m		

Remarks

Scale (approx)	Logged By
1:50	PC

Figure No. 9025-08-19.RC28

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Royal Canal Urban Greenway – Rotary Core Photographs

RC18





Royal Canal Urban Greenway – Rotary Core Photographs

RC24





Royal Canal Urban Greenway – Rotary Core Photographs

RC24



Royal Canal Urban Greenway – Rotary Core Photographs

RC28





Royal Canal Urban Greenway – Rotary Core Photographs

RC28





APPENDIX 6 – Angled Rotary Borehole Records

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Site Royal Canal Urban Greenway			**Borehole Number** RC02
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 45° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 1.80m	**Ground Level (mOD)** 56.99	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707097.1 E 737627.5 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	0	0	0				(0.80)	Poor recovery. Recovery consists of slightly sandy slightly clayey GRAVEL with boulders. Gravel is fine to coarse subangular to subrounded. Driller notes: Clay.		
0.40						56.43	0.80			
0.80	100	59	59	3			(1.00)	Medium strong-strong fine grained dark grey LIMESTONE partially weathered with calcite veining. One set of fractures. F1: 45-50 degrees. Closely spaced undulating smooth closed.		
1.80						55.72	1.80	Complete at 1.80m		

Remarks
Borehole complete at 1.80m.
Borehole backfilled on completion.
Borehole drilled downwards at 45 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC02

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Site Royal Canal Urban Greenway			**Borehole Number** RC05
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 50° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.50m	**Ground Level (mOD)** 56.94	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707208.2 E 737666.4 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	44	32	32				(0.50)	Poor recovery. Recovery consists of slightly sandy GRAVEL. Gravel is fine to coarse subangular to subrounded.		
0.50						56.62	0.50			
0.80	82	65	61	43			(2.00)	Medium strong-strong fine grained dark grey LIMESTONE partially weathered with calcite veining. One set of fractures. F1: 45-60 degrees. Closely spaced undulating smooth closed.		
2.50						55.33	2.50	Complete at 2.50m		

Remarks
Borehole complete at 2.50m.
Borehole backfilled on completion.
Borehole drilled downwards at 40 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC05

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Site Royal Canal Urban Greenway			**Borehole Number** RC06
Machine : Beretta T44 **Flush :** Water **Core Dia :** 96 mm **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 3.00m	**Ground Level (mOD)** 57.15	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707297.5 E 737707.8 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	-	-					(1.50)	No Recovery. Driller notes: Clay.		
1.50	47	-				55.65	1.50 (1.50)	Poor recovery. Recovery consists of slightly sandy slightly clayey GRAVEL with some subangular to subrounded cobbles of limestone. Gravel is fine to coarse subangular to subrounded. Driller notes: Large to small boulders in Clay.		
3.00						54.15	3.00	Complete at 3.00m		

Remarks
Borehole complete at 3.00m.
Borehole backfilled on completion.
Borehole drilled downwards at 40 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC06

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Site Royal Canal Urban Greenway			**Borehole Number** RC08
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination :** 50° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.20m	**Ground Level (mOD)** 56.60	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707464 E 737785.5 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	0	-					(0.40)	No Recovery. Driller notes: roots into Clay.		
0.40	100	-				56.35	0.40 (0.30)	Slightly sandy slightly clayey GRAVEL. Gravel is fine to coarse subangular to subrounded.		
0.70	93	60	54	8		56.15	0.70 (1.50)	Medium strong-strong fine grained grey LIMESTONE partially weathered with some calcite veining. One set of fractures. F1: 40-50 degrees. Closely spaced undulating smooth closed with some brown staining.		
2.20						55.19	2.20	Complete at 2.20m		

Remarks
Borehole complete at 2.20m.
Borehole backfilled on completion.
Borehole drilled downwards at 40 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC10

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Site Royal Canal Urban Greenway			**Borehole Number** RC08A
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 55° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.30m	**Ground Level (mOD)** 56.74	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707464.8 E 737785.9 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	50	-					(0.70)	Slightly sandy clayey GRAVEL with rootlets. Gravel is fine to coarse subangular to subrounded.		
0.80	100	91	83	5		56.33	0.70	Medium strong-strong fine grained grey LIMESTONE partially weathered with calcite veining. One set of fractures. F1: 30-45 degrees. Closely spaced undulating smooth occasionally open with clay infill and brown staining.		
2.30						55.42	(1.60) 2.30	Complete at 2.30m		

Remarks
Borehole complete at 2.30m.
Borehole backfilled on completion.
Borehole drilled downwards at 35 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC08

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Site Royal Canal Urban Greenway			**Borehole Number** RC12
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 50° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 1.60m	**Ground Level (mOD)** 56.94	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707569.4 E 737828.7 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	0	-					(0.30)	No Recovery. Driller notes: Clay.		
0.30	100	-				56.75	0.30	Very weak to weak grey fine grained LIMESTONE. Recovery of slightly clayey slightly gravelly angular fine to coarse gravel and angular cobbles. 0.3 to 1.6m Mostly non intact core		
0.90	100	-					(1.30)			
1.60						55.91	1.60	Complete at 1.60m		

Remarks
Borehole complete at 1.60m.
Borehole backfilled on completion.
Borehole drilled downwards at 40 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC12

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Site Royal Canal Urban Greenway			**Borehole Number** RC14
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination :** 50° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 1.60m	**Ground Level (mOD)** 56.78	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707621.2 E 737850.7 N	**Dates** 21/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	100	54	39	15			(1.60)	Weak-medium strong fine grained grey LIMESTONE distinctly weathered with calcite veins. Two sets of fractures. F1: 30-40 degrees closely space undulating smooth closed. F2: 40-60 degrees. Closely spaced undulating smooth open with clay infill and some brown staining.		
1.40				N.I.				Not intact.		
1.60						55.75	1.60	Complete at 1.60m		

Remarks
Borehole complete at 1.60m.
Borehole backfilled on completion.
Borehole drilled downwards at 40 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC14

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Site Royal Canal Urban Greenway			**Borehole Number** RC16
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 50° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 3.60m	**Ground Level (mOD)** 56.47	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707714.3 E 737892.1 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(3.60)	Poor Recovery. Recovery consists of slightly sandy slightly clayey GRAVEL with subangular to subrounded cobbles of limestone. Gravel is fine to coarse subangular to subrounded. Driller notes: small to large boulders in Clay.		
						54.15	3.60	Complete at 3.60m		

Remarks
Borehole complete at 3.60m.
Borehole backfilled on completion.
Borehole drilled downwards at 40 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC16

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Site Royal Canal Urban Greenway			**Borehole Number** RC19
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 52° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 5.50m	**Ground Level (mOD)** 56.83	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707803.3 E 737931.3 N	**Dates** 22/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(5.50)	Poor Recovery. Recovery consists of slightly sandy slightly clayey GRAVEL with subangular to subrounded cobbles of limestone. Gravel is fine to coarse subangular to subrounded. Driller notes: small to large boulders in Clay.		
						53.44	5.50	Complete at 5.50m		

Remarks
Borehole complete at 5.50m.
Borehole backfilled on completion.
Borehole drilled downwards at 38 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RC19

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Site Royal Canal Urban Greenway			**Borehole Number** RCH01
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination :** 78° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.50m	**Ground Level (mOD)** 58.20	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707031.6 E 737603.8 N	**Dates** 01/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00										
	50	17	17				(0.70)	Brown slighlty sandy CLAY with some subangular to subrounded cobbles, wood fragments and rootlets.		
0.70						58.06	0.70			
1.00	70	55	50	13			(1.80)	Medium strong-strong fine grained grey fossiliferous LIMESTONE. Partially-distinctly weathered with some calcite veining. One set of fractures. F1: 70-80 degrees. Closely spaced undulating smooth occasionally open with clay infill.		
2.00	100	54	54							
2.50						57.68	2.50	Complete at 2.50m		

Remarks
Borehole complete at 2.50m.
Borehole backfilled on completion.
Borehole drilled downwards at 12 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH01

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Site Royal Canal Urban Greenway			**Borehole Number** RCH02
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination :** 78° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.40m	**Ground Level (mOD)** 58.30	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707135.9 E 737630.4 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00								Brown slighlty sandy CLAY with some rootlets.		
							(0.70)			
0.70	84	26	22			58.15	0.70	Medium strong-strong fine grained grey LIMESTONE. Distinctly weathered with some calcite veining. Two set of fractures. F1: 65-80 degrees. Closely spaced undulating smooth closed with brown oxidation staining. F2: 10-20 degrees. Closely spaced undulating smooth closed.		
				13			(1.70)			
1.90	90	80	70							
2.40						57.80	2.40	Complete at 2.40m		

Remarks
Borehole complete at 2.40m.
Borehole backfilled on completion.
Borehole drilled downwards at 12 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH02

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Site Royal Canal Urban Greenway			**Borehole Number** RCH03
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 78° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.30m	**Ground Level (mOD)** 57.01	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707210.7 E 737655.1 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	100	94	91	6			(2.30)	Medium strong-strong fine grained grey fossiliferous LIMESTONE. Partially -distinctly weathered with some calcite veining. Two set of fractures. F1: 80-90 degrees. Closely spaced undulating smooth closed. F2: 10-20 degrees. Closely spaced undulating rough closed.		
1.60	100	57	57							
2.30						56.53	2.30	Complete at 2.30m		

Remarks
Borehole complete at 2.30m depth.
Borehole backfilled on completion.
Borehole drilled downwards at 12 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH03

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Site Royal Canal Urban Greenway			**Borehole Number** RCH04
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 78° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 3.60m	**Ground Level (mOD)** 58.07	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707301.9 E 737697.5 N	**Dates** 19/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	14	-					(3.60)	Poor recovery. Recovery consists of slightly sandy slightly clayey GRAVEL of varying lithologies. Gravel is fine to coarse subangular to subrounded. Driller notes: Clay with boulders.		
3.60						57.32	3.60	Complete at 3.60m		

Remarks
Borehole complete at 3.60m, no rock encountered.
Borehole backfilled on completion.
Borehole drilled downwards at 12 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH04

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Site Royal Canal Urban Greenway				**Borehole Number** **RCH05**
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination :** 78° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 1.40m	**Ground Level (mOD)** 57.75	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707404.4 E 737747 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	0	-					(0.30)	No Recovery.		
0.30	100	61	31	5		57.69	0.30	Weak-medium strong fine grained grey LIMESTONE distinctly weathered with calcite veining. One set of fractures. F1: 75-90 degrees. Very closely-closely spaced undulating smooth closed with brown staining.		
0.60							(1.10)			
1.40						57.46	1.40	Complete at 1.40m		

Remarks
Borehole complete at 1.40m depth.
Borehole backfilled on completion.
Borehole drilled downwards at 12 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No.
9025-08-19.RCH05

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Site Royal Canal Urban Greenway			**Borehole Number** RCH06
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination :** 78° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.10m	**Ground Level (mOD)** 58.03	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707466.6 E 737774.3 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00	100	72	47	9			(2.10)	Medium strong-strong fine grained dark grey LIMESTONE partially-dstinctly weathered with calcite veining. 2 sets of fractures. F1: 80-90 degrees. Closely spaced undulating smooth closed. F2: 0-10 degrees. Closely spaced undulating smooth closed with some brown staining.		
1.50	100	100	100							
2.10						57.60	2.10	Complete at 2.10m		

Remarks
Borehole complete at 2.10m.
Borehole backfilled on completion.
Borehole drilled downwards at 12 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH06

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Site Royal Canal Urban Greenway			**Borehole Number** RCH07
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 30° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.20m	**Ground Level (mOD)** 57.55	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707564.2 E 737814.3 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							(0.30)	No recovery. Driller notes: Clay.		
0.30	95	62	31	11		57.29	0.30 (1.90)	Medium strong-strong fine grained dark grey LIMESTONE partially-distinctly weathered with calcite veining. 2 sets of fractures. F1: 40-55 degrees. Closely spaced undulating smooth closed. F2: 40-60 degrees. Closely spaced undulating smooth occasionally open with clay infill.		
2.20						55.64	2.20	Complete at 2.20m		

Remarks
Borehole complete at 2.20m depth.
Borehole backfilled on completion.
Borehole drilled downwards at 60 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH07

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Site Royal Canal Urban Greenway			**Borehole Number** RCH08
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 45° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.10m	**Ground Level (mOD)** 56.80	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707655.8 E 737851.9 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								Slightly sandy clayey GRAVEL with many cobbles and boulders of limestone. Gravel is fine to coarse subangular to subrounded. Driller notes clay into weathered rock.		
0.30							(0.80)			
	100	32	17			56.23	0.80	Very weak to weak dark grey fine grained LIMESTONE. Recovery of anglar fine to coarse gravel and angular cobbles. 0.8 to 1.0 mostly non intact core		
							(1.30)			
2.10						55.31	2.10	Complete at 2.10m		

Remarks
Borehole complete at 2.10m.
Borehole backfilled on completion.
Borehole drilled downwards at 45 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH08

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Site Royal Canal Urban Greenway			**Borehole Number** RCH09
Machine : Beretta T44 **Flush :** Water **Core Dia:** 96 mm **Inclination:** 52° to the vertical **Method :** Rotary Cored	**Casing Diameter** 96mm cased to 2.10m	**Ground Level (mOD)** 56.63	**Client** Fingal County Council	**Job Number** 9025-08-19
	Location 707803.6 E 737914.3 N	**Dates** 20/05/2020	**Engineer** DBFL Consulting Engineers Ltd.	**Sheet** 1/1

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	10						(2.10)	Poor Recovery. Recovery consists of slightly sandy GRAVEL with cobbles of limestone. Gravel is fine to coarse subangular to subrounded. Driller notes: Clay with boulders.		
2.10						55.34	2.10	Complete at 2.10m		

Remarks
Borehole complete at 2.10m depth.
Borehole backfilled on completion.
Borehole drilled downwards at 38 degrees from horizontal

Scale (approx)	Logged By
1:50	CB

Figure No. 9025-08-19.RCH09

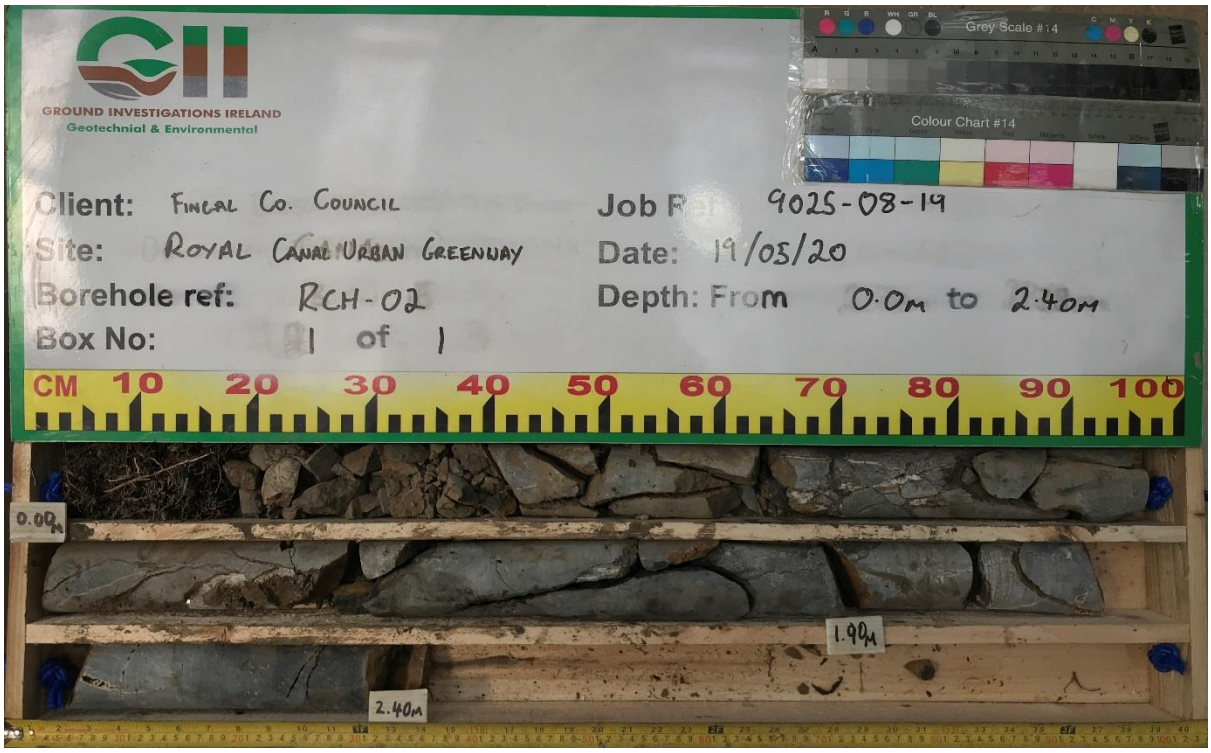
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Royal Canal Rotary Core – Fingal Co. Council

RCH01



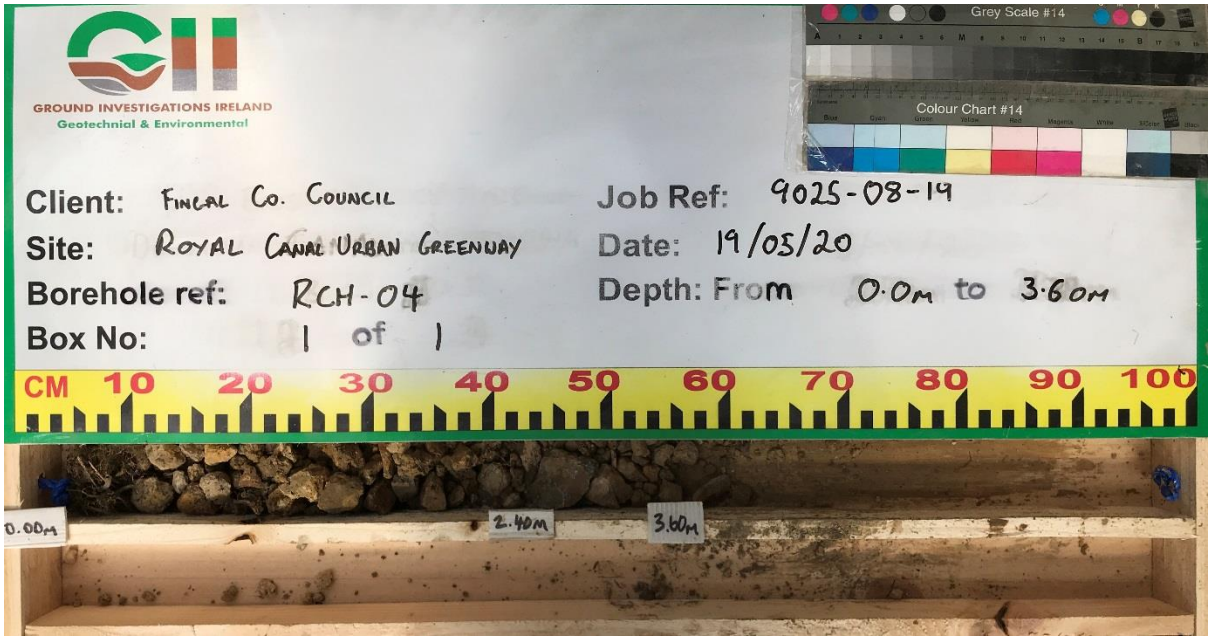
RCH02



RCH03

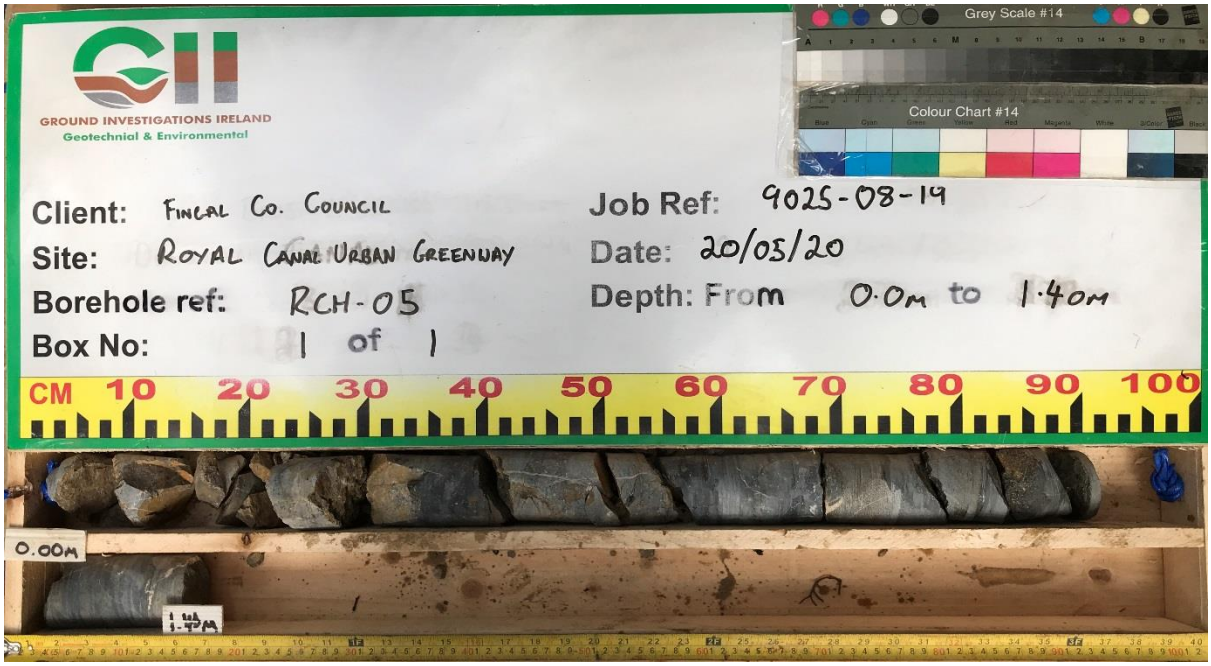

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Date: 19/05/20
Borehole ref: RCH-03
Depth: From 0.0m to 2.30m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
2.00m
1.60m
2.30m

RCH04


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Date: 19/05/20
Borehole ref: RCH-04
Depth: From 0.0m to 3.60m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.00m
2.40m
3.60m

Royal Canal Rotary Core – Fingal Co. Council

RCH05

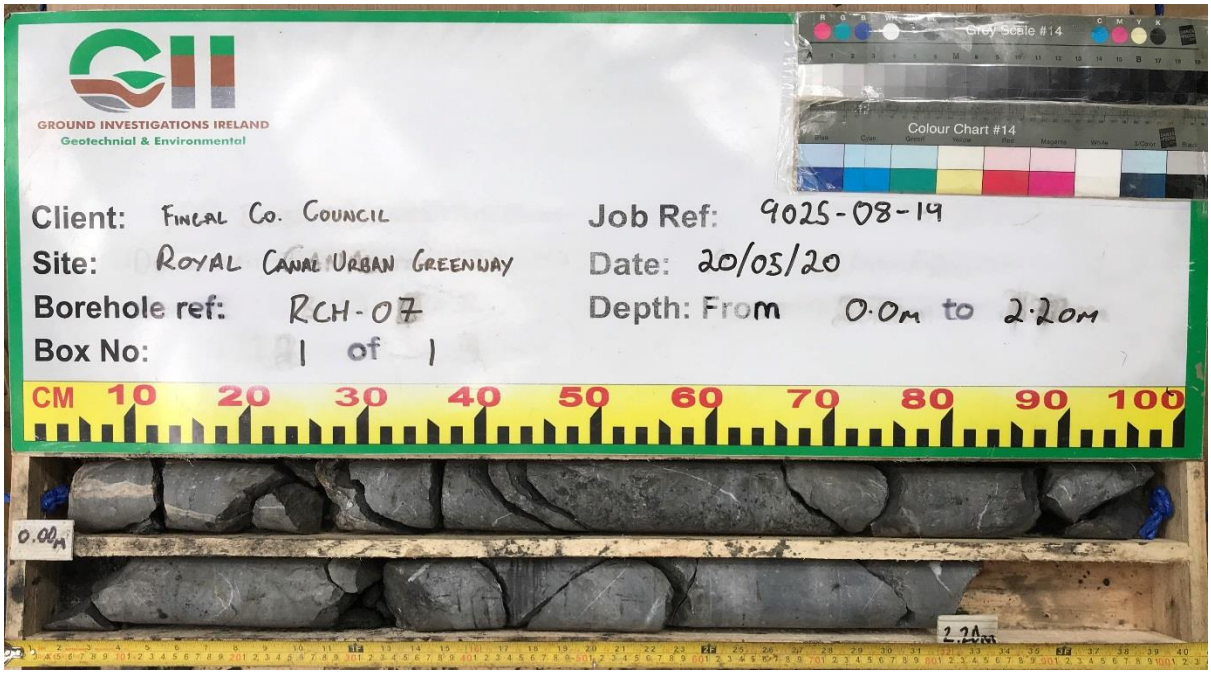


RCH06



Royal Canal Rotary Core – Fingal Co. Council

RCH07

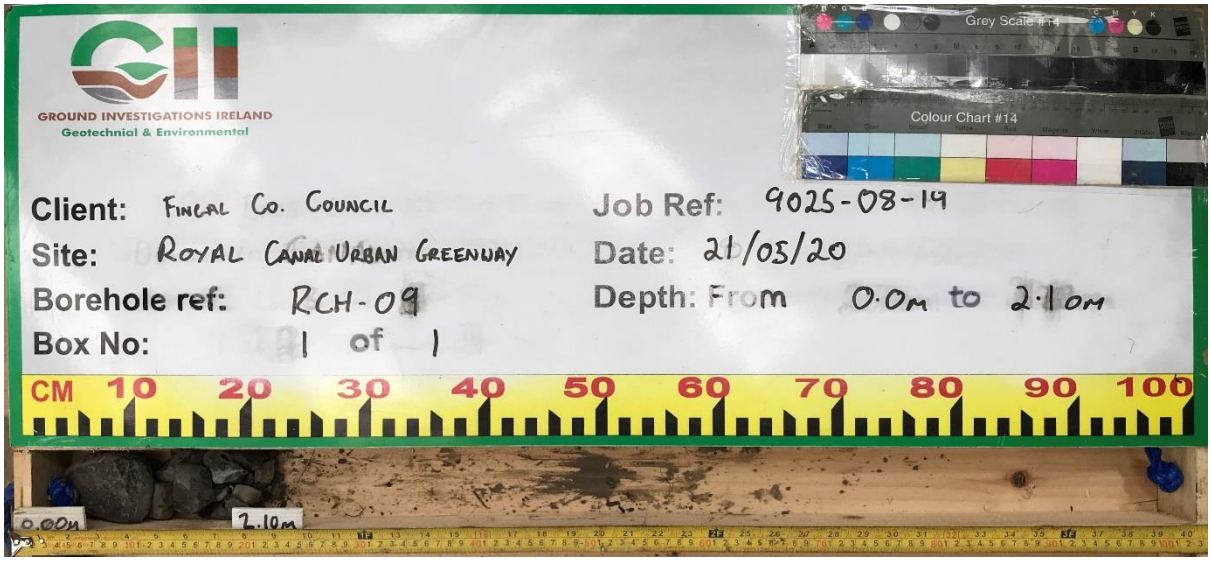


RCH08



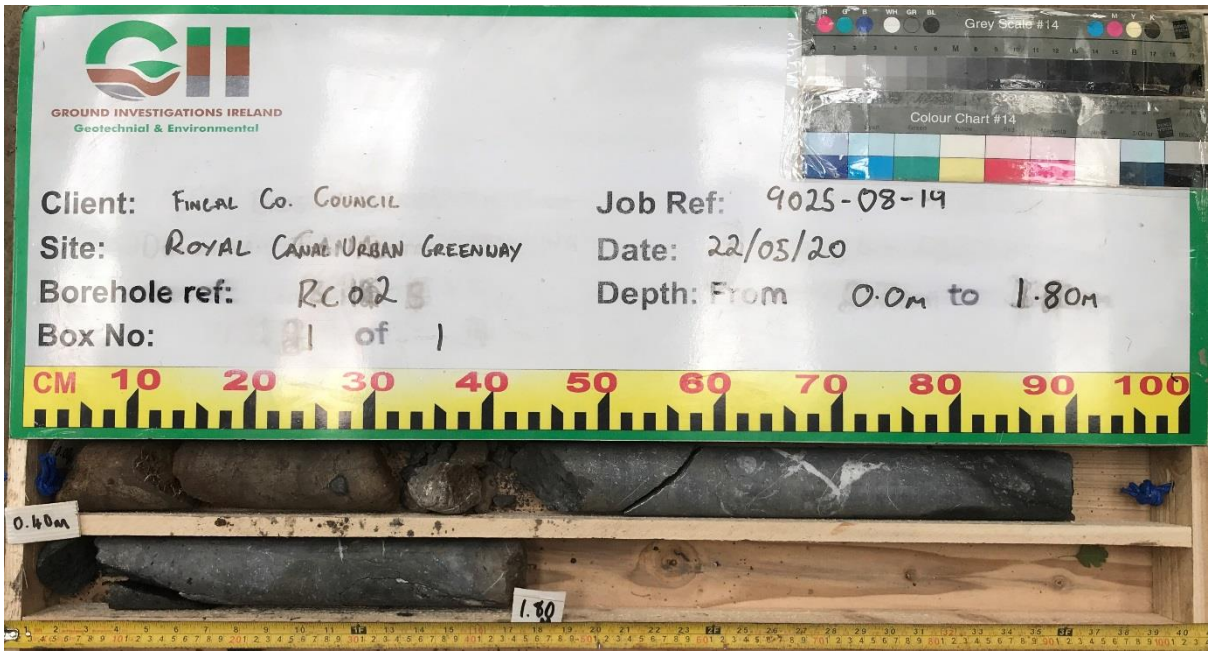
Royal Canal Rotary Core – Fingal Co. Council

RCH09

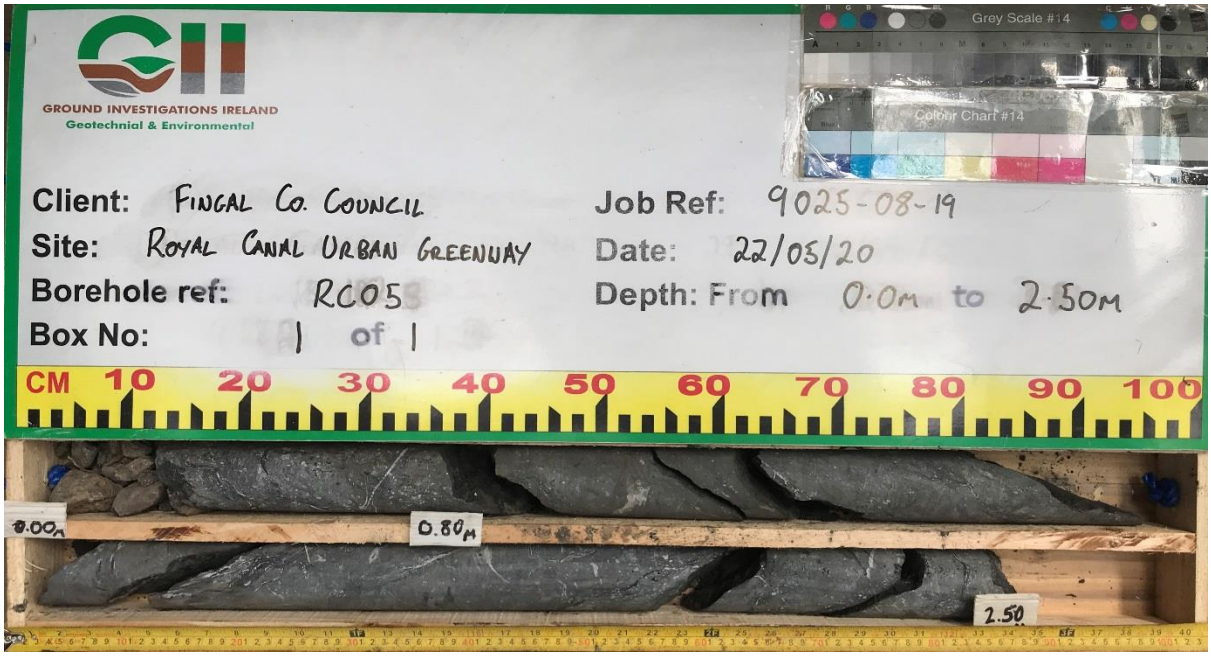


Royal Canal Rotary Core – Fingal Co. Council

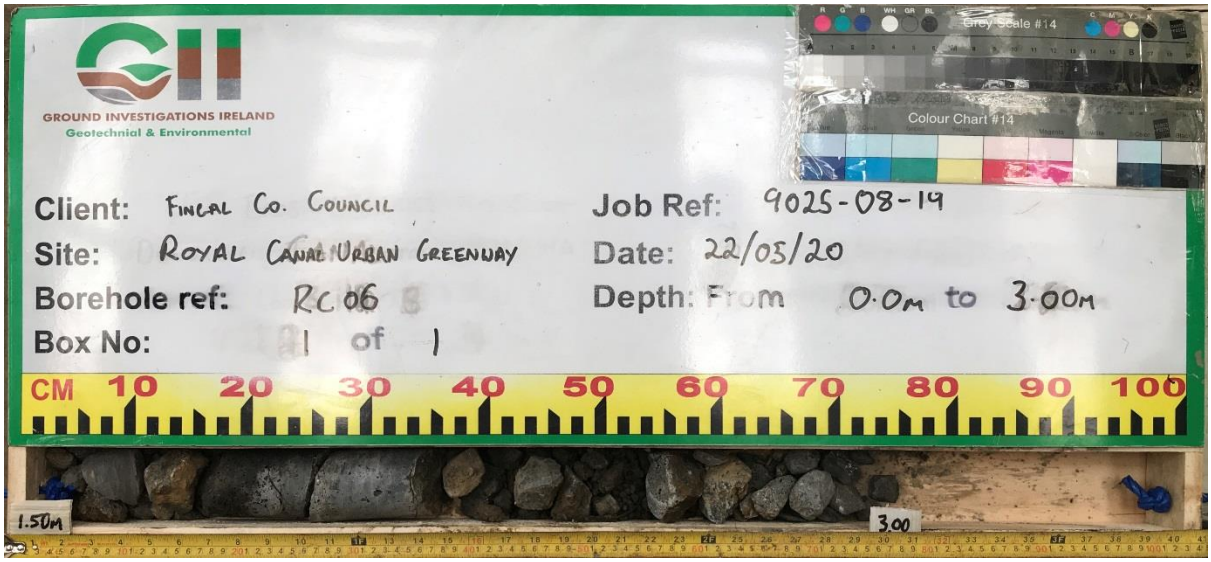
RC02



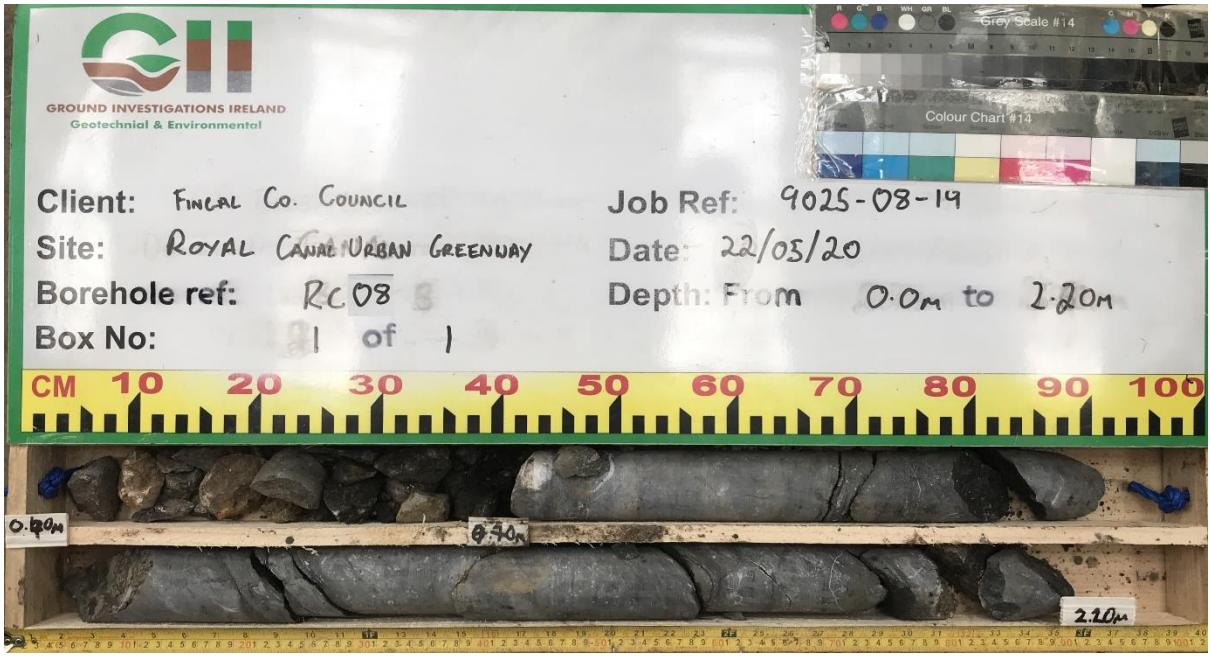
RC05



RC06


GROUND INVESTIGATIONS IRELAND
Geotechnial & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Date: 22/05/20
Borehole ref: RC06
Depth: From 0.0m to 3.00m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
1.50m
3.00

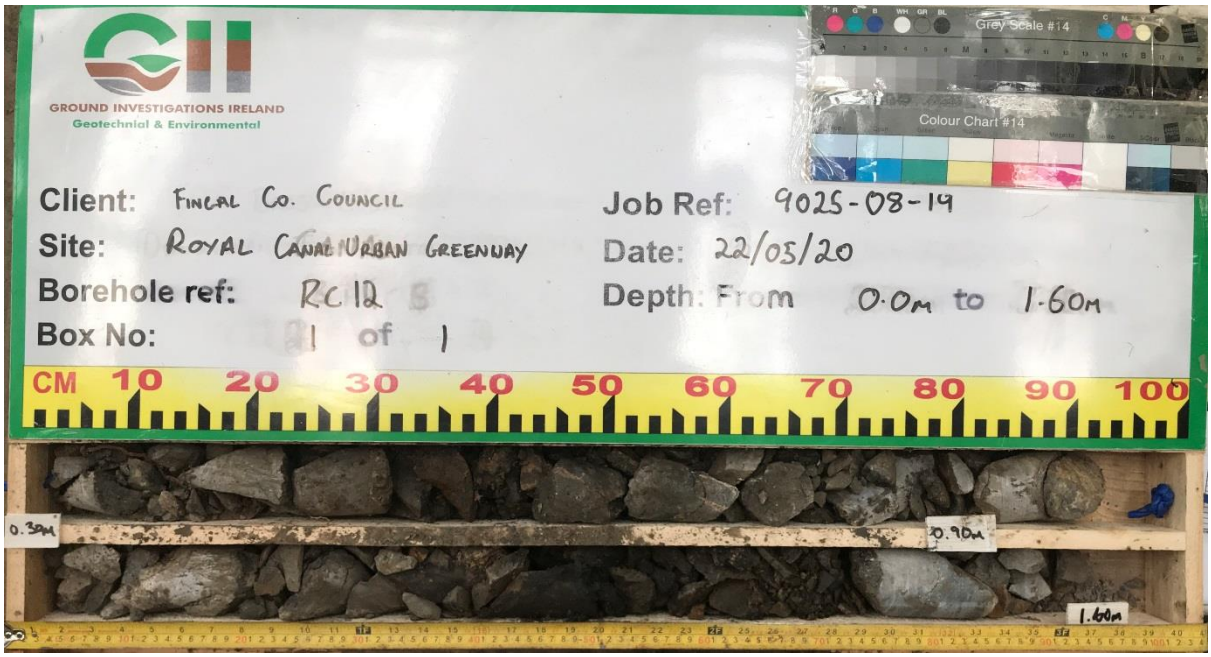
RC08


GROUND INVESTIGATIONS IRELAND
Geotechnial & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Date: 22/05/20
Borehole ref: RC08
Depth: From 0.0m to 2.20m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.80m
2.20m

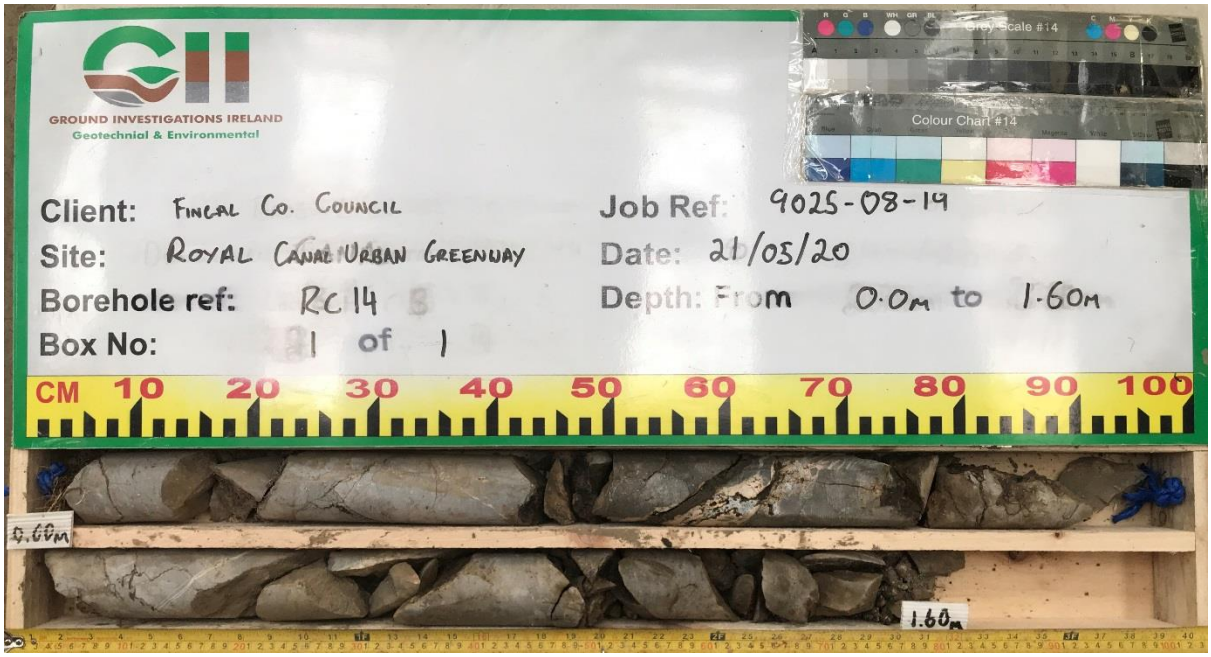
RC08A


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Date: 22/05/20
Borehole ref: RC08A
Depth: From 0.0m to 2.30m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.00m
0.80m
2.30m

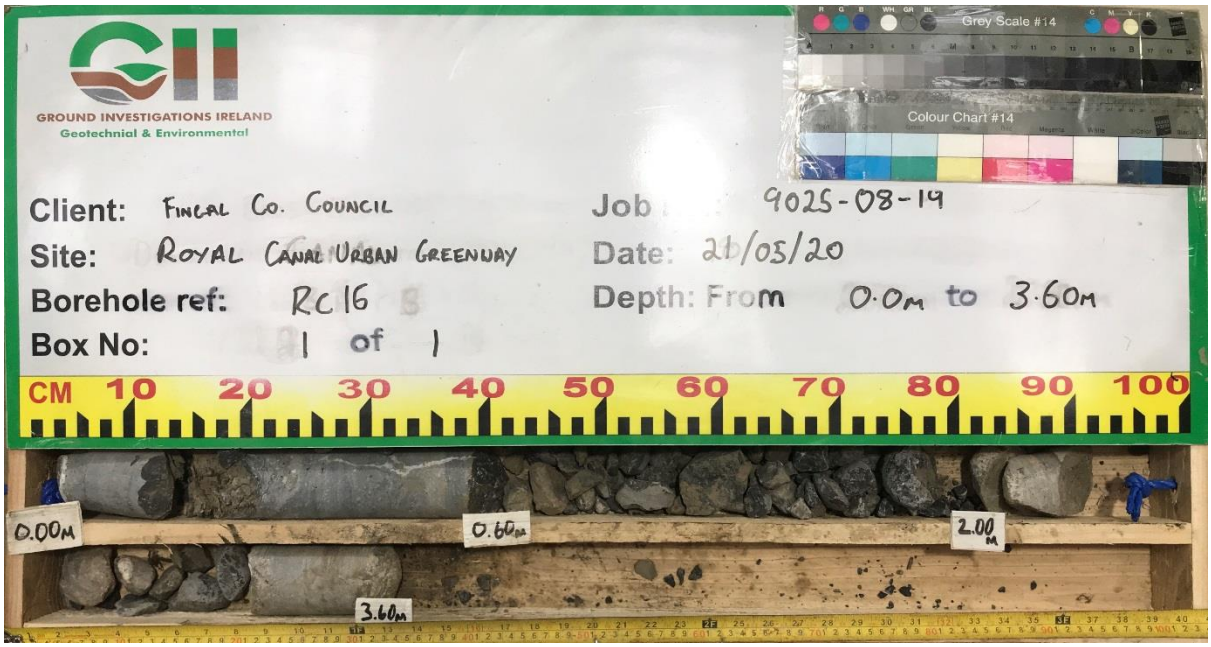
RC12


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Date: 22/05/20
Borehole ref: RC12
Depth: From 0.0m to 1.60m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.30m
0.90m
1.60m

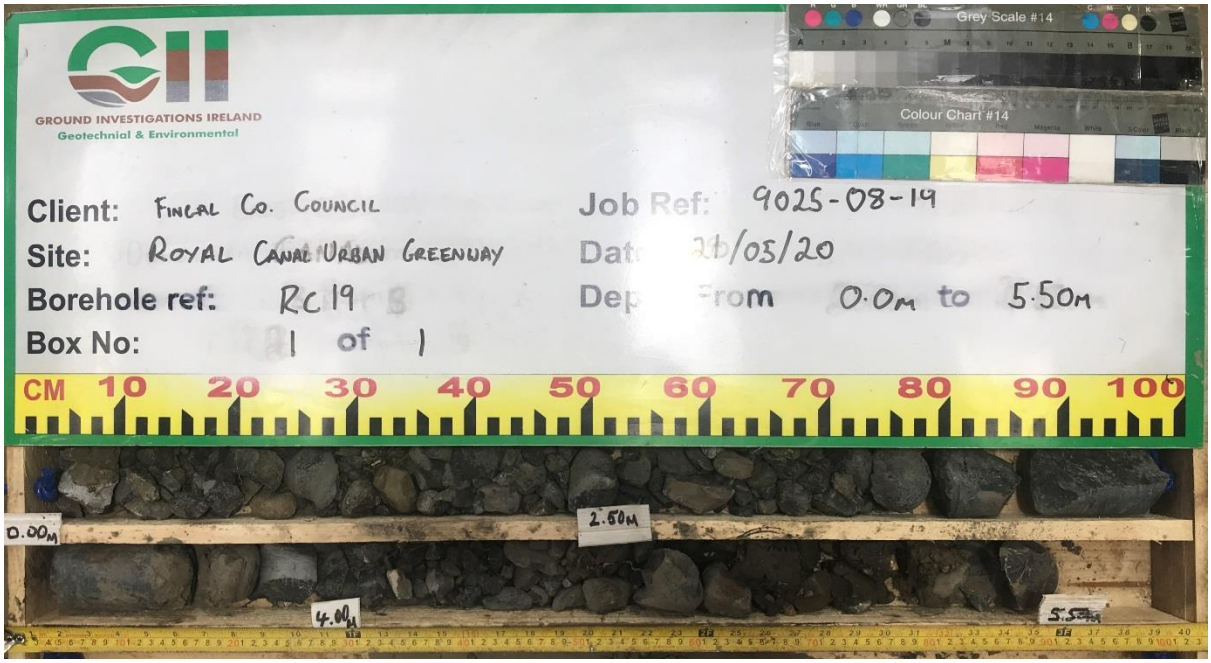
RC14


GROUND INVESTIGATIONS IRELAND
Geotechnial & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-14
Site: Royal Canal Urban Greenway
Date: 21/05/20
Borehole ref: RC 14
Depth: From 0.0m to 1.60m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.60m
1.60m

RC16


GROUND INVESTIGATIONS IRELAND
Geotechnial & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job 9025-08-14
Site: Royal Canal Urban Greenway
Date: 21/05/20
Borehole ref: RC 16
Depth: From 0.0m to 3.60m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.00m
0.60m
2.00m
3.60m

RC19


GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Grey Scale #14
Colour Chart #14
Client: Fingal Co. Council
Job Ref: 9025-08-19
Site: Royal Canal Urban Greenway
Dat 26/05/20
Borehole ref: RC 19
Dep From 0.0m to 5.50m
Box No: 1 of 1
CM 10 20 30 40 50 60 70 80 90 100
0.00m
2.50m
4.00m
5.50m

APPENDIX 7 – Laboratory Testing

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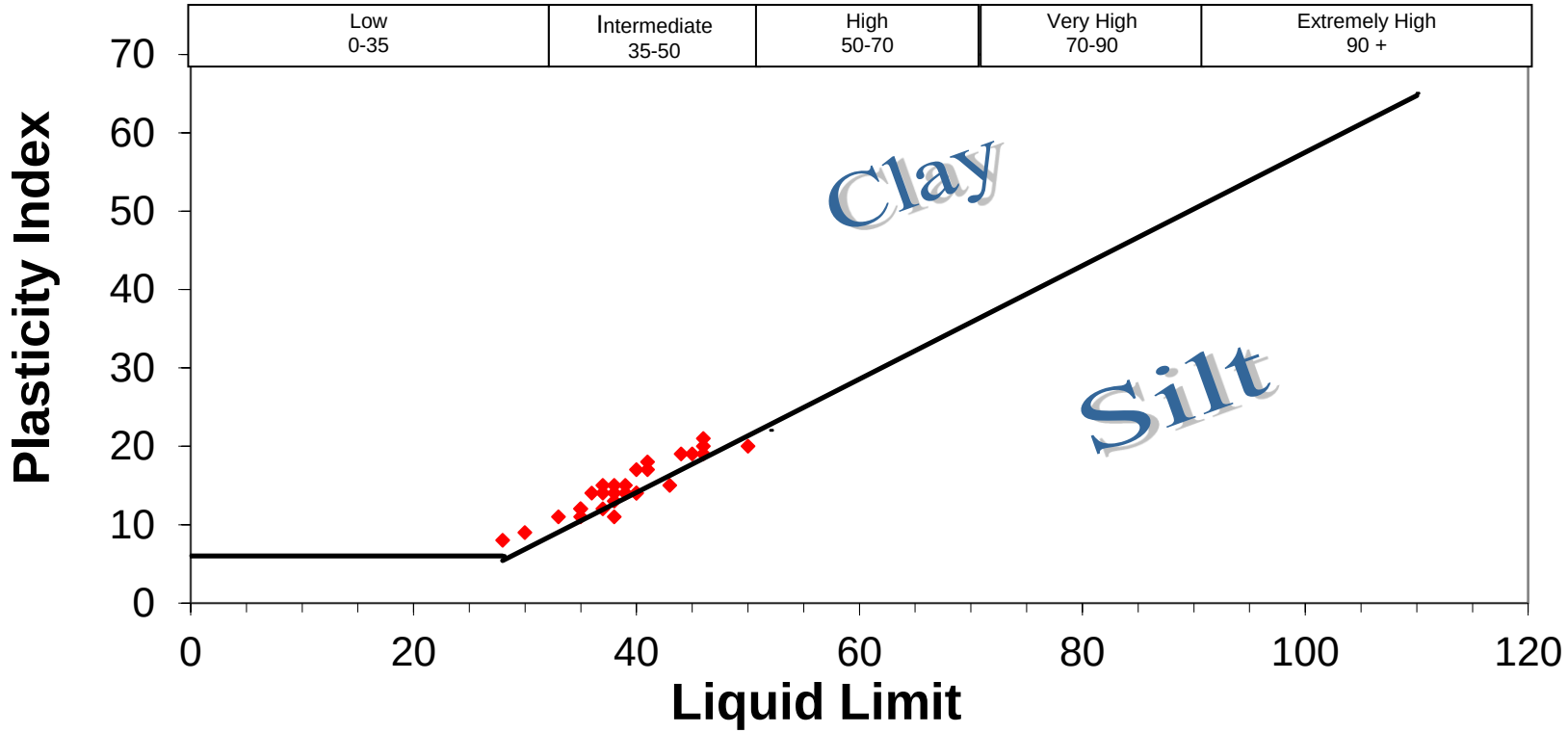
National Materials Testing Laboratory Ltd.

SUMMARY OF TEST RESULTS

				Particle			Index Properties		Bulk	Cell	Undrained Triaxial Tests		Lab	
BH/TP	Depth	sample	Moisture	Density	<425um	LL	PL	PI	Density	Presssure	Compressive	Strain at	Vane	Remarks
No	m	No.	%	Mg/m3	%	%	%	%	Mg/m3	kPa	Stress kPa	Failure %	kPa	
St01	0.50	B	26.0		60.2	46	27	19						
ST02	1.30	B	16.9		32.1	35	23	12						
ST06	0.50	B	20.4		49.0	39	24	15						
ST07	1.50	B	31.6		63.9	46	25	21						
ST08	0.50	B	27.2		71.9	40	26	14						
ST10	0.50	B	21.8		39.3	38	24	14						
ST12	1.50	B	19.0		57.6	41	23	18						
ST15	1.50	B	25.3		56.9	37	23	14						
ST18	0.20	B	25.6		89.5	36	22	14						
ST19	0.50	B	31.2		54.1	44	25	19						
ST20	0.50	B	21.5		38.2	43	28	15						
ST21	1.40	B	12.9		30.1	28	20	8						
ST22	0.80	B	15.4		57.8	33	22	11						
ST23	0.50	B	20.5		54.5	35	23	12						
ST24	1.30	B	19.8		37.0	37	25	12						
ST26	0.40	B	12.5		26.9	38	27	11						
ST28	0.50	B	17.4		38.2	35	24	11						
ST30	0.50	B	20.5		58	30	21	9						
ST31	0.50	B	18.0		26.8	50	30	20						
ST32	0.50	B	22.8		26.8	40	23	17						
ST41	1.00	B	15.5		69.1	38	25	13						
ST43	0.40	B	23.0		48.0	41	24	17						
ST44	1.50	B	18.0		50.7	39	25	14						
ST46	1.50	B	29.6		79.5	46	26	20						
ST47	1.50	B	23.7		50.7	45	26	19						
ST48	0.50	B	27.8		69.6	38	23	15						
ST50	0.60	B	18.1		45.1	40	26	14						
ST51	1.50	B	17.3		57.8	37	22	15						
NMTL		Notes :									Job ref No.	NMTL 3205	GII Project ID:	9025-08-19
29/06/2020		1. All BS tests carried out using preferred (definitive) method unless otherwise stated.									Location	Royal Canal Urban Greenway		

NMTL LTD
Unit 18c, Tullow Industrial Estate
Tullow
County Carlow
Tel: 00353 59 9180822
Mob: 00353 872575508
billa@nmtl.ie

Contract:	**Royal Canal Urban Greenway**
Client:	**Ground Investigations Ireland Ltd**
Engineer:	**Mike Sutton**
GII Project ID	**9025-08-19**
Date:	**29/06/2020**
Tested By:	**Sb/Tch/Ms** **Checked:** **Bc**
Job ref No.	**NMTL 3205**

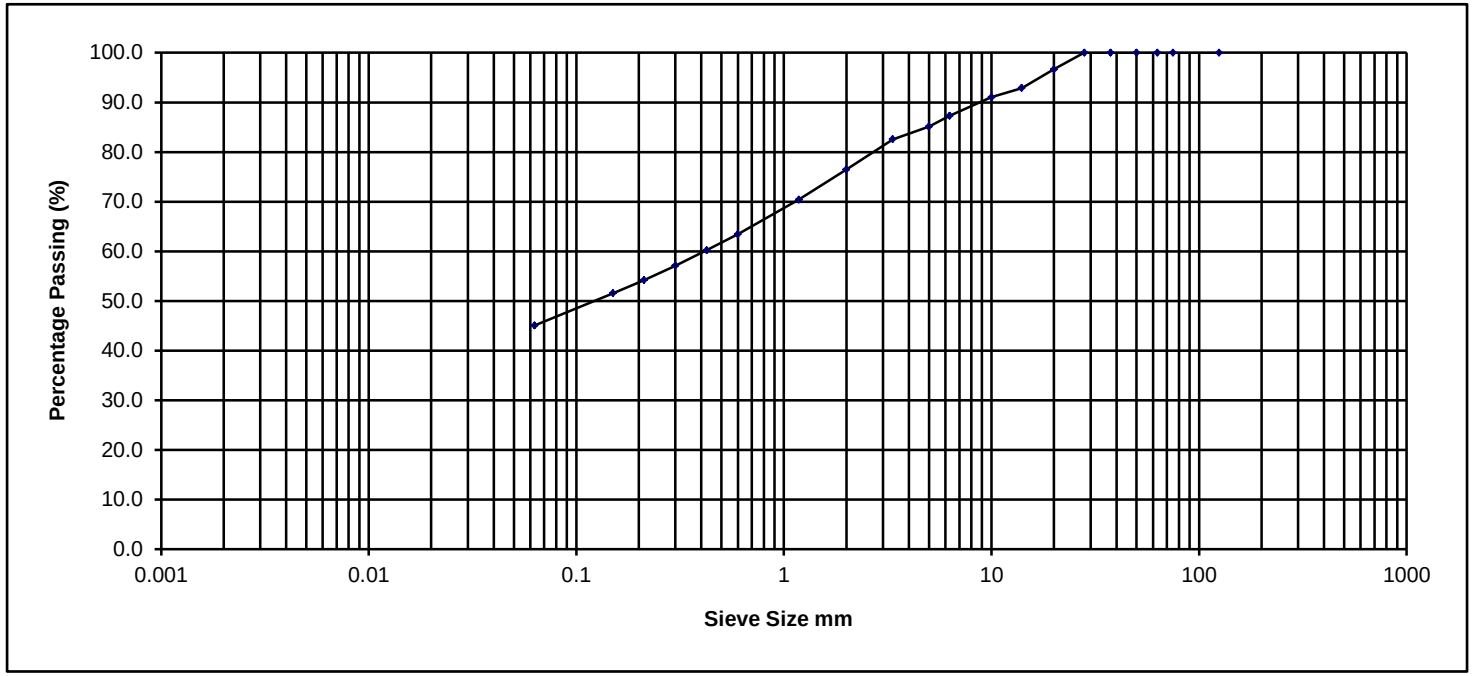


NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	100.0
20.000	96.7
14.000	92.9
10.000	91.0
6.300	87.3
5.000	85.1
3.350	82.6
2.000	76.5
1.180	70.4
0.600	63.5
0.425	60.2
0.300	57.1
0.212	54.2
0.150	51.6
0.063	45.1



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		45.1			31.4			23.5		0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST01
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	17/06/2020	Depth	0.50m

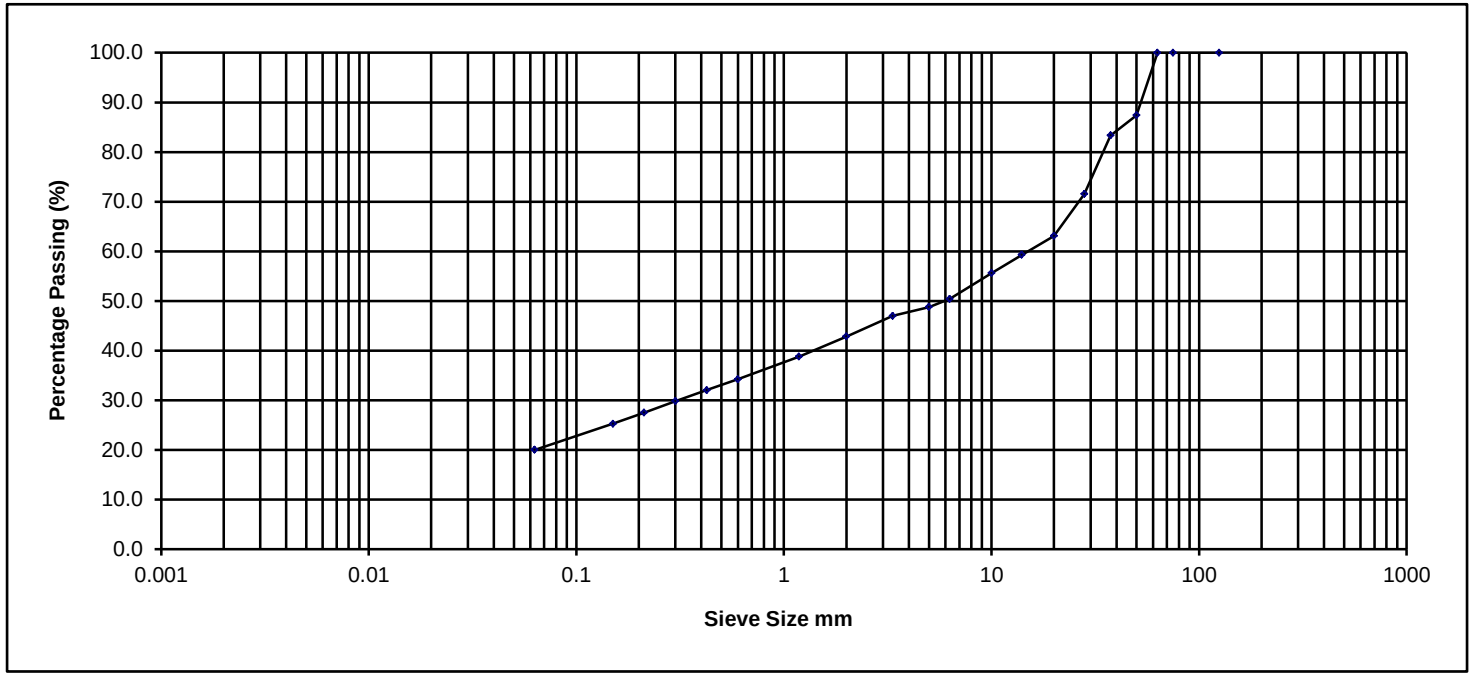
NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	87.4
37.500	83.4
28.000	71.5
20.000	63.1
14.000	59.3
10.000	55.6
6.300	50.4
5.000	48.8
3.350	47.0
2.000	42.9
1.180	38.8
0.600	34.2
0.425	32.1
0.300	29.8
0.212	27.5
0.150	25.3
0.063	20.0



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	20.0	22.9	57.1	0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST02
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Depth	1.30m
				Date sample tested	24/06/2020		

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	90.5
37.500	88.2
28.000	81.5
20.000	76.7
14.000	73.3
10.000	72.0
6.300	66.9
5.000	64.5
3.350	61.4
2.000	57.1
1.180	53.7
0.600	50.4
0.425	49.0
0.300	47.7
0.212	46.2
0.150	44.7
0.063	40.4



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		40.4			16.7			42.9		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST06
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	24/06/2020	Depth	0.30m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	95.1
50.000	90.1
37.500	88.4
28.000	86.5
20.000	85.0
14.000	82.2
10.000	80.1
6.300	77.2
5.000	76.1
3.350	74.4
2.000	71.5
1.180	68.6
0.600	65.4
0.425	63.9
0.300	62.2
0.212	60.4
0.150	58.5
0.063	53.4



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		53.4			18.1			23.6		4.9	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY with some cobbles.					Project No.	NMTL 3205
						BH/TP No.	ST07
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Depth	1.50m

Date sample tested 17/06/2020

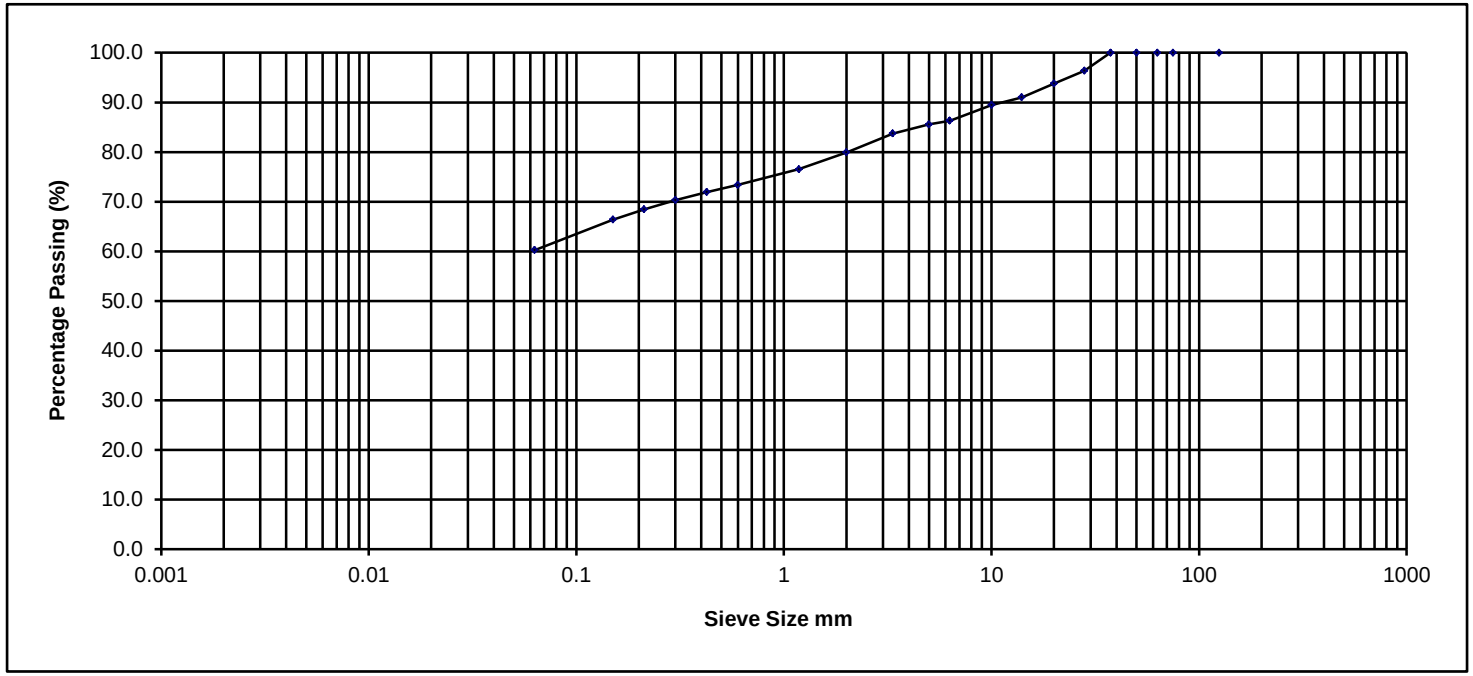
NMTL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	96.4
20.000	93.8
14.000	91.0
10.000	89.5
6.300	86.3
5.000	85.6
3.350	83.7
2.000	79.9
1.180	76.5
0.600	73.4
0.425	71.9
0.300	70.3
0.212	68.4
0.150	66.4
0.063	60.3



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		60.3			19.7			20.1		0.0	0.0

Sample Description	Brown slightly sandyslightly gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST08
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	24/06/2020
						Depth	0.50m

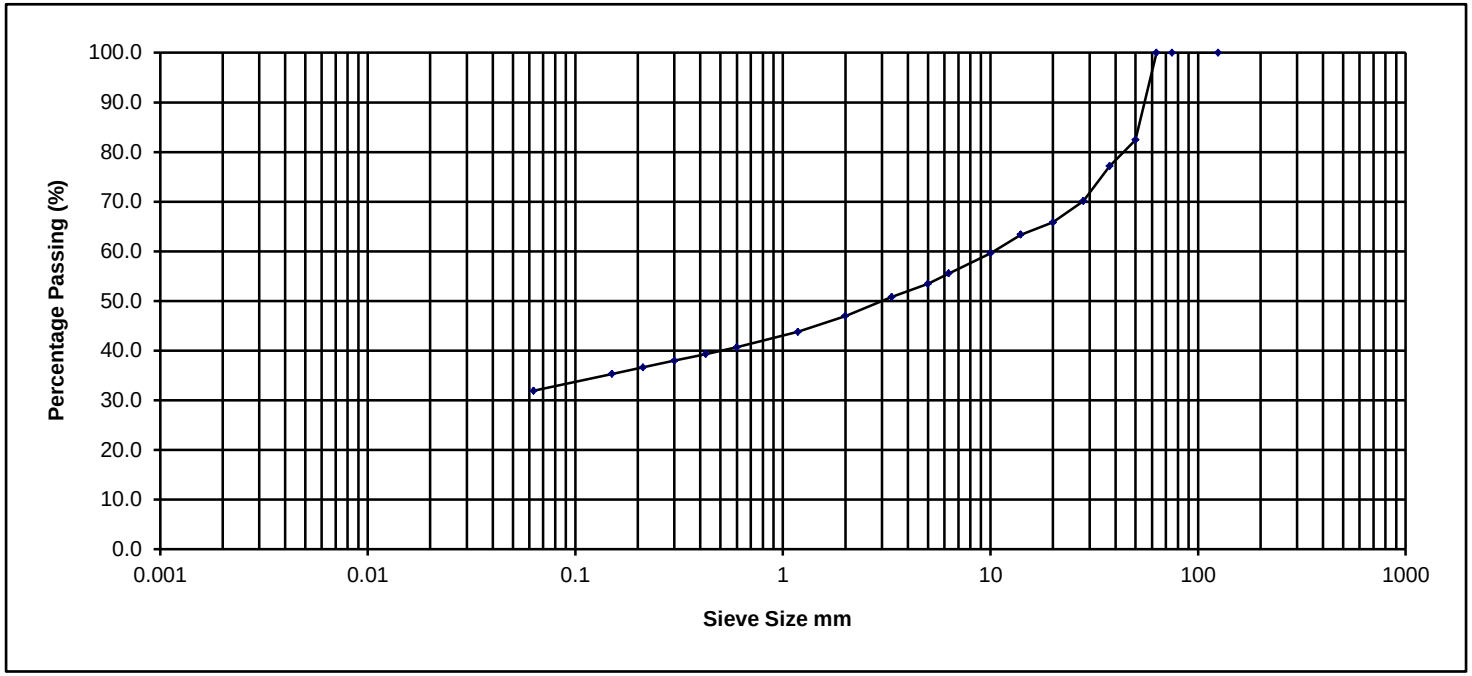
NMTL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	82.5
37.500	77.1
28.000	70.1
20.000	65.8
14.000	63.4
10.000	59.6
6.300	55.6
5.000	53.5
3.350	50.8
2.000	47.0
1.180	43.8
0.600	40.7
0.425	39.3
0.300	38.0
0.212	36.6
0.150	35.3
0.063	31.9



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		31.9			15.1			53.0		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST10
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	24/06/2020	Depth	0.50m

NMTL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	98.1
20.000	96.4
14.000	88.2
10.000	85.9
6.300	80.3
5.000	77.8
3.350	73.7
2.000	69.0
1.180	64.5
0.600	59.8
0.425	57.6
0.300	55.2
0.212	52.6
0.150	50.0
0.063	42.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		42.5			26.5			31.0		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST12
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	17/06/2020	Depth	1.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	96.9
37.500	93.6
28.000	90.3
20.000	86.0
14.000	85.5
10.000	82.6
6.300	77.2
5.000	75.2
3.350	72.5
2.000	67.7
1.180	63.5
0.600	59.1
0.425	56.9
0.300	54.6
0.212	51.8
0.150	48.8
0.063	41.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		41.5			26.2			32.3		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST15
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	24/06/2020	Depth	1.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	97.4
28.000	97.4
20.000	97.2
14.000	97.2
10.000	96.7
6.300	95.9
5.000	95.4
3.350	94.8
2.000	93.5
1.180	92.2
0.600	90.5
0.425	89.5
0.300	88.2
0.212	86.5
0.150	84.1
0.063	72.7



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	72.7	20.8	6.5	0.0	0.0

Sample Description	Brown slightly gravelly slightly sandy silty CLAY	Project No.	NMTL 3205
		BH/TP No.	ST18
Project	Royal Canal Urban Greenway GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc / Approved Bc / Date sample tested 24/06/2020	Depth	0.20m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	90.9
28.000	87.5
20.000	86.2
14.000	82.3
10.000	78.9
6.300	75.1
5.000	72.9
3.350	68.7
2.000	63.6
1.180	59.6
0.600	55.8
0.425	54.1
0.300	52.2
0.212	50.0
0.150	47.7
0.063	40.6



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		40.6			23.0			36.4		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY					Project No.	NMTL 3205
						BH/TP No.	ST19
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	17/06/2020	Depth	0.50m

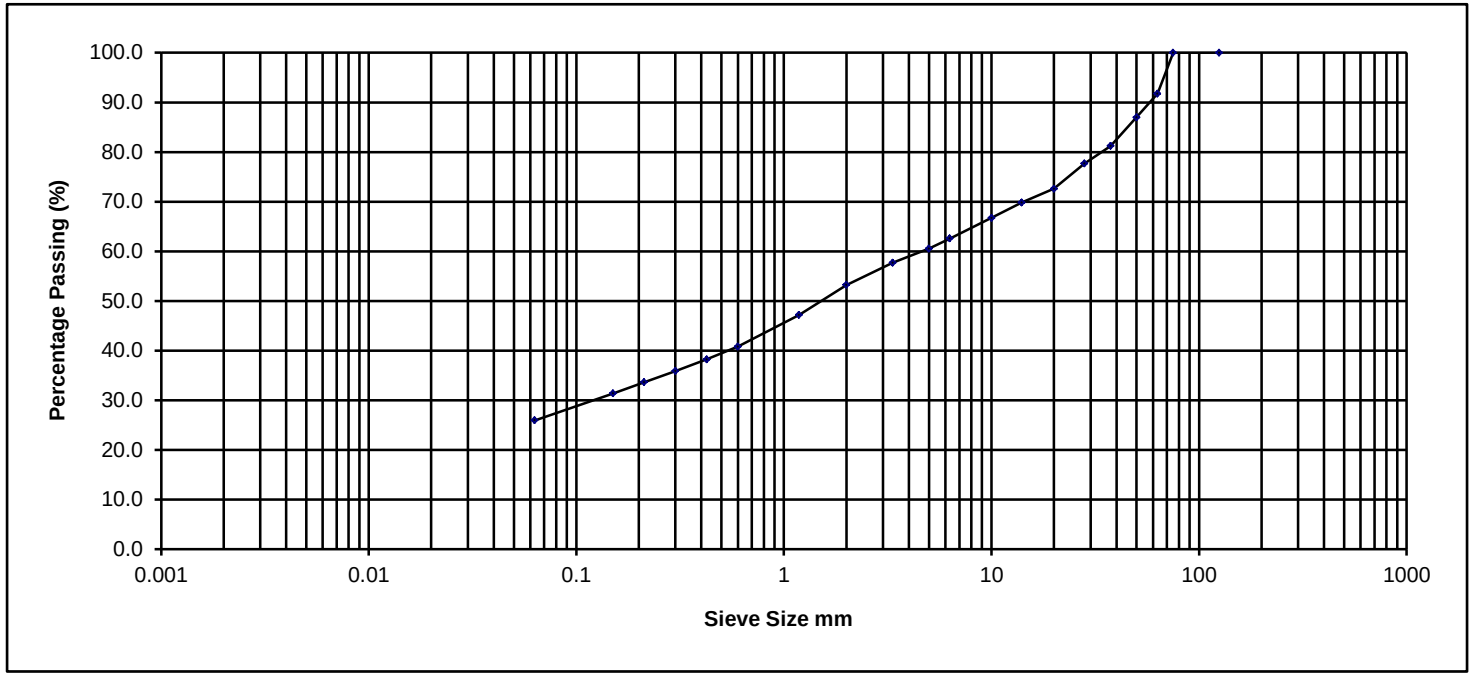
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	91.8
50.000	87.0
37.500	81.2
28.000	77.7
20.000	72.6
14.000	69.8
10.000	66.7
6.300	62.6
5.000	60.6
3.350	57.7
2.000	53.2
1.180	47.2
0.600	40.8
0.425	38.2
0.300	35.9
0.212	33.6
0.150	31.4
0.063	26.0



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	26.0	27.3	38.5	8.2	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.			Project No.	NMTL 3205
				BH/TP No.	ST20
Project	Royal Canal Urban Greenway		GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 24/06/2020	Depth	0.50m

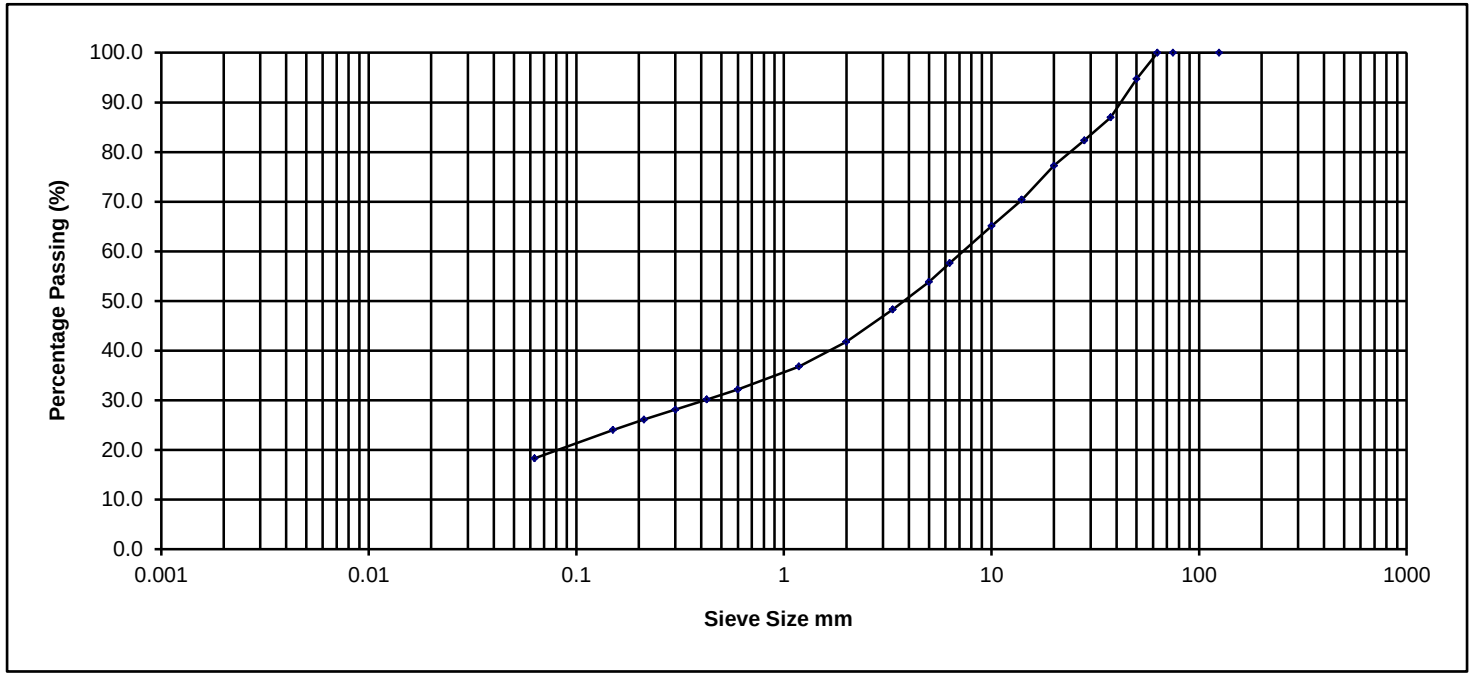
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.7
37.500	87.0
28.000	82.3
20.000	77.3
14.000	70.4
10.000	65.1
6.300	57.7
5.000	53.8
3.350	48.3
2.000	41.8
1.180	36.8
0.600	32.2
0.425	30.1
0.300	28.1
0.212	26.1
0.150	24.0
0.063	18.3



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		18.3			23.5			58.2		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.			Project No.	NMTL 3205
				BH/TP No.	ST21
Project	Royal Canal Urban Greenway		GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 24/06/2020	Depth	1.40m

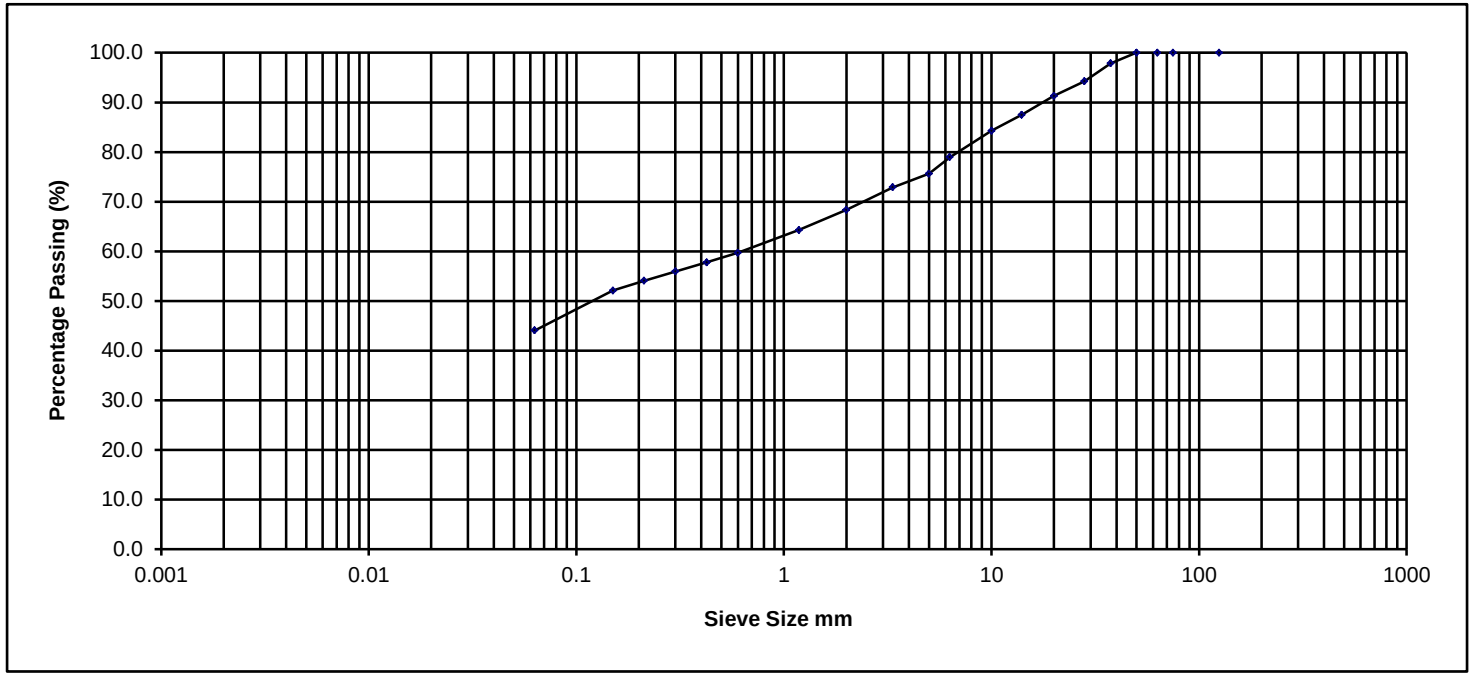
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	97.9
28.000	94.3
20.000	91.3
14.000	87.5
10.000	84.3
6.300	79.0
5.000	75.6
3.350	72.9
2.000	68.4
1.180	64.3
0.600	59.7
0.425	57.8
0.300	55.9
0.212	54.1
0.150	52.1
0.063	44.1



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		44.1			24.3			31.6		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY	Project No.	NMTL 3205
		BH/TP No.	ST22
Project	Royal Canal Urban Greenway	GII PROJECT ID: 9025-08-19	Sample No. B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 17/06/2020 — Depth 0.80m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	93.5
50.000	90.3
37.500	86.9
28.000	85.3
20.000	81.4
14.000	79.4
10.000	77.0
6.300	73.1
5.000	71.7
3.350	68.9
2.000	64.1
1.180	60.1
0.600	56.1
0.425	54.5
0.300	52.9
0.212	51.2
0.150	49.5
0.063	43.4



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		43.4			20.7			29.4		6.5	0.0

Sample Description	Grey/brown slightly sandy slightly gravelly silty CLAY with some cobbles.	Project No.	NMTL 3205
		BH/TP No.	ST23
Project	Royal Canal Urban Greenway GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc / Approved Bc / Date sample tested 17/06/2020	Depth	0.50m

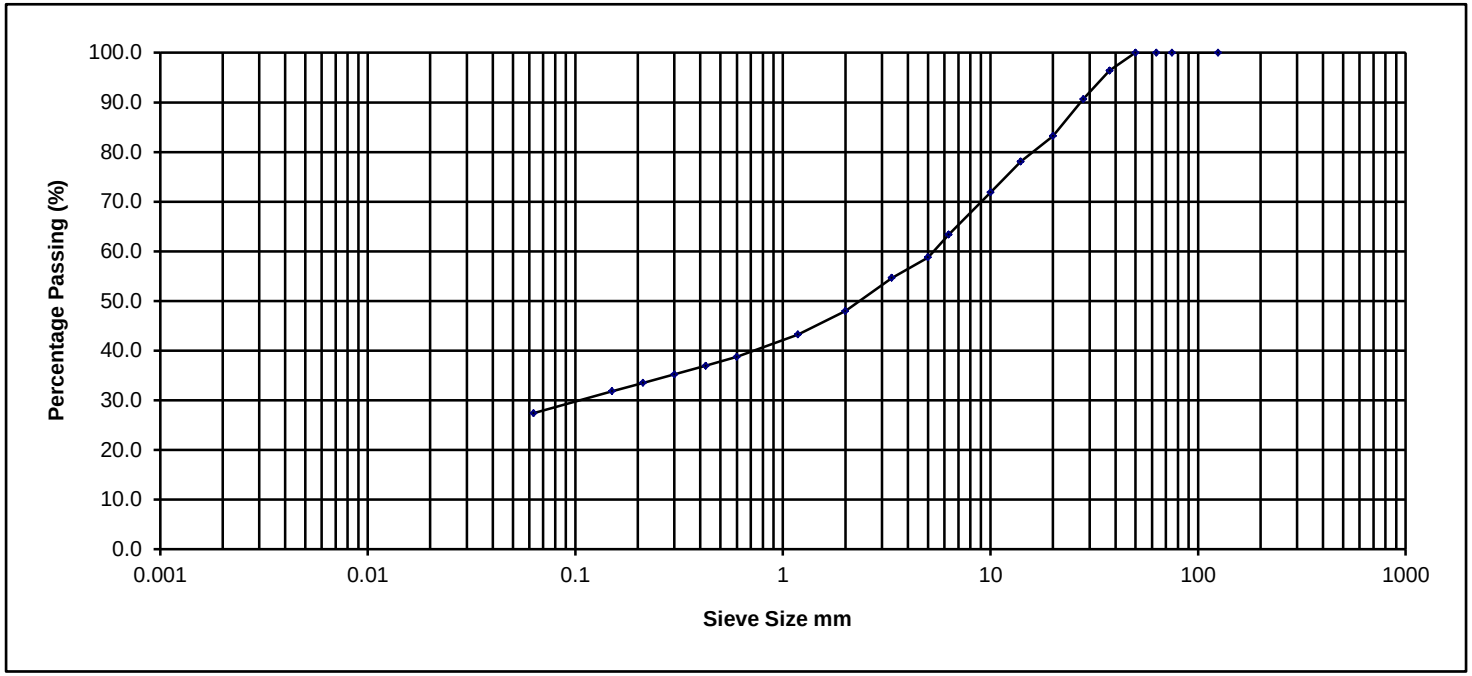
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	96.4
28.000	90.7
20.000	83.2
14.000	78.1
10.000	71.9
6.300	63.4
5.000	58.8
3.350	54.6
2.000	48.0
1.180	43.2
0.600	38.8
0.425	37.0
0.300	35.2
0.212	33.5
0.150	31.8
0.063	27.4



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		27.4			20.6			52.0		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.			Project No.	NMTL 3205
				BH/TP No.	ST24
Project	Royal Canal Urban Greenway		GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 17/06/2020	Depth	1.30m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	90.3
50.000	87.9
37.500	82.8
28.000	74.6
20.000	67.6
14.000	62.3
10.000	55.6
6.300	47.4
5.000	44.4
3.350	41.3
2.000	37.3
1.180	33.1
0.600	28.7
0.425	26.9
0.300	25.2
0.212	23.5
0.150	21.8
0.063	17.2



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	17.2	20.1	53.0	9.7	0.0

Sample Description	Brown silty sandy GRAVEL with some cobbles.			Project No.	NMTL 3205
				BH/TP No.	ST26
Project	Royal Canal Urban Greenway		GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 17/06/2020	Depth	0.40m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	97.3
20.000	89.9
14.000	83.7
10.000	76.3
6.300	65.9
5.000	61.5
3.350	56.5
2.000	49.3
1.180	44.1
0.600	39.9
0.425	38.2
0.300	36.7
0.212	35.0
0.150	33.2
0.063	27.2



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	27.2	22.1	50.7	0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.	Project No.	NMTL 3205
		BH/TP No.	ST28
Project	Royal Canal Urban Greenway	GII PROJECT ID: 9025-08-19	Sample No. B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 24/06/2020 Depth 0.50m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	91.5
37.500	88.4
28.000	82.1
20.000	74.4
14.000	70.7
10.000	68.4
6.300	66.0
5.000	64.9
3.350	64.2
2.000	62.6
1.180	61.1
0.600	59.1
0.425	58.0
0.300	56.7
0.212	55.2
0.150	53.5
0.063	44.8



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		44.8			17.8			37.4		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.					Project No.	NMTL 3205
						BH/TP No.	ST30
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	24/06/2020	Depth	0.50m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	97.8
50.000	93.5
37.500	92.5
28.000	86.9
20.000	81.4
14.000	70.6
10.000	60.5
6.300	51.5
5.000	46.9
3.350	43.3
2.000	37.1
1.180	33.0
0.600	28.6
0.425	26.8
0.300	25.2
0.212	23.6
0.150	22.3
0.063	19.0



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		19.0			18.1			60.6		2.2	0.0

Sample Description	Brown slightly sandy very gravelly clayey SILT with occasional cobbles.					Project No.	NMTL 3205
						BH/TP No.	ST31
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	17/06/2020	Depth	0.50m

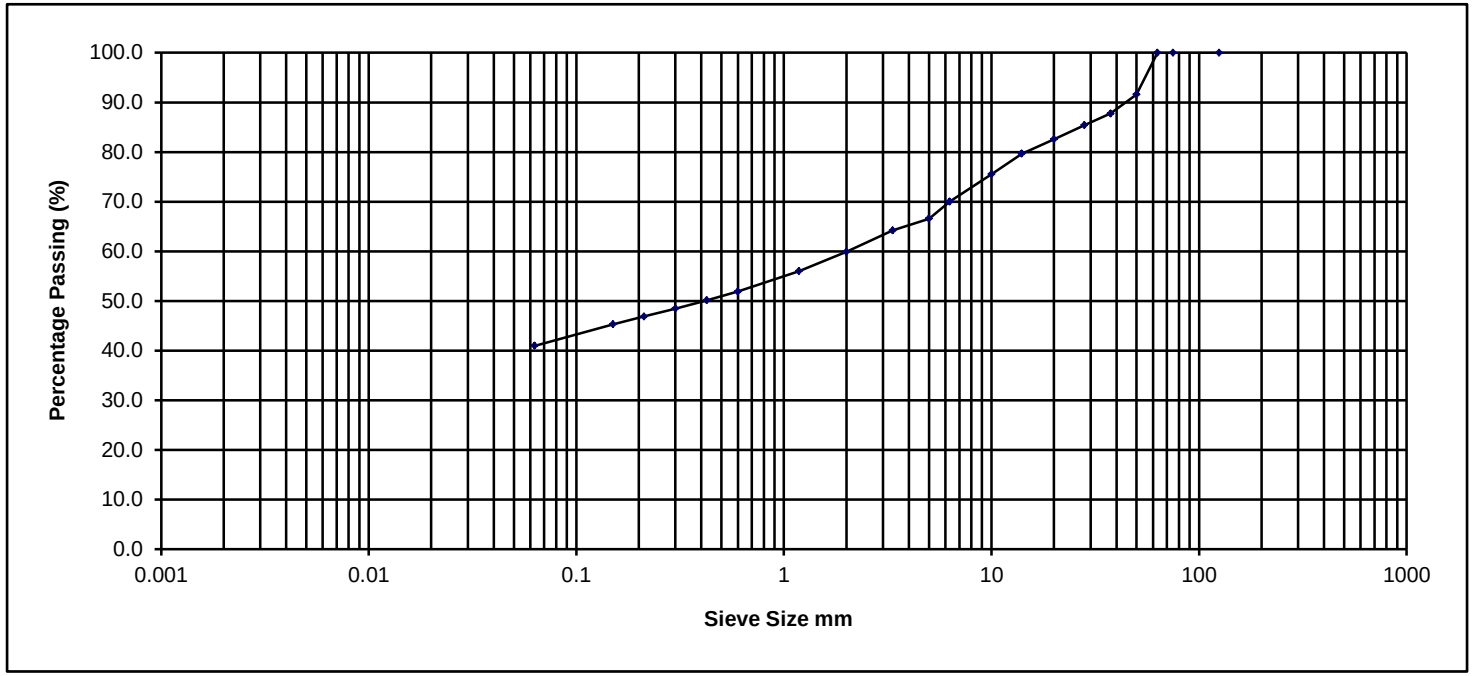
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	91.6
37.500	87.8
28.000	85.4
20.000	82.6
14.000	79.7
10.000	75.5
6.300	70.0
5.000	66.6
3.350	64.2
2.000	59.9
1.180	56.0
0.600	51.9
0.425	50.1
0.300	48.5
0.212	46.9
0.150	45.3
0.063	41.0



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	41.0	18.9	40.1	0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.	Project No.	NMTL 3205
		BH/TP No.	ST32
Project	Royal Canal Urban Greenway	GII PROJECT ID: 9025-08-19	Sample No. B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 24/06/2020 Depth 0.50m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	97.1
28.000	95.4
20.000	92.3
14.000	89.9
10.000	87.4
6.300	84.2
5.000	82.1
3.350	80.0
2.000	76.4
1.180	73.4
0.600	70.4
0.425	69.1
0.300	67.6
0.212	65.9
0.150	64.1
0.063	58.2



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		58.2			18.2			23.6		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.			Project No.	NMTL 3205
				BH/TP No.	ST41
Project	Royal Canal Urban Greenway		GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 25/06/2020	Depth	1.00m

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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.3
37.500	89.9
28.000	85.0
20.000	81.8
14.000	75.3
10.000	73.3
6.300	68.1
5.000	65.1
3.350	62.6
2.000	58.3
1.180	54.4
0.600	50.0
0.425	48.0
0.300	46.0
0.212	44.0
0.150	41.9
0.063	37.4



Percentage Particle Size

Clay	Fine Silt	Medium Silt	Coarse Silt	Fine Sand	Medium Sand	Coarse Sand	Fine Gravel	Medium Gravel	Coarse Gravel	Cobbles	Boulder
		37.4			20.9			41.7		0.0	0.0

Sample Description	Brown slightly sandy gravelly silty CLAY.			Project No.	NMTL 3205
				BH/TP No.	ST43
Project	Royal Canal Urban Greenway		GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc	Approved Bc	Date sample tested 17/06/2020	Depth	0.40m

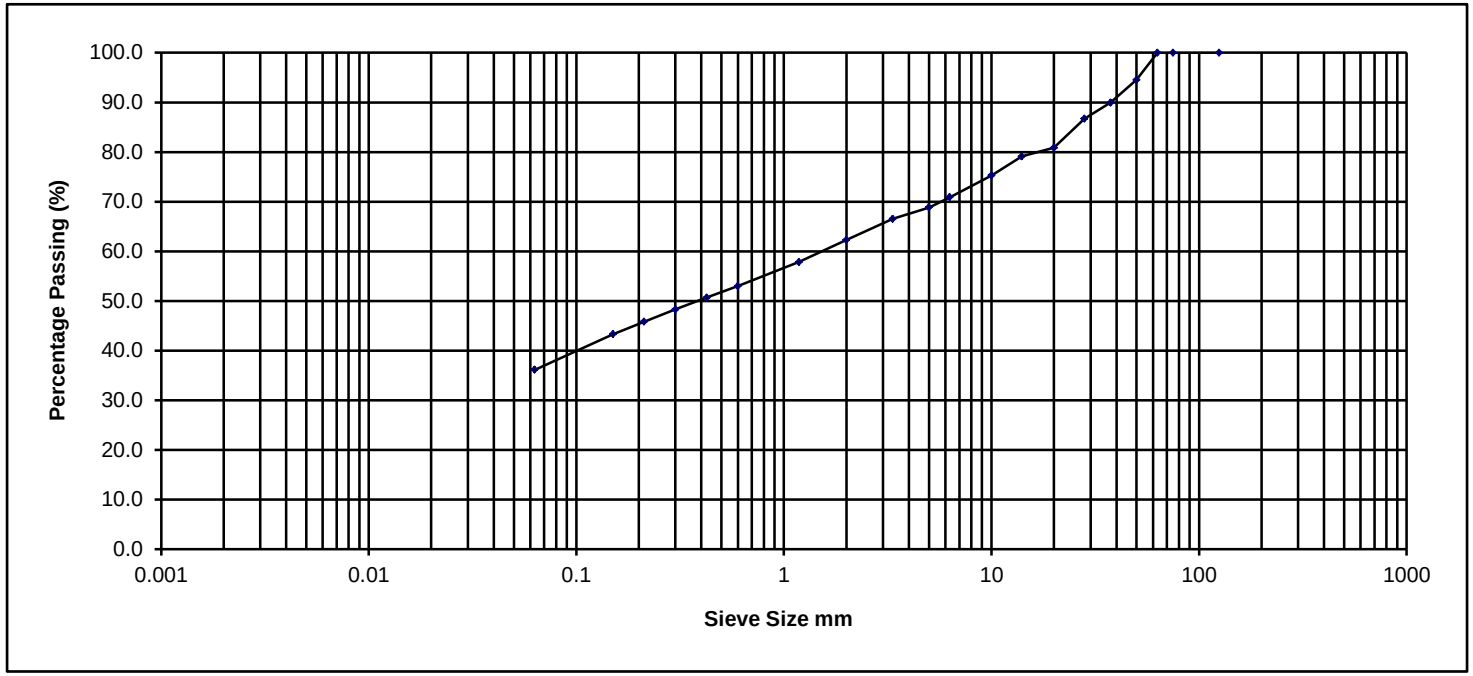
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	94.5
37.500	90.0
28.000	86.7
20.000	80.9
14.000	79.1
10.000	75.3
6.300	70.9
5.000	68.8
3.350	66.5
2.000	62.3
1.180	57.8
0.600	53.0
0.425	50.7
0.300	48.3
0.212	45.8
0.150	43.3
0.063	36.1



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	36.1	26.1	37.7	0.0	0.0

Sample Description	Brown slightly sandy gravelly SILT/CLAY.					Project No.	NMTL 3205
						BH/TP No.	ST44
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/06/2020	Depth	1.50m

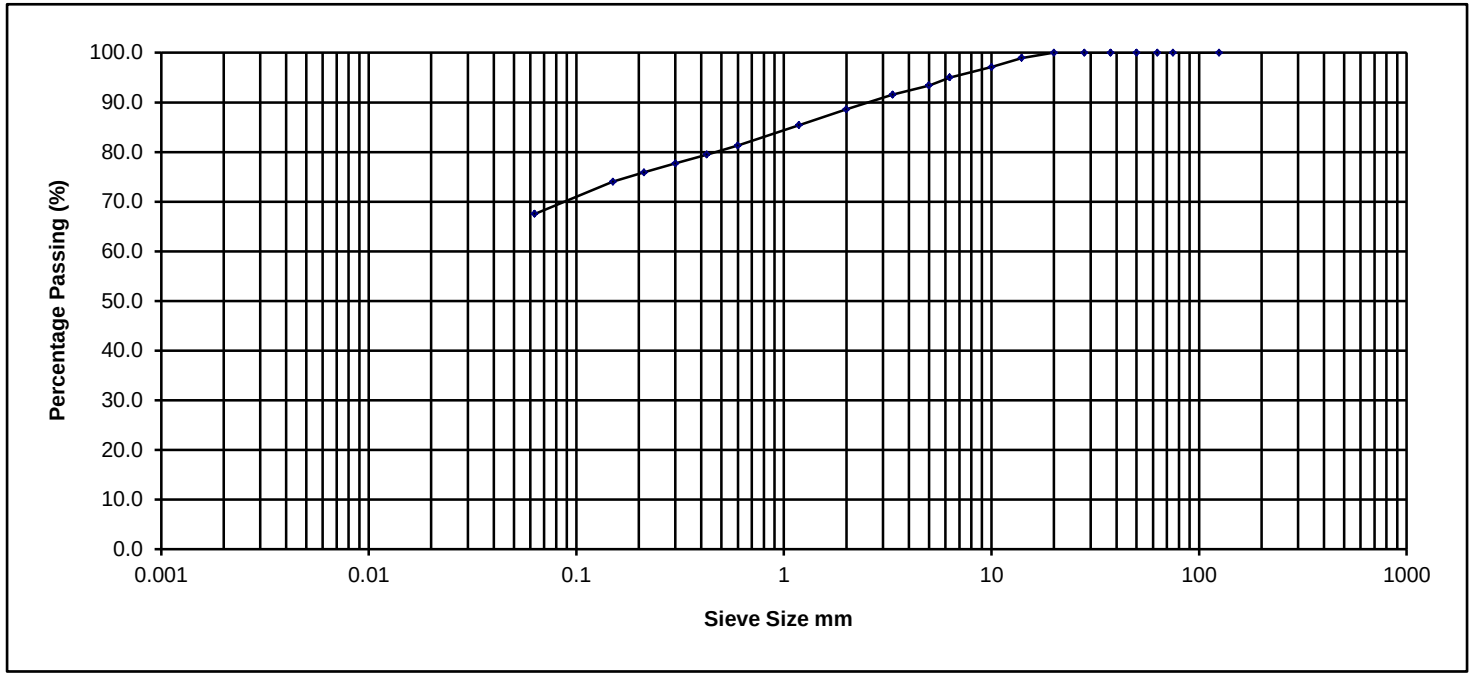
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Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	100.0
28.000	100.0
20.000	100.0
14.000	98.9
10.000	97.1
6.300	95.0
5.000	93.4
3.350	91.6
2.000	88.6
1.180	85.4
0.600	81.3
0.425	79.5
0.300	77.7
0.212	75.9
0.150	74.0
0.063	67.5



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		67.5			21.1			11.4		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.					Project No.	NMTL 3205
						BH/TP No.	ST46
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/06/2020	Depth	1.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	95.4
37.500	92.6
28.000	90.8
20.000	89.5
14.000	86.2
10.000	83.8
6.300	82.0
5.000	80.5
3.350	79.4
2.000	76.1
1.180	72.8
0.600	68.8
0.425	66.8
0.300	64.8
0.212	62.6
0.150	60.4
0.063	54.7



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		54.7			21.3			23.9		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.					Project No.	NMTL 3205
						BH/TP No.	ST47
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/06/2020	Depth	1.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	91.2
28.000	90.5
20.000	89.8
14.000	87.0
10.000	85.2
6.300	82.5
5.000	80.9
3.350	79.7
2.000	76.9
1.180	74.1
0.600	71.0
0.425	69.6
0.300	67.9
0.212	66.0
0.150	64.0
0.063	57.6



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	57.6	19.3	23.1	0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.					Project No.	NMTL 3205
						BH/TP No.	ST48
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	25/06/2020	Depth	1.50m

NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	93.9
37.500	92.3
28.000	86.9
20.000	78.4
14.000	74.9
10.000	69.2
6.300	63.6
5.000	61.0
3.350	58.7
2.000	54.3
1.180	50.5
0.600	46.8
0.425	45.1
0.300	43.4
0.212	41.4
0.150	39.4
0.063	34.0



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		34.0			20.3			45.7		0.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY.					Project No.	NMTL 3205
						BH/TP No.	ST50
Project	Royal Canal Urban Greenway			GII PROJECT ID: 9025-08-19		Sample No.	B
Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	18/06/2020	Depth	0.60m

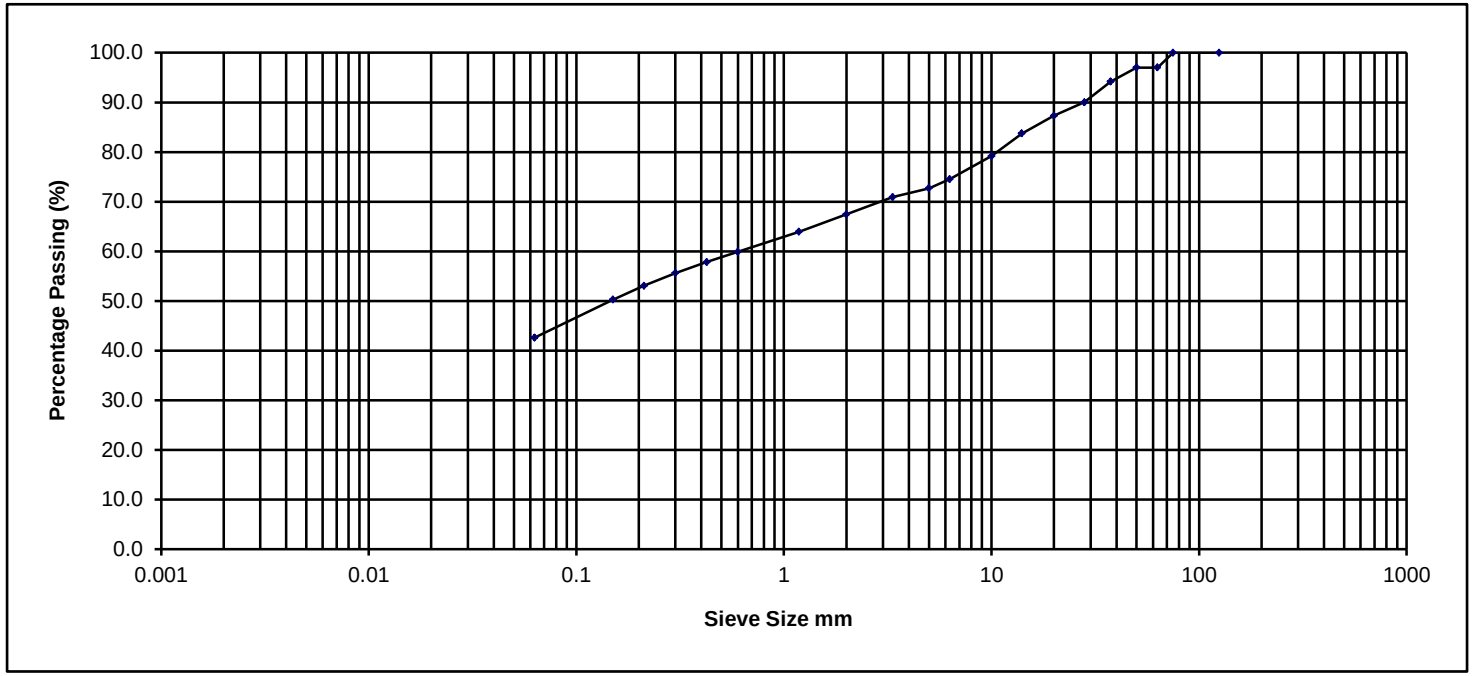
NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	97.0
50.000	97.0
37.500	94.2
28.000	90.0
20.000	87.3
14.000	83.7
10.000	79.2
6.300	74.6
5.000	72.7
3.350	70.9
2.000	67.4
1.180	63.9
0.600	59.9
0.425	57.8
0.300	55.6
0.212	53.1
0.150	50.3
0.063	42.6



Percentage Particle Size

Clay	Fine Medium Coarse	Fine Medium Coarse	Fine Medium Coarse	Cobbles	Boulder
	Silt	Sand	Gravel		
	42.6	24.8	29.6	3.0	0.0

Sample Description	Brown slightly sandy slightly gravelly silty CLAY, with occasional cobbles.	Project No.	NMTL 3205
		BH/TP No.	ST51
Project	Royal Canal Urban Greenway GII PROJECT ID: 9025-08-19	Sample No.	B
Operator Tzr	Checked Nc Approved Bc Date sample tested 25/06/2020	Depth	1.50m

NM TL Ltd

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Ground Investigations Ireland
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Ireland

Attention :	Mike Sutton
Date :	10th June, 2020
Your reference :	9025-08-19
Our reference :	Test Report 20/6999 Batch 1
Location :	Royal Canal Urban Greenway
Date samples received :	3rd June, 2020
Status :	Final report
Issue :	1

Fifteen samples were received for analysis on 3rd June, 2020 of which fifteen 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:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9025-08-19
Location: Royal Canal Urban Greenway
Contact: Mike Sutton
EMT Job No: 20/6999

Report : Solid

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

EMT Sample No.	1	2	3	4	5	6	7	8	9	10	LOD/LOR	Units	Method No.
Sample ID	ST12	ST19	ST22	ST23	ST24	ST26	ST31	ST43	ST44	ST46			
Depth	1.50	0.50	0.80	0.50	1.30	0.40	0.50	0.40	1.50	1.50			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020			
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	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020			
Sulphur as S	0.02	0.02	0.08	0.07	0.03	0.08	0.13	0.03	0.03	0.02	<0.01	%	TM30/PM15
Chloride (2:1 Ext BRE) #	0.004	0.003	0.090	0.004	0.007	0.013	0.004	0.005	0.005	0.004	<0.002	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0093	0.0077	0.3884	0.0121	0.0214	0.0131	0.0231	0.0109	0.0130	0.0049	<0.0015	g/l	TM38/PM20
Organic Matter	0.7	1.1	1.9	1.3	0.8	0.9	2.7	2.4	1.5	1.5	<0.2	%	TM21/PM24
pH #	8.47	8.32	7.82	8.44	8.65	8.71	8.39	8.49	8.59	8.37	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9025-08-19
Location: Royal Canal Urban Greenway
Contact: Mike Sutton
EMT Job No: 20/6999

Report : Solid

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

EMT Sample No.	11	12	13	14	15						LOD/LOR	Units	Method No.
Sample ID	ST47	ST50	BH18	BH24	BH24								
Depth	1.50	0.60	2.00	0.50	1.00								
COC No / misc													
Containers	T	T	T	T	T								
Sample Date	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	03/06/2020	03/06/2020	03/06/2020	03/06/2020	03/06/2020								
Sulphur as S	0.01	0.19	0.02	0.01	0.02						<0.01	%	TM30/PM15
Chloride (2:1 Ext BRE) #	0.002	0.022	0.004	0.004	0.010						<0.002	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0061	0.0267	0.0070	0.0035	0.0104						<0.0015	g/l	TM38/PM20
Organic Matter	1.3	1.0	1.0	1.1	0.7						<0.2	%	TM21/PM24
pH #	8.53	8.57	8.61	8.34	8.66						<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 9025-08-19
Location: Royal Canal Urban Greenway
Contact: Mike Sutton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/6999						

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.: 20/6999

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: 20/6999

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
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.			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.			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		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 :	15th June, 2020
Your reference :	9025-08-19
Our reference :	Test Report 20/7242 Batch 1
Location :	Royal Canal Urban Greenway
Date samples received :	8th June, 2020
Status :	Final report
Issue :	1

Seventeen samples were received for analysis on 8th June, 2020 of which seventeen 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:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9025-08-19
Location: Royal Canal Urban Greenway
Contact: Mike Sutton
EMT Job No: 20/7242

Report : Solid

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

EMT Sample No.	1	2	3	4	5	6	7	8	9	10	LOD/LOR	Units	Method No.
Sample ID	ST02	ST06	ST08	ST10	ST15	ST18	ST20	ST21	ST28	ST30			
Depth	1.30	0.30	0.50	0.50	1.50	0.20	0.50	1.40	0.50	0.40			
COC No / misc													
Containers	T	T	T	T	T	T	T	T	T	T			
Sample Date	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020			
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	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020			
Sulphur as S	0.02	0.03	0.02	0.03	0.02	0.01	0.08	0.06	0.04	0.01	<0.01	%	TM30/PM15
Chloride (2:1 Ext BRE) #	0.004	0.004	0.004	0.003	0.005	<0.002	0.006	0.022	0.004	0.003	<0.002	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0083	0.0117	0.0106	0.0090	0.0130	0.0043	0.0202	0.0567	0.0391	0.0149	<0.0015	g/l	TM38/PM20
Organic Matter	0.6	1.1	1.2	1.1	0.6	0.7	1.9	0.8	0.8	0.6	<0.2	%	TM21/PM24
pH #	8.57	8.49	8.39	8.60	8.47	8.51	8.26	8.60	8.71	8.73	<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 9025-08-19
Location: Royal Canal Urban Greenway
Contact: Mike Sutton
EMT Job No: 20/7242

Report : Solid

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

EMT Sample No.	11	12	13	14	15	16	17				LOD/LOR	Units	Method No.
Sample ID	ST32	ST41	ST48	ST51	BH28	BH28	RC19						
Depth	0.50	1.00	1.50	1.50	2.00	3.00	5.00						
COC No / misc													
Containers	T	T	T	T	T	T	T						
Sample Date	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020	05/06/2020						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1						
Date of Receipt	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020	08/06/2020						
Sulphur as S	0.14	0.03	0.02	0.04	0.05	0.65	0.20				<0.01	%	TM30/PM15
Chloride (2:1 Ext BRE) #	0.005	0.006	0.003	0.008	0.005	0.036	0.007				<0.002	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.1447	0.0793	0.0130	0.0153	0.0110	0.2525	0.0290				<0.0015	g/l	TM38/PM20
Organic Matter	1.0	1.0	1.1	0.7	0.6	3.4	0.5				<0.2	%	TM21/PM24
pH #	8.40	8.27	8.10	8.70	8.63	8.24	8.63				<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 9025-08-19
Location: Royal Canal Urban Greenway
Contact: Mike Sutton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/7242						

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.: 20/7242

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: 20/7242

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
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.			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.			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		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

LABORATORY REPORT

4043

Contract Number: PSL20/2739

Report Date: 01 July 2020

Client's Reference: 9025-08-19

Client Name: Ground Investigations Ireland Ltd
Catherinestown House
Hazelhatch Road
Newcastle
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For the attention of: Chris Byrne

Contract Title: Royal Canal Urban Greenway

Date Received: 5/6/2020
Date Commenced: 5/6/2020
Date Completed: 1/7/2020

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.

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH

ISRM Suggested Methods, pp 111 –116, 1981.

Hole Number	Sample Number	Sample Type	Top Depth (m)	Base Depth (m)	Sample Diameter (mm)	Sample Length (mm)	Height Ratio	Initial Mass (g)	Bulk Density (Mg/m)	Moisture Content (%)	Dry Density (Mg/m)	Load Failure (kN)	UCS (MPa)	Failure Mode	Date Tested	Remarks
RCH01		C	1.00	1.25	63	162	2.6	1364	2.70	0.1	2.70	161.7	51.9	Brittle	30/06/20	
RCH03		C	0.15	0.50	63	160	2.5	1354	2.71	0.3	2.71	180.5	57.9	Brittle	30/06/20	
RCH06		C	1.15	1.50	63	163	2.6	1367	2.69	0.2	2.68	119.5	38.3	Brittle	30/06/20	
RCH07		C	0.45	0.65	63	152	2.4	1274	2.69	0.2	2.68	42.3	13.6	Brittle	30/06/20	
RC02		C	1.00	1.30	62	161	2.6	1352	2.78	0.4	2.77	139.2	46.1	Brittle	30/06/20	
RC05		C	0.55	0.80	62	122	2.0	1015	2.76	0.3	2.75	57.0	18.9	Brittle	30/06/20	
RC08A		C	0.95	1.30	62	162	2.6	1370	2.80	0.2	2.80	191.8	63.5	Brittle	30/06/20	

PSL Professional Soils Laboratory

Royal Canal Urban Greenway

Contract No:
PSL20/2739
Client Ref:
9025-08-19

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		Area	D_e^2	D_e	Failure Load (P)		I_s	Corr Fac	I_{s50}	Failure Type	Remarks
				Par / Perp	W	D	(mm2)		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)		
RCH01	1.80		A	Perp	63	39	2457	3128.35	55.93	-	9.55	3.05	1.052	3.21	Valid	
RCH02	1.90		A	Perp	63	31	1953	2486.64	49.87	-	9.38	3.77	0.999	3.77	Valid	
RCH03	0.00		A	Perp	63	44	2772	3529.42	59.41	-	10.74	3.04	1.081	3.29	Valid	
RCH05	0.90		A	Perp	63	46	2898	3689.85	60.74	-	21.27	5.76	1.092	6.29	Valid	
RCH06	0.20		A	Perp	63	36	2268	2887.71	53.74	-	13.64	4.72	1.033	4.88	Valid	
RCH07	0.00		A	Perp	63	42	2646	3368.99	58.04	-	14.23	4.22	1.069	4.52	Valid	
RC02	0.80		A	Perp	62	42	2604	3315.52	57.58	-	12.16	3.67	1.066	3.91	Valid	
RC05	0.80		A	Perp	62	40	2480	3157.63	56.19	-	9.12	2.89	1.054	3.04	Valid	
RC08	0.70		A	Perp	62	46	2852	3631.28	60.26	-	14.23	3.92	1.088	4.26	Valid	
RC08A	0.80		A	Perp	62	36	2232	2841.87	53.31	-	8.68	3.05	1.029	3.14	Valid	
RC14	0.25		A	Perp	62	31	1922	2447.17	49.47	-	9.90	4.05	0.995	4.03	Valid	

Note All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

UKAS TESTING 4043

PSL Professional Soils Laboratory

Royal Canal Urban Greenway

Contract No:

PSL20/2739

Client Ref:

9025-08-19

SUMMARY OF POINT LOAD TEST RESULTS

ISRM Suggested Methods : 2007

Borehole Number	Depth (m)	Sample Ref	Test Type	Orientation	Dimensions (mm)		D_e^2	D_e	Failure Load		I_s	Corr Fac	I_{s50}	Failure Type	Remarks
				Par / Perp	L	D		(mm)	(Mpa)	(kN)	(MPa)	F	(MPa)		
RCH01	1.80		D	Par	-	63	3969	63.00	-	16.73	4.215	1.110	4.68	Valid	
RCH02	1.90		D	Par	-	63	3969	63.00	-	13.16	3.316	1.110	3.68	Valid	
RCH03	0.00		D	Par	-	63	3969	63.00	-	18.30	4.611	1.110	5.12	Valid	
RCH05	0.90		D	Par	-	63	3969	63.00	-	31.96	8.052	1.110	8.93	Valid	
RCH06	0.20		D	Par	-	63	3969	63.00	-	21.71	5.470	1.110	6.07	Valid	
RC02	0.80		D	Par	-	62	3844	62.00	-	13.39	3.483	1.102	3.84	Valid	
RC05	0.80		D	Par	-	62	3844	62.00	-	10.03	2.609	1.102	2.87	Valid	
RC08	0.70		D	Par	-	62	3844	62.00	-	16.28	4.235	1.102	4.67	Valid	
RC08A	0.80		D	Par	-	62	3844	62.00	-	16.89	4.394	1.102	4.84	Valid	

Note All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

UKAS TESTING 4043

PSL Professional Soils Laboratory

Royal Canal Urban Greenway

Contract No:

PSL20/2739

Client Ref:

9025-08-19

APPENDIX 8 – Geophysics Report

www.gii.ie

AGP20095_01

Report on the Geophysical Investigation at Royal Canal Urban Greenway Castleknock Co. Dublin For Ground Investigations Ireland Ltd.

25th June 2020

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PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOPHYSICS LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGP20095		
AUTHOR	**CHECKED**	**REPORT STATUS**	**DATE**
EURGEOL PETER O'CONNOR P.GEO. M.SC (GEOPHYSICS), DIP. EIA MGT.	TONY LOMBARD M.SC (GEOPHYSICS)	V.01	25TH JUNE 2020

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1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by Ground Investigations Ireland Limited to carry out a geophysical investigation at the site of Royal Canal Urban Greenway, Castleknock, Co. Dublin.The objective of the investigation was to map the depth to bedrock along the tow path and provide information on the quality of the bedrock.

The surveyed section of the Royal Canal Way is located between Coolmine in the west and Castleknock in the east in County Dublin. The length of surveyed section is 1090m along the southern tow path. Topography ranges from 63.4 m OD to 57.6 m OD.

The Geological Survey of Ireland (GSI) 1:100k Bedrock Geology map for the area indicates that the site is underlain by dark limestone & shale of Lucan Formation with a transition to Tober Colleen mudstone to the east of the survey area. The map also indicates outcrop along the western two-thirds of the survey area.

The GSI Quaternary Sediments map for the area indicates that the predominant part of the site is in an area of subcropping/outcropping rock with till derived from limestones in the east of the site.

Direct investigation information was available in the form of conventional rotary cores, hand cores and horizontal barge mounted cores. These recovered limestone at shallow depths initially with rock levels falling away to the east. RC24 reached a depth of 23.2 m bgl without recovering rock.

The survey involved involving the collection of 20 seismic refraction profiles (S1 – S20) and one ERT profile (R1).

Layer 1 on the seismic data with velocities in the range 350 – 700 m/s has been interpreted as a continuous thin surface layer of sandy gravelly CLAY with an average thickness of 1 m.

From Ch. 0 to 690 m **Layer 2** on the seismic data with velocities in the range 900 – 1800 m/s has been interpreted as a layer of moderately weathered and fractured limestone/mudstone with an average thickness of around 3 m. The excavatability of this layer is estimated as rippable to marginally rippable. From Ch. 690 to 1090 m **Layer 2** has been interpreted as between 2.5 and 25 m of very stiff sandy gravelly clay with local pockets of increased sand/gravel content.

From Ch. 0 to Ch. 285 m **Layer 3** bedrock seismic velocities range from 3400 m/s to 5000 m/s which are typical of slightly weathered to fresh limestone bedrock. From Ch. 335 m to 1090 m the seismic velocities of **Layer 3** are within the range 2800 – 3500 m/s which has been interpreted as mudstone with limestone zones. The excavatability of **Layer 3** (slightly weathered to fresh limestone, mudstone with limestone) is estimated as break/blast based on the seismic velocities.

There is a zone of anomalously low bedrock velocity between Ch. 285-335 m and has been interpreted as a fault zone or a band of weak mudstone. It coincides with the poor recovery on RCH04 and RC06. No rock was recovered in borehole RC24 to 23.2 m bgl and its location coincides with a deepening of the bedrock seismic refractor and with the low resistivity bedrock on profile R1 between Ch. 957 and 985 m. This low resistivity zone extends to around 40 bgl and has been interpreted as a possible fault or weak mudstone zone.

Where bedrock excavation is proposed, a detailed assessment of excavatability should be carried out. The findings of the geophysical investigation should be reviewed following any further direct investigations.

2. INTRODUCTION

APEX Geophysics Limited was requested by Ground Investigations Ireland Limited to carry out a geophysical investigation at the site of Royal Canal Urban Greenway, Castleknock, Co. Dublin.

2.1 Survey Objectives

The objective of the investigation was:

- Map the depth to bedrock along the tow path
- Provide information on the quality of the bedrock.

2.2 Site Background

The surveyed section of the Royal Canal Way is located between Coolmine in the west and Castleknock in the east in County Dublin (Fig. 2.1). The length of surveyed section is approximately 1090m along the southern tow path. Topography along the survey area ranges from 63.4 m OD in the west to 57.6 m OD in the east.



Fig 2.1: Site location.

2.2.1 Geology

The Geological Survey of Ireland (GSI) 1:100k Bedrock Geology map for the area (Figure 2.2) indicates that the site is underlain by dark limestone & shale ('Calp',) of Lucan Formation with a transition to Tober Colleen mudstone to the east of the survey area. The map also indicates bedrock outcrop immediately north along the western two-thirds of the survey area.

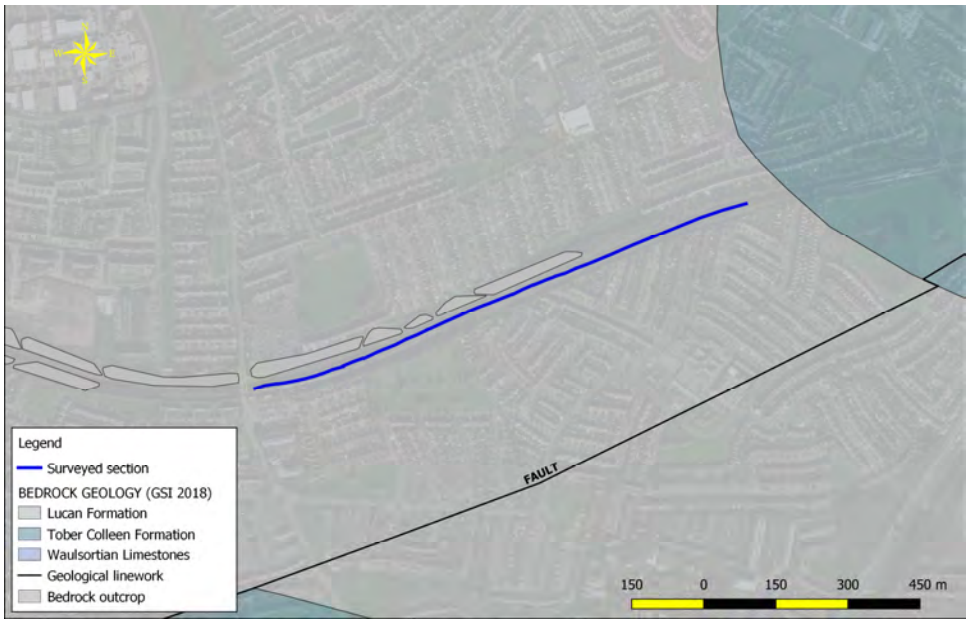


Fig 2.2: Bedrock geology.

2.2.2 Soils

The GSI Quaternary Sediments map for the area (Fig. 2.3) indicates that the predominant part of the site is in an area of subcropping/outcropping rock with some till derived from limestones in the east of the site.



Fig 2.3: Quaternary sediments.

2.2.3 Karst

No karst features are listed on the GSI karst database in the vicinity of the site.

2.2.4 Vulnerability

The groundwater vulnerability rating for the site (Fig. 2.4) is classified as predominantly rock at or near surface with extreme to high in the east of the site.



Fig 2.4: Groundwater vulnerability.

2.2.5 Aquifer Classification

The Lucan Formation rocks (Fig. 2.5) are classified as a 'Locally Important aquifer – bedrock which is moderately productive except for Local Zones' (GSI).'

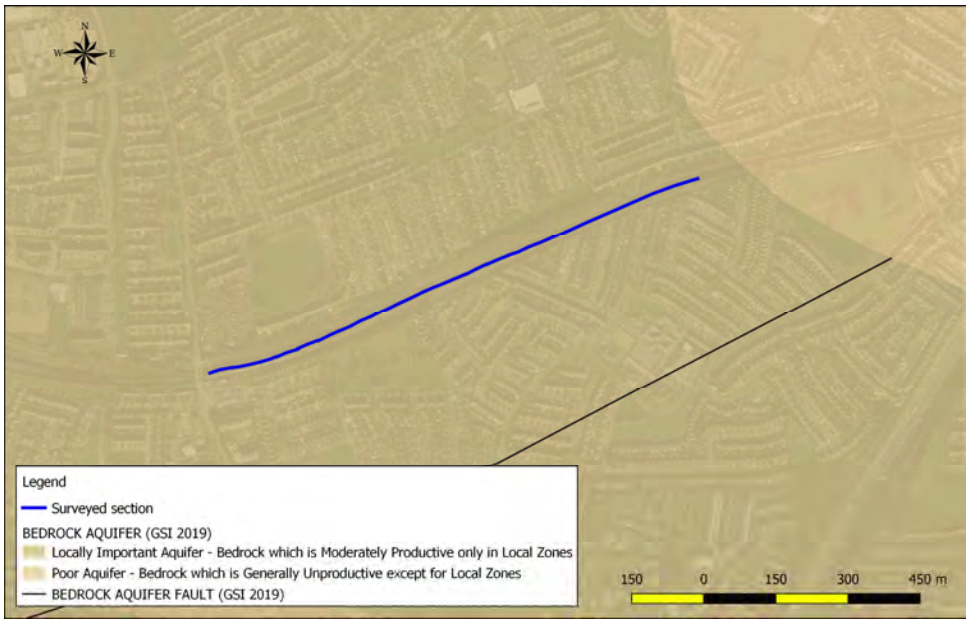


Fig 2.5: Bedrock aquifer.

2.2.6 Historical Data

The historical 6 inch sheet for the area indicates outcropping limestone and shales (Figure 2.6) immediately north of the survey area.

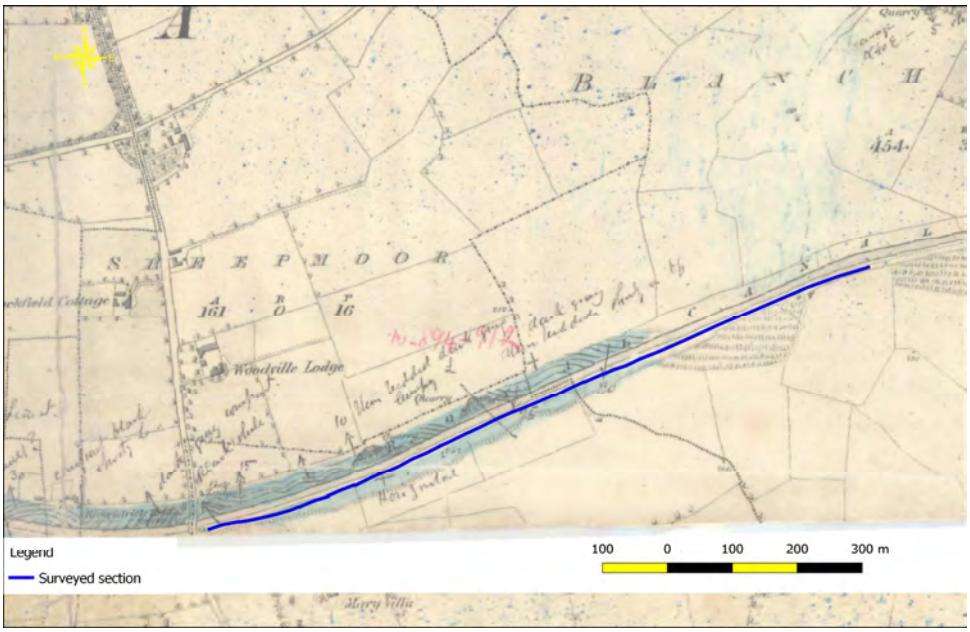


Fig 2.6: The historical 6inch map.

2.2.7 Direct Investigation Data

The following direct investigation information was available at the time writing:

Hand cored (concrete drill) logs along the southern tow path of the canal (RC03, RC04, RC07, RC09, RC11, RC13, RC15, RC17, RC20, RC22).

Rotary core logs along the southern two path of the canal (RC18, RC24, RC28).

Rotary core logs along the northern bank of the canal (RC02, RC05, RC06, RC08, RC08A, RC12, RC14, RC16, RC19).

Horizontal rotary core logs (drilled from barge) into southern bank of canal (RCH01 – RCH09). RCH01-RCH06 were drilled at 2-3m below the towpath, RCH07-RCH09 were drilled at approximately 1m below the tow path.

No rock was recovered from RCH04 and RC06.

The rock level on the boreholes drops away between RCH08 and RCH09.

2.3 Survey Rationale

The investigation consisted of Seismic Refraction profiling and 2D Electrical Resistivity Tomography (ERT).

Seismic Refraction profiling measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities. Readings are taken using geophones connected via multi-core cable to a seismograph. This method should allow profiling of the depth to the top of the bedrock along profiles across the site.

ERT images the resistivity of the materials in the subsurface along a profile to produce a cross-section showing the variation in resistivity with depth, depending on the length of the profile. Each cross-section will be interpreted to determine the material type along the profile at increasing depth, based on typical resistivities returned for Irish ground materials.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which may otherwise exist. Further information on the detailed methodology of each geophysical method employed in this investigation is given in **APPENDIX A: DETAILED GEOPHYSICAL METHODOLOGY**.

3. RESULTS

The survey was carried out between the 11th and 12th of June 2020 involving the collection of 20 seismic refraction profiles (S1 – S20) and one ERT profile (R1). The geophysical survey locations are shown on Drawing AGP20095_01A-C (Appendix C).

3.1 ERT

One ERT profile (R1) has been acquired across the site. The resistivity values have been interpreted on the following basis:

Resistivity (Ohm-m)	Interpretation
60-170	Sandy gravelly CLAY
60-340	MUDSTONE
340-680	LIMESTONE

The ERT results have been used for interpretation in conjunction with the seismic refraction dataset.

3.2 Seismic refraction profiling

Twenty seismic refraction spreads were recorded across the site (S1-S20). The seismic refraction data has been interpreted on the following basis:

P-Wave Seismic Velocity (m/s)	Interpretation	Estimated Stiffness/ Rock Quality	Estimated Excavatability
350 - 700	Overburden	Soft-firm /Loose-med. dense	Diggable
900 - 1800	Moderately weathered/fractured LIMESTONE (western part of survey area)	Poor-Fair	*Rippable – Marginally Rippable
1800 - 2200	Overburden (eastern part of survey area)	Very stiff/ very dense	Diggable
2600 - 3800	Moderately –slightly weathered MUDSTONE with LIMESTONE zones	Fair (poor in fault zones)	Breaking/Blasting
3400 - 5000	Slightly weathered/fractured – Fresh LIMESTONE	Good (poor in fault zones, fair in mudstone zones)	Breaking/Blasting

The processed seismic data are contained in Appendix D.

3.3 Integrated Interpretation

The ERT, Seismic Refraction and direct investigation results have been combined to produce the Interpreted Sections on Drawings AGP20095_02A to AGP18019_02B. Chainage 0m is at the western end of S1. The combined geophysical results are summarised as follows:

Layer	Seismic Velocity (m/s)	Resistivity (Ohm-m)	Average Thickness (m)	Interpretation	Stiffness/ Rock Quality	Excavatibility
1	350-700	60 - 170	1.0	Sandy gravelly CLAY	Soft-firm	Diggable
2	900-1800	no data	2.5	Moderately weathered/fractured rock	Poor-fair	Rippable – marginally rippable
	1800-2200	60 - 170	12.0	Sandy gravelly CLAY	Very stiff	Diggable
3	2600-3500	60-340		Moderately –slightly weathered MUDSTONE with LIMESTONE zones	Poor - Fair	Breaking/ Blasting
4	3400-5000	340-680		Slightly weathered/fractured – fresh LIMESTONE	Good	Breaking/ Blasting

4. DISCUSSION

4.1 Soils

Ch. 0 to 690 m, (S1-S15 on AGP20095_02A and AGP20095_02B)

Layer 1 on the seismic data with velocities in the range 350 – 700 m/s has been interpreted as a thin layer of sandy gravelly CLAY. Thickness ranges from 0.5 m to 3.5 m with an average thickness of around 1 m. Based on the seismic velocities the estimated stiffness of this layer is soft-firm.

Ch. 690 to 1090 m (S16-S20, R1 on AGP18019_02B)

In this section the estimated soil thicknesses increase significantly to within the range 2.5 to 25 m. **Layer 1** continues as a thin (c. 1m) surface layer of soft-firm sandy gravelly clay. **Layer 2** has been interpreted as sandy gravelly clay with an average thickness of 12m increasing locally to around to 23m around at Ch. 970.

The resistivity values of **Layer 2** are mostly less than 100 Ohm-m indicating a predominantly clayey material. Resistivity values increase slightly between Ch. 960 – 995 m indicating an increase in sand/gravel content which is consistent with the sand/gravel content noted on the log of RC24.

Seismic P-wave velocities for **Layer 2** are in the range 1800 - 2000 m/s indicating an over consolidated very stiff clay which correlates well with the SPT values and stiffness description on RC24 and RC28.

4.2 Bedrock

Ch. 0 to 690 m, (S1-S15 on AGP20095_02A and AGP18019_02B)

In this section of the survey **Layer 2** on the seismic data with velocities in the range 900 – 1800 m/s has been interpreted as a layer of moderately weathered and fractured limestone/mudstone. Thickness ranges from 1.5 m to 4.5 m with an average thickness of around 3 m. Based on the seismic velocities the degree of weathering/fracturing has been estimated as moderate.

The excavatability of **Layer 2** (moderately weathered and fractured limestone/mudstone) is estimated as rippable to marginally rippable based on the seismic velocities.

There is an anomalous zone on seismic profile S7 between Ch. 285-335 m where **Layer 1 and Layer 2** combine together with a lower velocity of 900 m/s. This has been interpreted as a zone of highly weathered rock and/or sandy gravelly clay. It overlies a zone of low anomalously low bedrock seismic velocity.

From Ch. 0 to Ch. 285 m **Layer 3** seismic velocities range from 3400 m/s to 5000 m/s which are typical of slightly weathered to fresh limestone bedrock and this correlates well with the generally good quality limestone recovered on boreholes RCH01-03.

The zone of anomalously low bedrock velocity (1700 m/s) referred to above occurs on S7 between Ch. 285-335 m and has been interpreted as a possible fault zone or a band of weak mudstone. There was no rock recovery in adjacent boreholes RCH04 and RC06 and RCO7 which are located in this zone.

From Ch. 335 m to 690 m the seismic velocities of Layer 3 decrease to within the range 2800 – 3500 m/s which has been interpreted as moderately to slightly weathered mudstone with limestone zones.

The excavatability of **Layer 3** (slightly weathered to fresh limestone, moderately to slightly weathered mudstone with limestone) is estimated as break/blast based on the seismic velocities.

Ch. 690 to 1090 m (S16-S20, R1 on AGP18019_02B)

From Ch. 690 to 1090 m the increased mudstone content of **Layer 3** bedrock can be seen on ERT profile R1 with alternating zones of mudstone and limestone of varying thickness and depth. Seismic velocities of the bedrock in this section range from 2600 m/s to 3300 m/s which have been interpreted as predominantly poor – fair quality mudstone with some limestone zones.

No rock was recovered in borehole RC24 to a depth of 23.2 m and the location of this borehole coincides with a deepening of the bedrock seismic refractor to around 25m bgl on S19 and S20 forming a channel type feature between Ch. 960 and 990 m. This area also coincides with the lowest resistivity bedrock on ERT profile R1 between Ch. 957 and 985 m. This low resistivity zone extends to around 40 bgl and it is likely that poor quality rock will extend to this depth. This area has been interpreted as a possible fault or weak mudstone zone.

Excavatability of **Layer 3** (mudstone with limestone) is estimated as break/blast based on the seismic velocities.

5. RECOMMENDATIONS

Where bedrock excavation is proposed, a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, rotary core drilling, strength testing, and trial excavation pits down to formation level using a high powered excavator of similar rating to that to be used during construction. A more detailed discussion of velocity and excavatability is contained in Appendix B.

The findings of the geophysical investigation should be reviewed following any further direct investigations.

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'Seismic refraction exploration for engineering site investigations', NTIS, U.S. Dept. of Commerce

Sheriff, R.E., and Geldart, L.P., 1982;
Exploration seismology, volume 1: Cambridge University Press, 253 pp.

Soske, J.L., 1959;
'The blind zone problem in engineering geophysics', Geophysics, 24, pp 359-365.

APPENDIX A: DETAILED GEOPHYSICAL METHODOLOGY

A combination of geophysical techniques was used to provide a high quality interpretation and reduce any ambiguities, which may otherwise exist.

Electrical Resistivity Tomography (ERT)

Electrical Resistivity Tomography was carried out to provide information on lateral variations in the overburden material as well as on the underlying overburden and bedrock.

Principles
This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. This method involves the use of electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

Data Collection
Profiles were recorded using a Tigre resistivity meter, imaging software, two 32 takeout multicore cables and up to 64 stainless steel electrodes. Saline solution was used at the electrode/ground interface in order to gain a good electrical contact required for the technique to work effectively. The recorded data were processed and viewed immediately after surveying.

Data Processing
The field readings were stored in computer files and inverted using the RES2DINV package (Geotomo Software, 2006) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-depth model of the resistivities.

The inverted 2D resistivity models and corresponding interpreted geology are displayed on the accompanying drawings alongside the processed seismic sections. Profiles have been contoured using the same contour intervals and colour codes. Distance is indicated along the horizontal axis of the profiles.

Seismic Refraction Profiling

Principles
This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

Seismic profiling measures the p-wave velocity (Vp) of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher Vp velocities while soft, loose or fractured materials have lower Vp velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.

Data Collection
A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable. Equipment was carried and operated by a two-person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile.(eg. 69m profile ~23m depth, 33m profile ~ 11m depth).

Data Processing
First break picking in digital format was carried out using the FIRSTPIX software program to construct p-wave (Vp) traveltime plots for each spread. Velocity phases were selected from these plots using the GREMIX software program and were used to calculate the thickness of individual velocity units. Topographic data were input. Material types were assigned and estimation made of material properties, cross-referenced to borehole and ERT data. The processed seismic data are displayed in Appendix D.

GREMIX interprets seismic refraction data as a laterally varying layered earth structure. It incorporates the slope-intercept method, parts of the Plus-Minus Method of Hagedoorn (1959), Time-Delay Method, and features the Generalized Reciprocal Method (GRM) of Palmer (1980). Up to four layers can be mapped; one deduced from direct arrivals and three deduced from refractions. Phantoming of all possible travel time pairs can be carried out by adjusting reciprocal times of off shots.

Approximate errors for Vp velocities are estimated to be +/- 10%. Errors for the calculated layer thicknesses are of the order of +/-20%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

Spatial Relocation

All the geophysical investigation locations were acquired using a Trimble Geo 7X high-accuracy GNSS handheld system using the settings listed below. This system allows collection of GPS data with c.20mm accuracy.

Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Meters
Altitude units:	Meters
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

APPENDIX B: EXCAVATABILITY

The seismic velocity of a rock formation is related to characteristics of the rock mass which include rock hardness and strength, degree of weathering and discontinuities. Usually the velocity is just one of several parameters used in the assessment of excavatability. The excavatability of a rock formation is favoured by the following factors:

- Open fractures, faults and other planes of weakness of any kind
- Weathering
- Brittleness and crystalline nature
- High degree of stratification or lamination
- Large grain size
- Low compressive strength

Weaver (1975) presented a comprehensive rippability rating chart (Fig.1) in which the p-wave velocity value and the relevant geological factors could be entered and assigned appropriate weightings. The total weighted index was found to correlate very well with actual rippability.

Fig.1 Rippability Rating Chart

Rock class	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock
Seismic velocity (m/s)	>2150	2150-1850	1850-1500	1500-1200	1200-450
Rating	26	24	20	12	5
Rock hardness	Extremely hard rock	Very hard rock	Hard rock	Soft rock	Very soft rock
Rating	10	5	2	1	0
Rock weathering	Unweathered	Slightly weathered	Weathered	Highly weathered	Completely weathered
Rating	9	7	5	3	1
Joint spacing (mm)	>3000	3000-1000	1000-300	300-50	<50
Rating	30	25	20	10	5
Joint continuity	Non continuous	Slightly continuous	Continuous-no gouge	Continuous-some gouge	Continuous-with gouge
Rating	5	5	3	0	0
Joint gouge	No separation	Slight separation	Separation <1mm	Gouge <5mm	Gouge >5mm
Rating	5	5	4	3	1
Strike and dip orientation	Very unfavourable	Unfavourable	Slightly unfavourable	Favourable	Very favourable
Rating	15	13	10	5	3
Total rating	100-90	90-70*	70-50	50-25	<25
Rippability assessment	Blasting	Extremely hard ripping and blasting	Very hard ripping	Hard ripping	Easy ripping
Tractor horsepower		770/385	385/270	270/180	180
Tractor kilowatts		575/290	290/200	200/135	135

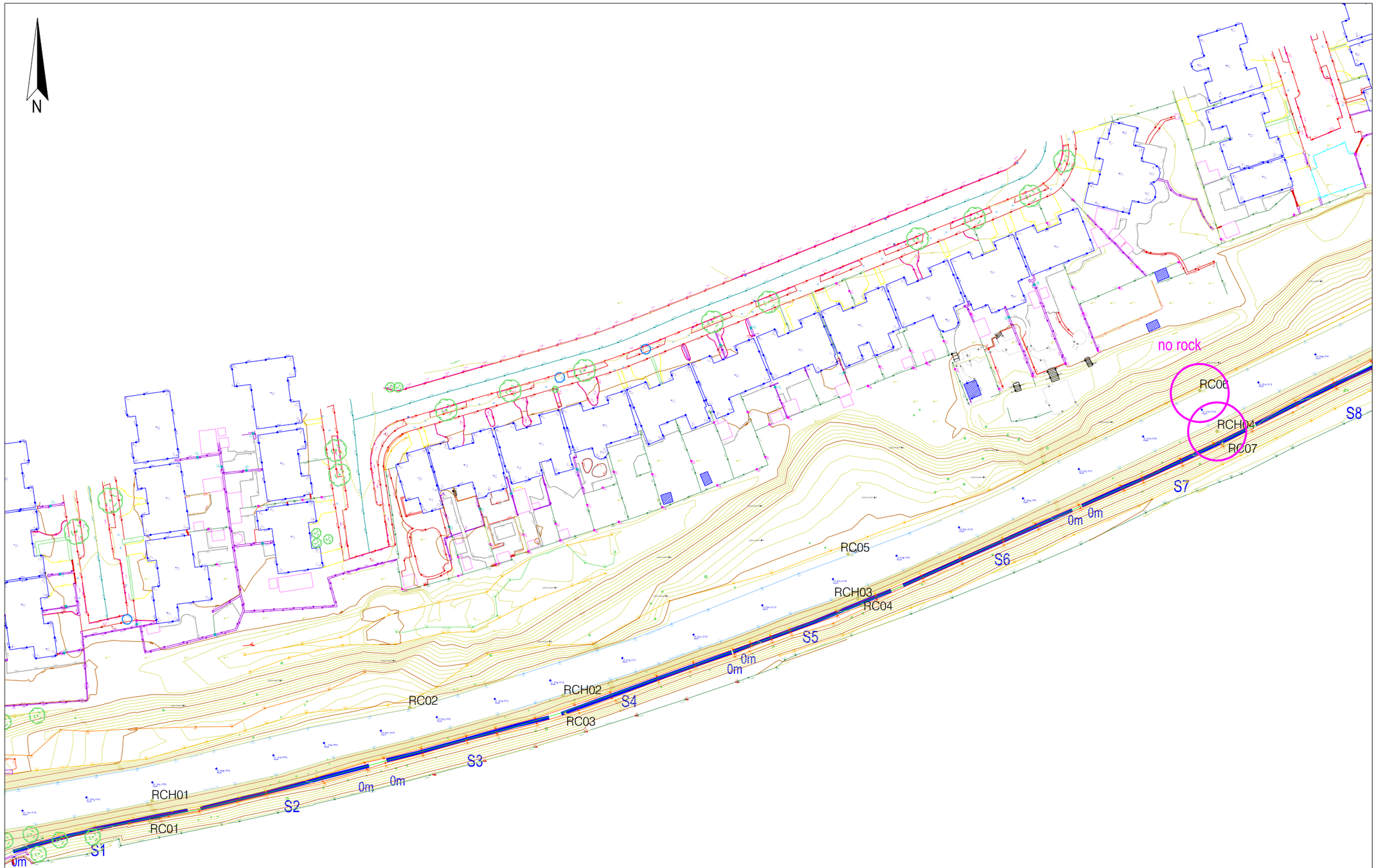
APPENDIX C: DRAWINGS

The information derived from the geophysical investigation as well as correlation with the available direct investigation is presented in the following drawings:

AGP20095_01A	Geophysical Survey Locations	1:1000	@ A3
AGP20095_01B	Geophysical Survey Locations	1:1000	@ A3
AGP20095_01C	Geophysical Survey Locations	1:1000	@ A3
AGP20095_02A	Interpreted Longitudinal Section	1:2000	@ A3
AGP20095_02B	Interpreted Longitudinal Section	1:2000	@ A3

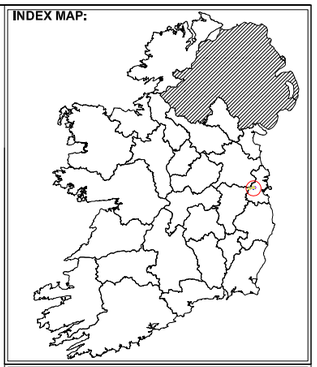
GEOPHYSICAL SURVEY LOCATIONS

SCALE 1:1000



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INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

BH1 — Borehole

no rock — Note from borehole log

The information displayed here is to be used in conjunction with AGP20095 Report on the Geophysical Investigation at Royal Canal Urban Greenway for Ground Investigations Ireland Ltd., APEX Geophysics Ltd. 25th June 2020.

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Ireland

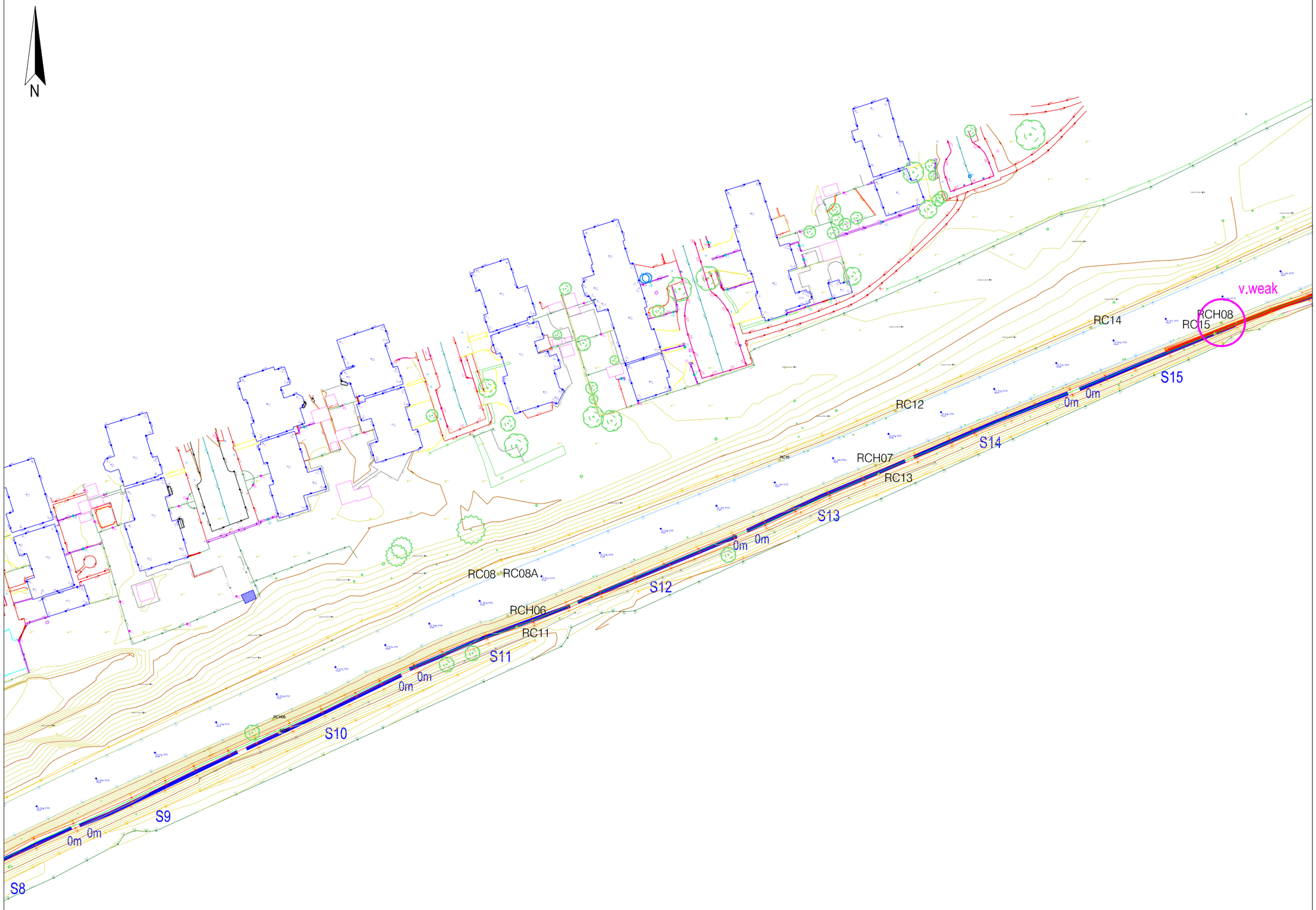
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E info@apexgeophysics.ie
www.apexgeophysics.ie

PROJECT:	ROYAL CANAL URBAN GREENWAY GEOPHYSICAL INVESTIGATION
CLIENT.:	GROUND INVESTIGATIONS IRELAND LIMITED
DRAWING NO:	AGP20095_01A
SCALE:	AS INDICATED @ A3
DATE:	25-06-2020

Version:	Date:	Drawn By:	Checked:
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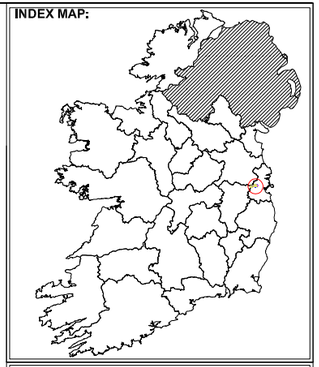
GEOPHYSICAL SURVEY LOCATIONS

SCALE 1:1000



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INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

BH1 — Borehole

no rock — Note from borehole log

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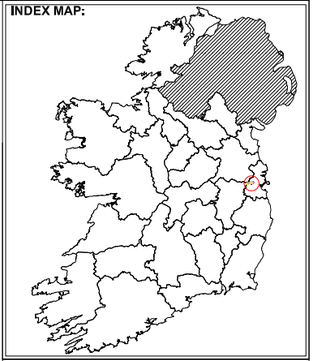
GEOPHYSICAL SURVEY LOCATIONS

SCALE 1:1000



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INDEX MAP:



LEGEND:

R1 — 2D resistivity profile

S1 — Seismic refraction profile

BH1 — Borehole

no rock — Note from borehole log

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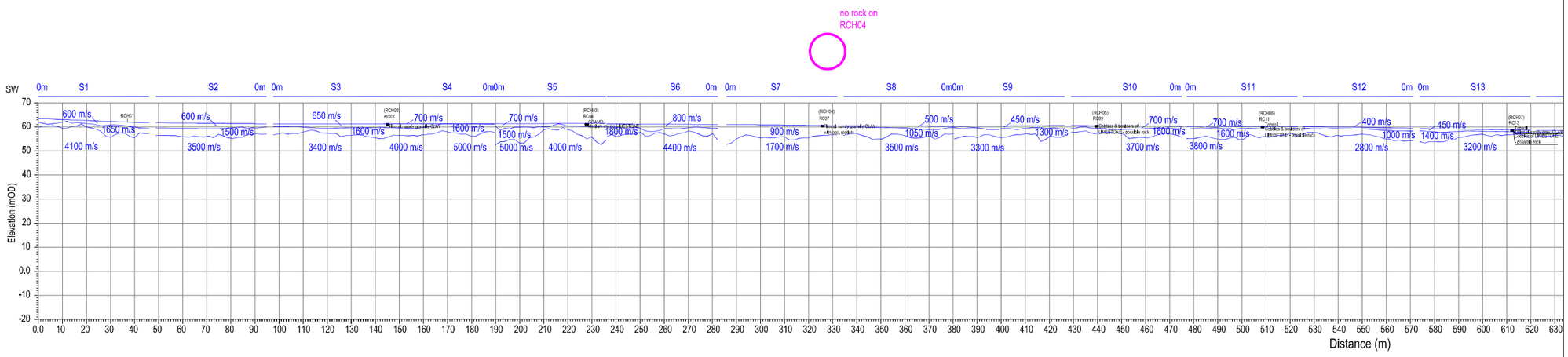
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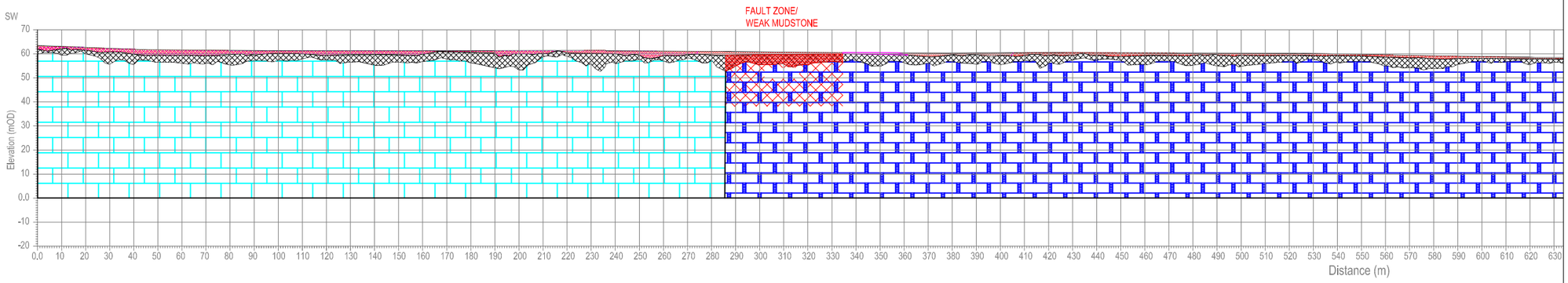
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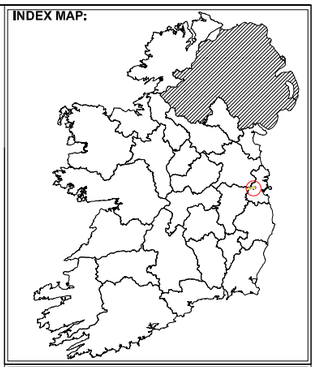
INTERPRETED LONGITUDINAL SECTION

SCALE 1:2000





INDEX MAP:



LEGEND:

- Summary borehole log (vertical)
- Note from borehole log (horizontal)
- Seismic refraction layer with interpreted P-wave velocity
- Soft-firm sandy gravelly clay
- Very stiff gravelly clay
- Surface Fill
- Moderately weathered/fractured rock, possible stiff gravelly clay
- Moderately weathered/fractured rock,
- Slightly weathered-fresh Limestone
- Mudstone with Limestone Zones
- Mudstone
- Fault/weak mudstone zone

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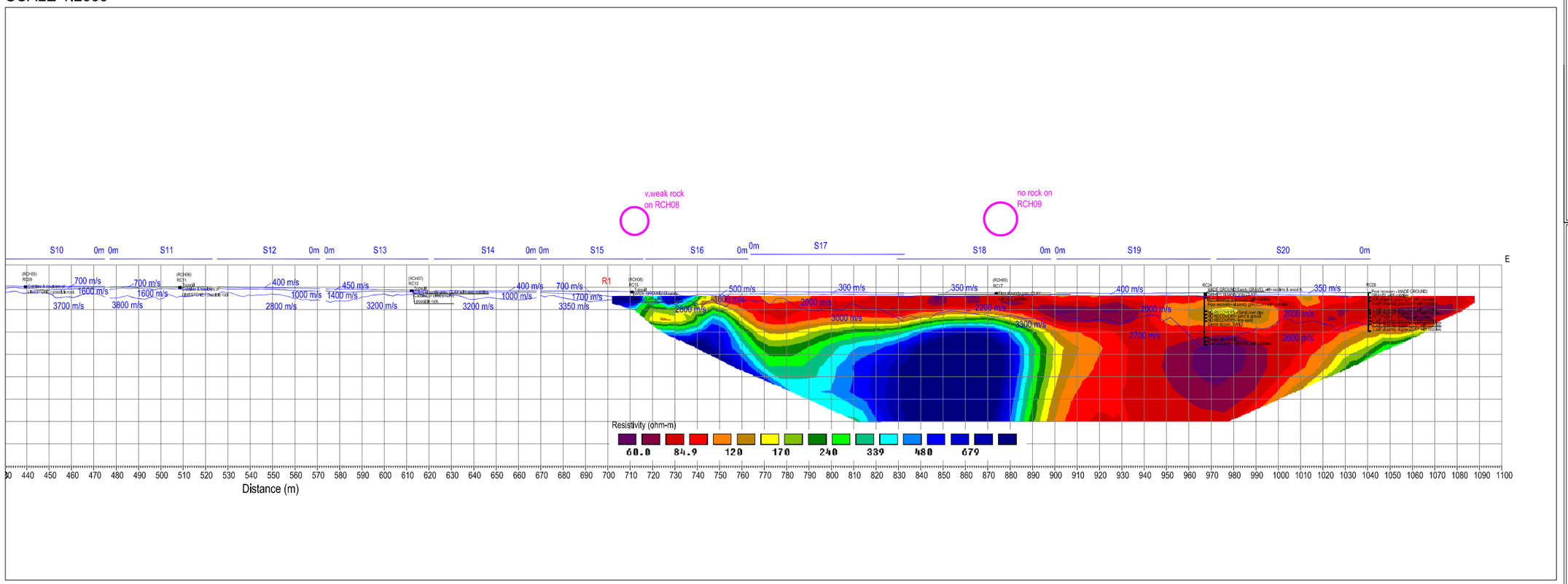
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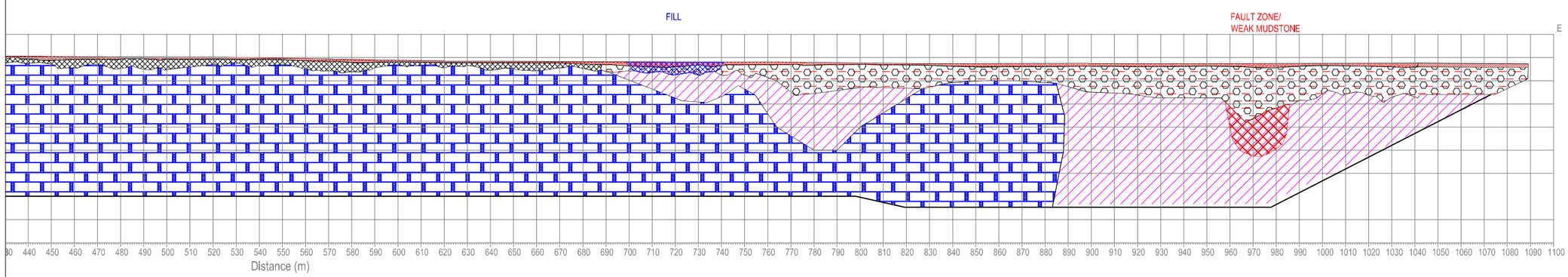
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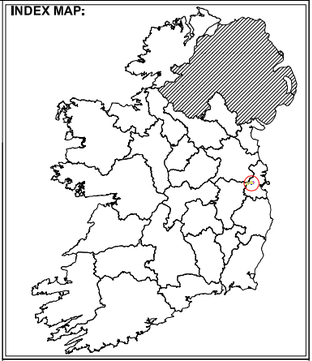
INTERPRETED LONGITUDINAL SECTION

SCALE 1:2000





INDEX MAP:



LEGEND:

- (RCH09) RC17 — Summary borehole log (vertical)
- Note from borehole log (horizontal)
- 1254-1288 m/s — Seismic refraction layer with interpreted P-wave velocity
- Soft-firm sandy gravelly clay
- Very stiff gravelly clay
- Surface Fill
- Moderately weathered/fractured rock, possible stiff gravelly clay
- Moderately weathered/fractured rock,
- Slightly weathered-fresh Limestone
- Mudstone with Limestone Zones
- Mudstone
- Fault/weak mudstone zone

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CLIENT.:	GROUND INVESTIGATIONS IRELAND LIMITED
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Version:	Date:	Drawn By:	Checked:
01	25-06-2020	POC	TL

APPENDIX D: SEISMIC DATA

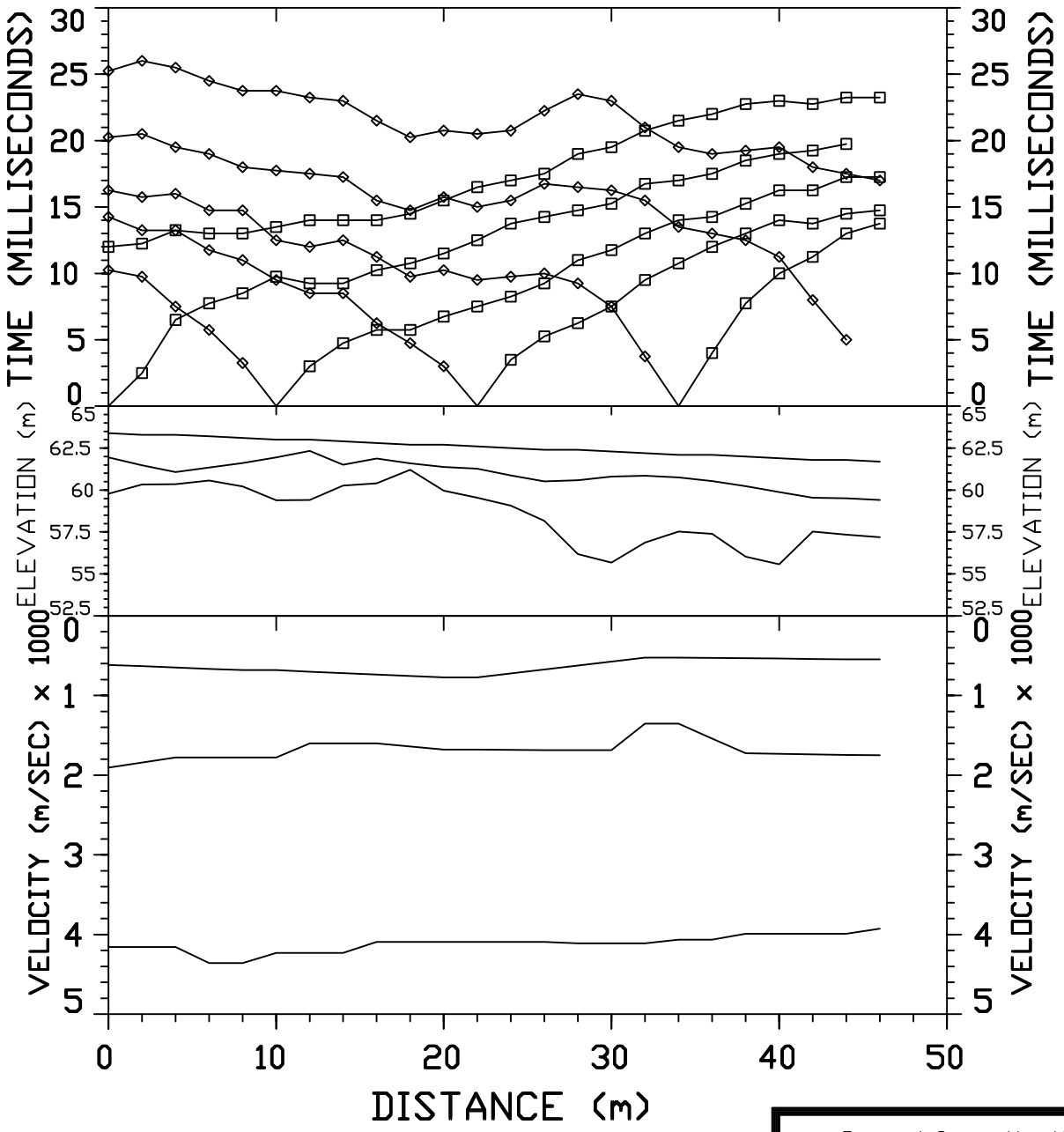


Plate: 10a

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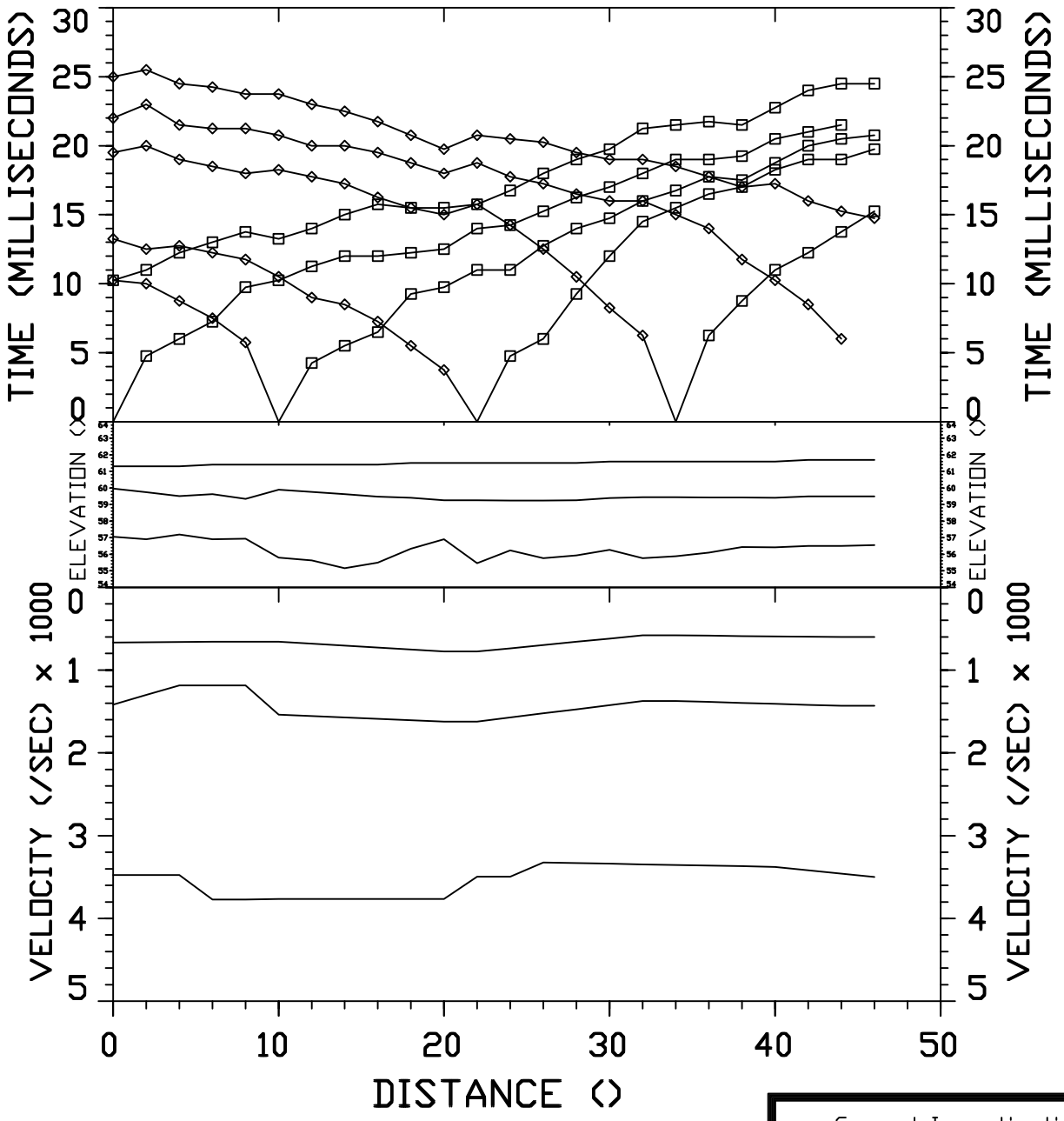


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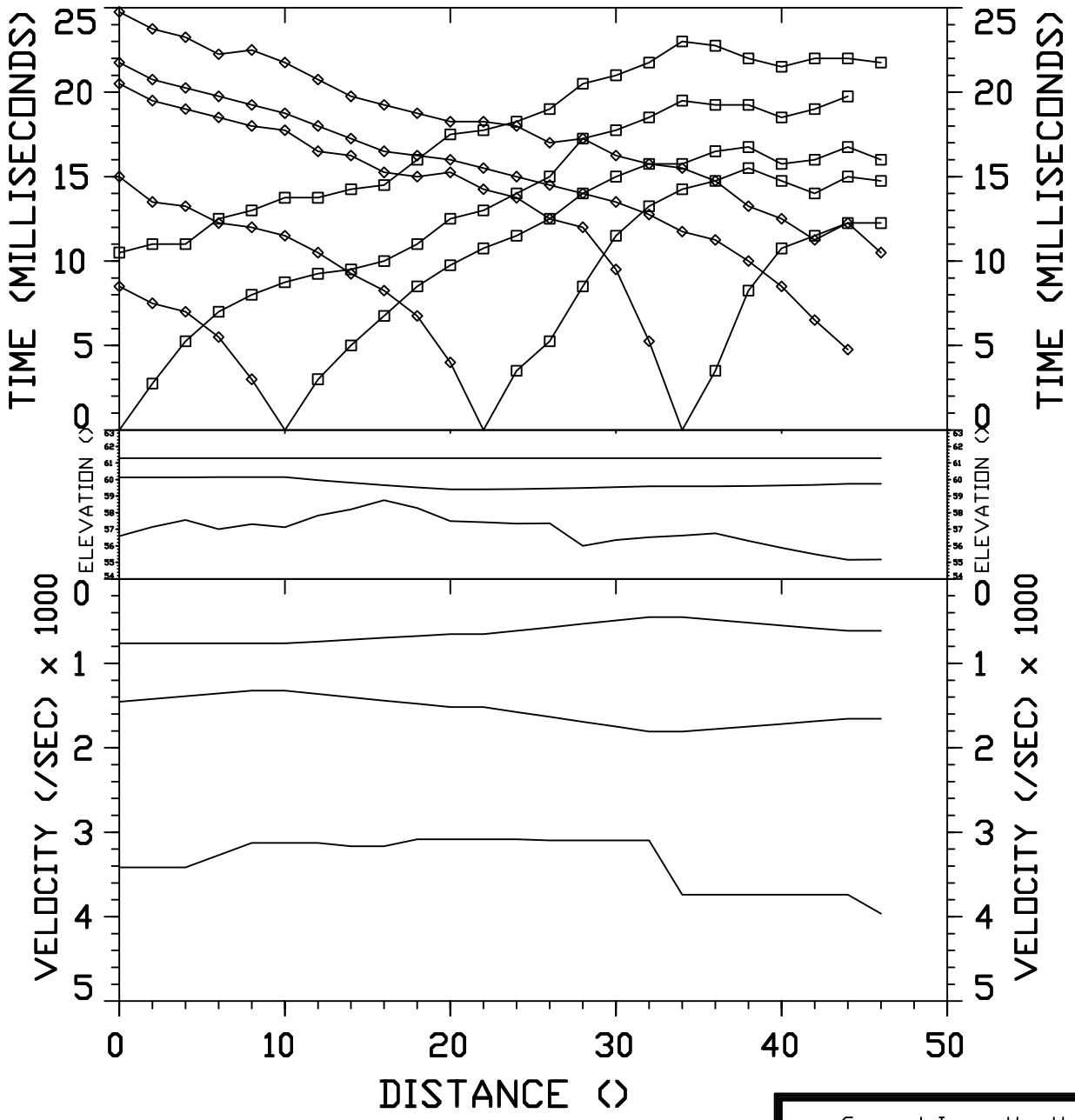


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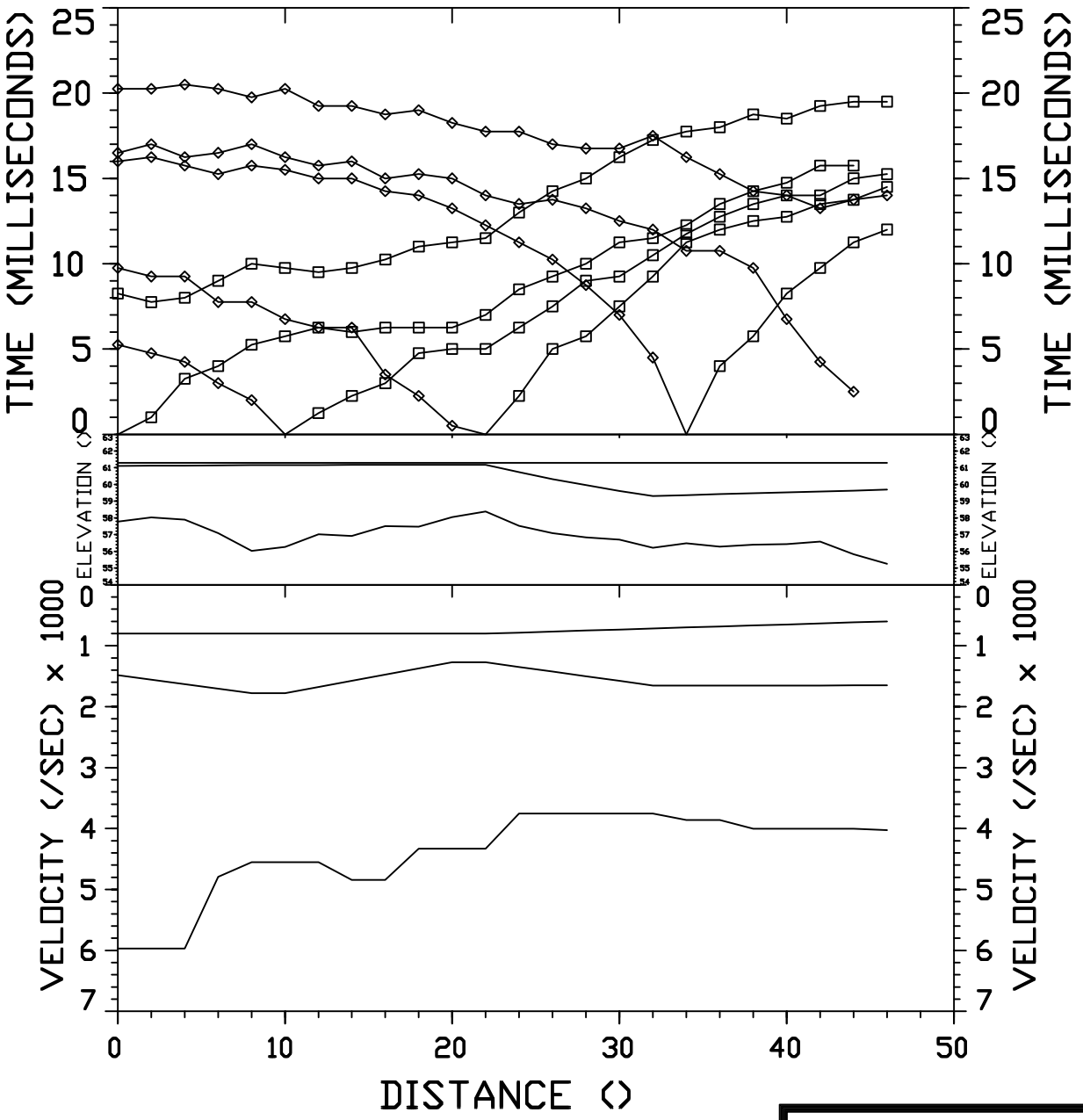


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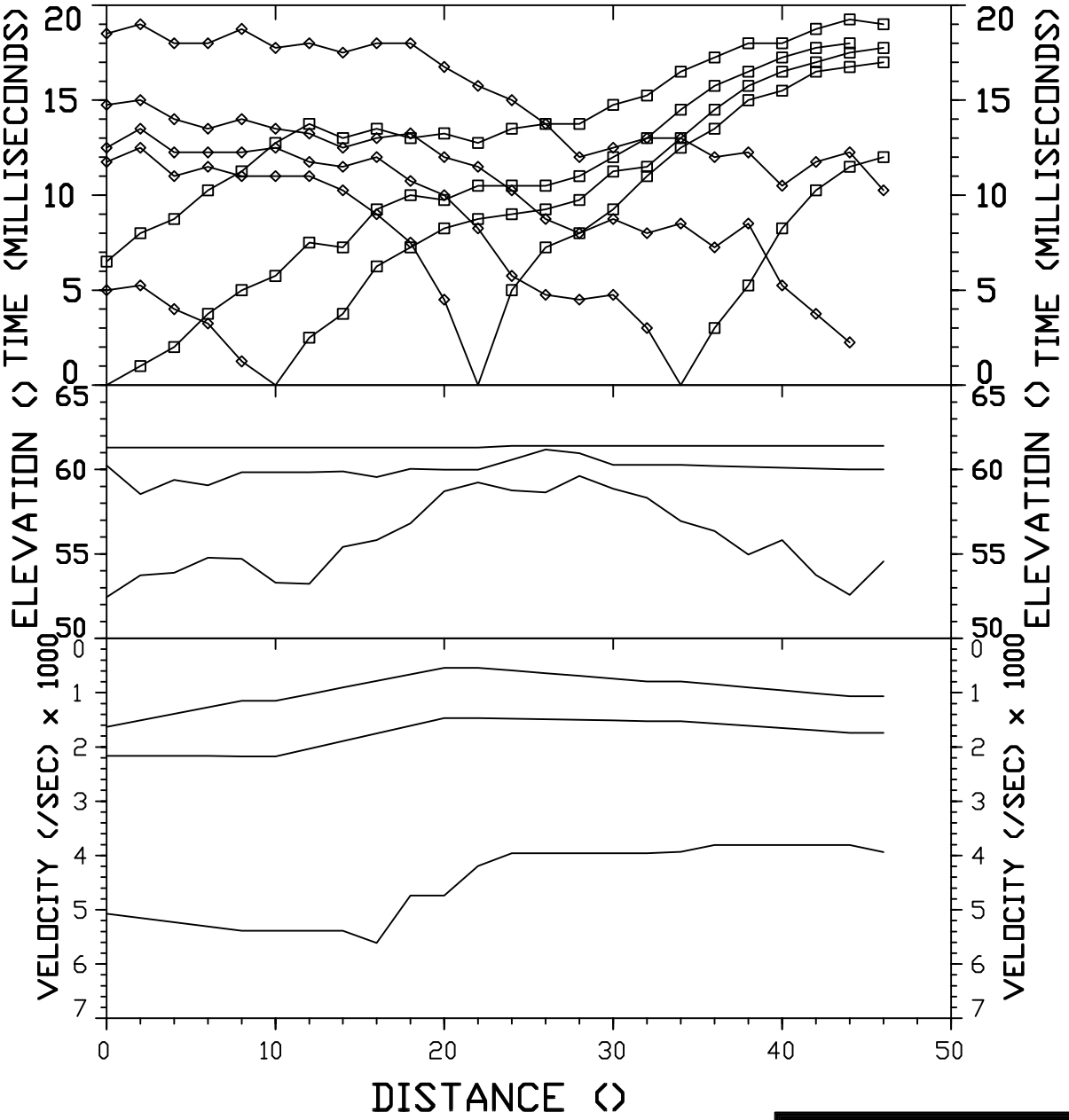


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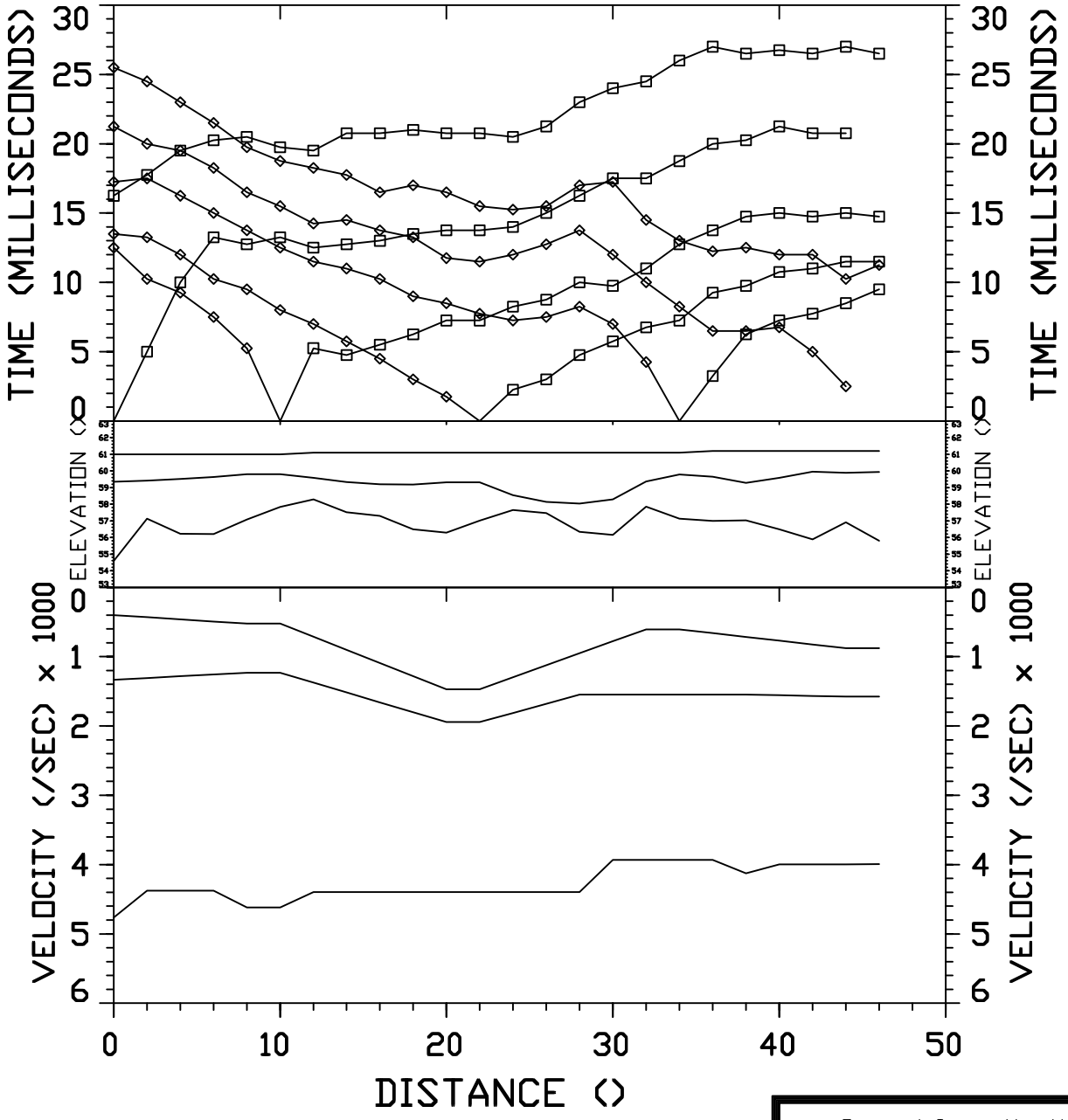


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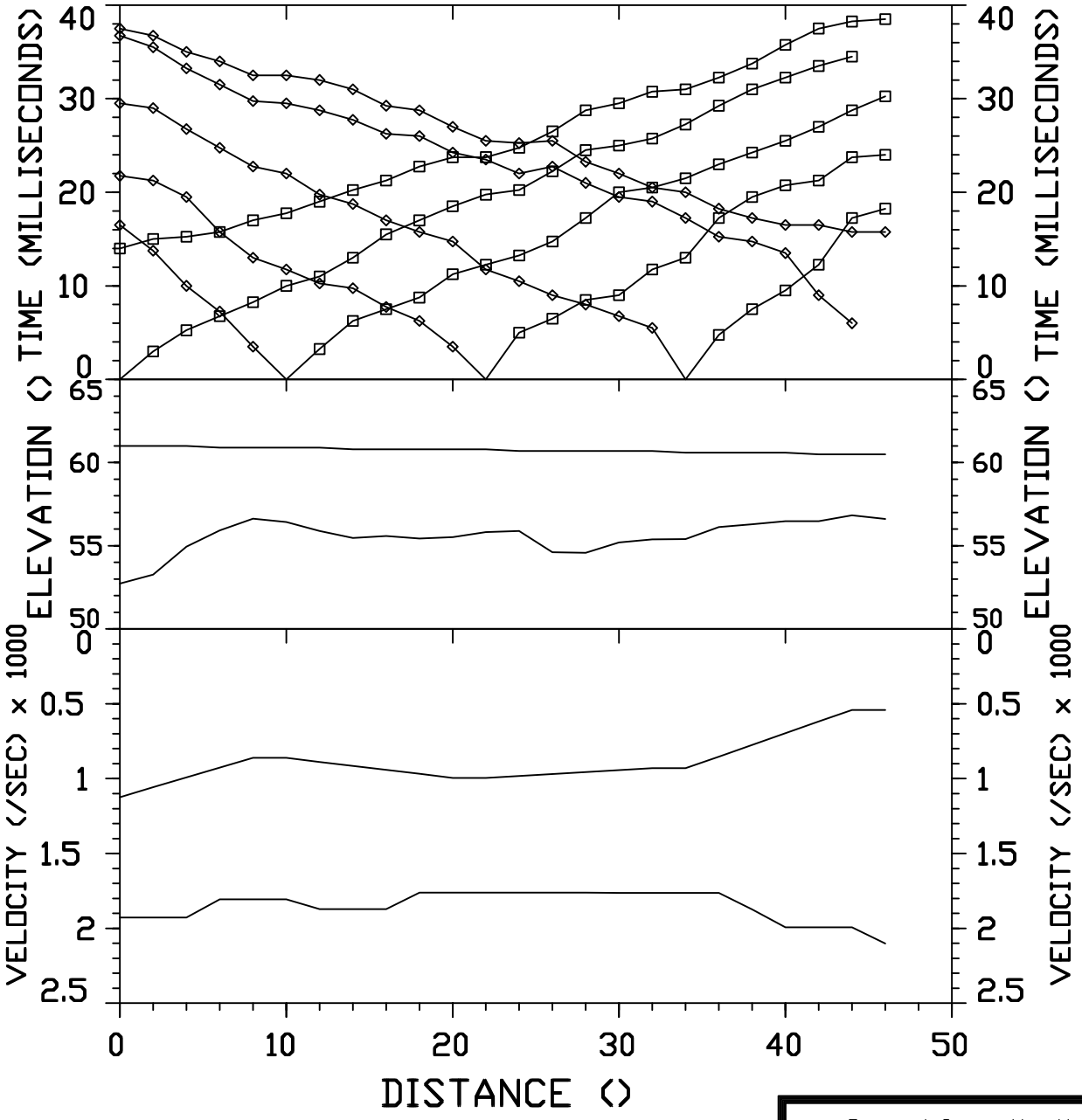


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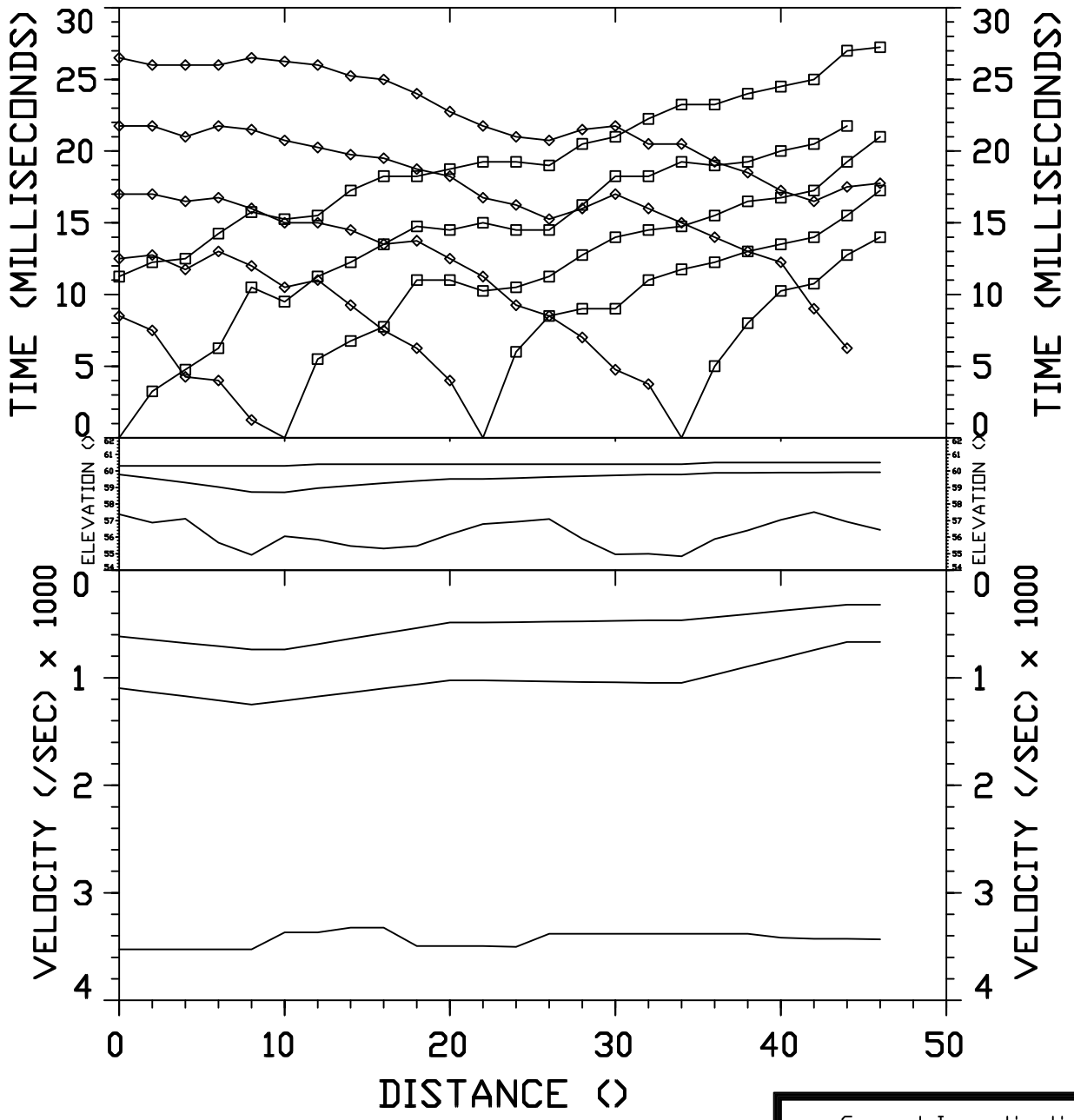


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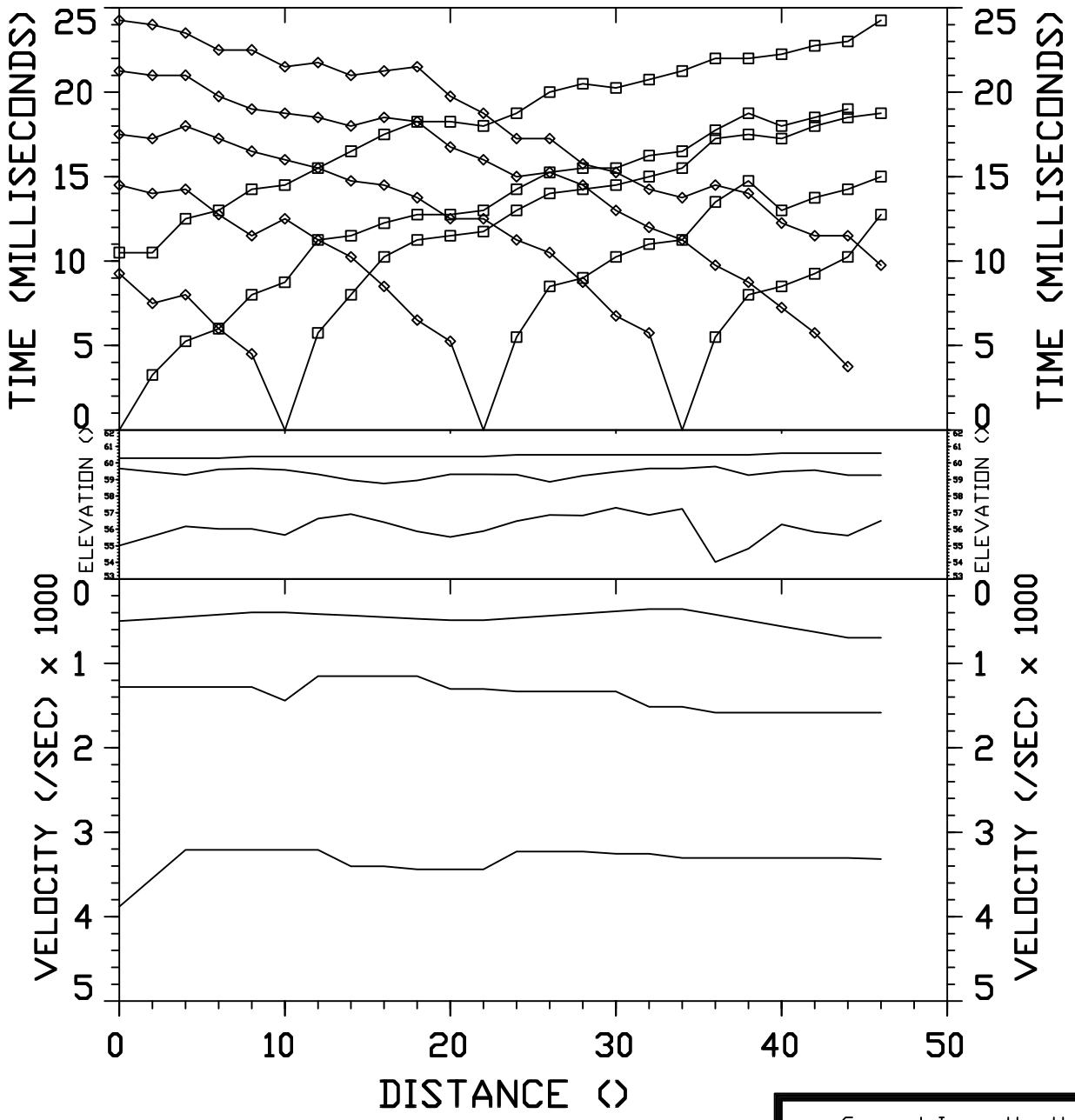


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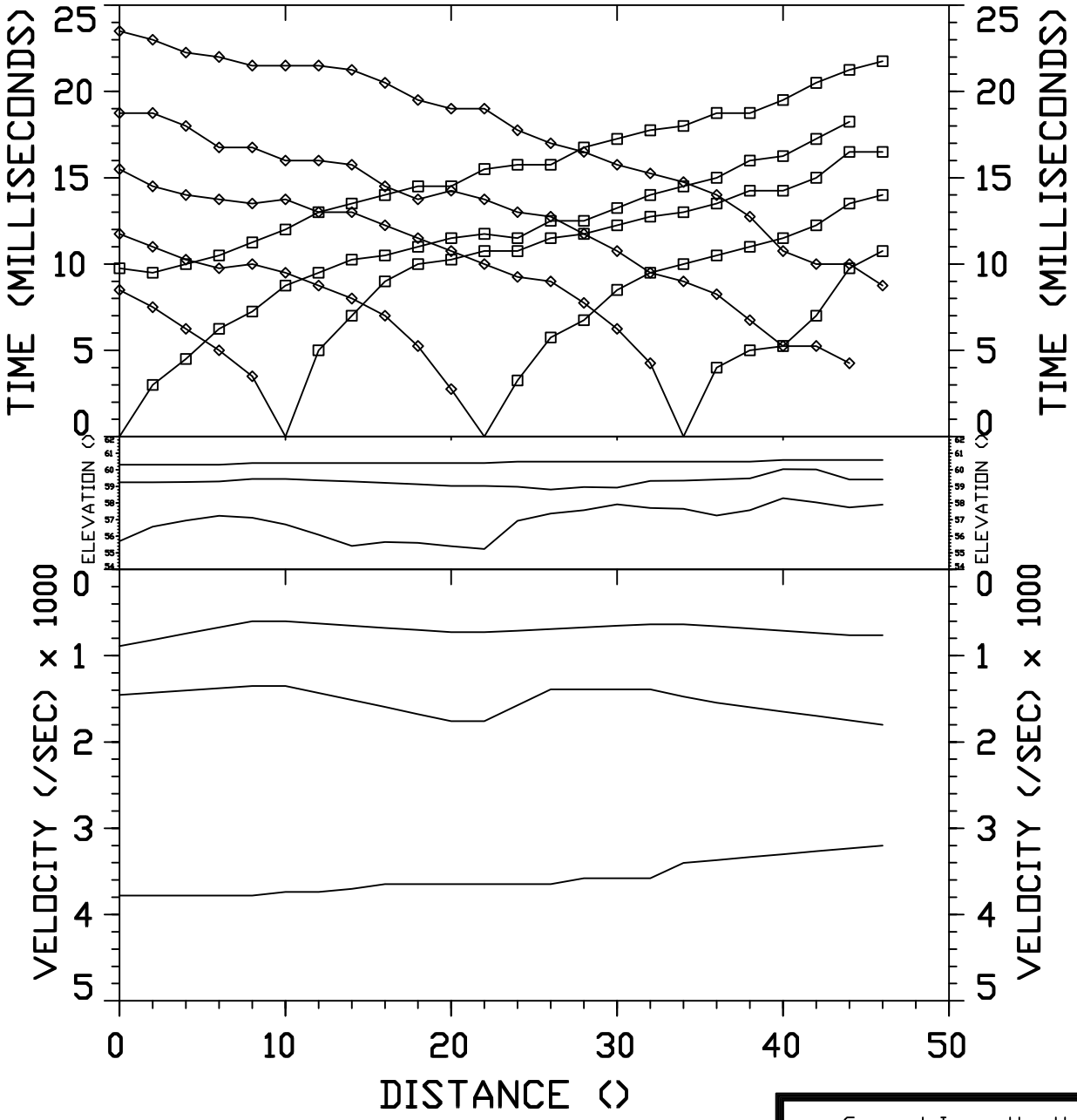


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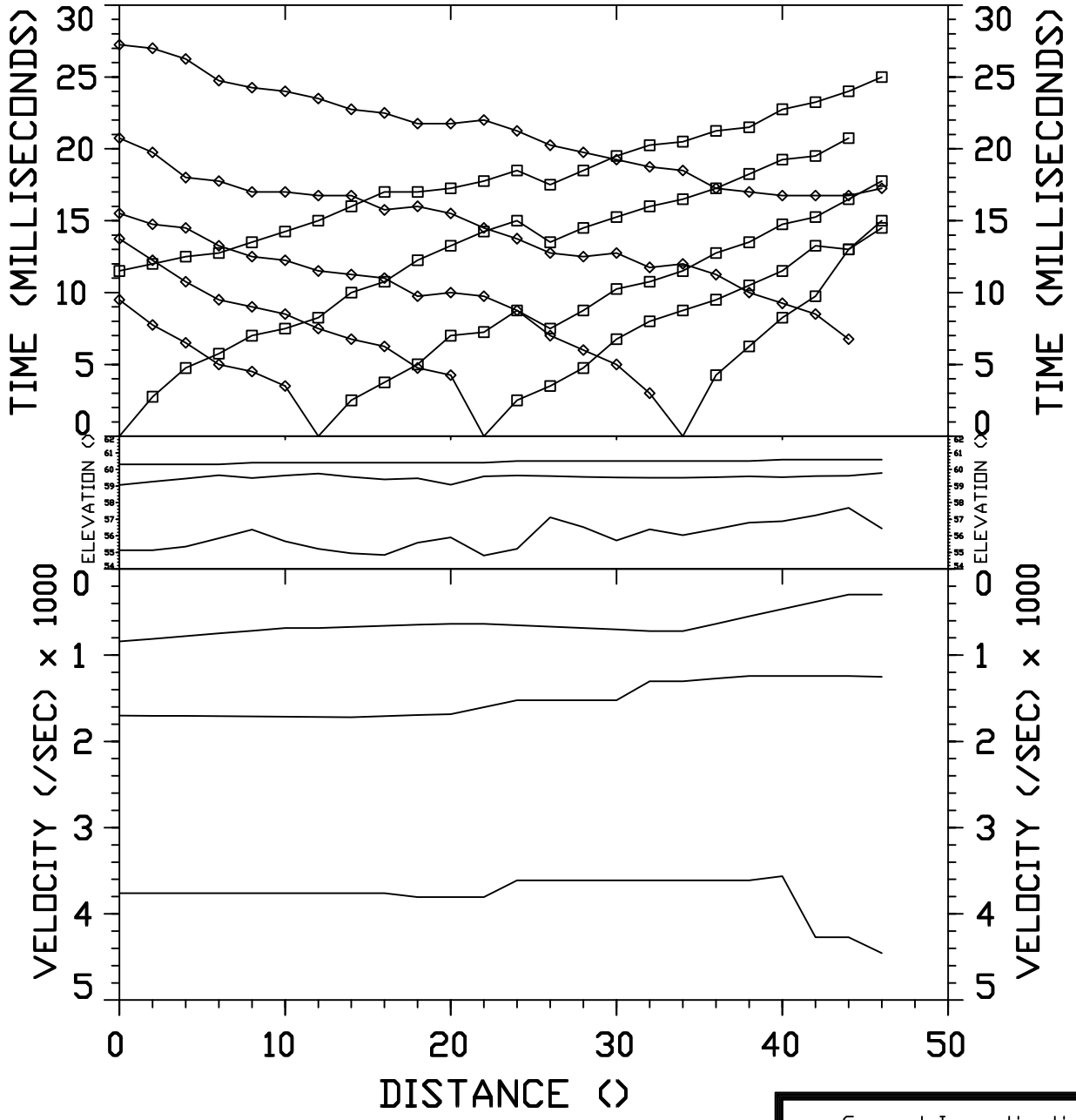


Plate: 10a

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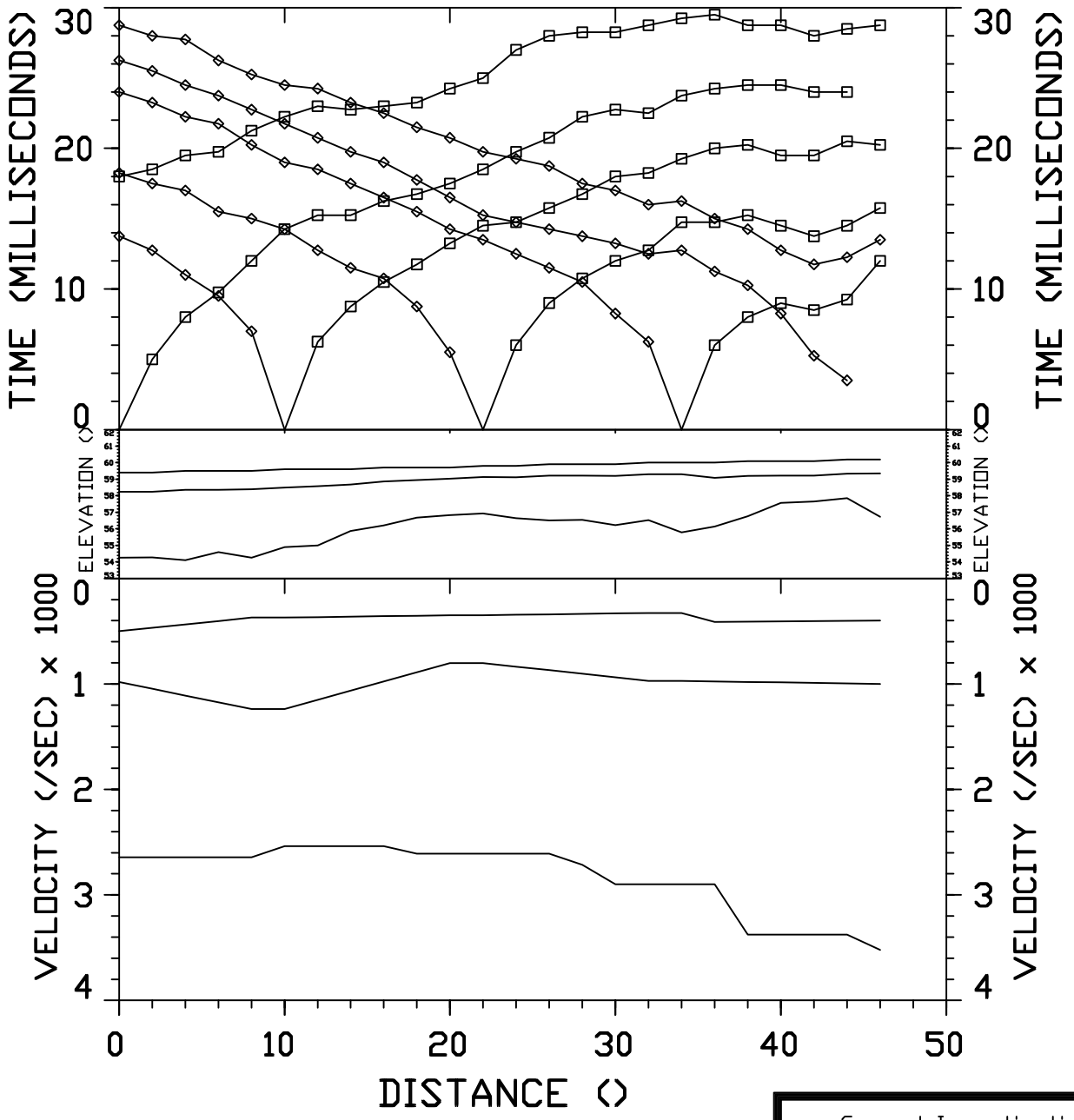


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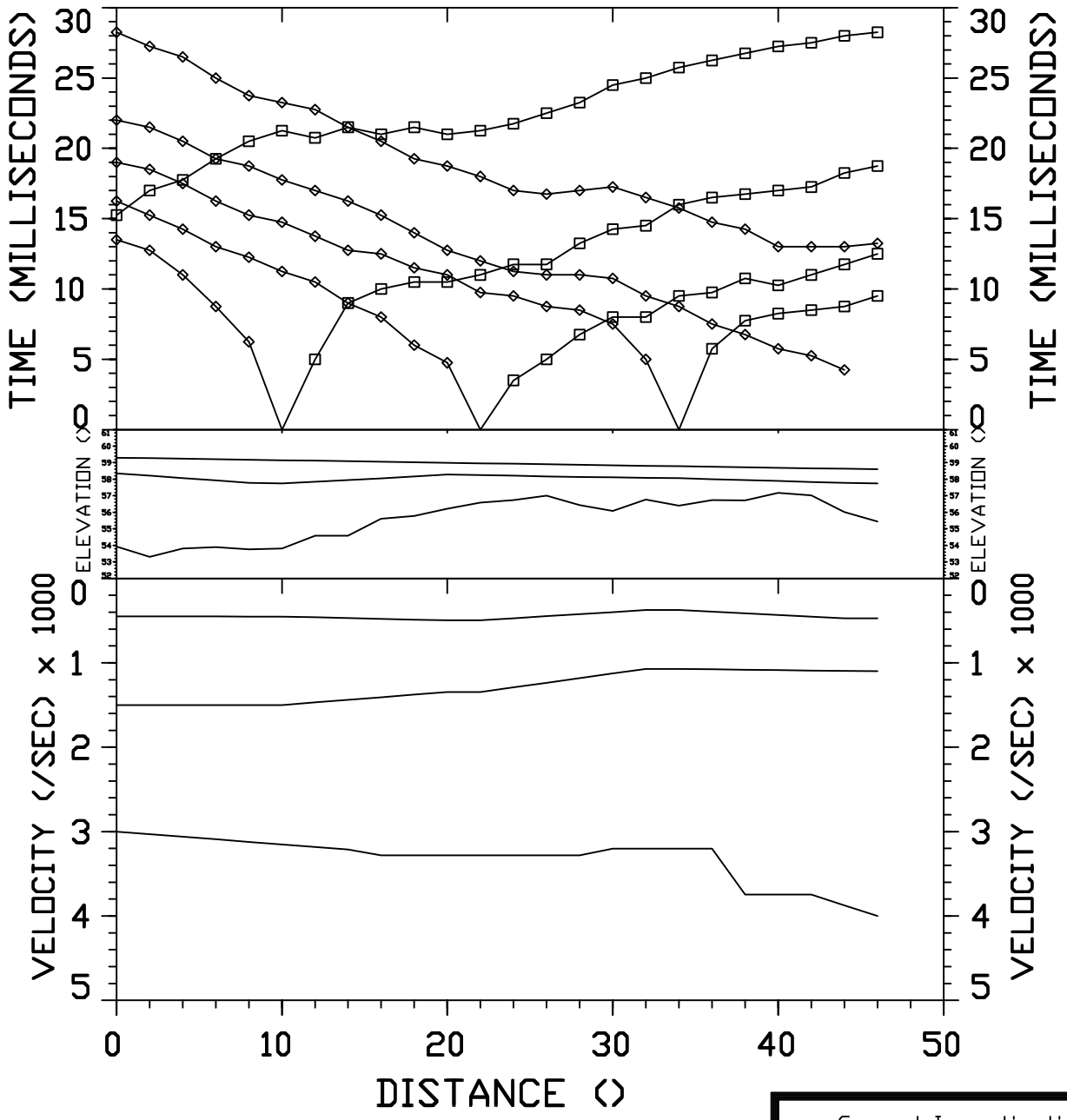


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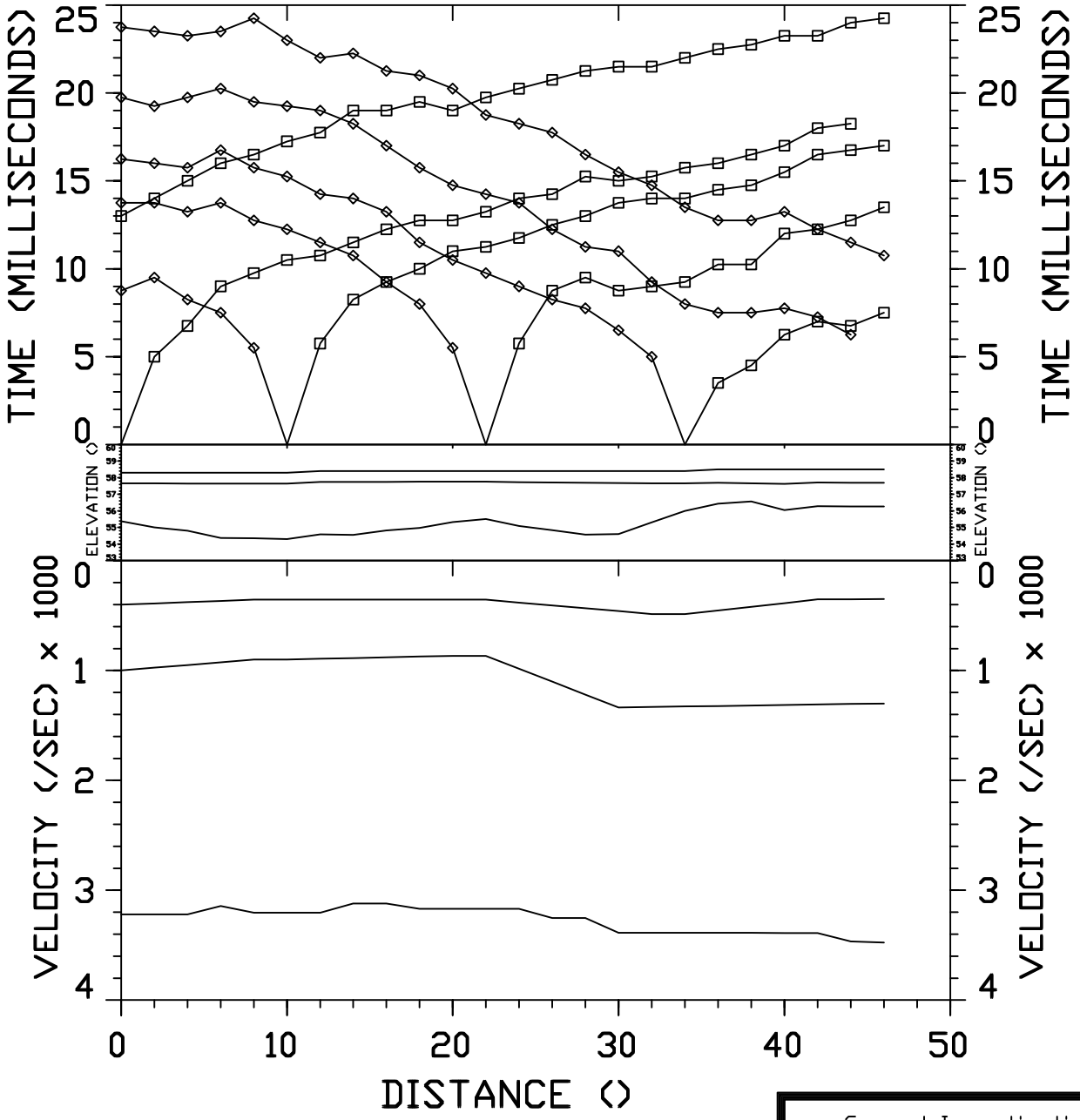


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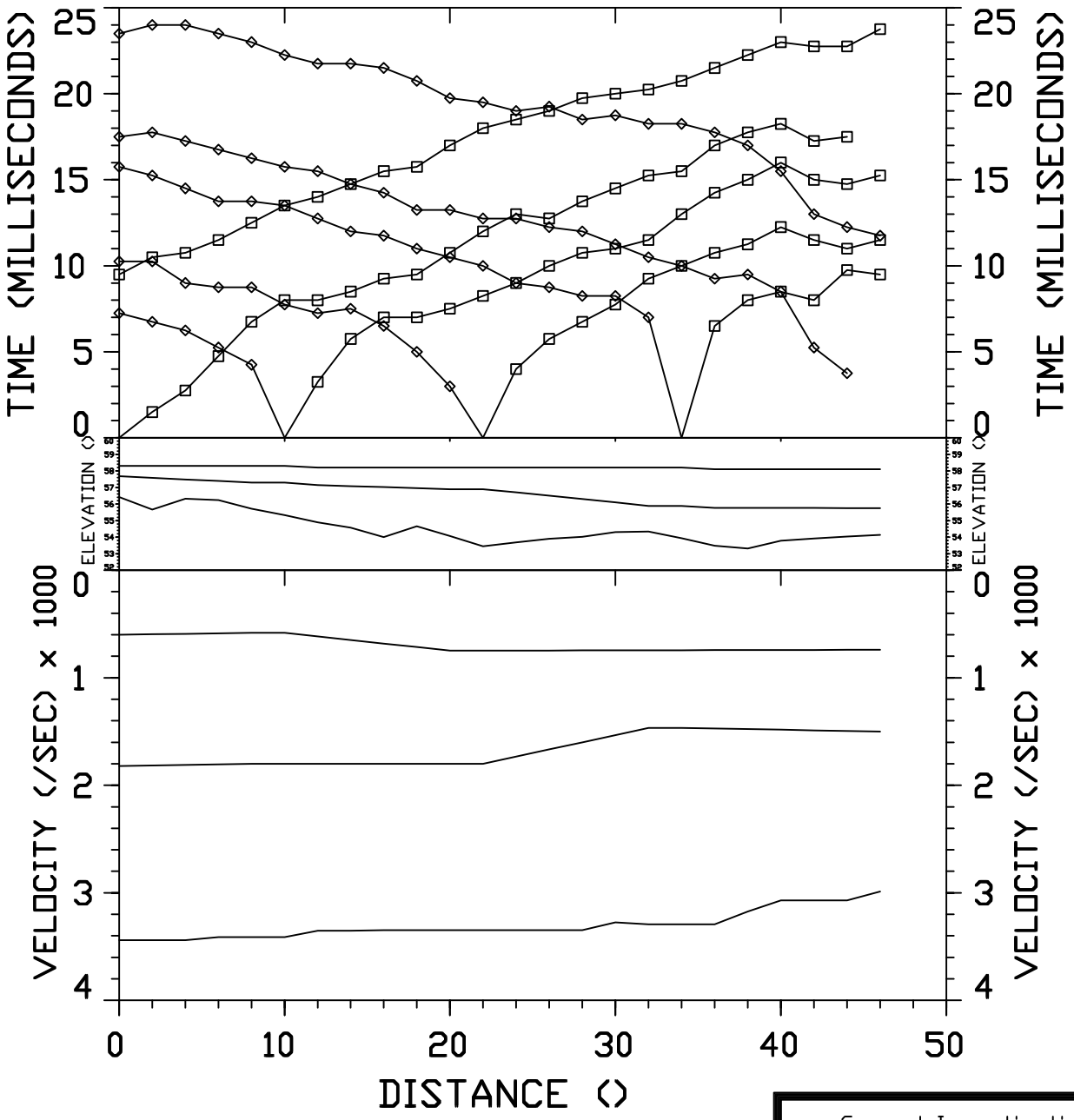


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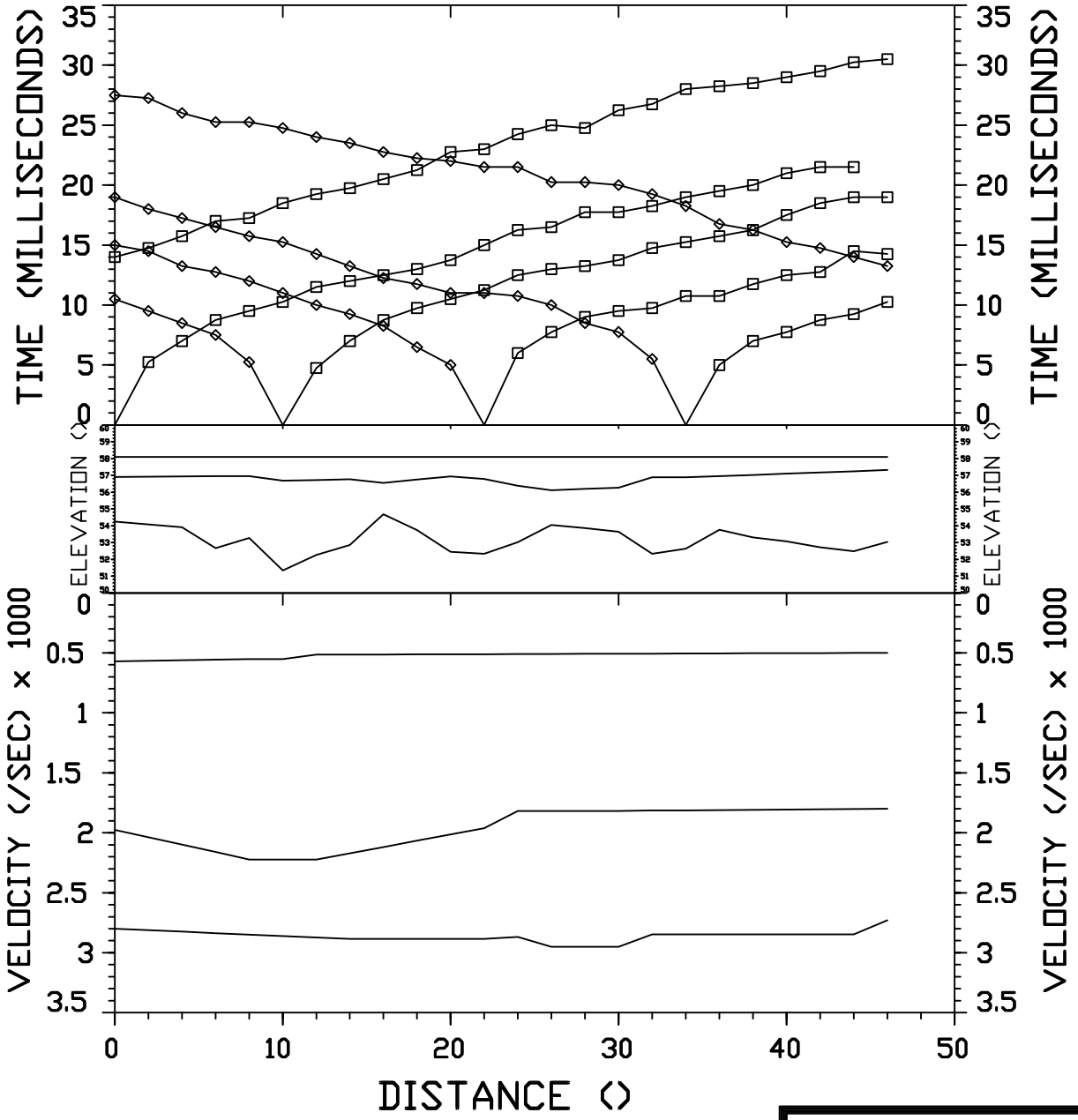


Plate: 10a

for: Ground Investigations Irl.	Royal Canal Castleknock Dublin
by: APEX Geophysics Ltd.	
Data SetS16	Date: June 2020
Equipment: Geode	Spread: S16
	Azimuth: 0

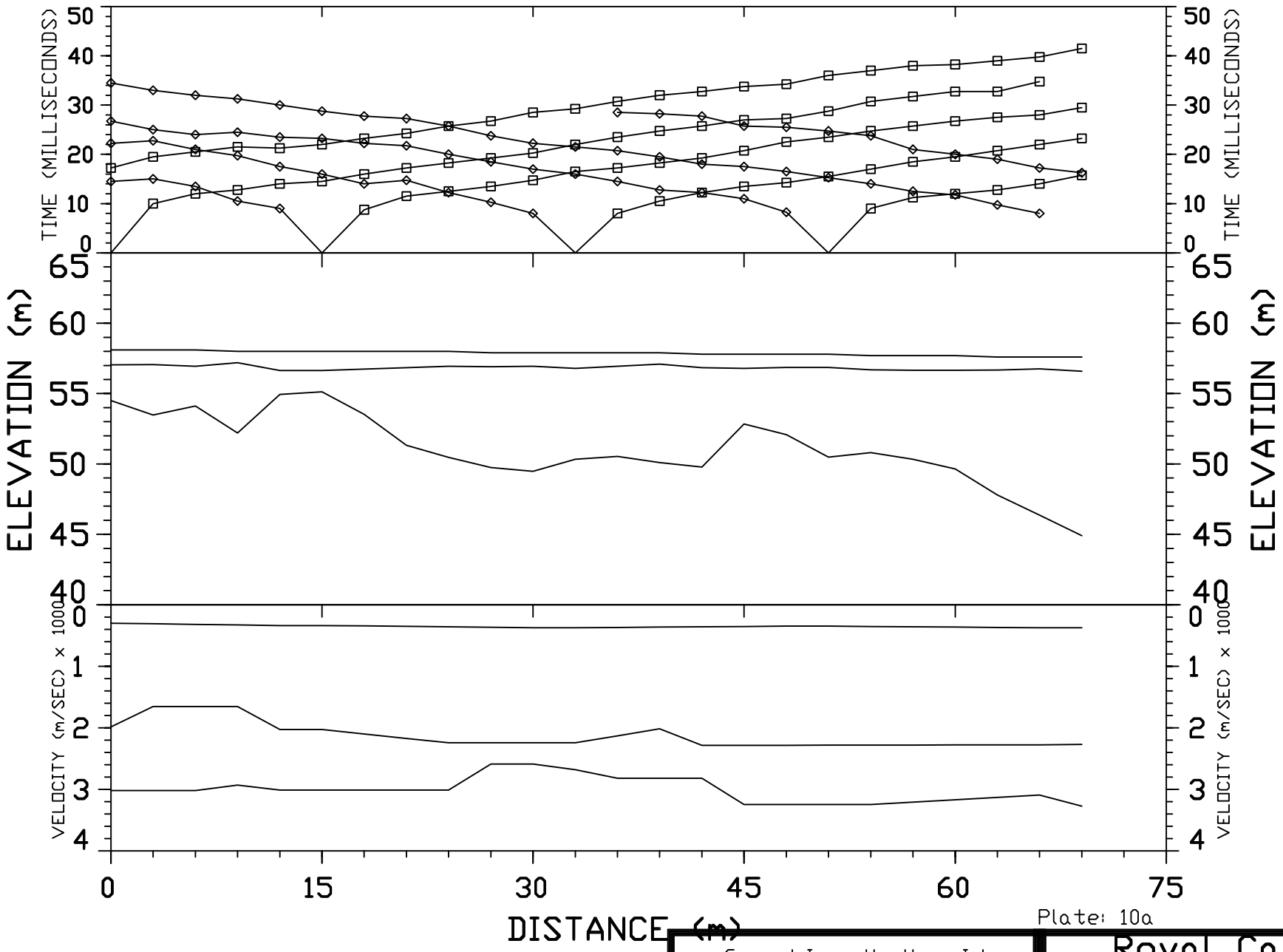


Plate: 10a

for: Ground Investigations Irl.	Royal Canal Castleknock Dublin
by: APEX Geophysics Ltd.	
Data SetS17 / Date: June 2020	
Equipment: Geode / Spread: S17	Azimuth: 0

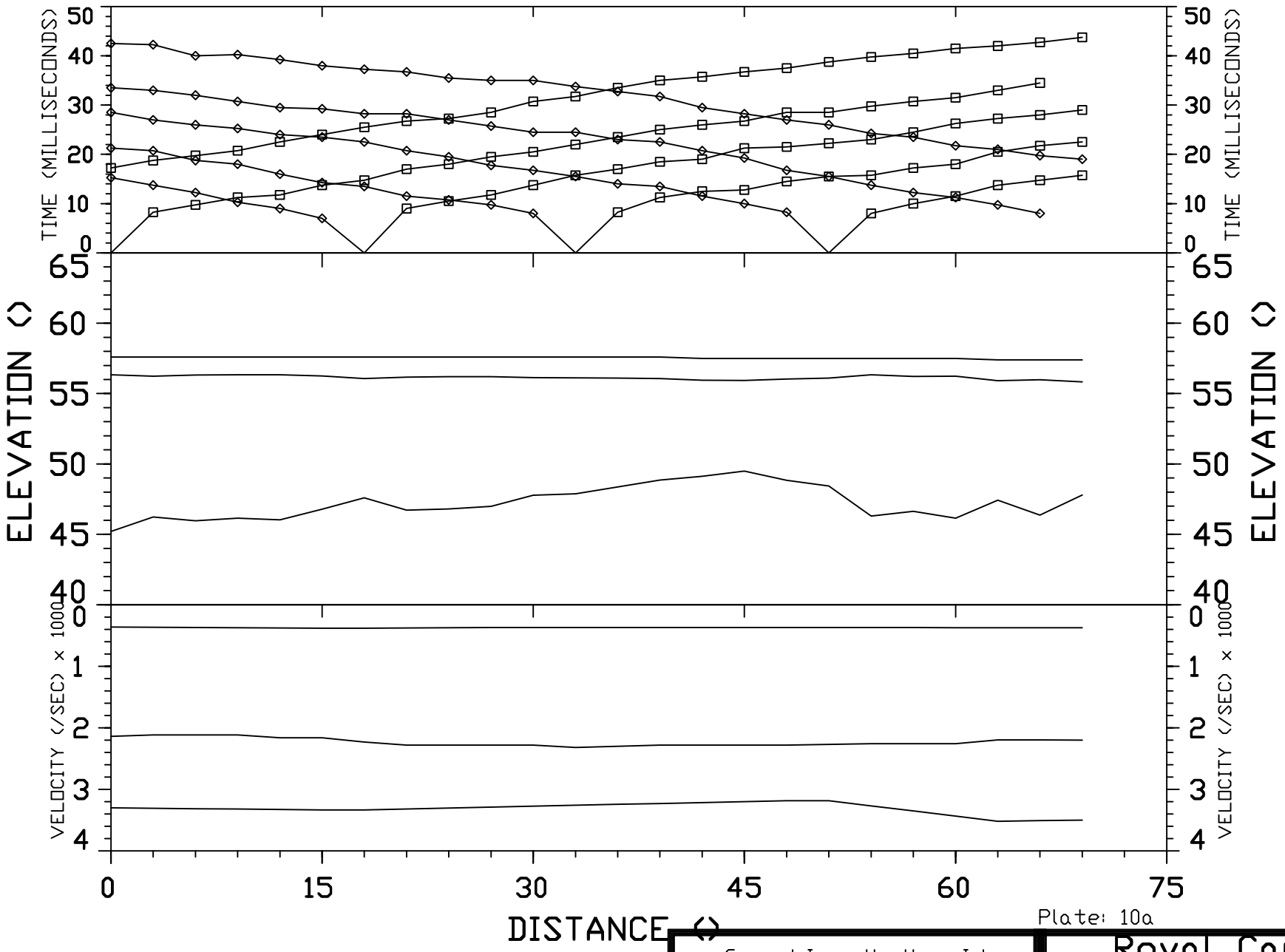


Plate: 10a

for: Ground Investigations Irl.		Royal Canal Castleknock Dublin
by: APEX Geophysics Ltd.		
Data SetS18	Date: June 2020	
Equipment: Geode	Spread: S18	Azimuth: 0

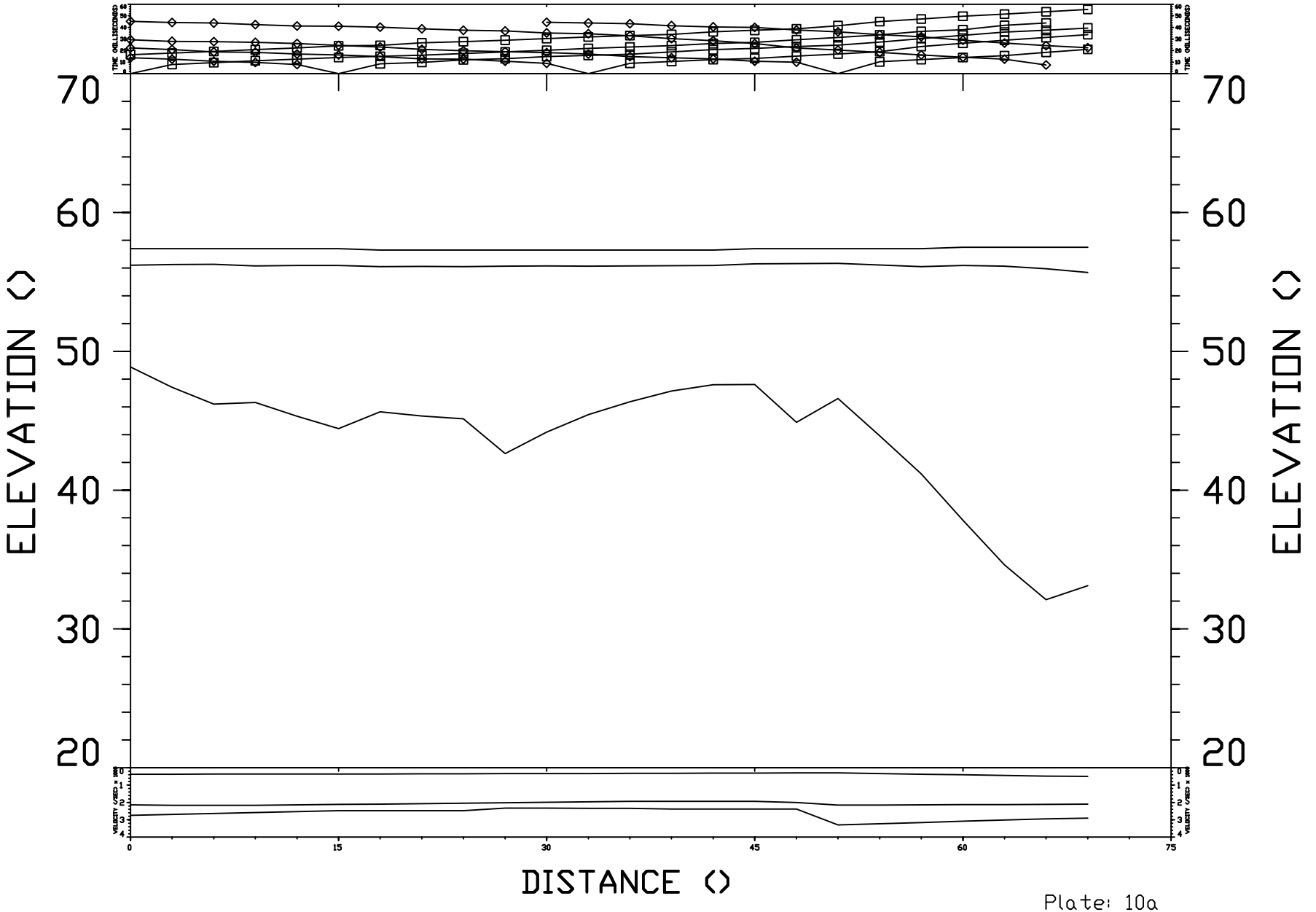


Plate: 10a

for: Ground Investigations Irl.	Royal Canal Castleknock Dublin
by: APEX Geophysics Ltd.	
Data SetS19	Date: June 2020
Equipment: Geode	Spread: S19
	Azimuth: 0

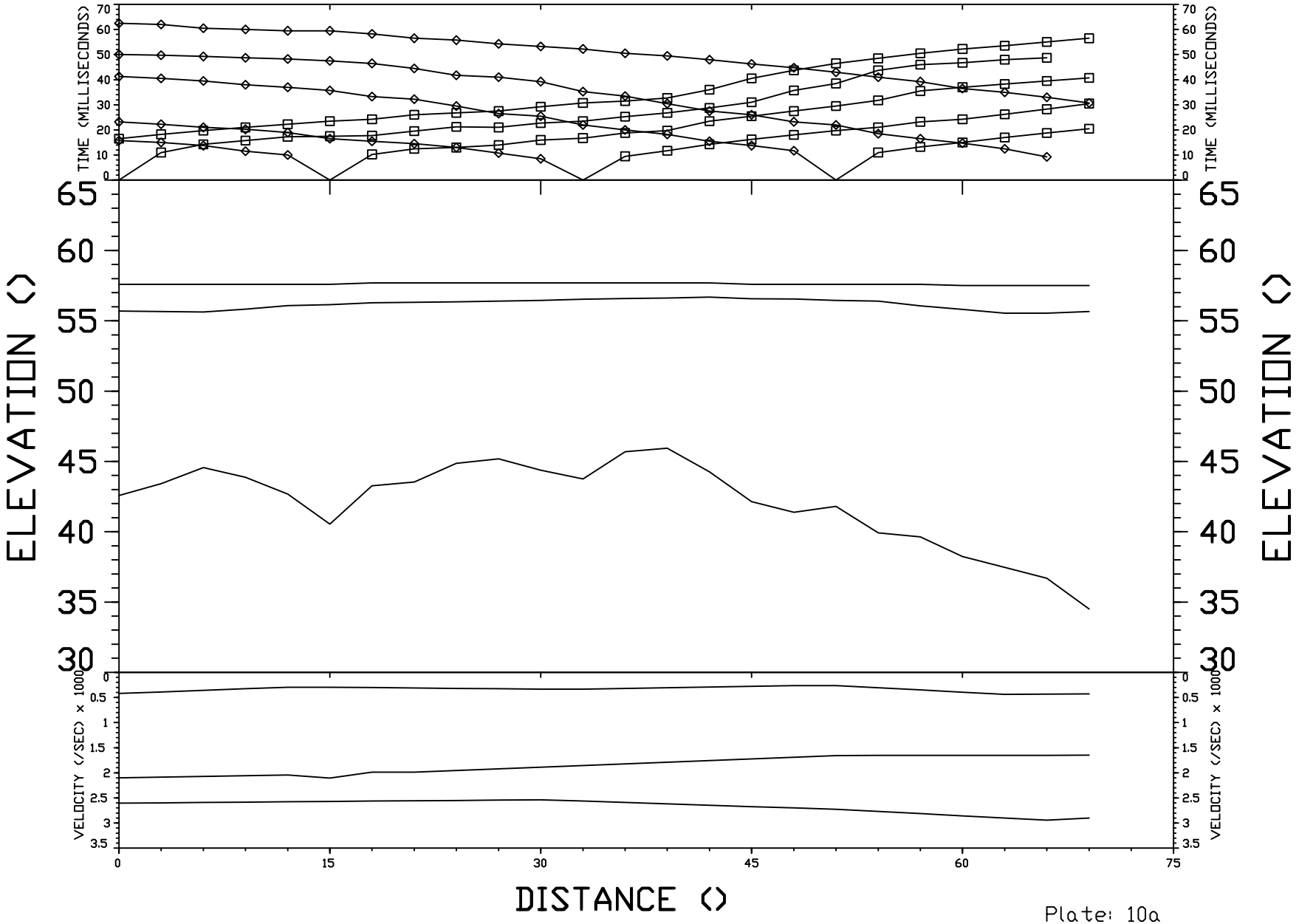


Plate: 10a

for: Ground Investigations Irl.	Royal Canal Castleknock Dublin
by: APEX Geophysics Ltd.	
Data SetS20 / Date: June 2020	
Equipment: Geode / Spread: S20	Azimuth: 0