



**GROUND
INVESTIGATIONS
IRELAND**

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Ground Investigations Ireland

Hickeys 43 Parkgate Place

Ground Investigation Report

DOCUMENT CONTROL SHEET

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1.0 Preamble

On the instructions of ARUP Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between March and June 2019 at the site of the residential and commercial development at 43 Parkgate Place, Dublin 8.

2.0 Overview

2.1. Background

It is proposed to construct a new mixed purpose development with associated services, access roads and car parking at the proposed site. The site is currently occupied by a commercial building and is situated in at No. 43 Parkgate Place. The proposed construction is envisaged to consist of piled foundations and conventional pavement make up with some local excavations for services and plant.

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 Asbestos Tile removal at all internal exploratory hole locations
- Carry out 5 No. Foundation Inspection Pits to determine existing foundation details
- Carry out 1 No. Slit Trench to expose existing services and determine a suitable location for a borehole
- Carry out 18 No. Window Sample Boreholes to recover soil samples
- Carry out 4 No. Cable Percussion boreholes to a maximum depth of 7.6m BGL
- Carry out 4 No. Rotary Core follow on Boreholes to a maximum depth of 15.60m BGL
- Carry out 3 No. Rotary Core Boreholes to a maximum depth of 17.0m BGL
- Installation of 10 No. Groundwater monitoring wells
- Carry out 2 No. Permeability tests
- Installation of 3 No. Gas monitoring caps
- Geophysical Survey
- Geotechnical & Environmental Laboratory testing
- Issue of AGS Data
- Report with recommendations

3.0 Subsurface Exploration

3.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.

The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

3.2. Foundation Pits

The foundation inspection pits were excavated at the locations shown in the exploratory hole location plan in Appendix 1. The exposed foundations were logged and sketched prior to backfilling and reinstatement. The logs and sketches are provided in Appendix 2 of this Report.

3.3. Slit Trenches

The slit trench were excavated using a 3.5 tonne tracked excavator at the location shown in the exploratory hole location plan in Appendix 1. The trench was excavated to locate any buried services and to determine a suitable location to carry out a borehole. The logs and sketches are provided in Appendix 3 of this Report.

3.4. Window Sampling

The window sampling was carried out at the locations shown in the location plan in Appendix 1 using a Tecop Tec 10 percussion drilling rig. At the location of WS116 the window sample was not carried out due to encountering an underground chamber. The window sampling consists of a 1m long steel tube with a cutting edge and an internal plastic liner which is mechanically driven into the ground utilising a 50kg weight falling a height of 500mm. Upon completion of the 1m sample, the tube is withdrawn and the plastic liner removed and sealed for logging and sub sampling by an Engineering Geologist. The tube is replaced in the borehole and a subsequent 1m sample can be recovered. Occasionally outer casing or a reduced diameter tube is utilised to enable the window sample to progress in difficult drilling conditions. Geotechnical or environmental soil samples can be recovered from each of the liners following logging. The window sample records are provided in Appendix 4 of this Report.

3.5. Cable Percussion Boreholes

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

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments

removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata. Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 5 of this Report.

3.6. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring. During the sequence of rotary coring two different core diameters were used. BH101, BH104, BH106 and BH107 were cored using a 146mm bit producing cores of 102mm diameter. BH102, BH103 and BH105 were cored using a 95.76mm bit producing cores of 64mm diameter.

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.

3.7. Permeability Testing

Permeability tests were carried out in the borehole. This consisted of a rising head test, which were carried out in BH101 and BH106. The rising head test was carried out in borehole as specified by the Consulting engineer and requires the pumping out of the groundwater encountered in the borehole. The initial groundwater levels are recorded, and pumping begins, with the volume of groundwater removed recorded. Once the borehole is emptied, the rise in water level with time in the borehole was recorded over a 2 hour test period, allowing for the calculation of the rate of groundwater ingress. The results of the permeability tests are provided in Appendix 8 of the Report.

3.8. Surveying

The exploratory hole locations have been recorded using a Geomax Zenith System which records the coordinates and elevation of the locations to either ITM or Irish National Grid as required by the project specification. It was not possible to establish by GPS an easting, northing and elevation for the internal exploratory holes. The easting and northing have been determined using the location plan in GIS format. The elevation of the exploratory holes were estimated at 4.25mOD. This was based on elevation levels taken outside of the building and a measurement taken to the top of the finished floor level. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.9. Geophysical Survey

A geophysical survey was carried out by APEX Geoservices to aid in the identification of the underlying strata. The survey consisted of seismic refraction and MASW S – wave velocity profiling. The results of this survey are provided in Appendix 9 of this report.

3.10. Groundwater and Gas Monitoring Installations

Groundwater Installations were installed upon the completion of all the boreholes to enable sampling and the determination of the equilibrium groundwater level. Gas monitoring installations were installed in WS110, WS114, and WS117 level. The typical groundwater monitoring installation consists of a 50mm HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report.

3.11. 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 testing, including Waste Acceptance Criteria (WAC) was carried out by Jones Environmental Laboratory in the UK.

Chemical testing including Organic Matter Content, Chloride content, pH and Sulphate was carried out by Derwentside Environmental Testing Services Limited in the UK.

Geotechnical testing consisting of Moisture Content, Atterberg limits and Particle Size Distribution (PSD) was carried out by Prosoils Geotechnical Laboratory in the UK.

Rock strength testing including Point Load (I_{s50}) and Unconfined Compressive Strength (UCS) testing was carried out in Trinity College Dublin's Geotechnical Laboratory

The results of the laboratory testing are included in Appendix 6 of this Report.

4.0 Ground Conditions

4.1. General

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

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

- Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits
- Residual Rock
- Weathered Rock
- Bedrock

SURFACING: Concrete surfacing was present in the majority of the exploratory holes to a max depth of 0.25m BGL with the exception of BH105 and WS113 where the concrete was encountered to 1.30m BGL and 1.10m BGL respectively. Tarmac was encountered in BH102 and BH103 to a max depth of 0.3m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Surfacing. The depth of Made Ground varied across the site and was encountered to depths of 1.20m to 5.0m BGL. These deposits were described generally as *brown sandy slightly gravelly CLAY with frequent cobbles and boulders or a brown clayey angular to sub-angular fine to coarse Gravel. These deposits contained occasional to frequent fragments of concrete, red brick, ceramic, mortar, slag and plastic.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *soft or firm brown sandy gravelly CLAY with occasional cobbles and boulders* or a *firm grey slightly gravelly silty CLAY*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the cohesive matrix. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs. A lower cohesive deposit was encountered in BH102, BH103 and BH106 and was typically described as a *dark grey slightly sandy slightly gravelly silty CLAY*.

GRANULAR DEPOSITS: The granular deposits were encountered the base of the cohesive deposits and were typically described as *Grey brown clayey sandy sub rounded to sub angular fine to coarse GRAVEL with occasional cobbles and rare boulders*. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs. At the location of WS101, WS102A, WS103, WS104, WS106 and WS107 a SAND deposit was encountered beneath the cohesive deposit and was typically described as a brown slightly clayey gravelly fine to coarse SAND with occasional cobbles.

Based on the SPT N values the deposits are typically loose and medium dense. A significant groundwater strike was noted in the boreholes on encountering the granular deposits.

RESIDUAL ROCK: Residual Rock was encountered in BH105 as a significant layer within the competent rock between the depths of 10.30m to 11.40m BGL. The Residual rock was recovered as a *hard very gravelly CLAY with relic bedding*.

WEATHERED BEDROCK: Weathered Rock was encountered in BH101. This material was recovered typically as *cobbles of Limestone/Mudstone* some clay and sand were also present with the rock mass either from weathering or as infilling to fractures.

BEDROCK: The rotary core boreholes recovered *Medium strong to strong grey/dark grey fine to medium grained laminated LIMESTONE interbedded with weak black fine grained laminated calcareous MUDSTONE*. This is typical of the Calp Formation. Rare visible pyrite veins were noted during logging which are typically present within the Calp Limestone.

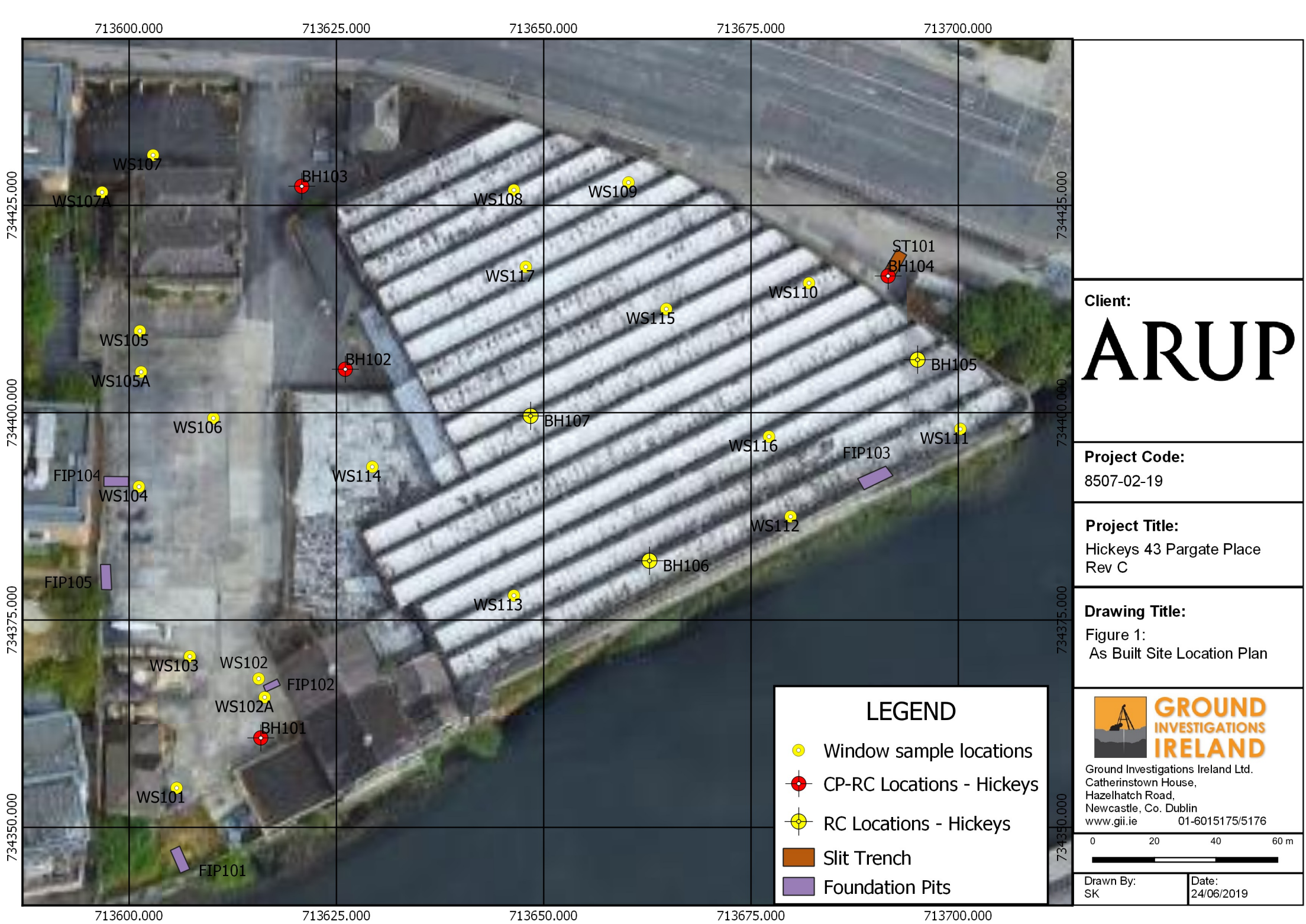
The depth to rock varies across the site from 6.40m BGL in BH102 to 8.50m BGL in BH105. The total core recovery is good, typically 100% with some of the uppermost runs dropping to 80 or 90%. The SCR and RQD both are relatively poor in the upper weathered zone, often recovered as non-intact, however both indices show an increase with depth in each of the boreholes.

4.2. Groundwater

Groundwater strikes are noted on the exploratory hole logs where they occurred and where possible drilling was suspended for twenty minutes to allow the subsequent rise in groundwater to be recorded. We would point out that these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the tide, time of year,

rainfall, nearby construction and other factors. For this reason, standpipes were installed in all of the Boreholes and in WS110, WS117 and WS114 to allow the equilibrium groundwater level to be determined. Gas caps were also installed in the window sample installations. The groundwater monitoring is included in Appendix 7 of this Report.

APPENDIX 1 - Site Location Plan



713600.000

713625.000

713650.000

713675.000

713700.000

734425.000

734425.000

734400.000

734400.000

734375.000

734375.000

734350.000

734350.000

713600.000

713625.000

713650.000

713675.000

713700.000

Client:

ARUP

Project Code:

8507-02-19






Project Title:

Hickeys 43 Pargate Place
Rev C

Drawing Title:

Figure 1:
As Built Site Location Plan

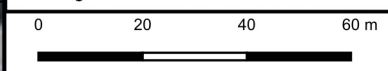
LEGEND

-  Window sample locations
-  CP-RC Locations - Hickeys
-  RC Locations - Hickeys
-  Slit Trench
-  Foundation Pits



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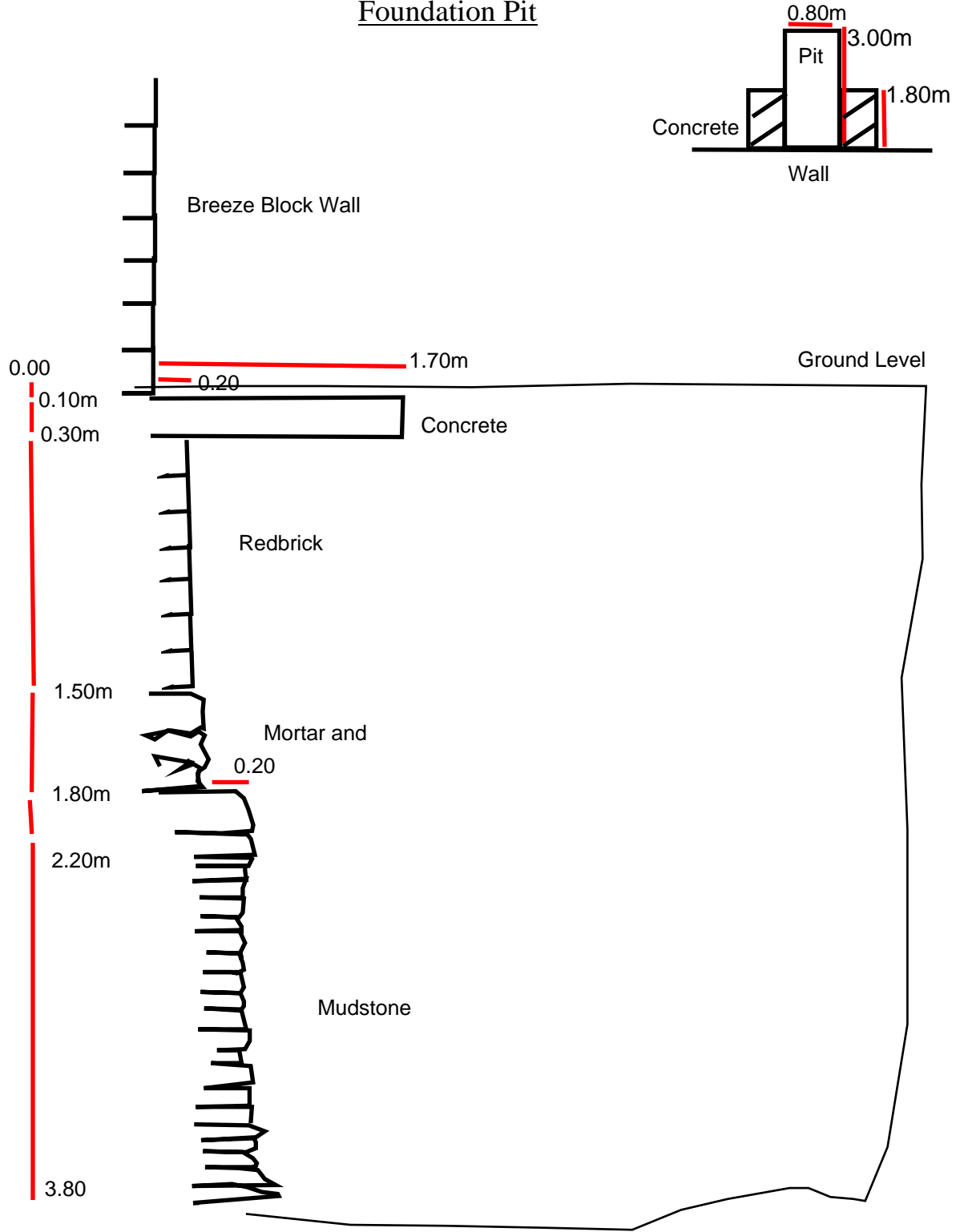


Drawn By:
SK

Date:
24/06/2019

APPENDIX 2 – Foundation Pit Records

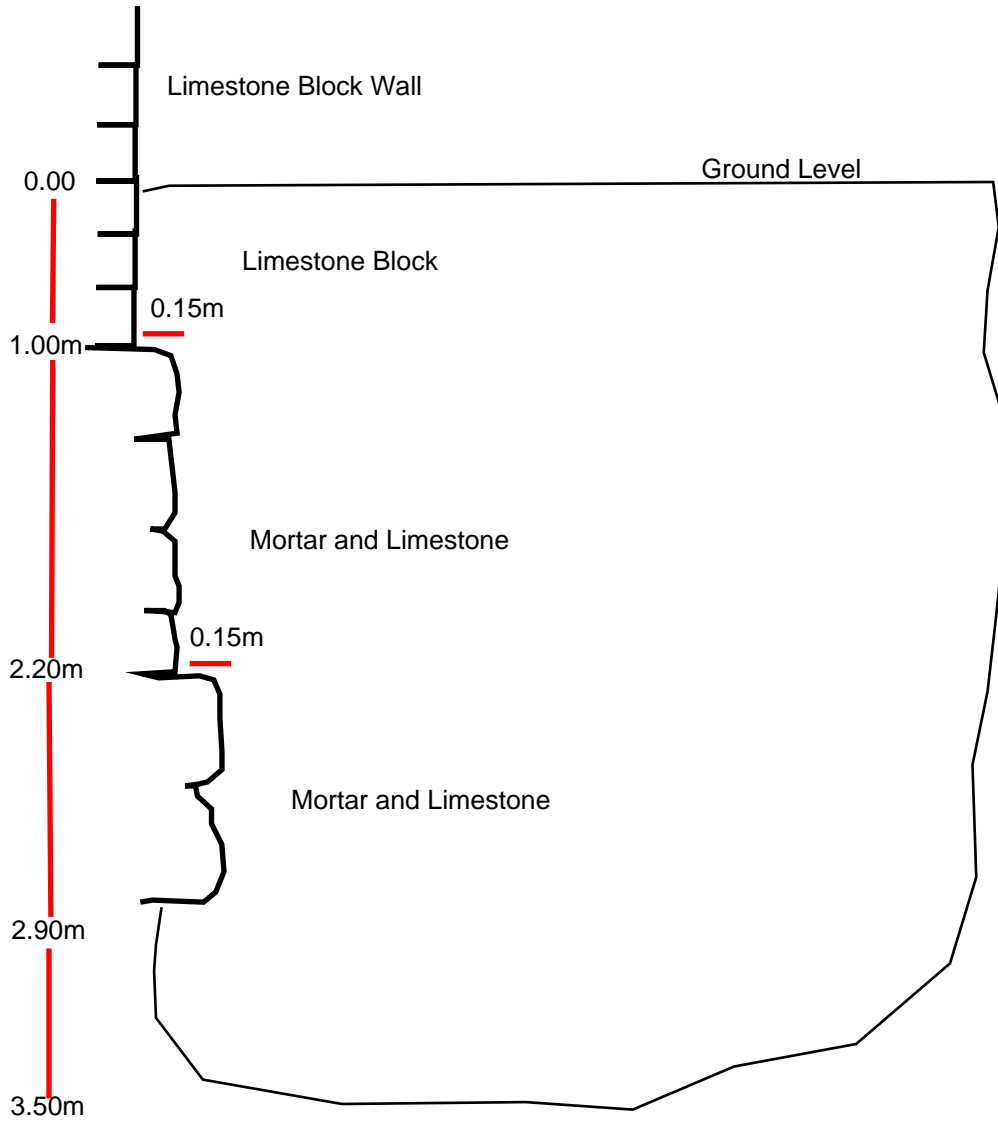
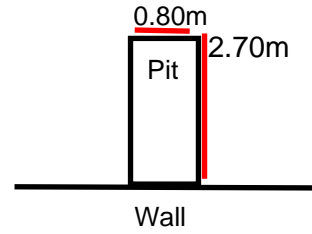
Foundation Pit



Stratigraphy - See Trial Pit Log

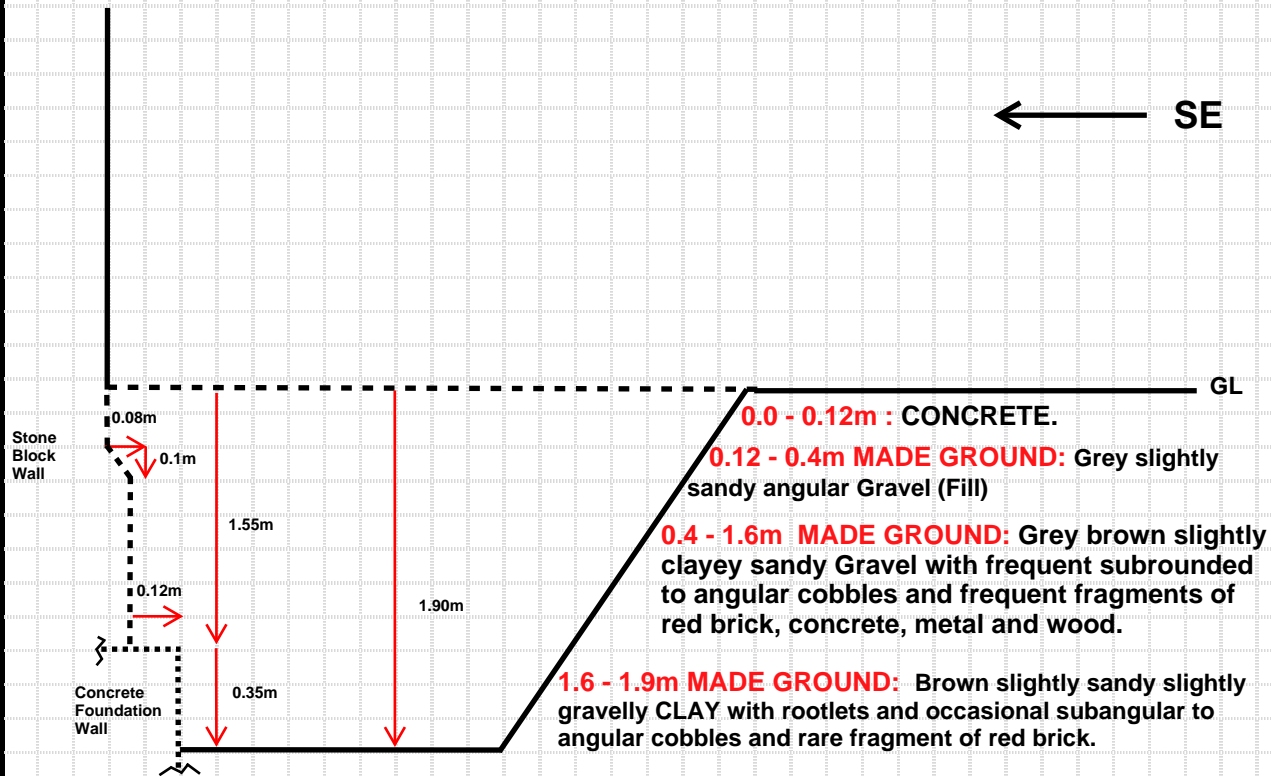
Project	Hickeys Warehouse 43 Parkgate Place	FIP101	
Client	ARUP		
Contractor	Ground Investigations Ireland Ltd	Date	11/04/19

Foundation Pit



Stratigraphy - See Trial Pit Log

Project	Hickeys Warehouse 43 Parkgate Place	FIP102	
Client	ARUP		
Contractor	Ground Investigations Ireland Ltd	Date	11/04/19



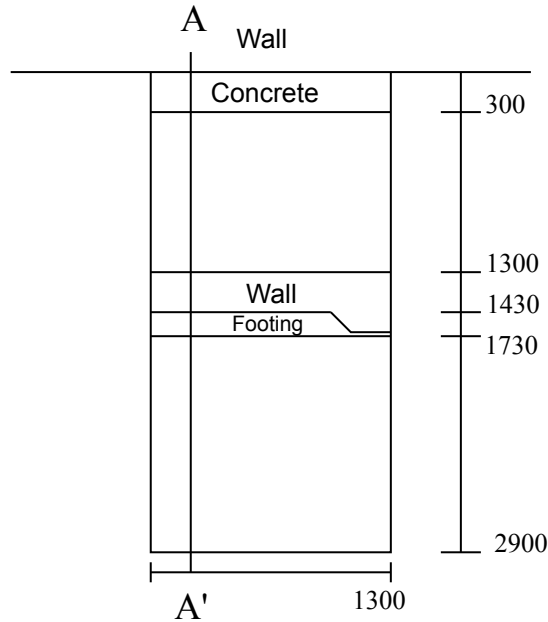
No groundwater encountered in Trial Pit.
 Trial Pit sidewalls are unstable.
 Trial Pit backfilled upon completion.

Samples: B - 1.0m
 B - 1.9m

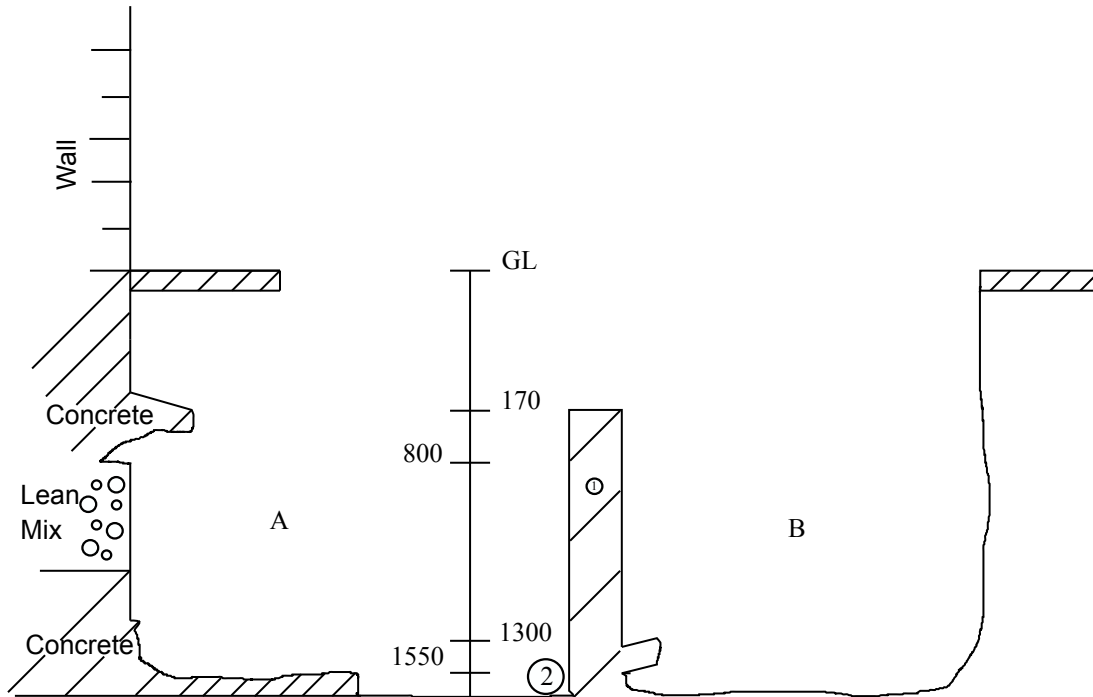
Project	Hickeys 43 Parkgate Place	FIP103	
Client	ARUP		
Contractor	Ground Investigations Ireland Ltd	Date	11/05/2019

FOUNDATION SKETCH

PLAN



CROSS-SECTION A -A'



See associated log for strata details
No Groundwater Encountered

1. 60mm pipe encountered in wall
2. 200mm lead pipe

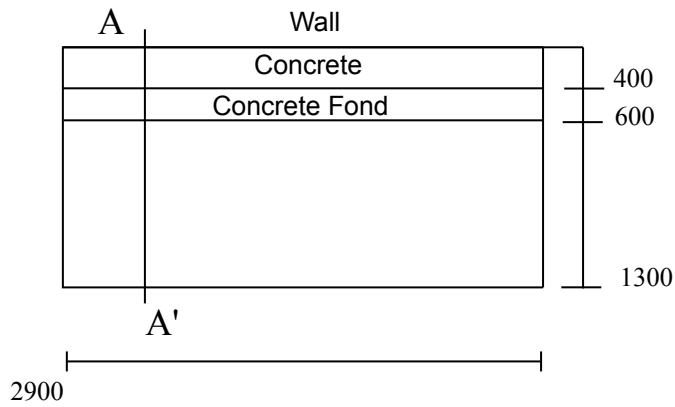
Not to Scale

All measurements in mm

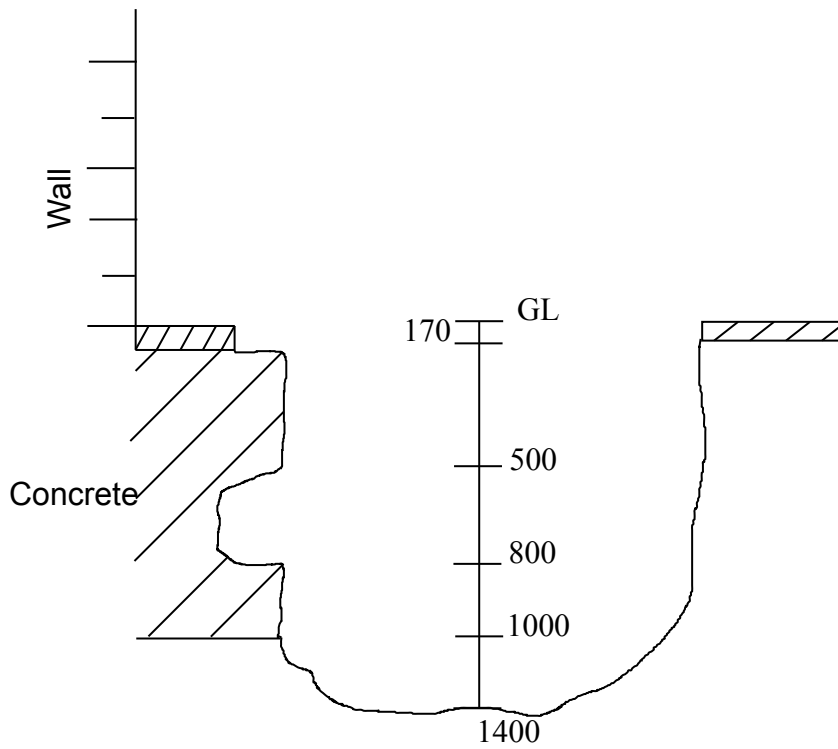
Project:	Hickeys 43 Parkgate Street	FIP104	
Engineer:	ARUP		
Contractor	Ground Investigations Ireland Ltd	Date	10/06/2019

FOUNDATION SKETCH

PLAN



CROSS-SECTION A -A'



See associated log for strata details
No Groundwater Encountered

Not to Scale

All measurements in mm

Project:	Hickeys 43 Parkgate Street	FIP105	
Engineer:	ARUP		
Contractor	Ground Investigations Ireland Ltd	Date	10/06/2019



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Site
Hickeys 43 Parkgate Place

Trial Pit Number
FIP101

Machine : JCB 3CX	Dimensions 3.00m x 1.80m	Ground Level (mOD) 3.62	Client ARUP	Job Number 8507-02-19
Method : Trial Pit	Location 713608.9 E 734345.8 N	Dates 11/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	EN			3.52	(0.10)	MADE GROUND: Dark brown slightly sandy slightly gravelly Topsoil with grass rootlets		
				3.32	(0.20)	MADE GROUND: Concrete and wood		
					(0.50)	MADE GROUND: Dark brown slightly sandy very gravelly Clay with rootlets and some redbrick and mortar fragments		
1.00	B			2.82	0.80	MADE GROUND: Dark brown mottled light grey slightly sandy very clayey angular to subangular fine to coarse Gravel with many slag, redbrick and mortar fragments and some glass and ash fragments		
					(1.00)			
1.50	EN			1.82	1.80	MADE GROUND: Brown slightly sandy slightly gravelly Clay with some charcoal and redbrick fragments and old rootlets and shell fragments		
2.00	B			1.32	2.30	Soft brown very sandy CLAY		
2.50	EN			0.82	2.80	Brown very sandy slightly clayey silty GRAVEL		▽1
3.50	B				(0.50)			
3.50	EN				(1.00)			
			slow ingress(1) at 3.80m, rose to 2.50m in 20 mins.	-0.18	3.80	Complete at 3.80m		▽1

<p>Plan</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p> <p style="text-align: center;">.</p>	<p>Remarks</p> <p>Trial carried out to expose foundation Groundwater encountered at 3.80m BGL Side wall collapse Trial pit backfilled on completion</p>
<p>Scale (approx)</p> <p>1:25</p>	<p>Logged By</p> <p>DML</p>
<p>Figure No.</p> <p>8507-02-19.FP101</p>	



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Site
Hickeys 43 Parkgate Place

Trial Pit Number
FIP102

Machine : JCB 3CX	Dimensions 2.70m x 0.80m	Ground Level (mOD) 3.95	Client ARUP	Job Number 8507-02-19
Method : Trial Pit	Location 713616.4 E 734366.6 N	Dates 11/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	EN			3.85	(0.10) 0.10	Reinforced Concrete		
1.50	EN				(1.70)	MADE GROUND: Dark brown slightly sandy very clayey angular to subangular fine to coarse Gravel with limestone boulders, redbrick, granite block and mortar fragments		
2.50 2.50	B EN			2.15	1.80	Soft brown slightly gravelly sandy CLAY with shell and rootlet fragments		
3.50	EN		slow ingress(1) at 3.20m.	0.95	3.00	Brown very clayey gravelly fine to coarse SAND		∇1
				0.45	3.50	Complete at 3.50m		

Plan .	Remarks Trial pit carried out to expose foundation Groundwater encountered at 3.80m BGL Side wall collapse Trial pit backfilled and reinstated on completion			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Scale (approx) 1:25</td> <td style="width: 33%;">Logged By DML</td> <td style="width: 33%;">Figure No. 8507-02-19.FIP102</td> </tr> </table>	Scale (approx) 1:25	Logged By DML	Figure No. 8507-02-19.FIP102
Scale (approx) 1:25	Logged By DML	Figure No. 8507-02-19.FIP102		



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Site
Hickeys 43 Parkgate Place
Trial Pit Number
FIP103

Machine : JCB 3CX Method : Trial Pit	Dimensions 2.70m x 0.80m	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
	Location 713690.6 E 734391.9 N	Dates 11/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.00	B			4.13	(0.12)	Concrete		
					0.12	MADE GROUND: Grey slightly sandy angular Gravel		
1.90-1.90	B			3.85	(0.28)	MADE GROUND: Grey brown slightly clayey sandy Gravel with frequent sub-rounded to angular cobbles and frequent fragments of red brick, concrete, metal and wood		
					0.40	MADE GROUND: Brown slightly clayey sandy gravelly Clay with rootlets and occasional sub-angular to angular cobbles and rare fragments of red brick		
				2.65	1.60	Complete at 1.90m		
				2.35	1.90			

Plan .	Remarks Trial pit carried out to expose foundation No groundwater encountered Side wall collapse Trial pit backfilled and reinstated on completion	
		Scale (approx) 1:25



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Site
Hickeys 43 Parkgate Place

Trial Pit Number
FIP104A

Machine : JCB 3CX Method : Trial Pit	Dimensions 2.90m x 1.30m	Ground Level (mOD) 3.67	Client ARUP	Job Number 8507-02-19
	Location 713596.9 E 734391.8 N	Dates 11/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-0.50	T			3.50	(0.17) 0.17	Concrete		
1.00-1.00	T			2.37	(1.13) 1.30	MADE GROUND: Dark brown sandy gravelly Clay with occasional red brick and mortar fragments		
						Complete at 1.30m		

Plan .	Remarks Trial pit carried out to expose foundation No groundwater encountered Trial pit stable Trial pit backfilled and reinstated on completion		
	<table border="1"> <tr> <td>Scale (approx) 1:25</td> <td>Logged By DML</td> <td>Figure No. 8507-02-19.FIP104A</td> </tr> </table>	Scale (approx) 1:25	Logged By DML
Scale (approx) 1:25	Logged By DML	Figure No. 8507-02-19.FIP104A	



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Site
Hickeys 43 Parkgate Place

Trial Pit Number
FIP104B

Machine : JCB 3CX Method : Trial Pit	Dimensions 2.90m x 1.55m	Ground Level (mOD) 3.67	Client ARUP	Job Number 8507-02-19
	Location 713596.9 E 734391.8 N	Dates 11/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-0.50	T			3.50	0.17	Concrete		
1.00-1.00	T			2.12	1.55	MADE GROUND: Dark brown/black slightly sandy very clayey angular to sub-angular fine to medium Gravel with frequent slag fragments, red brick, ropes and wire		
						Complete at 1.55m		

Plan	Remarks
.	Trial pit is a continuation of FIP104 - See associated Foundation Pit log
.	No groundwater encountered
.	Trial pit stable
.	Trial pit backfilled and reinstated on completion
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	Scale (approx) 1:25
	Logged By DML
	Figure No. 8507-02-19.FIP104B



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Site
Hickeys 43 Parkgate Place

Trial Pit Number
FIP105

Machine : JCB 3CX Method : Trial Pit	Dimensions 2.30m x 0.90m	Ground Level (mOD) 3.65	Client ARUP	Job Number 8507-02-19
	Location 713596.6 E 734379.8 N	Dates 11/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.20-1.20	T			3.48	(0.17)	Concrete		
					0.17	MADE GROUND: dark reddish brpwn sandy very clayey fine to coarse angular to sub-rounded Gravel with frequent redbrick, slag, plastic and glass fragments		
					(1.23)			
				2.25	1.40	Complete at 1.55m		

Plan	Remarks
.	Trial pit carried out to expose foundation No groundwater encountered Trial pit stable Trial pit backfilled and reinstated on completion
.	
.	
.	
.	
.	
	Scale (approx) 1:25
	Logged By DML
	Figure No. 8507-02-19.FIP105

8507-02-19 Hickeys – Trial Pit Photographs



FIP101



FIP101



FIP101



FIP101



FIP101



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FIP101



FIP102



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FIP103



FIP103



FIP103



FIP104



FIP104A



FIP104A



FIP104A



FIP104B



FIP104B



FIP105



FIP105



FIP105

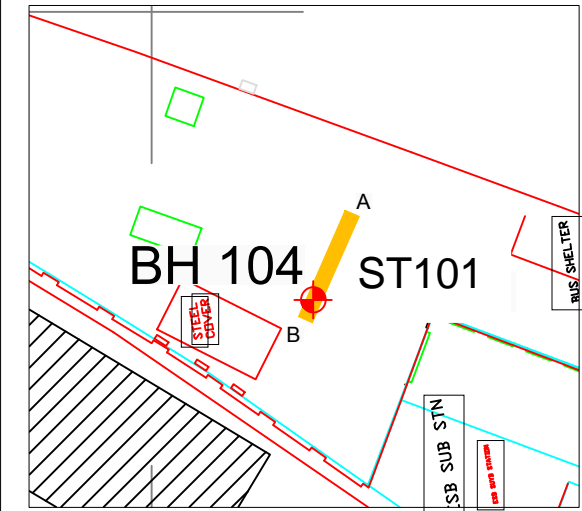


FIP105



FIP105

APPENDIX 3 – Slit Trench Records



Legend

- Slit Trench
- Borehole

NB: ALL m OD LEVELS ARE TO GROUND LEVEL ABOVE SERVICES

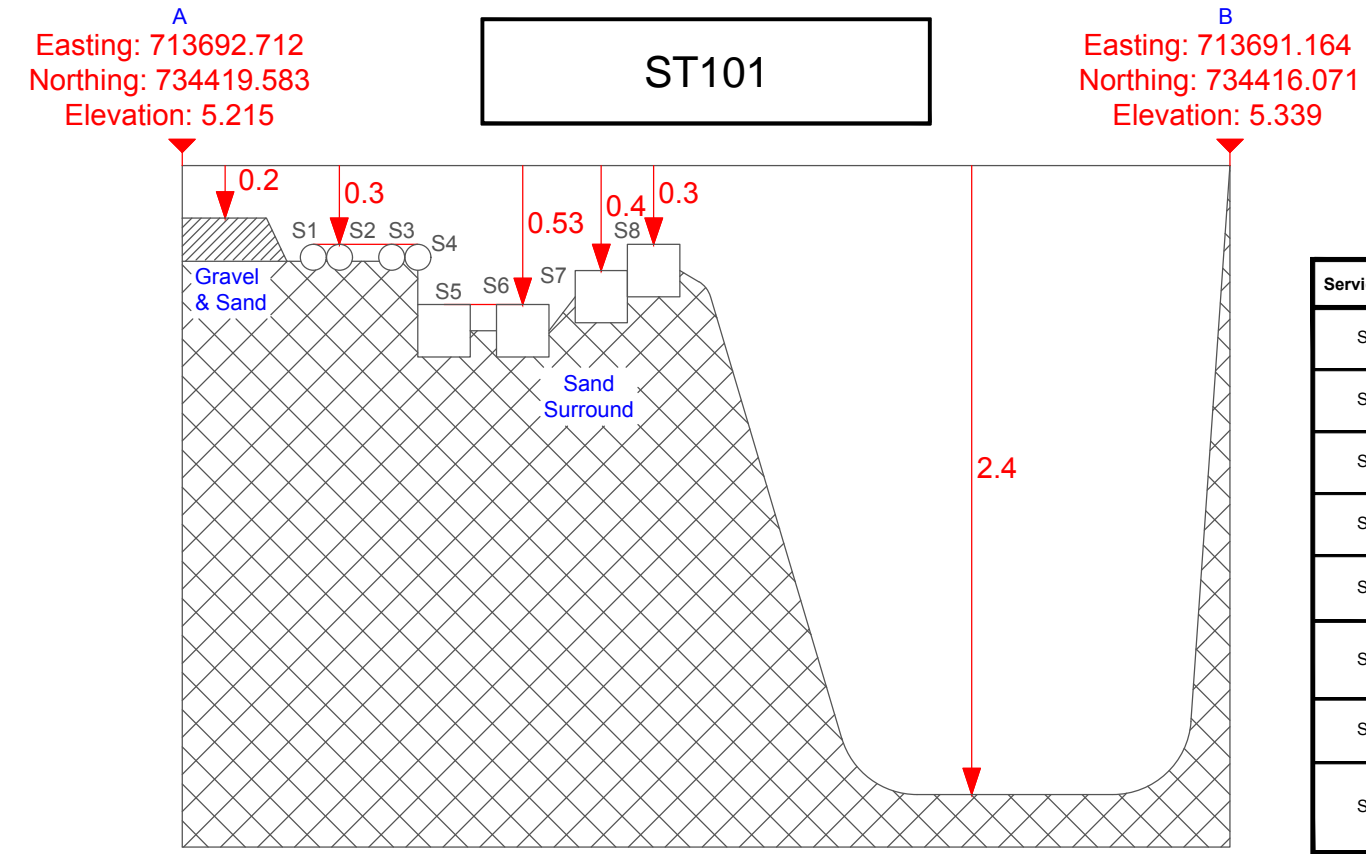
DATE OF EXCAVATION : 10/04/19



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PROJECT:	Hickeys 43 Parkgate Place
DRAWING No.:	ST101
DATE:	April 2019
CLIENT:	ARUP
SCALE:	0.0347 @ A3

Version:	Date:	Drawn By:	Checked By:
Draft 2	30/04/2019	G.S.	S.C.



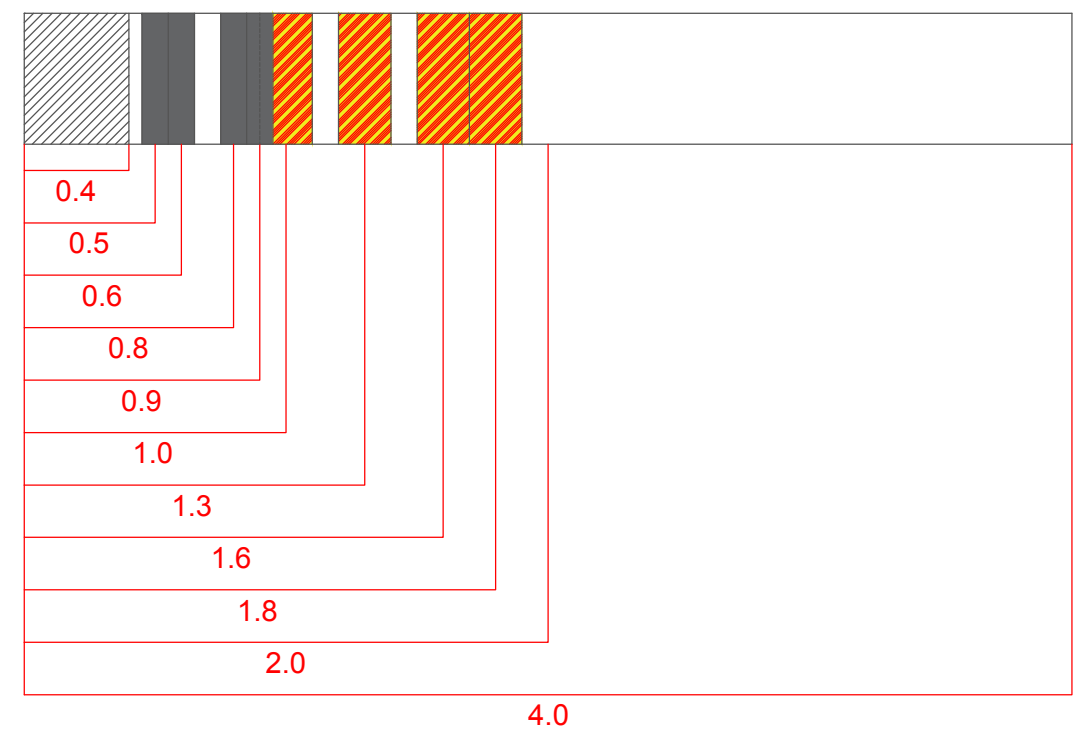
Service No	ø (m)	Colour- Material	Utility	Angle to trench	Co-ordinates	Elevation
S1	0.100	Black Plastic	Eircom	85	713692.712	4.94
					734419.583	
S2	0.100	Black Plastic	Eircom	85	713692.727	4.942
					734418.989	
S3	0.100	Black Plastic	Eircom	85	713692.717	4.94
					713692.717	
S4	0.100	Black Plastic	Eircom	85	713692.623	4.893
					734418.779	
S5	0.200	Yellow and Red Tiles	ESB	90	713692.544	4.794
					734418.52	
S6	0.200	Yellow and Red Tiles	ESB	90	713692.475	4.784
					734418.223	
S7	0.200	Yellow and Red Tiles	Eircom	85	713692.368	4.858
					734418.004	
S8	0.200	Yellow and Red Tiles	Eircom	85	734417.813	4.937
					713692.285	

From (m)	To (m)	Description
0.00	0.08	Concrete
0.08	0.40	MADE GROUND: Grey brown slightly sandy clayey angular to sub-rounded fine to coarse Gravel
0.40	0.80	MADE GROUND: Brown mottled black slightly sandy gravelly Clay with many redbrick, mortar, ash and ceramic fragments
0.80	2.50	MADE GROUND: Dark grey brown slightly sandy gravelly Clay with ash, redbrick and mortar fragments

Groundwater	Y/N	Depth

Surface from/to	Surface type	
0.00	4.00	Concrete

Sample Type	Sample Depth
Env	0.50
Env	1.00
Env	1.80
Env	2.50



8507-02-19 Hickeys –Slit Trench Photographs



ST101



ST101



ST101



ST101



ST101



ST101



ST101



ST101

APPENDIX 4 – Window Sample Records



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Site
Hickeys 43 Parkgate Place

Number
WS101

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 3.66	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713606.9 E 734356.4 N	Dates 03/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50 0.50-1.00	EN B			3.56	(0.10) 0.10	CONCRETE		
					(0.45)	MADE GROUND: Reddish brown slightly sandy clayey angular to subangular fine to medium Gravel with redbrick and mortar fragments 0.00-0.55m - Hand Pit		
				3.11	0.55	0.55-1.00m - 75% Recovery		
1.00 1.00-2.00	EN B				(1.05)	MADE GROUND: Grey brown sandy very gravelly Clay with some old redbrick, mortar, slag and charcoal fragments		
				2.06	1.60	1.00-2.00m - 65% Recovery		
					(0.40)	MADE GROUND: Light brown slightly sandy silty Clay with occasional charcoal and mortar fragments		
2.00 2.00-3.00	EN B			1.66	2.00	Soft light brown slightly sandy silty CLAY		
					(0.90)	2.00-3.00m - 45% Recovery		
3.00 3.00-4.00	EN B			0.76	2.90	Brown slightly clayey gravelly fine to coarse SAND with occasional cobbles		
					(1.10)	3.00-4.00m - 55% Recovery		
4.00	EN			-0.34	4.00	Complete at 4.00m		

Remarks Concrete coring carried out prior to hand pit 0.00-0.55m BGL - Hand Pit Window sample terminated at scheduled depth Window Sample hole backfilled and re-instated upon completion	Scale (approx) 1:25	Logged By DML
Figure No. 8507-02-19.WS101		



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Site
Hickeys 43 Parkgate Place

Number
WS102

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 3.90	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713615.6 E 734368 N	Dates 04/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.04-1.20	B			3.81	(0.09) 0.09	CONCRETE		
					(0.31)	MADE GROUND: Brown sandy very clayey angular to subrounded fine to coarse Gravel with some angular to subangular cobbles and boulders 0.00-0.40m - Hand Pit		
0.60	EN			3.50	0.40	MADE GROUND: Dark grey mottled slightly sandy very gravelly Clay with redbrick, ash and slag fragments 0.40-1.00m - 100% Recovery		
					(0.80)	1.00-1.20m - 100% Recovery		
1.20	EN			2.70	1.20	Obstruction due to Cobble or Boulder Complete at 1.20m		

Remarks Concrete coring carried out prior to hand pit 0.00-0.40m BGL - Hand Pit Window Sample terminated at 1.20m BGL due to Obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS102	



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Site
Hickeys 43 Parkgate Place

Number
WS102A

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 3.88	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713616.3 E 734365.8 N	Dates 06/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	B			3.78	(0.10) 0.10	CONCRETE		
0.50-0.50	EN					MADE GROUND: Black slightly sandy very clayey fine to medium angular to sub-rounded Gravel with some slag and mortar fragments		
0.60-1.90	B					0.00-0.60m - Handpit		
0.90-0.90	EN				(1.80)	0.60-1.00m - 40% Recovery		
1.50-1.50	EN					1.00-2.00m - 65% Recovery		
1.90-2.90	B			1.98	1.90	Soft brown silty CLAY with occasional shell fragments.		
2.50-2.50	EN				(1.00)	2.00-3.00m - 85% Recovery		
2.90-4.00	B			0.98	2.90	Brown slightly clayey gravelly fine to coarse SAND		
3.50-3.50	EN				(1.10)	3.00-4.00m - 65% Recovery		
				-0.12	4.00	Complete at 4.00m		

Remarks Concrete coring carried out prior to hand pit 0.00-0.60m - Hand pit Window Sample terminated at scheduled depth Window Sample hole backfilled and re-instated upon completion	Scale (approx) 1:25	Logged By NM
Figure No. 8507-02-19.WS102A		



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Site
Hickeys 43 Parkgate Place

Number
WS103

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 3.69	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713607.3 E 734370.7 N	Dates 03/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-3.50	B				(0.24)	CONCRETE		
				3.45	0.24	MADE GROUND: Brown slightly sandy very gravelly Clay		
					(0.36)	0.00-1.00m - 75% Recovery		
0.60	EN			3.09	0.60	MADE GROUND: Dark brown black mottled orange sandy clayey angular to subrounded fine to medium Gravel with redbrick, mortar and slag fragments		
					(0.40)			
				2.69	1.00	MADE GROUND: Dark grey brown slightly sandy gravelly Clay with ceramic and mortar fragments		
					(0.60)			
				2.09	1.60	MADE GROUND: Dark grey brown sandy very clayey angular to subrounded fine to coarse Gravel with many slag fragments		
1.60	EN				(1.70)	2.00-3.00m - 50% Recovery		
				0.39	3.30	Soft to firm brown slightly sandy silty CLAY		
					(0.30)			
3.50	EN				3.60	Brown gravelly subangular to subrounded fine to coarse SAND		
3.50-4.00	B			0.09	3.60	3.00-4.00m - 75% Recovery		
					(0.40)			
3.80	EN				4.00	Complete at 4.00m		
				-0.31				

Remarks Concrete caving carried out prior to hand Hand pit carried out to 0.50m BGL Window Sample terminated at scheduled depth Window Sample hole backfilled and re-instated upon completion	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS103	



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Site
Hickeys 43 Parkgate Place
Number
WS104

Machine : TEC OP 10 Method : Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 3.71	Client ARUP	Job Number 8507-02-19
	Location 713601.2 E 734391.1 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.14-2.00	B			3.57	(0.14) 0.14	CONCRETE		
0.50	EN					MADE GROUND: Dark brown sandy clayey angular to subangular fine to coarse Gravel with many redbrick, mortar, slag and charcoal fragments		
						0.00-1.00m - 62% Recovery		
1.50	EN				(1.66)			
						1.00-2.00m - 100% Recovery		
2.00-2.80	B			1.91 1.71	1.80 (0.20) 2.00	MADE GROUND: Brown slightly sandy slightly gravelly silty Clay with occasional mortar and charcoal fragments		
						Soft brown SILT/CLAY		
2.50	EN				(0.60)			
						2.00-3.00m - 100% Recovery		
				1.11	2.60 (0.20)	Light brown slightly clayey slightly gravelly fine to coarse SAND		
				0.91	2.80	Obstruction due to Cobble or Boulder		
						Complete at 2.80m		

Remarks Concrete Coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at 2.80m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS104	



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Site
Hickeys 43 Parkgate Place

Number
WS105

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.00	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713601.3 E 734409.9 N	Dates 04/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				3.87	(0.13) 0.13	CONCRETE		
				3.50	(0.37) 0.50	MADE GROUND: Brown concrete Cobbles and Boulders with some slightly clayey sandy angular to subangular fine to coarse Gravel		
						Obstruction due to Asbestos and boulders		
						Complete at 0.50m		

Remarks 0.00-0.50m BGL - Hand Pit Window Sample terminated at 0.50m BGL on encountering asbestos and the obstruction of a boulder Window Sample hole backfilled and re-instated upon completion	Scale (approx) 1:25	Logged By DML
Figure No. 8507-02-19.WS105		



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Site
Hickeys 43 Parkgate Place

Number
WS105A

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 3.97	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713601.4 E 734405 N	Dates 04/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40-1.00	B			3.81	(0.16) 0.16	CONCRETE		
0.50	EN				(0.84)	MADE GROUND: Dark grey brown slightly clayey angular to subrounded fine to medium Gravel with many old redbrick, tarmacadam, mortar and slag fragments 0.00-1.00m BGL - 71% Recovery		
1.00-1.30	B			2.97	1.00 (0.30)	MADE GROUND: Brown slightly sandy very clayey angular to subangular fine to coarse Gravel with occasional redbrick, mortar and slag fragments 1.00-1.30m BGL 100% Recovery		
1.30	EN			2.67	1.30	Obstruction due to Cobble or Boulder Complete at 1.30m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at 1.30m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS105A	



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Site
Hickeys 43 Parkgate Place

Number
WS106

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 3.61	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713610.2 E 734399.4 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.14-2.50	B			3.47	(0.14) 0.14	CONCRETE	[Pattern: Dotted]	
0.50	EN					MADE GROUND: Brown slightly sandy gravelly Clay with many mortar and red brick fragments	[Pattern: Diagonal Cross-hatch]	
						0.00-1.00m - 100% Recovery		
1.00	EN				(1.26)			
						MADE GROUND: Dark brown black slightly sandy slightly gravelly silty Clay with some slag and redbrick fragments	[Pattern: Diagonal Cross-hatch]	
						1.00-2.00m - 80% Recovery		
2.20	EN			2.21	1.40			
						MADE GROUND: Dark brown slightly sandy very gravelly Clay with some slag and redbrick fragments	[Pattern: Diagonal Cross-hatch]	
						1.51		
						(0.40)		
2.50-3.00	B			1.11	2.50			
						Soft brown SILT/CLAY	[Pattern: Horizontal Dashed]	
						2.00-3.00m - 90% Recovery		
2.80	EN				(0.50)			
3.00-4.00	B			0.61	3.00			
						Light brown slightly clayey slightly gravelly fine to coarse SAND	[Pattern: Dotted]	
						3.00-4.00m - 70% Recovery		
						(1.00)		
						Complete at 4.00m		
						-0.39		
						4.00		

Remarks Concrete Coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at scheduled depth Window Sample hole backfilled and re-instated upon completion	Scale (approx) 1:25	Logged By DML	Figure No. 8507-02-19.WS106
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Site
Hickeys 43 Parkgate Place

Number
WS107

Machine : TEC OP 10

Dimensions

Ground Level (mOD)

Client

Job Number
8507-02-19

Method : Drive-in Windowless Sampler

4.64

ARUP

Location
713602.9 E 734431.1 N

Dates
30/03/2019

Project Contractor
Ground Investigations Ireland

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	Tarmac with cobbles throughout		
				3.94 3.89	0.70 0.75	Concrete and boulders Complete at 0.75m		

Remarks
Tarmac cut and broken out using consaw and kango
Window Sample refused due to obstruction of concrete and boulders
Window Sample hole backfilled and re-instated upon completion

Scale (approx)
1:25

Logged By
DML

Figure No.
8507-02-19.WS107



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Site
Hickeys 43 Parkgate Place
Number
WS107A

Machine : TEC OP 10 Method : Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
	Location 713596.8 E 734426.6 N	Dates 30/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50 0.50	B EN				(1.60)	MADE GROUND: Grey brown slightly sandy very gravelly CLAY with some redbrick fragments		
1.70 1.70	B EN			2.65	1.60 (0.50)	MADE GROUND: Brown slightly sandy slightly gravelly CLAY with some redbrick fragments		
2.50 2.50	B EN			2.15	2.10 (1.00)	Soft grey slightly gravelly SILT/CLAY with occasional shell fragments		
3.50 3.50	B EN			1.15	3.10 (0.60)	Grey brown sandy very clayey angular to subrounded fine to medium GRAVEL		
				0.55	3.70	Obstruction due to cobble or boulder Complete at 3.70m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at 3.70m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS107	



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Site
Hickeys 43 Parkgate Place

Number
WS108

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713646.4 E 734426.9 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.12-0.70	B			4.13	(0.12) 0.12	CONCRETE 0.00-0.70m - Hand Pit		
0.50 0.50-2.60	EN B			3.55	(0.58) 0.70	MADE GROUND: Grey brown sandy clayey angular to subrounded fine to coarse Gravel with many redbrick and concrete fragments 0.70-1.00m - 100% Recovery		
1.50	EN				(1.90)	MADE GROUND: Brown slightly sandy gravelly Clay with some charcoal and mortar fragments 1.00-2.00m - 80% Recovery		
2.00	EN					2.00-3.00m - 80% Recovery		
2.60-3.50	B			1.65	2.60 (0.40)	Soft to firm brown slightly sandy gravelly CLAY		
				1.25	3.00 (0.50)	Soft grey brown CLAY		
3.50	EN			0.75	3.50	3.00-4.00m - 20% Recovery Complete at 3.58m		

Remarks Concrete Coring carried out prior to hand pit Hand pit carried out to 0.70m BGL Window Sample terminated at 3.50m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	DML
Figure No.		8507-02-19.WS108



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Site
Hickeys 43 Parkgate Place

Number
WS109

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713660.2 E 734427.8 N	Dates 06/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.08-1.00	B			4.17	(0.08) 0.08	CONCRETE MADE GROUND: Brown slightly sandy slightly gravelly Clay with some redbrick mortar charcoal and ceramic fragments 0.08-1.00m - 100% Recovery	+	
0.90	EN							
1.00-2.00	B					1.00-2.00m - 80% Recovery		
1.90	EN							
2.00-3.00	B				(3.92)	2.00-3.00m - 50% Recovery		
2.90	EN							
3.00-3.90	B					3.00-4.00m - 10% Recovery		
3.90	EN							
				0.25	4.00	Complete at 4.00m		

Remarks
 Concrete Coring carried out prior to hand pit
 Hand pit carried out to 0.50m BGL
 Window sample terminated at required depth
 Window Sample hole backfilled and re-instated upon completion
 Not possible to establish by GPS the locations of internal exploratory holes
 The coordinates have been determined using the location plan drawing
 The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level

	Scale (approx)	Logged By
	1:25	NM
Figure No.		
8507-02-19.WS109		



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Site
Hickeys 43 Parkgate Place

Number
WS110

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713682 E 734415.7 N	Dates 06/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	B			4.17	(0.08) 0.08	CONCRETE		
					(0.92)	MADE GROUND: Dark brown mottled orange slightly sandy very clayey fine to medium Gravel with redbrick and mortar fragments		
						0.00-1.00m - 22% Recovery		
0.90	EN			3.25	1.00	MADE GROUND: Brown slightly sandy gravelly Clay with occasional redbrick mortar shell and bone fragments		
1.00-2.00	B					1.00-2.00m - 70% Recovery		
1.80	EN							
2.00-3.00	B				(2.30)	2.00-3.00m - 100% Recovery		
2.90	EN							
3.00-4.00	B							
				0.95	3.30	Soft to firm dark grey CLAY with occasional shell fragments		
					(0.50)	3.00-4.00m - 80% Recovery		
3.50	EN							
				0.45	3.80	Dark grey slightly sandy very clayey fine to coarse sub-angular to sub-rounded GRAVEL		
				0.25	4.00	Complete at 4.00m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at required depth Window Sample hole backfilled and re-instated upon completion Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	NM
	Figure No. 8507-02-19.WS110	



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Site
Hickeys 43 Parkgate Place

Number
WS111

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713700.3 E 734398.1 N	Dates 06/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	EN			4.14	(0.11)	CONCRETE		
					(0.44)	MADE GROUND: Grey brown mottled yellow slightly sandy clayey fine to coarse angular to sub-rounded Gravel with some yellow brick fragments Handpit to 0.55m		
				3.70	0.55	Complete at 0.55m		

Remarks

Concrete carried out prior to hand pit
0.00-0.55m BGL Hand pit
Window Sample terminated at 0.55m BGL due to obstruction of old wall.
Window Sample hole backfilled and re-instated upon completion
Not possible to establish by GPS the locations of internal exploratory holes
The coordinates have been determined using the location plan drawing
The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level

Scale (approx)	Logged By
1:25	NM

Figure No.
8507-02-19.WS111



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Site
Hickeys 43 Parkgate Place

Number
WS112

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713679.8 E 734387.6 N	Dates 06/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	B			4.15	(0.10) 0.10	CONCRETE		
					(0.50)	MADE GROUND: Light brown slightly sandy clayey fine to coarse angular to sub-angular Gravel with redbrick and mortar fragments		
				3.65	0.60	0.00-1.00m - 50% Recovery		
0.70	EN					MADE GROUND: Brown mottled dark brown slightly sandy very gravelly Clay with many charcoal mortar and redbrick and some slag fragments		
1.00-2.00	B					1.00-2.00m - 65% Recovery		
1.70	EN				(2.20)			
2.00-2.80	B					2.00-3.00m - 50% Recovery		
2.70	EN			1.45	2.80	Complete at 2.80m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.55m BGL Window Sample terminated at 2.80m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	NM
	Figure No. 8507-02-19.WS112	



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Site
Hickeys 43 Parkgate Place

Number
WS113

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713646.4 E 734378 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70	B					CONCRETE		
					(1.10)	0.00-1.00m - 100% Recovery		
1.10-2.50 1.20	B EN			3.15	1.10	MADE GROUND: Brown grey slightly clayey angular to subangular fine to coarse Gravel with redbrick and mortar fragments		
				2.85	1.40	MADE GROUND: Dark brown black slightly sandy Silt		
1.70	EN				(0.50)	1.00-2.00m - 100% Recovery		
				2.35	1.90	MADE GROUND: Brown slightly sandy slightly gravelly Silt/Clay with some mortar, charcoal and redbrick fragments		
2.30	EN				(0.60)			
2.50-3.00 2.60	B EN			1.75	2.50	Soft brown SILT/CLAY		
					(0.50)	2.00-3.00m - 100% Recovery		
				1.25	3.00	Complete at 3.00m		

Remarks Concrete Coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at 3.0m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx) 1:25	Logged By DML
Figure No. 8507-02-19.WS113		



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Site
Hickeys 43 Parkgate Place

Number
WS114

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713629.3 E 734393.5 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.70	B			4.16	(0.09) 0.09	CONCRETE		
					(0.51)	MADE GROUND: Grey slightly sandy clayey angular to rounded fine to coarse Gravel with some concrete fragments		
0.50	EN			3.65	0.60 (0.10)	0.70-1.00m - 100% Recovery		
0.70-2.50	B			3.55	0.70	CONCRETE		
					(0.60)	MADE GROUND: Light brown gravelly Clay with some charcoal wood and red brick fragments		
1.50	EN			2.95	1.30	MADE GROUND: Dark brown slightly sandy very gravelly Clay with many yellow and red brick, charcoal and mortar fragments		
					(1.30)	1.00-2.00m - 90% Recovery		
2.50	EN			1.65	2.60	2.00-3.00m - 100% Recovery		
2.50-3.00	B				(0.40)	Soft brown SILT/CLAY		
2.60	EN			1.25	3.00	Complete at 3.00m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.50m BGL Window Sample terminated at 3.0m BGL due to obstruction of cobble or boulder 50mm slotted standpipe installed from 3.00m to 1.50m with pea gravel surround, plain pipe installed from 1.50m to ground level with bentonite seal with gas tap and flush cover. Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	DML
Figure No.		8507-02-19.WS114



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Site
Hickeys 43 Parkgate Place

Number
WS115

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713664.8 E 734412.6 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30-1.80	B			4.17	(0.08)	CONCRETE		
0.50	EN			3.95	(0.22)	MADE GROUND: Grey slightly sandy slightly clayey angular to subangular fine to coarse Gravel with redbrick and concrete fragments		
1.50	EN				(1.50)	MADE GROUND: Brown slightly sandy very gravelly Clay with mortar and redbrick fragments 0.00-1.00m - 65% Recovery		
1.80-3.30	B			2.45	1.80	MADE GROUND: Brown slightly sandy gravelly Clay with occasional charcoal and mortar fragments		
2.50	EN				(1.50)	2.00-3.00m - 80% Recovery		
						3.00-3.30m - 100% Recovery		
				0.95	3.30	Hydrocarbon Odour Obstruction due to Cobble Complete at 3.30m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.60m BGL Window Sample terminated at 3.30m BGL due to obstruction of cobble or boulder Window Sample hole backfilled and re-instated upon completion Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS117	



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Site
Hickeys 43 Parkgate Place

Number
WS116

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713677.2 E 734397.2 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				4.17	0.08 (0.08)	CONCRETE		
					(0.62)	MADE GROUND: Grey slightly sandy slightly clayey angular to subangular fine to coarse Gravel with redbrick and concrete fragments		
				3.55	0.70	Complete at 0.70m		

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 0.70m BGL Window Sample terminated on encountering an underground chamber Window Sample hole backfilled and re-instated upon completion Elevation is an Estimation based on levels taken outside and a measurement taken to the top of finished floor level Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS116	



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Site
Hickeys 43 Parkgate Place

Number
WS117

Machine : TEC OP 10	Dimensions	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Method : Drive-in Windowless Sampler	Location 713647.8 E 734417.6 N	Dates 30/03/2019	Project Contractor Ground Investigations Ireland	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.04-0.70	B			4.21	0.04	CONCRETE		
					(0.66)	MADE GROUND: Brown slightly sandy very gravelly Clay with some redbrick and mortar fragments		
0.50	EN					0.00-1.00m - 100% Recovery		
0.70-1.80	B			3.55	0.70	MADE GROUND: Brown slightly sandy slightly gravelly Clay with redbrick and mortar fragments		
					(1.20)			
1.50	EN					1.00-2.00m - 100% Recovery		
1.80-2.90	B			2.35	1.90	MADE GROUND: Brown slightly sandy very gravelly Clay with mortar, redbrick, charcoal and slag fragments		
					(1.00)			
2.50	EN					2.00-3.00m - 80% Recovery		
2.90-4.00	B			1.35	2.90	Soft grey SILT/CLAY with occasional shell fragments		
					(1.00)			
3.50	EN					3.00-4.00m - 70% Recovery		
4.00	EN			0.35 0.25	3.90 (0.10) 4.00	Grey slightly sandy very clayey fine to medium angular to sub-rounded GRAVEL Complete at 4.00m		

Remarks Concrete coring carried out prior to window sample Window sample terminated at required depth 50mm slotted standpipe installed from 4.00m to 1.50m with pea gravel surround, plain pipe installed from 1.50m to ground level with bentonite seal with gas tap and flush cover. Elevation is an Estimation based on levels taken outside and a measurement taken to the top of finished floor level Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx)	Logged By
	1:25	DML
	Figure No. 8507-02-19.WS117	

8507-02-19 Hickeys Warehouse – Window Sample Photographs

WS101



WS102



WS102A



WS103



WS104



WS105



WS105



WS105



WS105



WS105A



WS106



WS107



WS108



WS109



WS110



WS111



WS111



WS111



WS112



WS113



WS114



WS115



WS117



WS117



APPENDIX 5 – Borehole Records



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH101

Machine : Dando 2000, Beretta T44	Casing Diameter 200mm cased to 7.10m 100mm cased to 12.60m	Ground Level (mOD) 3.91	Client ARUP	Job Number 8507-02-19
Method : Cable Percussion, Rotary Core	Location 713615.9 E 734360.3 N	Dates 03/04/2019- 29/04/2019	Project Contractor Ground Investigations Ireland	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					3.81	0.10	Concrete.			
0.50	B					(0.50)	MADE GROUND: Brown slightly sandy slightly clayey fine to coarse angular to sub-angular Gravel with angular to sub-angular cobbles and boulders.			
0.50	EN				3.31	0.60				
1.00	B			5,4/3,1,2,2		(0.90)	MADE GROUND: Black slightly sandy slightly clayey fine to coarse angular to sub-angular Gravel with angular to sub-angular cobbles and boulders and slag fragments			
1.00	EN				2.41	1.50				
1.20-1.65	SPT(C) N=8					(1.00)	MADE GROUND: Brown slightly sandy silty Clay with occasional mortar charcoal and redbrick fragments			
2.00	B			1,0/1,0,1,1		(1.00)				
2.00-2.45	SPT(C) N=3				1.41	2.50	Soft light brown sandy very silty CLAY			
2.00	EN				0.91	3.00	Stiff light brown sandy very silty CLAY			
3.00	B			2,5/7,7,6,7		(0.40)				
3.00-3.45	SPT(C) N=27				0.51	3.40	Medium dense brown sandy slightly clayey sub-angular to rounded fine to medium GRAVEL			
3.00	EN					(0.60)				
4.00	B			Water strike(1) at 3.80m. 1,2/1,1,1,3	-0.09	4.00	Loose brown very sandy sub-angular to rounded fine to medium GRAVEL			
4.00-4.45	SPT(C) N=6					(0.50)				
4.00	EN				-0.59	4.50	Loose brown very sandy sub-angular to rounded fine to medium GRAVEL with sub-angular to rounded cobbles			
5.00	B			2,2/2,3,3,4		(0.50)				
5.00-5.45	SPT(C) N=12				-1.09	5.00	Medium dense brown sandy slightly clayey sub-angular to rounded fine to medium GRAVEL with sub-angular to rounded cobbles			
5.00	EN					(0.50)				
6.00	B			2,3/14,26,10		(0.50)				
6.00-6.42	SPT(C) 50/270				-1.59	5.50	Medium dense grey slightly clayey sandy fine to medium angular to sub-rounded GRAVEL.			
6.00	EN					(0.50)				
7.00-7.08	TCR			25/50		(1.10)				
6.90	SCR			SPT(C) 25*/75		(1.10)				
7.00	RQD					(1.10)				
	FI			B		(1.10)				
7.70	100	18	0			-3.19	7.10			
						(1.50)	WEATHERED ROCK: Recovered as angular cobbles of weak thinly laminated dark grey black fine grained calcareous MUDSTONE and weak thinly bedded grey fine to medium LIMESTONE Obstruction due to rock or boulder.			
8.60	95	21	11			-4.69	8.60			
8.80						(1.40)	Strong dark grey fine grained LIMESTONE with some bands of weak thinly laminated dark grey black fine grained calcareous mudstone and some calcite veining. Distinctly weathered. Non Intact. 8.60-9.70m. Two Fracture sets. F1: very close to closely spaced, 30-50 degrees, undulating smooth, tight to open, clay staining. F2: closely spaced, 50-70 degrees, undulating smooth, tight to open, clay smearing.			
9.70	100	50	13	15						
10.00				NI						

Remarks Concrete coring carried out prior to hand pit Hand Pit to 1.20m BGL Groundwater encountered at 3.80 BGL Obstruction due to rock or boulder at 7.10m BGL. Cable Percussion to 7.10m BGL and Rotary Core follow on to 12.60m BGL. 50mm slotted standpipe installed from 6.50m to 5.00m with pea gravel surround, plain pipe installed from 5.0m to ground level with bentonite seal and flush cover	Scale (approx) 1:50	Logged By NM
Figure No. 8507-02-19.BH101		



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH101

Machine : Dando 2000, Beretta T44 Flush : Water Core Dia : HQ mm Method : Cable Percussion, Rotary Core	Casing Diameter 200mm cased to 7.10m 100mm cased to 12.60m	Ground Level (mOD) 3.91	Client ARUP	Job Number 8507-02-19
	Location 713615.9 E 734360.3 N	Dates 03/04/2019- 29/04/2019	Project Contractor Ground Investigations Ireland	Sheet 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.65	100	34	0	9		-6.09	10.00	Weak to medium strong dark grey thinly bedded fine grained LIMESTONE interbedded with weakly laminated grey black fine grained calcareous mudstone and rare calcite veining. Partially weathered. 10.00-10.65m. One Fracture set. F1: closely spaced, 50-70 degrees, undulating smooth, tight to open, clay smearing.			
				NI			(1.10)				
11.10	100	71	45	9		-7.19	11.10	Very strong to medium strong dark grey thinly bedded fine grained LIMESTONE with calcareous mudstone bands and calcite veining. Partially weathered. 11.10-12.60m. Two Fracture sets. F1: close to medium spaced, 20-40 degrees, undulating smooth, tight to open, clay smearing. F2: close to medium spaced, 40-60 degrees, undulating smooth, tight to open, clay smearing.			
							(1.50)				
12.60						-8.69	12.60	Complete at 12.60m			

Remarks	Scale (approx)	Logged By
	1:50	NM
	Figure No. 8507-02-19.BH101	



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH102

Machine : Dando 2000 & Beretta T44	Casing Diameter 200mm to 6.40m 98mm to 15.50m	Ground Level (mOD) 4.10	Client ARUP	Job Number 8507-02-19
Method : Cable Percussion with Rotary Core follow on	Location 713624.7 E 734403.6 N	Dates 13/04/2019-07/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				4.05	0.05 (0.25)	TARMACADAM			
0.50	EN				3.80	0.30	MADE GROUND: Grey brown slightly clayey sandy fine to coarse sub-angular to sub-rounded Gravel with cement fragments.			
1.00	B				3.10	1.00	MADE GROUND: Brown sandy very clayey fine to coarse angular to sub-rounded Gravel.			
1.00	EN			10,5/2,2,4,3		(0.70)	MADE GROUND: Light brown mottled dark brown slightly sandy gravelly Clay with mortar and redbrick fragments			
1.20-1.65	SPT(C) N=11					(1.10)				
2.00	B				2.00	2.10	Soft dark grey very sandy very gravelly very silty CLAY.			
2.00-2.45	SPT(C) N=4			1,1/1,1,1,1		(0.90)				
2.00	EN				1.10	3.00	Firm dark grey very sandy slightly gravelly very silty CLAY.			
3.00	B				0.60	3.50	Loose becoming medium dense brown very gravelly fine to coarse SAND with occasional sub-rounded cobbles			
3.00-3.45	SPT(C) N=11			2,3/3,3,2,3		(0.50)				
3.00	EN					(1.75)				
4.00	B									
4.00-4.45	SPT(C) N=9			1,2/2,2,2,3						
4.00	EN									
5.00	B									
5.00	SPT(C) N=12			Water strike(1) at 4.70m, rose to 4.00m in 20 mins. 1,2/2,3,3,4						
5.00-5.45	B				-1.15	5.25	Medium dense brown slightly clayey sandy sub-angular to sub-rounded fine to medium GRAVEL with wood fragments			
5.30	EN					(0.75)				
6.40	B									
6.00	SPT(C) 35/125			EN 25/50	-1.90	6.00	Firm dark grey sandy gravelly very silty CLAY			
6.00-6.28	EN			7,7/10,25		(0.40)				
6.00	TCR			SPT(C) 25*/0						
6.40-6.40	SCR				-2.30	6.40	OVERBURDEN: Recovery consists of greyish brown slightly sandy gravelly CLAY with occasional cobble fragments of Limestone. Gravel is fine to medium angular of Limestone. Drillers notes: CLAY			
6.40	RQD					(0.40)	Obstruction due to rock at 6.40m BGL. Rotary Core follow on from 6.40m BGL			
6.80	FI					6.80	Medium strong to strong fine grained thinly laminated grey/dark grey LIMESTONE. partially weathered with occasional calcite veining, oxide staining and brown Clay staining interbedded with a weak fine grained thinly laminated black MUDSTONE. Distinctly weathered with occasional calcite veining, Clay bands, pyritic laminae and oxide staining			
7.65				4						
8.00				14						
8.20				5						
8.55				13						
9.30										
9.70										

Remarks Concrete coring carried out prior to hand pit Hand Pit to 1.20m BGL Obstruction at 6.40m BGL due to rock. Groundwater encountered at 4.70m BGL Rotary Core follow on from 6.40m BGL Chiselling from 6.40m to 6.40m for 1 hour.	Scale (approx) 1:50	Logged By NM & EB
Figure No. 8507-02-19.BH102		



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH102

Machine : Dando 2000 & Beretta T44 Flush : Water Core Dia : 68 mm Method : Cable Percussion with Rotary Core follow on	Casing Diameter 200mm to 6.40m 98mm to 15.50m Location 713624.7 E 734403.6 N	Ground Level (mOD) 4.10 Dates 13/04/2019-07/05/2019	Client ARUP Project Contractor Ground Investigations Ireland	Job Number 8507-02-19 Sheet 2/2
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Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.05	100	65	38	11			(8.70)	Fracture set 1: Very closely to closely spaced, dipping 0 - 25 degrees, rough planar to smooth planar with some oxide staining Fracture set 2: Very closely to medium spaced, dipping 30 - 50 degrees, rough planar to smooth planar with some oxide staining Fracture set 3: Medium spaced, dipping 70 - 85 degrees, rough undulose to rough planar with occasional Clay staining			
11.95	100	80	43								
12.55	100	55	46								
14.05	100	72	56								
15.50	100	80	63	14		-11.40	15.50	Complete at 15.50m			

Remarks	Scale (approx) 1:50	Logged By NM & EB
Figure No. 8507-02-19.BH102		



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH103

Machine : Dando 2000, Beretta T44	Casing Diameter 200mm cased to 5.70m 100mm cased to 15.10m	Ground Level (mOD) 4.66	Client ARUP	Job Number 8507-02-19
Method : Cable Percussion, Rotary Core	Location 713620.8 E 734427.3 N	Dates 14/04/2019- 08/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B				4.36	(0.30)	TARMACADAM			
0.50	EN					0.30	MADE GROUND: Brown slightly sandy very clayey fine to coarse angular to sub-rounded Gravel with concrete tarmacadam and redbrick.			
1.00	B			5,3/3,4,2,4	3.66	(0.70)	MADE GROUND: Brown gravelly very sandy very silty Clay with mortar and charcoal fragments.			
1.00	EN					1.00				
1.20-1.65	SPT(C) N=13					(1.40)				
2.00	B			1,1/2,2,1,2	2.26	2.40	Firm grey sandy very gravelly very silty CLAY.			
2.00-2.45	SPT(C) N=7					2.40				
2.00	EN					(1.20)				
3.00	B			2,3/2,2,3,3	1.06	3.60	Loose grey slightly sandy very clayey fine to coarse sub-angular to sub-rounded GRAVEL			
3.00-3.45	SPT(C) N=10					(0.30)				
3.00	EN					3.90	Loose brown sandy GRAVEL			
4.00	B			1,1/1,2,2,2	0.76	(1.10)				
4.00-4.45	SPT(C) N=7					5.00	Very dense dark brown sandy silty GRAVEL with occasional sub-rounded cobbles			
4.00	EN					(1.40)	Obstruction due to rock at 5.70m BGL.			
5.00	B			4,2/1,3,18,25	-0.34	6.40	Diller notes: Clay with boulders. Recovery consists of strong dark grey fine grained LIMESTONE with calcite veining. Partially weathered.			
5.00-5.41	SPT(C) 47/260					(0.30)				
5.00	EN					6.70	Medium strong to strong dark grey thinly bedded fine grained LIMESTONE with some bands of weak thinly laminated dark grey black fine grained calcareous mudstone and occasional calcite veining. Partially weathered			
5.70	B					(1.50)	6.70-8.60m. Two Fracture sets. F1: very close to closely spaced, 0-20 degrees, undulating smooth, clay staining. F2: very close to closely spaced, 600-70 degrees, undulating smooth, clay staining.			
6.40	TCR					8.20	Strong dark grey thinly bedded fine grained LIMESTONE with some bands of weak thinly laminated dark grey black fine grained calcareous mudstone and occasional calcite veining. Partially weathered			
	SCR					(3.05)	Non Intact.			
	RQD									
	FI									
6.40	100	0	0		-1.74	6.40				
6.70					-2.04	6.70				
	85	47	17	14						
8.20					-3.54	8.20				
8.60	83	57	43							
9.70				8						

Remarks Concrete coring carried out prior to hand pit Hand Pit to 1.20m BGL Obstruction at 5.70m BGL due to rock. No groundwater encountered. Cable percussion to 5.70m BGL and Rotary Core follow on to 15.10m BGL. 50mm slotted standpipe installed from 4.50m to 3.20m with pea gravel surround, plain pipe installed from 3.20m to ground level with bentonite seal and flush cover Chiselling from 6.40m to 6.40m for 1 hour.	Scale (approx)	Logged By
	1:50	NM
	Figure No. 8507-02-19.BH103	



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH103

Machine : Dando 2000, Beretta T44 Flush : Water Core Dia : HQ mm Method : Cable Percussion, Rotary Core	Casing Diameter 200mm cased to 5.70m 100mm cased to 15.10m	Ground Level (mOD) 4.66	Client ARUP	Job Number 8507-02-19
	Location 713620.8 E 734427.3 N	Dates 14/04/2019-08/05/2019	Project Contractor Ground Investigations Ireland	Sheet 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.25	100	59	46					8.60-11.25m. Two Fracture sets. F1: very close to closely spaced, 30-45 degrees, undulating smooth, tight to open, clay smearing. F2: medium spaced, 50-70 degrees, undulating smooth, tight to open, clay smearing.			
12.40	100	71	48	10		-6.59	11.25 (1.50)	Medium strong to strong dark grey thinly bedded fine grained LIMESTONE with some bands of weak thinly laminated dark grey black fine grained calcareous mudstone and occasional calcite veining. Partially weathered 11.25-12.75m. One Fracture set. F1: close to medium spaced, 30-50 degrees, undulating smooth, tight to open, clay smearing.			
12.75	100	75	44	14		-8.09	12.75	Strong dark grey thinly bedded fine grained LIMESTONE with some bands of weak thinly laminated dark grey black fine grained calcareous mudstone and occasional calcite veining. Partially weathered 12.75-14.10m. One Fracture set. F1: very close to closely spaced, 30-50 degrees, undulating smooth, tight to open, clay smearing.			
14.10	100	88	74	5			(2.35)	14.10-15.10m. One Fracture set. F1: close to widely spaced, 30-45 degrees, undulating smooth, tight to open, clay smearing.			
15.10						-10.44	15.10	Complete at 15.10m			

Remarks	Scale (approx)	Logged By
	1:50	NM
	Figure No. 8507-02-19.BH103	



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH104

Machine : Dando 2000, Beretta T44	Casing Diameter 200mm to 7.60m 100mm to 15.60m	Ground Level (mOD) 5.29	Client ARUP	Job Number 8507-02-19
Method : Cable Percussion, Rotary Core	Location 713691.5 E 734416.5 N	Dates 15/04/2019- 02/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
3.00	B SPT(C) N=5 J T			1,2/1,1,2,1	2.29	(3.00)	MADE GROUND: Greyish brown slightly sandy gravelly Clay with occasional subrounded cobbles and some ceramic, concrete and red brick fragments			
3.00-3.45						(1.00)	MADE GROUND: Dark grey very gravelly silty Sand			
3.00						(1.00)	MADE GROUND: Dark grey very gravelly slightly clayey Sand			
3.00						(1.00)	MADE GROUND: Dark grey very gravelly slightly clayey Sand			
4.00	B J T			4,7/11,8,5,2	1.29	(1.00)	MADE GROUND: Dark grey very gravelly slightly clayey Sand			
4.00						(1.00)	MADE GROUND: Dark grey very gravelly slightly clayey Sand			
5.00	B SPT(C) N=26 J T			4,7/11,8,5,2	0.29	(1.20)	Stiff greyish brown sandy very gravelly very silty CLAY. Gravel is angular to subrounded			
5.00-5.45						(1.20)Lense of soft grey mottled black gravelly CLAY with spongy Pseudofibrous Peat occurs between 5.80m to 6.20m BGL			
5.00						(1.20)Lense of soft grey mottled black gravelly CLAY with spongy Pseudofibrous Peat occurs between 5.80m to 6.20m BGL			
6.00	J B SPT(C) N=21 T			Water strike(1) at 5.80m, rose to 5.50m in 20 mins. 2,2/3,4,7,7	-0.91	(1.20)	Dense grey very sandy GRAVEL with occasional sub-rounded cobbles. Sand is predominately coarse and Gravel is subangular to rounded			
6.00-6.45						(1.20)	Dense grey very sandy GRAVEL with occasional sub-rounded cobbles. Sand is predominately coarse and Gravel is subangular to rounded			
7.00	B SPT(C) N=33 J T			4,6/7,7,9,10	-2.11	(0.20)	Brown subangular COBBLES and BOULDERS (Presumed weathered rock)			
7.00-7.45						(0.50)	Strong dark grey thinly bedded fine grained LIMESTONE with frequent calcite veining. Partially weathered.			
7.00						(1.60)	Strong dark greythinly bedded fine grained LIMESTONE with frequent calcite veining and some bands of weak thinly laminated dark grey black fine grained calcareous mudstone. Partially weathered.			
7.00						(1.60)	Strong dark greythinly bedded fine grained LIMESTONE with frequent calcite veining and some bands of weak thinly laminated dark grey black fine grained calcareous mudstone. Partially weathered.			
7.50	TCR	SCR	RQD	FI	B					
7.50	90	0	0	6						
7.60										
8.10				NI						
8.50	100	60	44							
9.60				4						
9.60					-4.41					

Remarks Borehole located in slit trench No groundwater encountered. Cable percussion to 7.60m BGL and Rotary Core follow on to 15.60m BGL. Core loss occurred between 13.10m to 14.10m BGL due to the inner barrel not locking in correctly with the outer barrel at the beginning of the 12.60m run. The core was lost when the run was returning to the surface 50mm slotted standpipe installed from 12.30m to 8.60m with pea gravel surround, plain pipe installed from 8.60m to ground level with bentonite seal and flush cover Chiselling from 7.50m to 7.50m for 1 hour.	Scale (approx) 1:50	Logged By NM
Figure No. 8507-02-19.BH104		



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH104

Machine : Dando 2000, Beretta T44	Casing Diameter 200mm to 7.60m 100mm to 15.60m	Ground Level (mOD) 5.29	Client ARUP	Job Number 8507-02-19
Flush :	Location 713691.5 E 734416.5 N	Dates 15/04/2019- 02/05/2019	Project Contractor Ground Investigations Ireland	Sheet 2/2
Core Dia: mm				
Method : Cable Percussion, Rotary Core				

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.32	93	30	10				(1.40)	Medium strong to weak dark grey fine grained calcareous MUDSTONE and interbedded limestone with a pyrite lamination and very rare calcite grains. Partially weathered. Two Fracture sets. F1: closely spaced, 0-20 degrees, undulating smooth, tight to open, clay staining. F2: very closely spaced, 40-50 degrees, undulating smooth, tight to open, clay smearing			
11.10				27		-5.81	11.10	Very strong dark grey thinly bedded fine grained LIMESTONE with a band of weak thinly laminated dark grey black fine grained calcareous mudstone and rare calcite veining. Partially weathered.			
	80	61	39				(2.00)	Two Fracture sets. F1: closely spaced, 10-30 degrees, undulating smooth, tight to open, clay staining and sand infill. F2: closely spaced, 30-45 degrees, undulating smooth, open, clay staining.			
12.60				8							
13.10	47	27	21			-7.81	13.10	Core Loss			
							(1.00)	Core Loss between 13.10-14.10m BGL. - See Remarks Section.			
14.10						-8.81	14.10	Very strong dark grey thinly bedded fine grained LIMESTONE with some bands of weak thinly laminated dark grey black fine grained calcareous mudstone and thick calcite veining. Partially weathered.			
	100	75	56	7			(1.50)	Two Fracture sets. F1: medium spaced, 10-30 degrees, undulating smooth, tight to open, clay staining and smearing. F2: closely spaced, 40-60 degrees, undulating smooth, tight to open, calcite infill and clay staining.			
15.60						-10.31	15.60	Complete at 15.60m			

Remarks	Scale (approx)	Logged By
	1:50	NM
	Figure No. 8507-02-19.BH104	



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH105

Machine : Beretta T44	Casing Diameter 98mm to 17.00m	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Flush : Water				
Core Dia: 68 mm				
Method : Rotary Cored	Location 713695.1 E 734406.3 N	Dates 11/05/2019- 12/05/2019	Project Contractor Ground Investigations Ireland	Sheet 1/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.30	0						(1.30)	CONCRETE			
2.00 2.00-2.45 2.00	10				1,1/1,2,1,1 SPT(C) N=5 T	2.95	1.30	OVERBURDEN: Poor recovery - recovery consists of brown slightly sandy slightly gravelly SILT. Gravel is fine subrounded and sand is predominately fine. Drillers notes: Sandy SILT (Soft)			
3.50 3.50-3.95 3.50	6				1,2/1,1,2,3 SPT(C) N=7 T		(5.20)				
5.00 5.00-5.45 5.00	21				2,3/3,1,2,3 SPT(C) N=9 T						
6.50 6.50-6.95	18				3,2/2,1,3,2 SPT(C) N=8	-2.25	6.50	OVERBURDEN: Poor recovery - recovery consists of grey sandy fine to coarse angular to subrounded GRAVEL of variable lithology. Drillers notes: Sand - Gravel (Loose)			
8.00 8.00-8.45	29				5,6/6,8,7,11 SPT(C) N=32	-3.75	8.00	OVERBURDEN: Poor recovery - recovery consists of grey clayey sandy fine to coarse subrounded GRAVEL of Limestone. Drillers notes: Gravel (Dense)			
8.50	81	12	12			-4.25	8.50	Weak fine grained thinly laminated grey LIMESTONE. Distinctly weathered with pyritic concretions, some calcite veining and residually weathered Mudstone bands			
9.50							(1.80)				
					NI						

Remarks
 Concrete coring carried out prior to drilling
 Bentonite seal from 17.00m BGL to 13.00m BGL, Slotted standpipe installed from 13.00m BGL to 11.50m BGL with a pea gravel surround and a plain standpipe was installed from 11.50m BGL to GL with a bentonite seal and a flush cover
 Not possible to establish by GPS the locations of internal exploratory holes
 The coordinates have been determined using the location plan drawing
 The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level

Scale (approx)
1:50

Logged By
EB

Figure No.
8507-02-19.BH105



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH105

Machine : Beretta T44	Casing Diameter 98mm to 17.00m	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Flush : Water			Project Contractor Ground Investigations Ireland	Sheet 2/2
Core Dia: 68 mm	Location 713695.1 E 734406.3 N	Dates 11/05/2019- 12/05/2019		
Method : Rotary Cored				

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00	79	0	0			-6.05	10.30	Black residual MUDSTONE with Limestone lithic fragments			
11.40	100	32	23			-7.15	11.40	Medium strong to strong fine grained thinly laminated grey LIMESTONE. Partially weathered with some residual Mudstone bands, pyritic laminae, pink and white calcite veining			
12.50	94	48	48	13		-8.75	13.00	Medium strong fine grained thinly laminated grey/dark grey LIMESTONE. Partially weathered with some pink and white calcite veining interbedded with a weak fine grained thinly laminated black MUDSTONE. Distinctly weathered to residual with pink calcite veining, pyrite specks throughout and occasional residual bands			
14.00	100	52	36				(4.00)	14.70m to 14.95m BGL Residual Mudstone band			
15.50								Fracture set 1: Closely to medium spaced, dipping 0 - 25 degrees, rough planar to rough undulose with occasional Clay staining			
16.00	100	65	38	11				Fracture set 2: Very closely to closely spaced, dipping 30 - 50 degrees, rough planar with occasional Clay staining			
17.00						-12.75	17.00	Fracture set 3: Closely to medium spaced, 70 - 85 degrees, rough planar to rough undulose			
17.00								Complete at 17.00m			

Remarks	Scale (approx)	Logged By
	1:50	EB
	Figure No. 8507-02-19.BH105	



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH106

Machine : Beretta T44	Casing Diameter 102mm cased to 12.70m	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Flush : Water			Project Contractor Ground Investigations Ireland	Sheet 1/2
Core Dia: 102 mm	Location 713662.8 E 734382 N	Dates 13/04/2019		
Method : Rotary Cored				

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00						4.15	0.10	CONCRETE			
							(2.10)	Open hole techniques carried out - Driller notes Clay and Gravel			
2.20 2.20-2.65	0	0	0		2,2/2,1,1,1 SPT(C) N=5	2.05	2.20	Open hole techniques carried out. Sample recovery indicates probable natural brown sandy gravelly CLAY (Soft)			
							(1.50)				
3.70 3.70-4.15	0	0	0		1,0/0,1,2,4 SPT(C) N=7	0.55	3.70	Open hole techniques carried out. Sample recovery indicates brown slightly sandy silty CLAY (Soft to firm)			
							(1.00)				
5.20 5.20-5.65	0	0	0		2,9/5,4,3,2 SPT(C) N=14	-0.45	4.70	Open hole techniques carried out. Sample recovery indicates Loose to medium dense brown sandy clayey fine to coarse sub-angular to sub-rounded GRAVEL			
							(2.00)				
6.70 6.70-7.15	40	3	0		Water strike(1) at 6.40m. 1,0/0,1,0,2 SPT(C) N=3	-2.45	6.70	Driller Notes: Grey sand and gravel. Recovery consists of grey slightly sandy slightly clayey fine to coarse sub-angular to sub-rounded GRAVEL (Loose) with occasional cobbles. SPT recovery consists of grey brown slightly sandy SILT (Soft).		▽1	
							(1.30)	6.70-8.00m 40% recovery			
8.00 8.20 8.40				NI		-3.75	8.00	Weak to medium strong dark grey fine grained LIMESTONE with weak calcareous Mudstone bands some calcite veining. Distinctly weathered. 8.00-8.40m - Non Intact.			
							(1.70)	8.40-9.70m - One fracture set. F1: Very close to closely spaced, 50-60 degrees, undulating smooth, tight to open with clay smearing and staining.			
9.70						-5.45	9.70	Strong dark grey fine grained LIMESTONE with occasional calcite veining.			

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 1.20m BGL Groundwater encountered at 6.40m BGL. Borehole backfilled on completion. Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx) 1:50	Logged By NM
Figure No. 8507-02-19.BH106		



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH106

Machine : Beretta T44
Flush : Water
Core Dia: 102 mm
Method : Rotary Cored

Casing Diameter
102mm cased to 12.70m

Ground Level (mOD)
4.25

Client
ARUP

Job Number
8507-02-19

Location
713662.8 E 734382 N

Dates
13/04/2019

Project Contractor
Ground Investigations Ireland

Sheet
2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.20	100	90	60	11			(1.50)	9.70-11.20m - Two fracture sets. F1: Very close to medium spaced, 60 degrees, undulating smooth, tight to open with some clay smearing. F2: Medium to widely spaced, 70 degrees, undulating smooth, tight to open, with some clay staining.			
	93	48	20	21		-6.95	11.20	Medium strong to strong dark grey fine grained LIMESTONE weak calcareous Mudstone bands and occasional calcite veining.			
12.70							(1.50)	11.20-12.70m - Two fracture sets. F1: Very close to closely spaced, 30-40 degrees, undulating smooth, tight to open with some clay smearing. F2: Medium spaced, 70-80 degrees, undulating smooth, tight to open, with some clay staining.			
						-8.45	12.70	Complete at 12.70m			

Remarks

Scale (approx)
1:50

Logged By
NM

Figure No.
8507-02-19.BH106



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH107

Machine : Beretta T44	Casing Diameter 102mm cased to 12.00m	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Flush : Water			Project Contractor Ground Investigations Ireland	Sheet 1/2
Core Dia: 150 mm	Location 713648.4 E 734399.5 N	Dates 06/04/2019- 07/04/2019		
Method : Rotary Cored				

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00						4.15	0.10	CONCRETE			
								Poor recovery. Driller notes: brown sandy clay			
	2	0	0		Water strike(1) at 1.20m.		(2.10)	0.00-2.20m - 2% recovery.		∇1	
2.20 2.20-2.65					3,4/3,2,2,2 SPT(C) N=9	2.05	2.20	No recovery. Driller notes: brown sandy clay (firm)			
	0	0	0				(1.50)	2.20-3.70m - 0% recovery.			
3.70 3.70-4.15					1,1/1,1,1,1 Water strike(2) at 3.70m. SPT(C) N=4	0.55	3.70	No recovery. Driller notes: sandy gravel (Loose)		∇2	
	0	0	0				(1.00)	3.70-5.20m - 0% recovery.			
5.20 5.20-5.65					3,2/3,2,3,2 SPT(C) N=10	-0.45	4.70	No recovery. Driller notes: sandy gravel (Loose to medium dense)			
	0	0	0				(2.00)	5.20-6.70m - 0% recovery.			
6.70 6.70-7.15					3,4/4,3,4,5 SPT(C) N=16	-2.45	6.70	No recovery. Driller notes: sandy gravel (Medium dense)			
	46	43	33				(0.80)				
7.50						-3.25	7.50	Strong dark grey fine grained LIMESTONE with calcite veining and occasional clay bands (8.00m BGL - 0.05m band).			
				3			(1.50)	7.50-8.20m - Two fracture sets. F1: Closely spaced, 40 degrees, undulating smooth, tight to open with clay infill. F2: Closely spaced, 50 degrees, undulating smooth, tight to open with clay infill.			
8.20				NI				8.20-8.50m - Non Intact.			
8.50				7				8.50-9.00m - Two fracture sets. F1: Very close to medium spaced, 30-40 degrees, undulating smooth, tight to open with some clay smearing. F2: Medium spaced, 50 degrees, undulating smooth, tight to open, with some clay smearing.			
9.00	93	50	20	NI		-4.75	9.00				
9.20						-4.95	(0.20) 9.20				
				5			(0.60)	Residual weathering with calcareous MUDSTONE.			
9.70 9.80								9.00-9.20m - Non Intact.			

Remarks Concrete coring carried out prior to hand pit Hand pit carried out to 1.20m BGL Groundwater encountered at 3.70m BGL and 1.20m BGL at the start of the following day. 50mm slotted standpipe installed from 12.00m to 4.00m with pea gravel surround, plain pipe installed from 4.00m to ground level with bentonite seal and flush cover. Not possible to establish by GPS the locations of internal exploratory holes The coordinates have been determined using the location plan drawing The elevation is estimated at 4.25 mOD based on levels taken outside and a measurement taken to the top of finished floor level	Scale (approx) 1:50	Logged By NM
Figure No. 8507-02-19.BH107		



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Site
Hickeys 43 Parkgate Place

Borehole Number
BH107

Machine : Beretta T44	Casing Diameter 102mm cased to 12.00m	Ground Level (mOD) 4.25	Client ARUP	Job Number 8507-02-19
Flush : Water	Location 713648.4 E 734399.5 N	Dates 06/04/2019- 07/04/2019	Project Contractor Ground Investigations Ireland	Sheet 2/2
Core Dia : 150 mm				
Method : Rotary Cored				

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.20	100	73	33	24		-5.55	9.80 (0.80)	Strong dark grey fine grained LIMESTONE with calcite veining and occasional clay bands. 9.20-9.80 - Two fracture sets. F1: Very close to medium spaced, 30-40 degrees, undulating smooth, tight to open with some clay smearing. F2: Medium spaced, 50 degrees, undulating smooth, tight to open, with some clay smearing.			
							-6.35				
12.00	100	75	31			-7.75	12.00	Medium strong to strong dark grey fine grained LIMESTONE with some calcite veining. Partially weathered. 9.80-12.00m - Two fracture sets. F1: Very close to medium spaced, 30-40 degrees, undulating smooth, tight to open with some clay staining. F2: Close to medium spaced, 60-80 degrees, undulating smooth, tight to open with some clay staining.			
								Complete at 12.00m			

Remarks	Scale (approx)	Logged By
	1:50	NM
	Figure No. 8507-02-19.BH107	

Hickeys 43 Parkgate Place – Rotary Core Photographs



BH101



BH101



BH102



BH102



BH102



BH102



BH103



BH103



BH103



BH104



BH104



BH105



BH105



BH105



BH105



BH106



BH107

APPENDIX 6 – Laboratory Test Records



LABORATORY REPORT



4043

Contract Number: PSL19/2698

Report Date: 20 May 2019
Client's Reference: 2413208
Client Name: Ground Investigations Ireland Ltd
Catherinestown House
Hazelhatch Road
Newcastle
Co Durham

For the attention of: Stephen Kealy

Contract Title: Hickeys 43 Parkgate Place
Date Received: 1/5/2019
Date Commenced: 1/5/2019
Date Completed: 20/5/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

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(Director)

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(Laboratory Manager)

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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH101		B	2.00		Brown slightly gravelly sandy very silty CLAY.
BH101		B	3.00		Brown very sandy very silty CLAY.
BH101		B	4.00		Brown very sandy GRAVEL.
BH101		B	5.00		Brown sandy GRAVEL.
BH101		B	7.00		Brown very sandy GRAVEL.
BH102		B	2.00		Brown very gravelly very sandy very silty CLAY.
BH102		B	3.00		Dark brown slightly gravelly very sandy very silty CLAY with some organic material.
BH102		B	4.00		Brown very sandy GRAVEL.
BH102		B	5.30		Brown very gravelly SAND.
BH102		B	6.00		Dark brown gravelly sandy very silty CLAY.
BH103		B	1.00		Brown very gravelly very sandy very silty CLAY.
BH103		B	3.00		Brown very gravelly sandy very silty CLAY.
BH103		B	4.00		Brown sandy GRAVEL.
BH103		B	5.00		Dark brown sandy silty GRAVEL with cobbles.



Hickleys 43 Parkgate Place

Contract No:

PSL19/2698

Client Ref:

8507-02-19

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

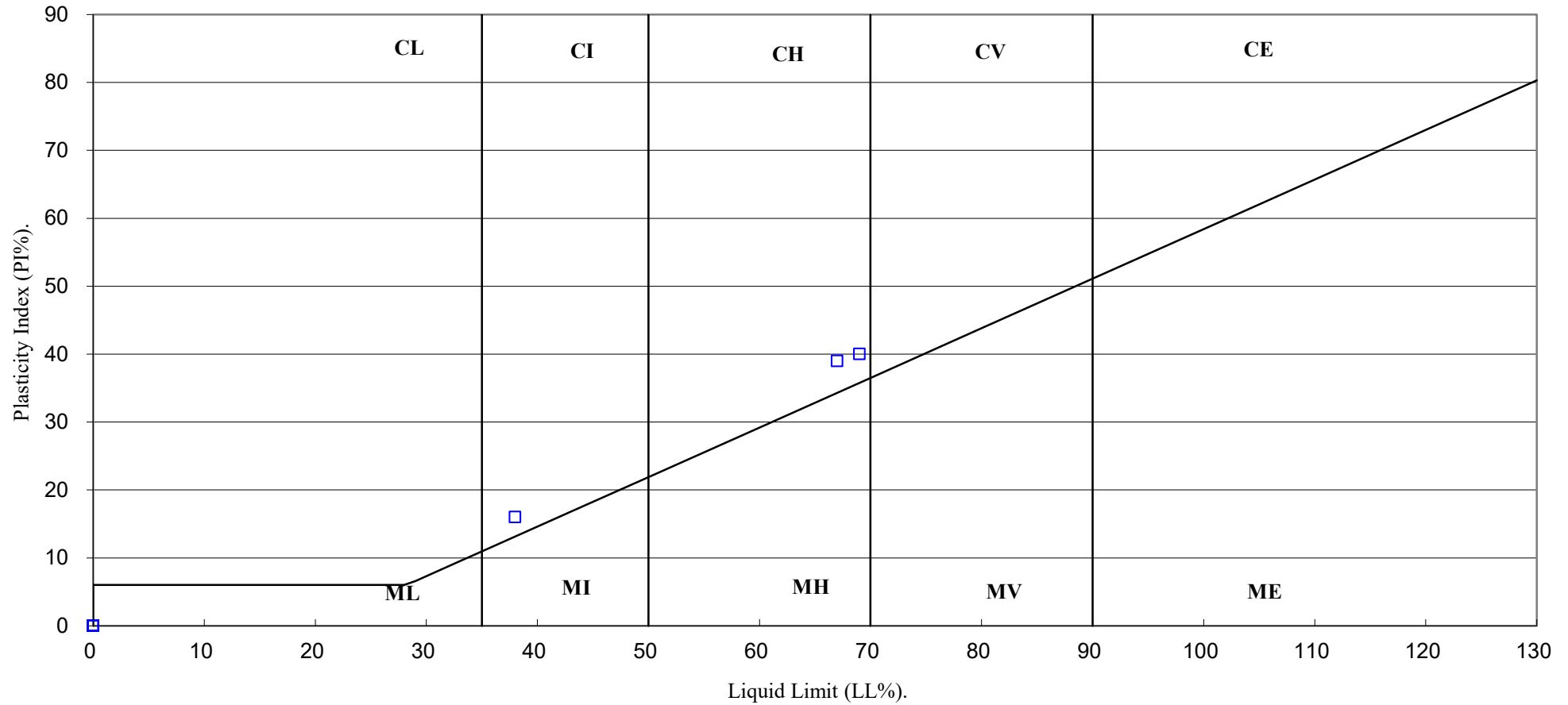
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % <small>Clause 3.2</small>	Linear Shrinkage % <small>Clause 6.5</small>	Particle Density Mg/m ³ <small>Clause 8.2</small>	Liquid Limit % <small>Clause 4.3/4</small>	Plastic Limit % <small>Clause 5.3</small>	Plasticity Index % <small>Clause 5.4</small>	Passing .425mm %	Remarks
BH101		B	2.00		36							
BH101		B	3.00		28		38	22	16	100		Intermediate plasticity CI.
BH102		B	2.00		17							
BH102		B	3.00		44							
BH102		B	6.00		45		69	29	40	75		High plasticity CH.
BH103		B	1.00		14							
BH103		B	3.00		38		67	28	39	71		High plasticity CH.
BH103		B	4.00		3.0				NP			
BH103		B	5.00		10				NP			

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

 4043		Hickleys 43 Parkgate Place	Contract No:
			PSL19/2698
			Client Ref:
			8507-02-19

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Hickleys 43 Parkgate Place

Contract No:

PSL19/2698

Client Ref:

8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

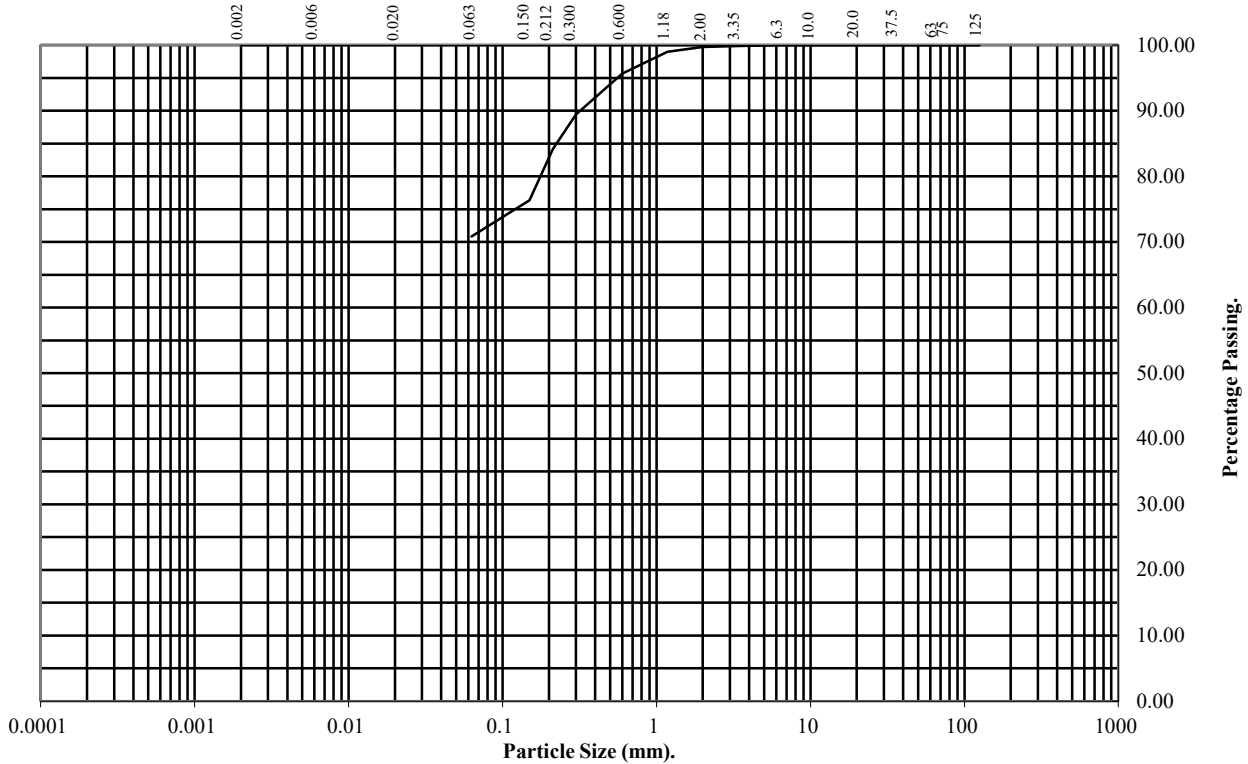
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH101** **Top Depth (m):** **3.00**

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

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	96
0.3	89
0.212	84
0.15	76
0.063	71

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	29
Silt/Clay	71

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

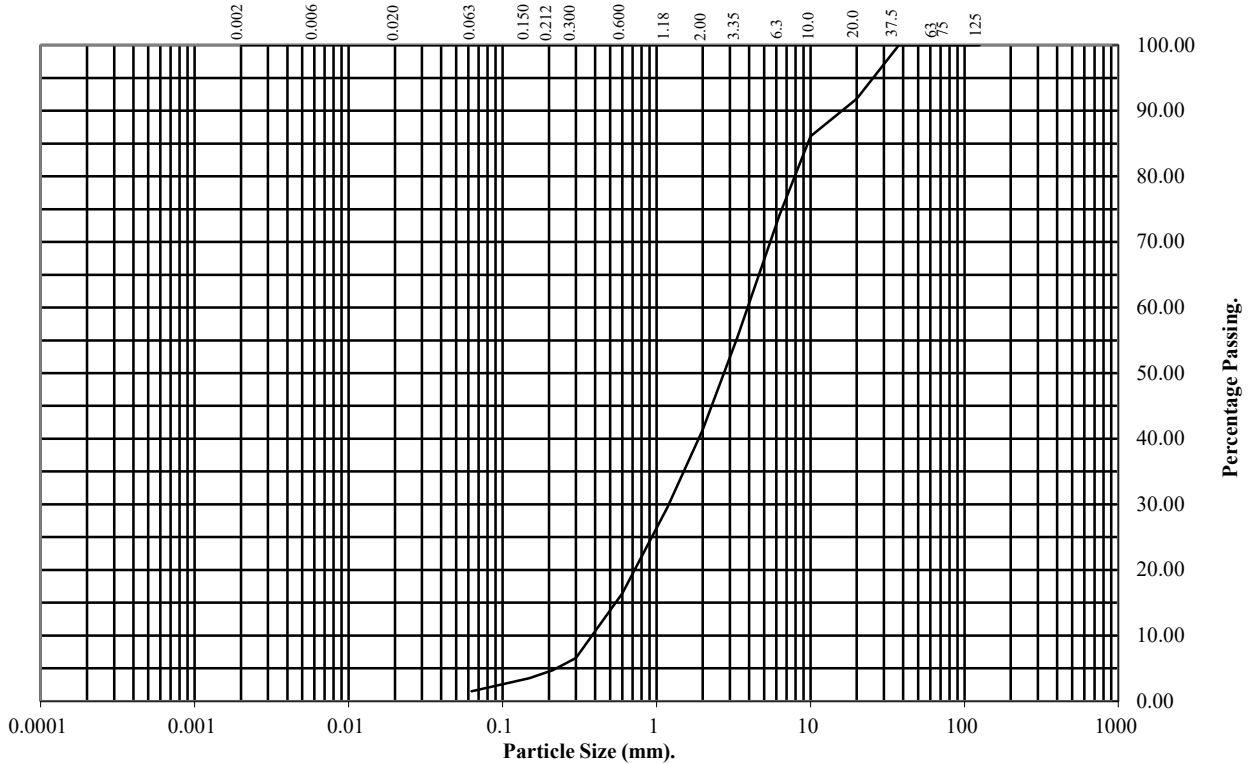
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH101** **Top Depth (m):** **4.00**

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

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	92
10	86
6.3	74
3.35	55
2	41
1.18	30
0.6	16
0.3	7
0.212	5
0.15	3
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	59
Sand	40
Silt/Clay	1

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

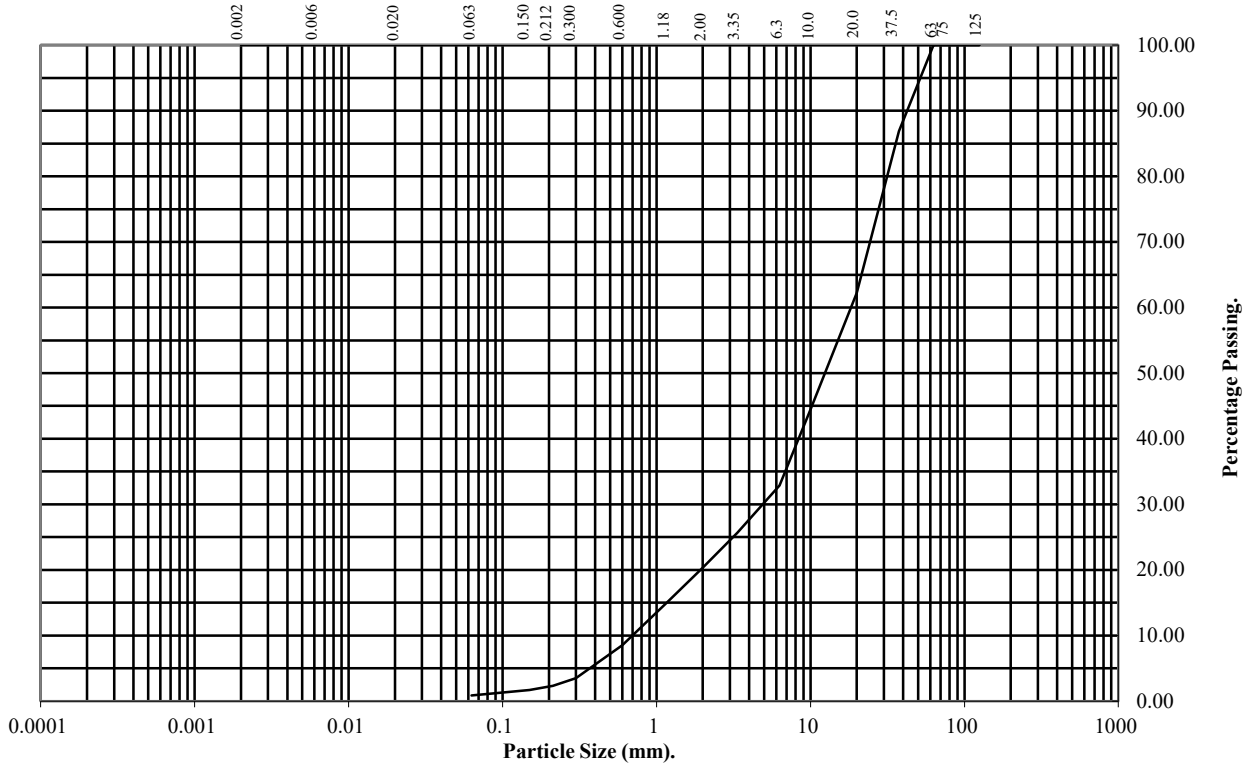
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH101** **Top Depth (m):** **5.00**

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

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	87
20	62
10	45
6.3	33
3.35	26
2	20
1.18	15
0.6	9
0.3	4
0.212	2
0.15	2
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	80
Sand	19
Silt/Clay	1

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

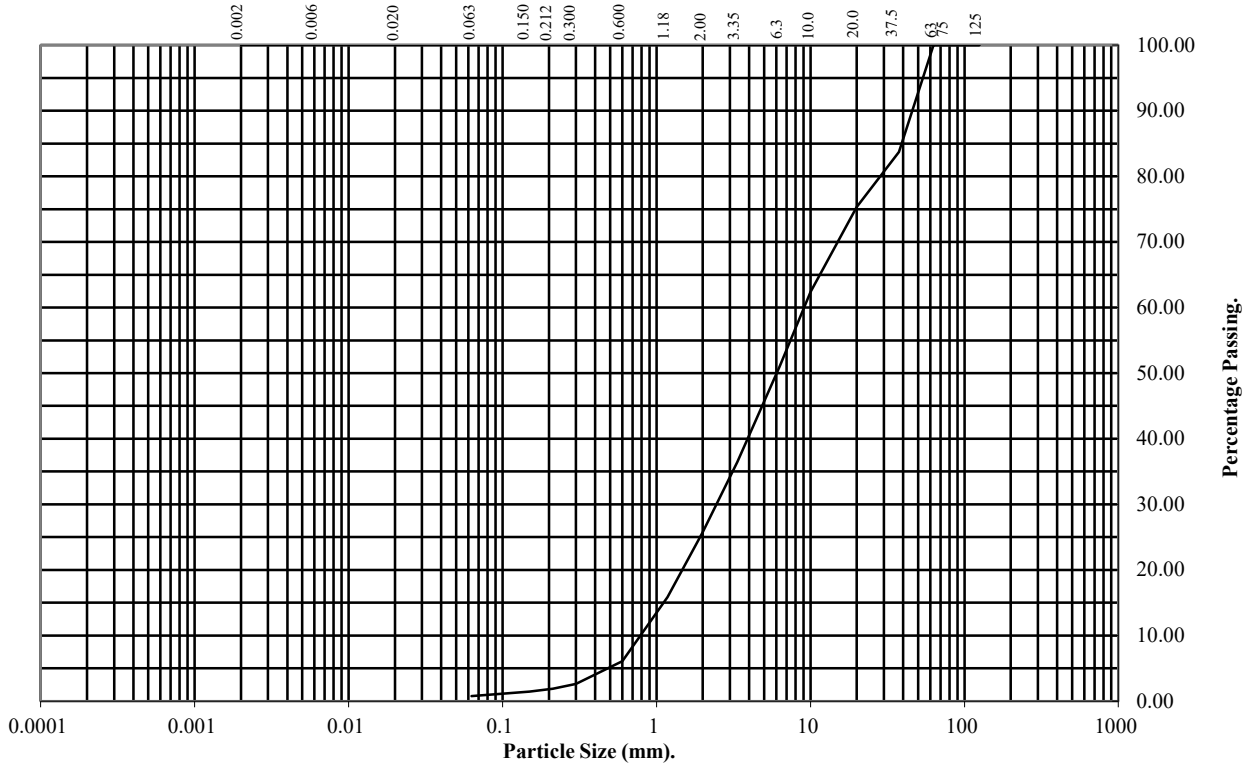
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH101** Top Depth (m): **7.00**

Sample Number: Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	84
20	75
10	62
6.3	51
3.35	36
2	26
1.18	16
0.6	6
0.3	3
0.212	2
0.15	1
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	74
Sand	25
Silt/Clay	1

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

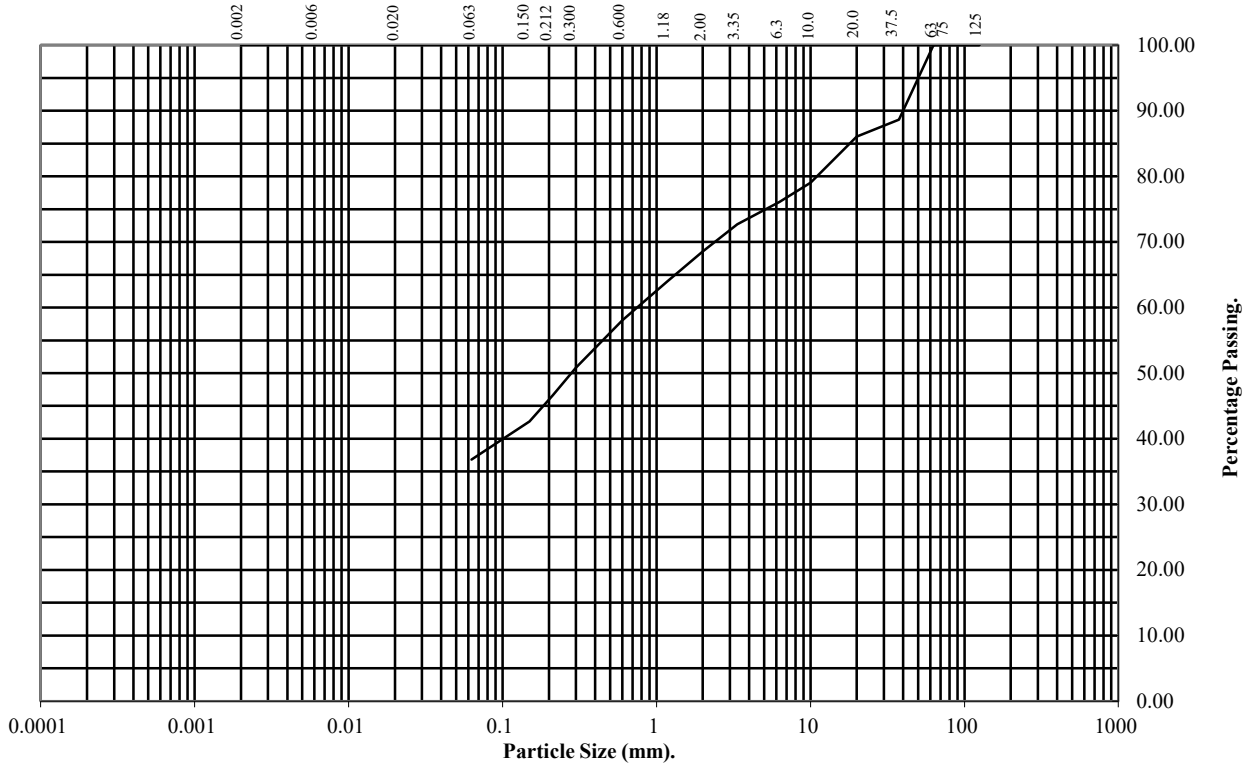
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH102** Top Depth (m): **2.00**

Sample Number: Base Depth(m):

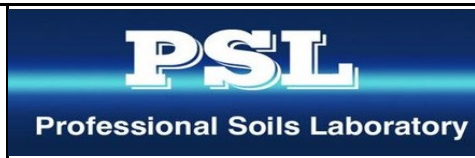
Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	89
20	86
10	79
6.3	76
3.35	73
2	69
1.18	64
0.6	58
0.3	51
0.212	47
0.15	43
0.063	37

Soil Fraction	Total Percentage
Cobbles	0
Gravel	31
Sand	32
Silt/Clay	37

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

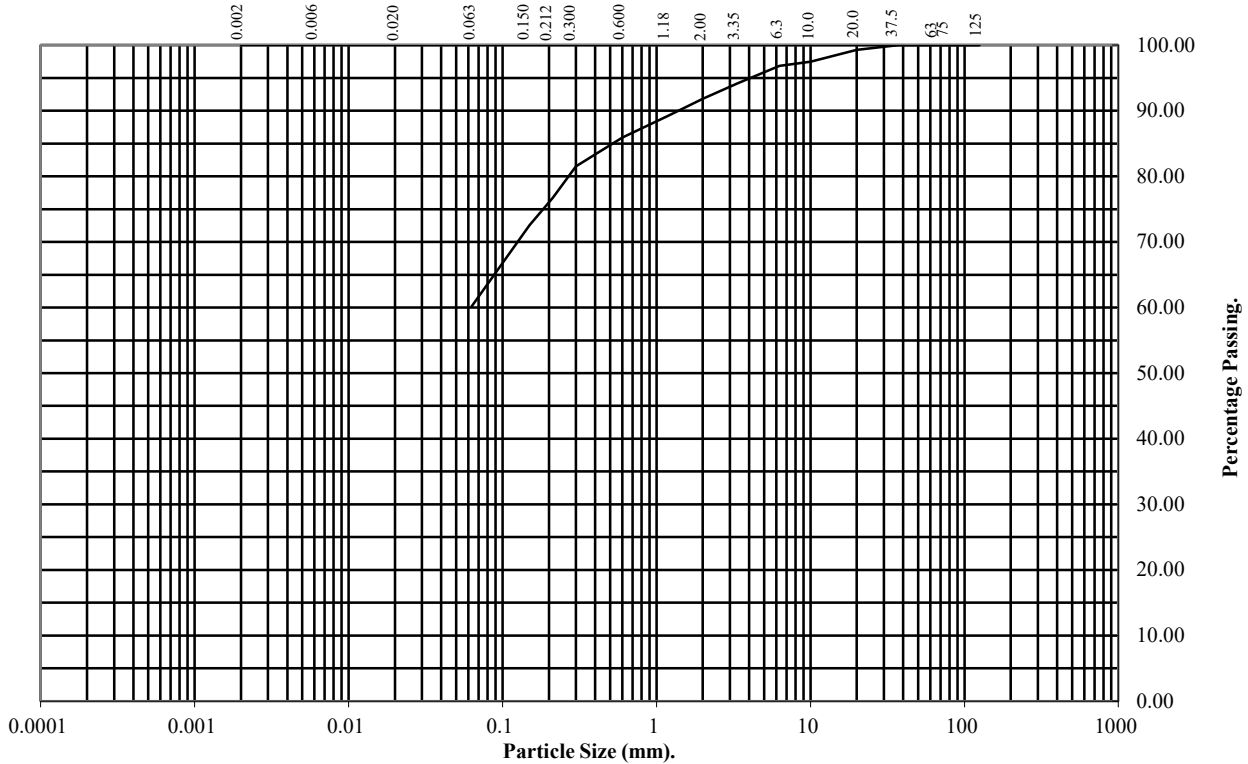
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH102** Top Depth (m): **3.00**

Sample Number: Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	97
6.3	97
3.35	94
2	92
1.18	89
0.6	86
0.3	82
0.212	77
0.15	73
0.063	60

Soil Fraction	Total Percentage
Cobbles	0
Gravel	8
Sand	32
Silt/Clay	60

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BH102

Top Depth (m):

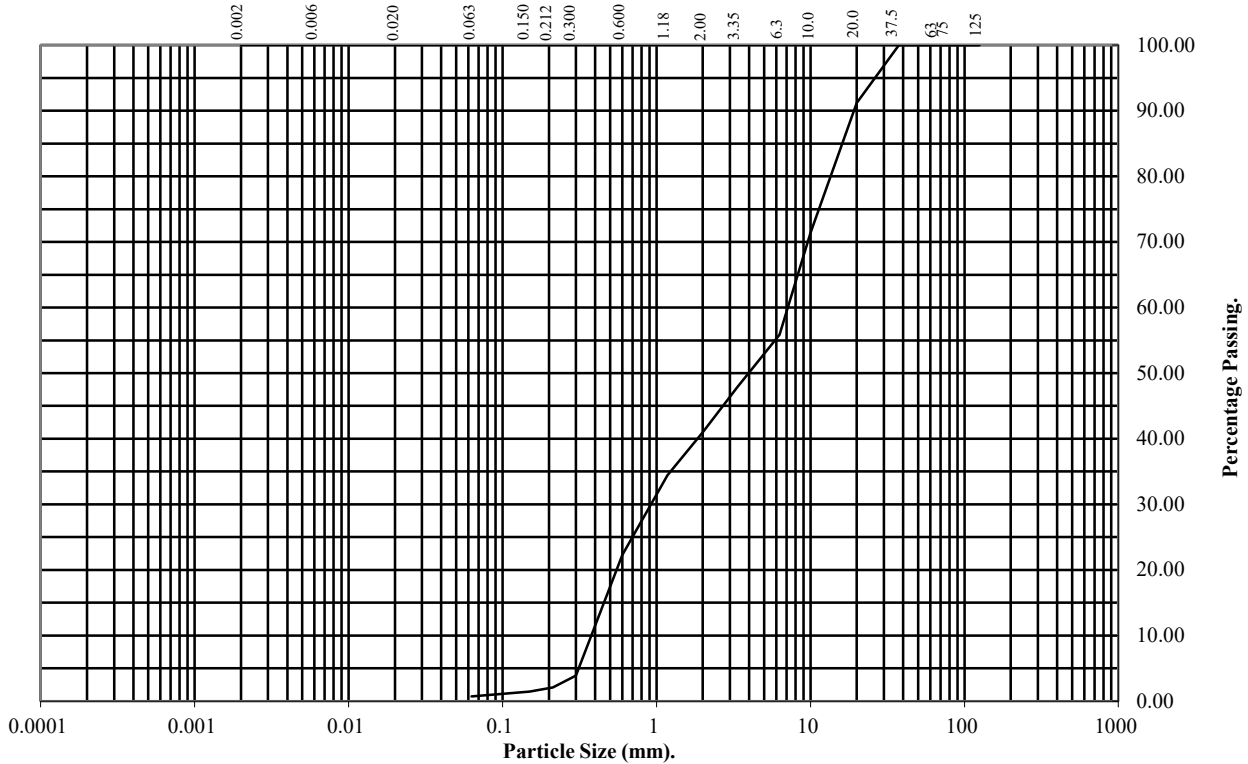
4.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	91
10	71
6.3	56
3.35	48
2	41
1.18	34
0.6	22
0.3	4
0.212	2
0.15	1
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	59
Sand	40
Silt/Clay	1

Remarks:

See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:

PSL19/2698

Client Ref:

8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

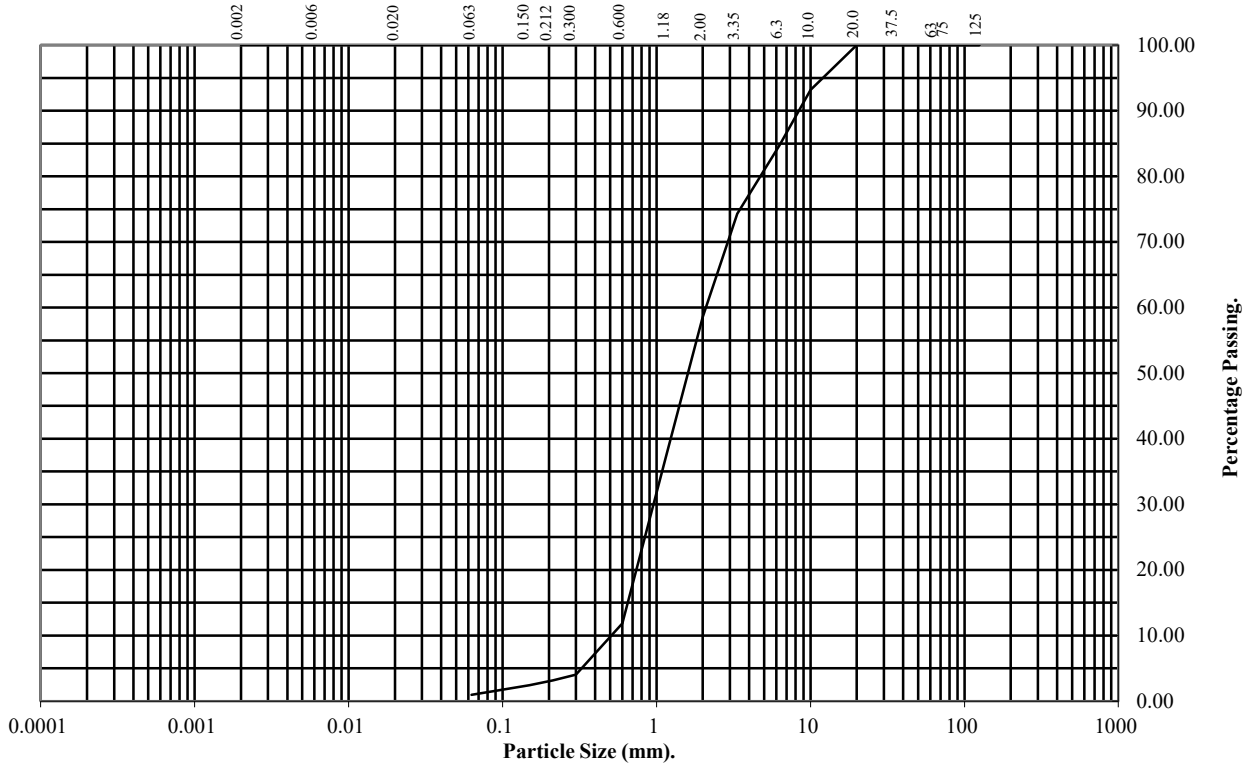
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH102** **Top Depth (m):** **5.30**

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

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	93
6.3	85
3.35	74
2	59
1.18	38
0.6	12
0.3	4
0.212	3
0.15	2
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	41
Sand	58
Silt/Clay	1

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

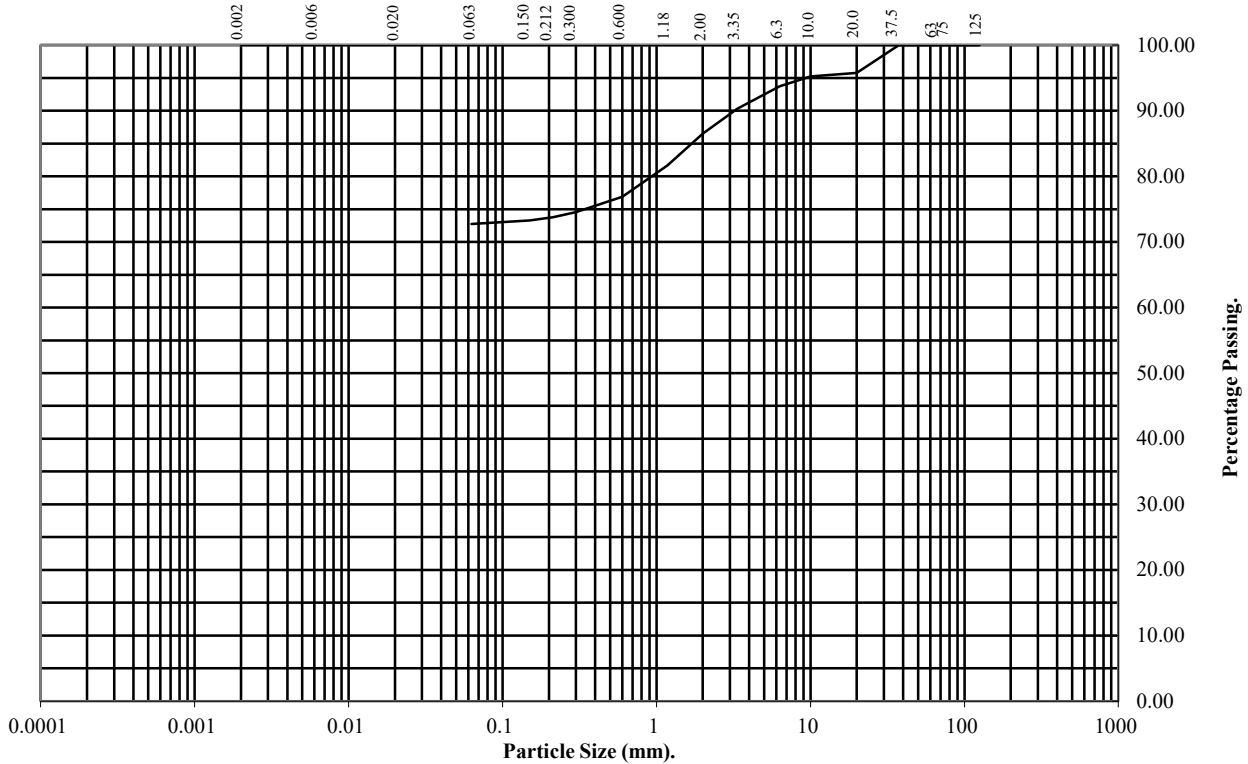
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH102** Top Depth (m): **6.00**

Sample Number: Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	96
10	95
6.3	94
3.35	90
2	86
1.18	82
0.6	77
0.3	75
0.212	74
0.15	73
0.063	73

Soil Fraction	Total Percentage
Cobbles	0
Gravel	14
Sand	13
Silt/Clay	73

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

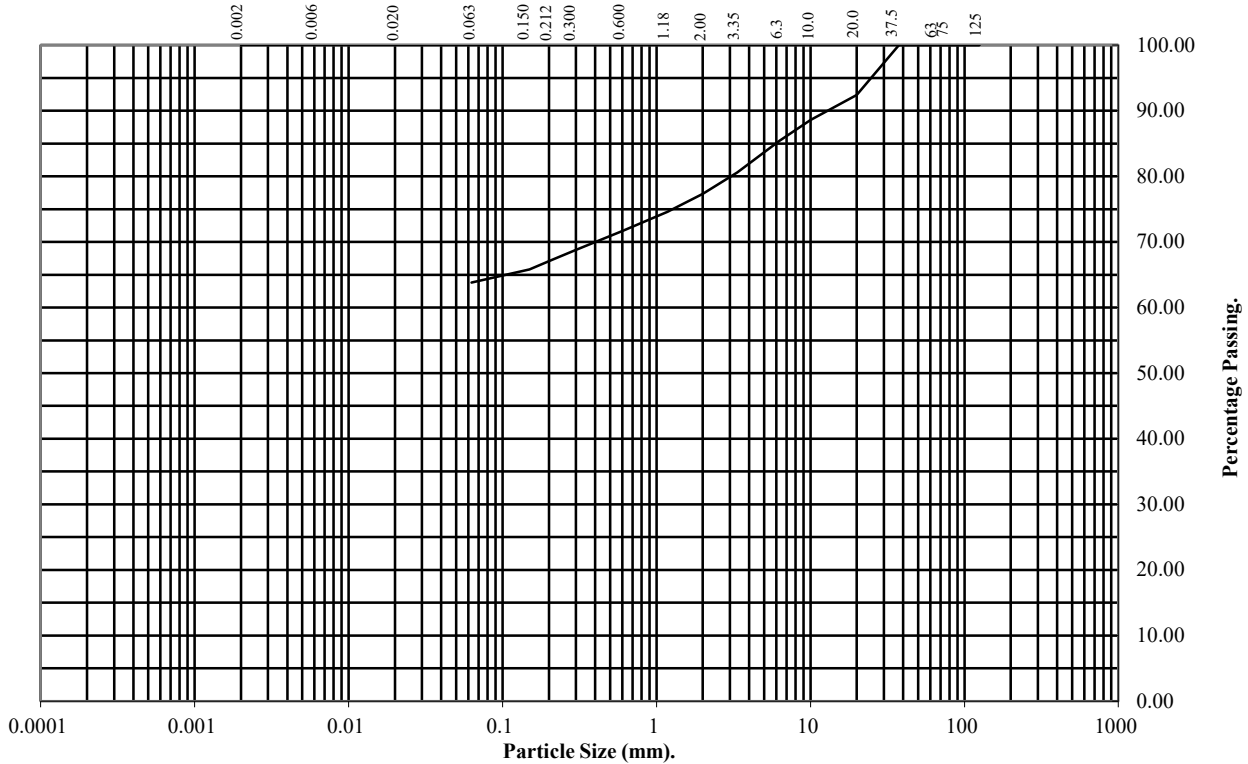
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH103** **Top Depth (m):** **3.00**

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

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	92
10	89
6.3	85
3.35	81
2	77
1.18	75
0.6	72
0.3	69
0.212	67
0.15	66
0.063	64

Soil Fraction	Total Percentage
Cobbles	0
Gravel	23
Sand	13
Silt/Clay	64

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

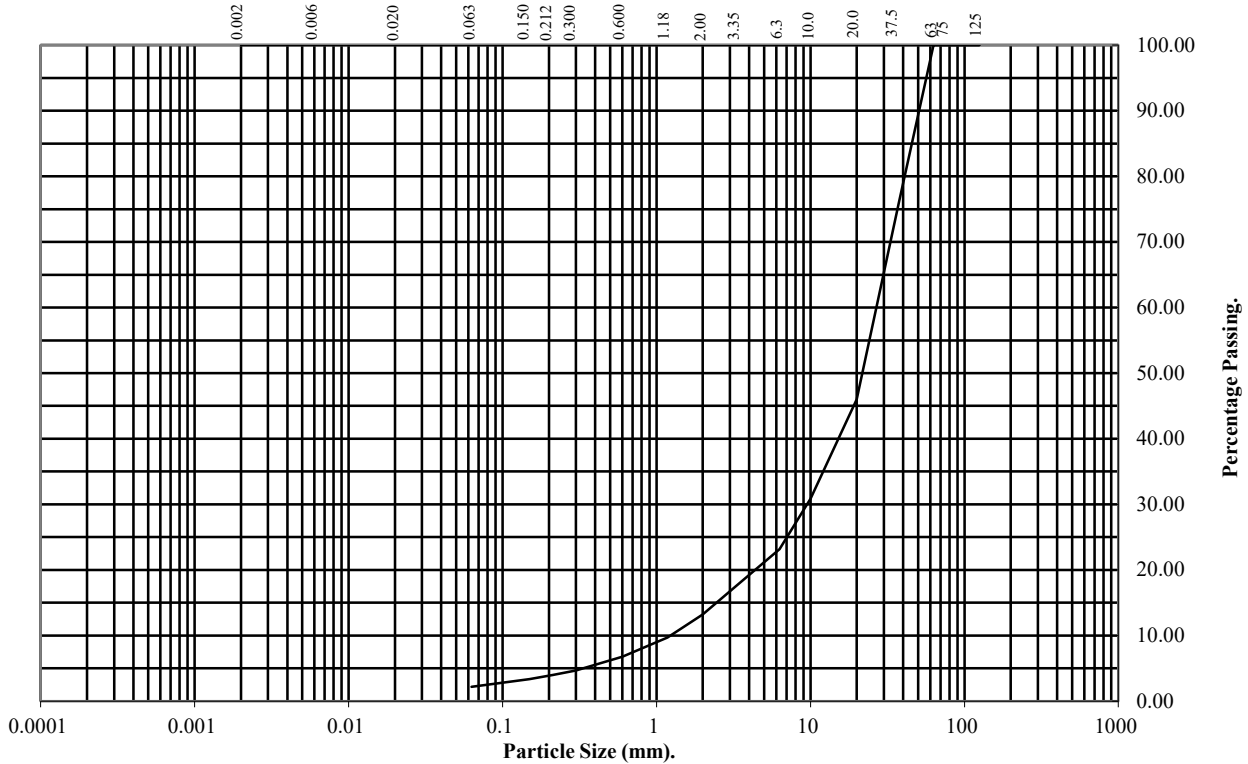
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH103** Top Depth (m): **4.00**

Sample Number: Base Depth(m):

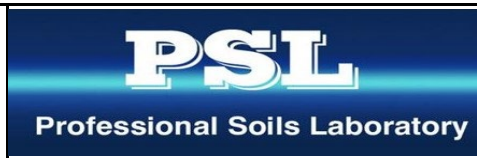
Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	76
20	46
10	31
6.3	23
3.35	18
2	13
1.18	10
0.6	7
0.3	5
0.212	4
0.15	3
0.063	2

Soil Fraction	Total Percentage
Cobbles	0
Gravel	87
Sand	11
Silt/Clay	2

Remarks:
See Summary of Soil Descriptions



Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

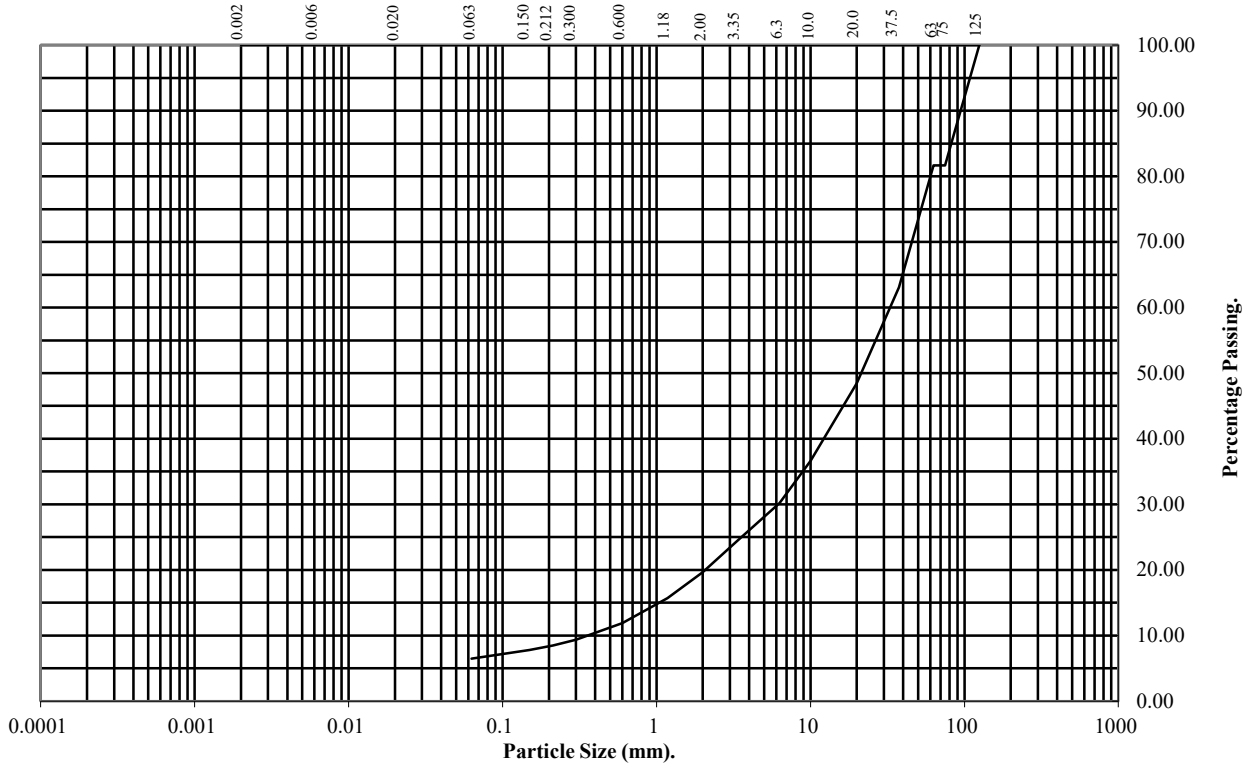
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH103** Top Depth (m): **5.00**

Sample Number: Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	82
63	82
37.5	63
20	48
10	37
6.3	30
3.35	24
2	20
1.18	16
0.6	12
0.3	9
0.212	8
0.15	8
0.063	6

Soil Fraction	Total Percentage
Cobbles	18
Gravel	62
Sand	14
Silt/Clay	6

Remarks:
See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

Hickleys 43 Parkgate Place

Contract No:
PSL19/2698
Client Ref:
8507-02-19



DETS

Certificate of Analysis

Certificate Number 19-08733

16-May-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-08733

Client Reference PSL19/2698

Order No (not supplied)

Contract Title Hickeys 43 Parkgate Place

Description 6 Soil samples.

Date Received 10-May-19

Date Started 10-May-19

Date Completed 16-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. 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 except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager





Summary of Chemical Analysis

Soil Samples

Our Ref 19-08733

Client Ref PSL19/2698

Contract Title Hickeys 43 Parkgate Place

Lab No	1499609	1499610	1499611	1499612	1499613	1499614
Sample ID	BH101	BH102	BH102	BH103	BH103	BH103
Depth	3.00	2.00	6.00	1.00	3.00	5.00
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Inorganics									
pH	DETSC 2008#					9.0	8.8		8.0
Organic matter	DETSC 2002#	0.1	%				0.5		
Chloride Aqueous Extract	DETSC 2055	1	mg/l	6.3	47	19	6.7	5.3	8.0
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	16	30	360	28	340	390

Information in Support of the Analytical Results

Our Ref 19-08733
 Client Ref PSL19/2698
 Contract Hickeys 43 Parkgate Place

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1499609	BH101 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days)	
1499610	BH102 2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days)	
1499611	BH102 6.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1499612	BH103 1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Organic Matter (Manual) (28 days), pH + Conductivity (7 days)	
1499613	BH103 3.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days)	
1499614	BH103 5.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



LABORATORY REPORT



4043

Contract Number: PSL19/2699

Report Date: 22 May 2019
Client's Reference: 19/02/8507
Client Name: Ground Investigations Ireland Ltd
Catherinestown House
Hazelhatch Road
Newcastle
Co Durham

For the attention of: Stephen Kealy

Contract Title: Hickeys 43 Parkgate Place
Date Received: 1/5/2019
Date Commenced: 1/5/2019
Date Completed: 22/5/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)

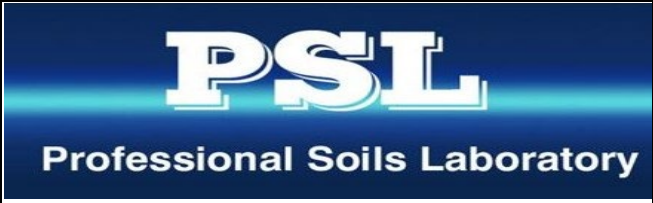
S Royle
(Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP101		B	1.00		Brown sandy clayey GRAVEL.
TP101		B	2.00		Brown gravelly very sandy CLAY.
TP101		B	2.50		Brown gravelly slightly clayey very silty SAND.
TP101		B	3.50		Brown very sandy slightly clayey silty GRAVEL.
TP102		B	2.50		Brown slightly gravelly sandy CLAY.



Hickeys 43 Parkgate Place

Contract No:
PSL19/2699
Client Ref:
8507-02-19



SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

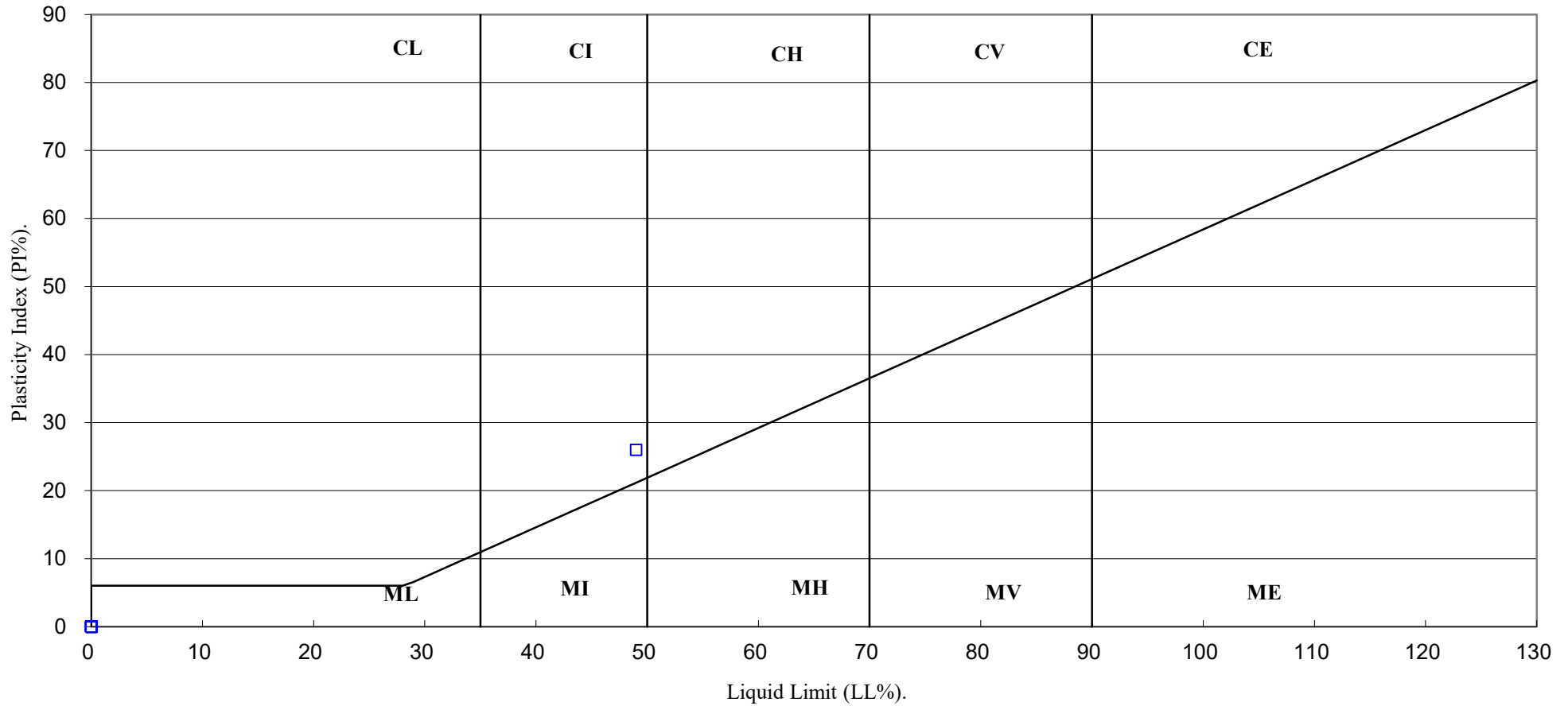
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % <small>Clause 3.2</small>	Linear Shrinkage % <small>Clause 6.5</small>	Particle Density Mg/m ³ <small>Clause 8.2</small>	Liquid Limit % <small>Clause 4.3/4</small>	Plastic Limit % <small>Clause 5.3</small>	Plasticity Index % <small>Clause 5.4</small>	Passing .425mm %	Remarks
TP101		B	1.00		17							
TP101		B	2.00		28							
TP101		B	2.50		25				NP			
TP102		B	2.50		32		49	23	26	96		Intermediate plasticity CI.

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

		Hickeys 43 Parkgate Place	Contract No:
			PSL19/2699
			Client Ref:
			8507-02-19

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Hickeys 43 Parkgate Place

Contract No:

PSL19/2699

Client Ref:

8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

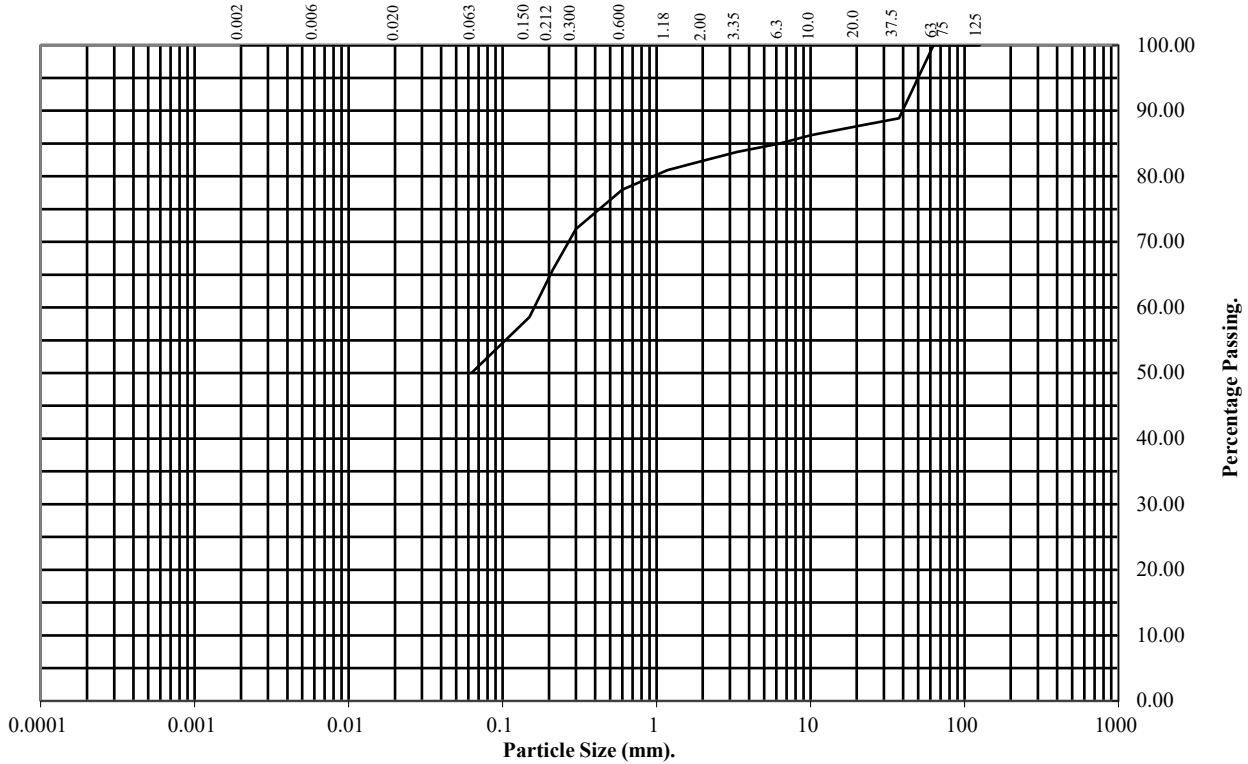
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **TP101** Top Depth (m): **2.00**

Sample Number: Base Depth(m):

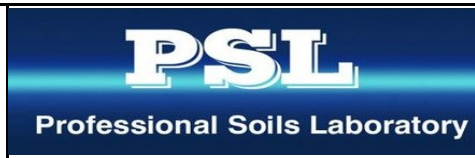
Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	89
20	88
10	86
6.3	85
3.35	84
2	82
1.18	81
0.6	78
0.3	72
0.212	66
0.15	59
0.063	50

Soil Fraction	Total Percentage
Cobbles	0
Gravel	18
Sand	32
Silt/Clay	50

Remarks:
See Summary of Soil Descriptions



Hickeys 43 Parkgate Place

Contract No:
PSL19/2699
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

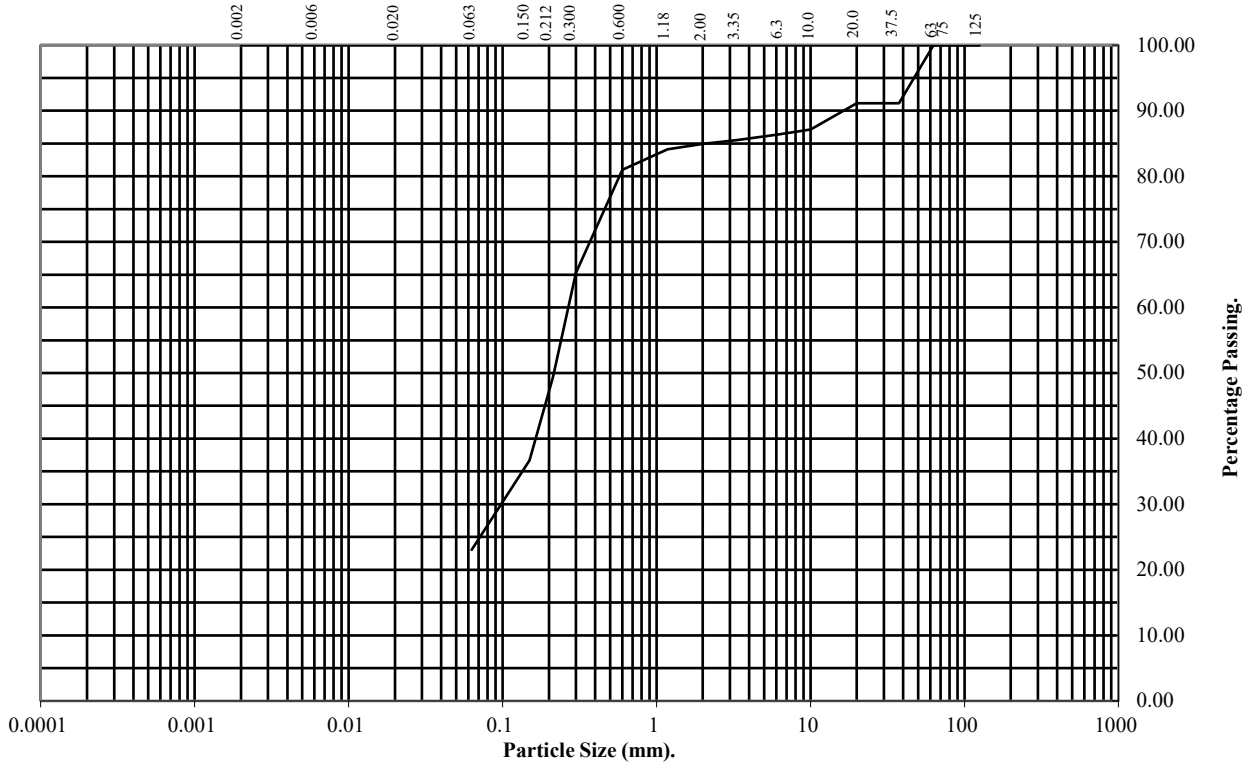
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP101 **Top Depth (m):** 2.50

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

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	91
20	91
10	87
6.3	86
3.35	86
2	85
1.18	84
0.6	81
0.3	65
0.212	49
0.15	37
0.063	23

Soil Fraction	Total Percentage
Cobbles	0
Gravel	15
Sand	62
Silt/Clay	23

Remarks:
See Summary of Soil Descriptions



Hickeys 43 Parkgate Place

Contract No:
PSL19/2699
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

TP101

Top Depth (m):

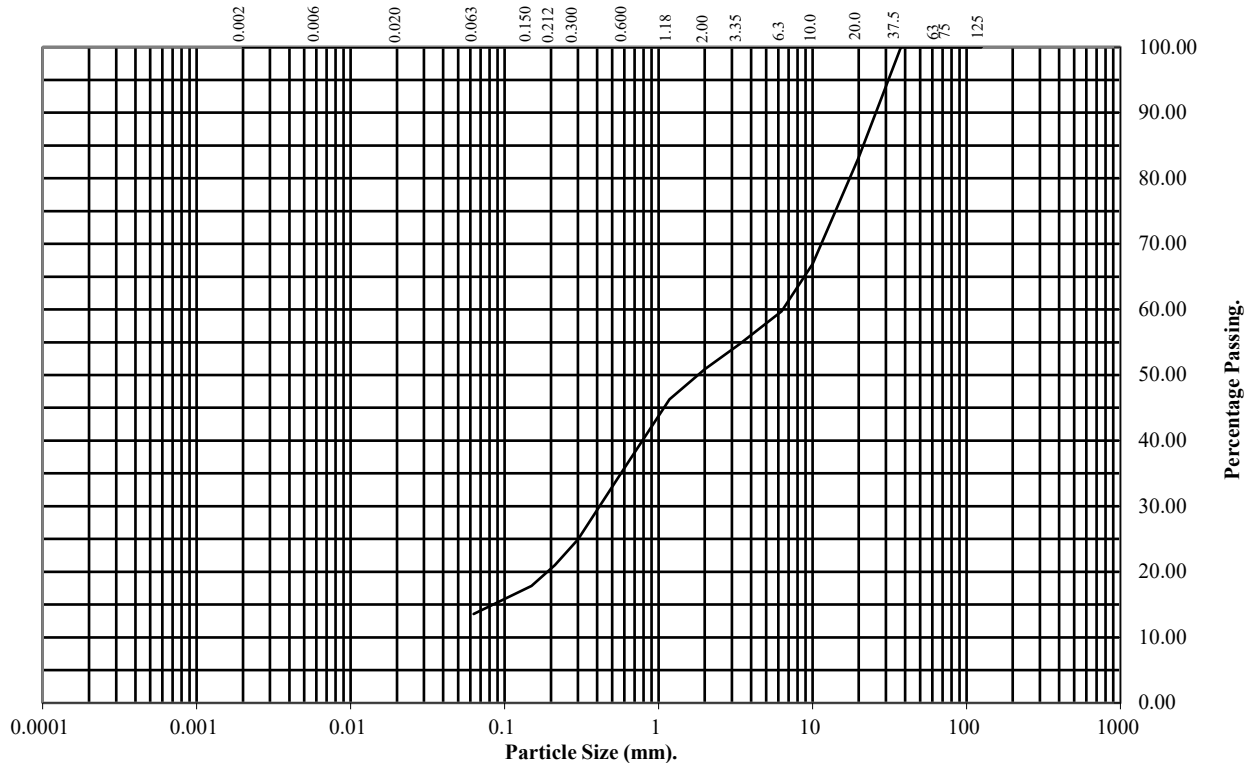
3.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	83
10	67
6.3	60
3.35	55
2	51
1.18	46
0.6	36
0.3	25
0.212	21
0.15	18
0.063	14

Soil Fraction	Total Percentage
Cobbles	0
Gravel	49
Sand	37
Silt/Clay	14

Remarks:
See Summary of Soil Descriptions

PSL
Professional Soils Laboratory

Hickeys 43 Parkgate Place

Contract No:
PSL19/2699
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

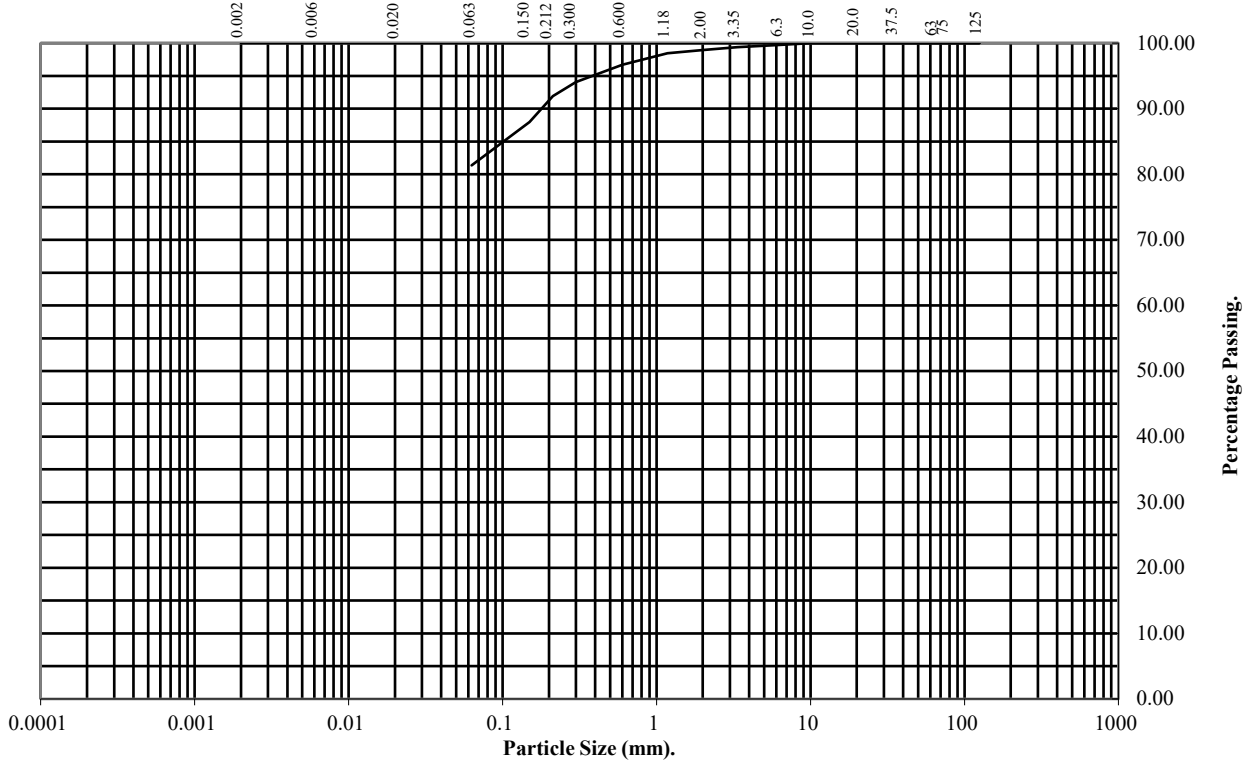
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **TP102** Top Depth (m): **2.50**

Sample Number: Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	98
0.6	97
0.3	94
0.212	92
0.15	88
0.063	81

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	18
Silt/Clay	81

Remarks:
See Summary of Soil Descriptions



Hickeys 43 Parkgate Place

Contract No:
PSL19/2699
Client Ref:
8507-02-19



DETS

Certificate of Analysis

Certificate Number 19-08343

10-May-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-08343

Client Reference PSL19/2699

Order No (not supplied)

Contract Title Hickeys 43 Parkgate Place

Description 3 Soil samples.

Date Received 07-May-19

Date Started 07-May-19

Date Completed 10-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. 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 except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-08343

Client Ref PSL19/2699

Contract Title Hickeys 43 Parkgate Place

Lab No	1497114	1497115	1497116
Sample ID	TP101	TP101	TP102
Depth	2.00	2.50	2.50
Other ID			
Sample Type	B	B	B
Sampling Date	02/05/19	02/05/19	02/05/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Inorganics						
pH	DETSC 2008#			8.5	8.3	8.1
Organic matter	DETSC 2002#	0.1	%			1.6
Chloride Aqueous Extract	DETSC 2055	1	mg/l	77	15	55
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	29	23	22

Information in Support of the Analytical Results

Our Ref 19-08343
 Client Ref PSL19/2699
 Contract Hickeys 43 Parkgate Place

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1497114	TP101 2.00 SOIL	02/05/19	PT 500ml		
1497115	TP101 2.50 SOIL	02/05/19	PT 500ml		
1497116	TP102 2.50 SOIL	02/05/19	PT 500ml		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



LABORATORY REPORT



4043

Contract Number: PSL19/2860

Report Date: 24 May 2019
Client's Reference: 19/02/8507
Client Name: Ground Investigations Ireland Ltd
Catherinestown House
Hazelhatch Road
Newcastle
Co Durham

For the attention of: Stephen Kealy

Contract Title: Hickeys 43 Parkgate Place
Date Received: 9/5/2019
Date Commenced: 9/5/2019
Date Completed: 24/5/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

R Gunson
(Director)

S Royle
(Laboratory Manager)

A Watkins
(Director)

S Eyre
(Senior Technician)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
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e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH104		B	3.00		Dark grey very gravelly silty SAND.
BH104		B	4.00		Dark grey very gravelly slightly clayey SAND.
BH104		B	5.00		Grey very gravelly sandy very silty CLAY.
BH104		B	6.00		Grey gravelly sandy very silty CLAY.
BH104		B	7.00		Brownish grey very sandy GRAVEL with cobbles.

 4043		Hickeys 43 Parkgate Place	Contract No:
			PSL19/2860
			Client Ref:
			8507-02-19

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
BH104		B	3.00		20							
BH104		B	4.00		17							
BH104		B	5.00		19							
BH104		B	6.00		35		54	27	27	81		High plasticity CH.

SYMBOLS : NP : Non Plastic

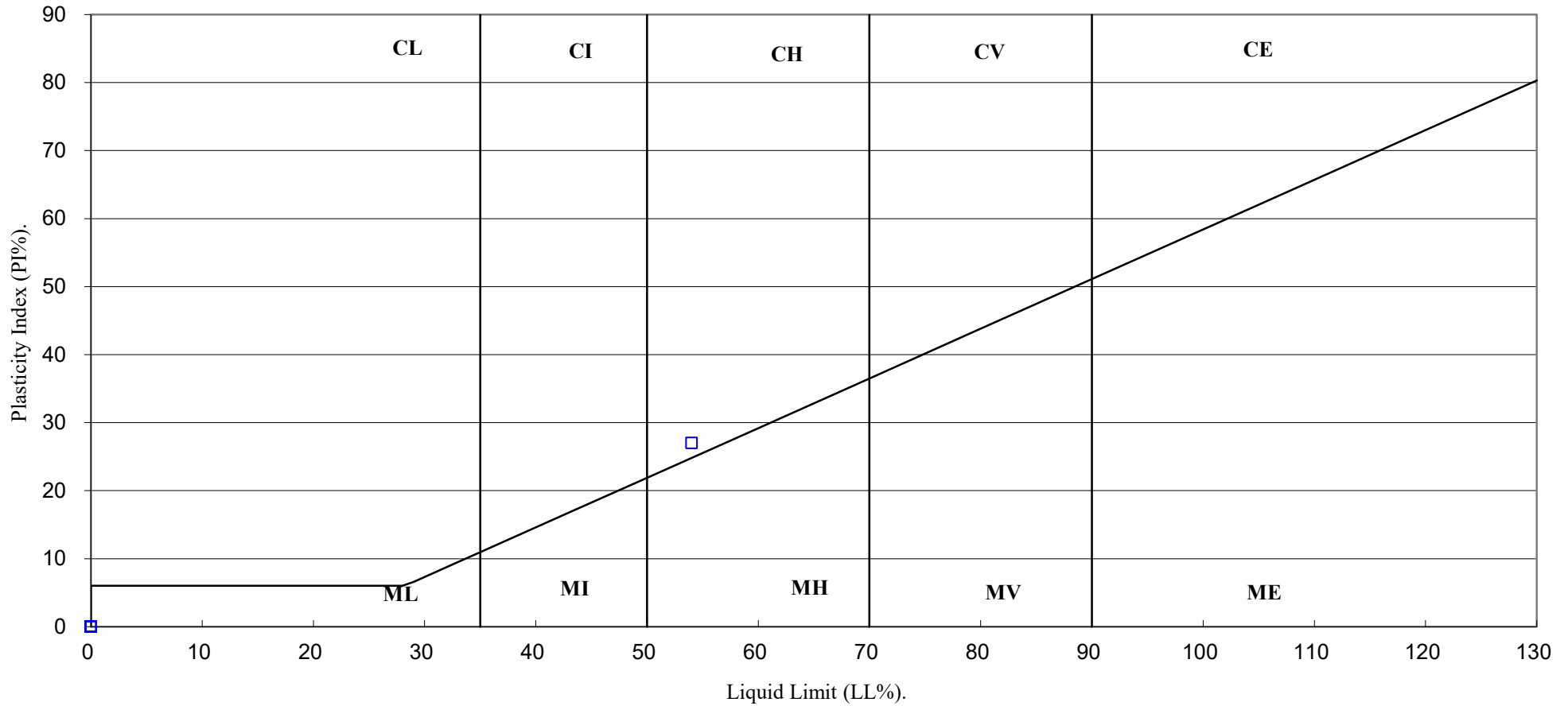
* : Liquid Limit and Plastic Limit Wet Sieved.



Hickeys 43 Parkgate Place

Contract No:
PSL19/2860
Client Ref:
8507-02-19

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Hickeys 43 Parkgate Place

Contract No:

PSL19/2860

Client Ref:

8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

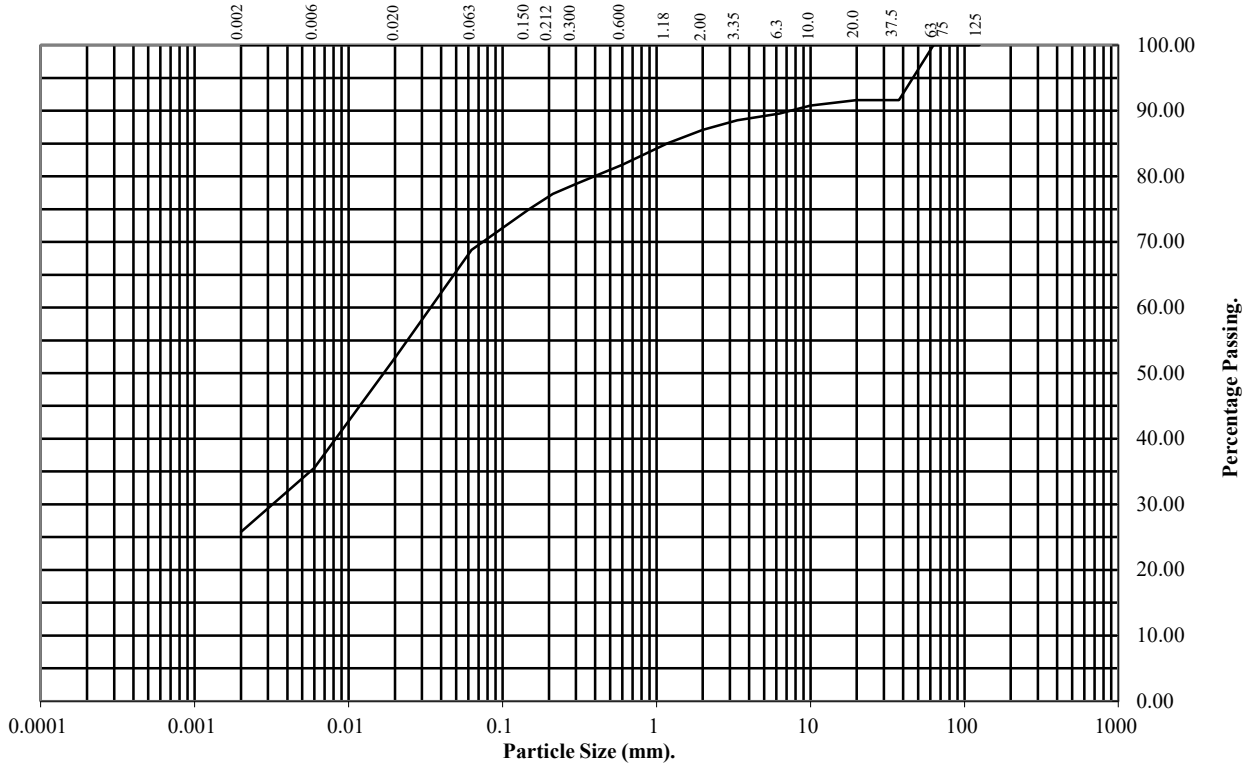
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: **BH104** Top Depth (m): **6.00**

Sample Number: Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	92
20	92
10	91
6.3	90
3.35	89
2	87
1.18	85
0.6	82
0.3	79
0.212	77
0.15	75
0.063	69

Particle Diameter	Percentage Passing
0.02	52
0.006	36
0.002	26

Soil Fraction	Total Percentage
Cobbles	0
Gravel	13
Sand	18
Silt	43
Clay	26

Remarks:
See Summary of Soil Descriptions



Hickeys 43 Parkgate Place

Contract No:
PSL19/2860
Client Ref:
8507-02-19

PARTICLE SIZE DISTRIBUTION TEST

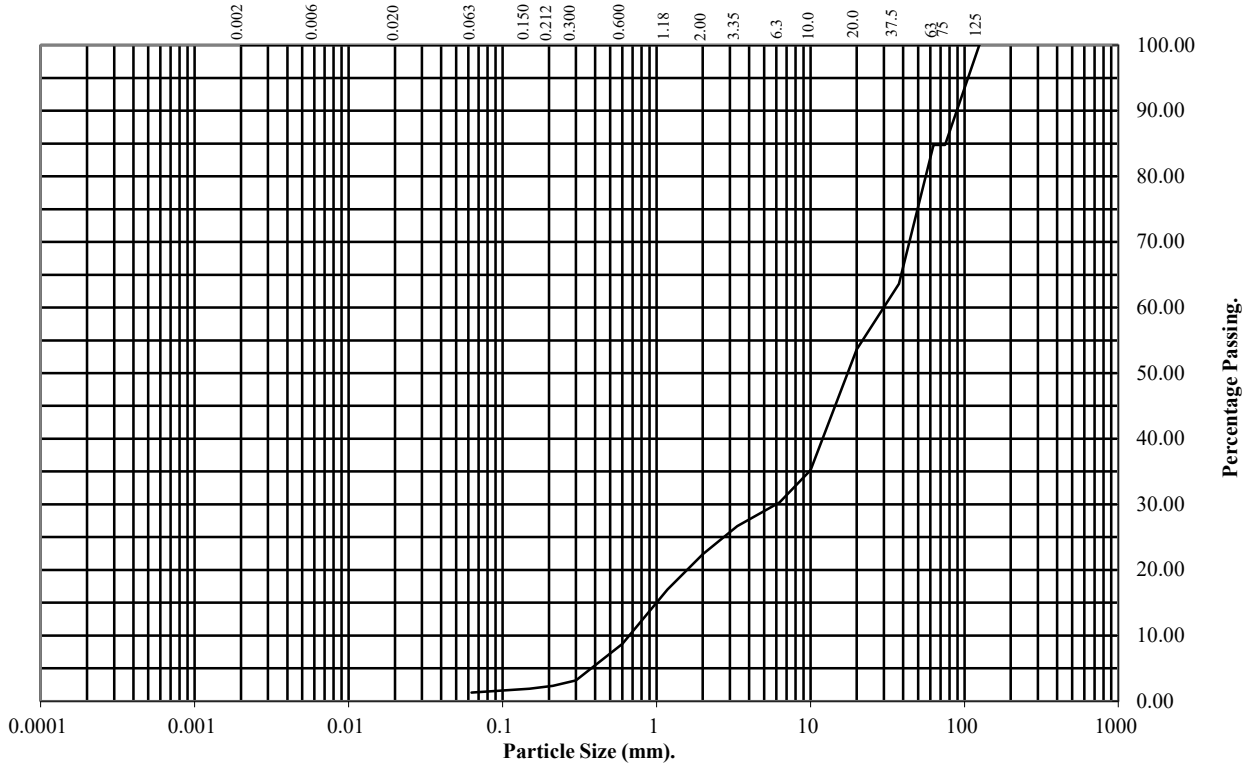
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **BH104** Top Depth (m): **7.00**

Sample Number: Base Depth(m):

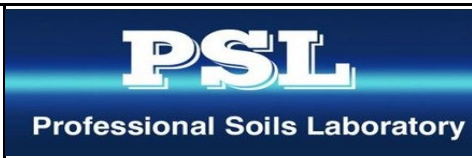
Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	85
63	85
37.5	64
20	54
10	35
6.3	30
3.35	27
2	22
1.18	17
0.6	9
0.3	3
0.212	2
0.15	2
0.063	1

Soil Fraction	Total Percentage
Cobbles	15
Gravel	63
Sand	21
Silt/Clay	1

Remarks:
See Summary of Soil Descriptions



Hickeys 43 Parkgate Place

Contract No:
PSL19/2860
Client Ref:
8507-02-19



Trinity College Dublin
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The University of Dublin

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Ground Investigations Ireland Ltd,
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Co. Dublin

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edunne@tcd.ie

Unconfined Compression Tests On Rock Cores

Project: Hickeys, 43 Parkgate Place
Project No: 8507 - 02 - 19
Delivery Date: 14.05.2019
Test Date: 16.05.2019

<i>Borehole Number</i>	<i>Depth (m)</i>	<i>Average Diameter (mm)</i>	<i>Height (mm)</i>	<i>Length/Dia. (Ratio)</i>	<i>Unconfined Compressive Strength (Mpa)</i>	<i>Density (Mg/m³)</i>
BH - 101	11.18 - 11.52	101.1	251.0	2.48	53.8	26.76
BH - 103	7.53 - 7.68	63.0	117.9	1.87	108.5	2.69
BH - 103	8.98 - 9.17	63.1	147.7	2.34	92.2	2.69
BH - 103	10.21 - 10.41	63.0	144.5	2.29	135.7	2.77
BH - 103	11.48 - 11.65	63.1	151.2	2.40	145.1	2.70
BH - 103	13.25 - 13.37	63.1	78.4	1.24	55.5	2.66
BH - 103	13.95 - 14.15	63.1	112.3	1.78	28.6	2.63
BH - 104	9.20 - 9.58	101.2	252.0	2.49	74.0	2.70
BH - 104	15.25 - 15.60	101.3	250.0	2.47	63.5	2.69

Prof. B. O'Kelly

Specimens prepared and tested in accordance with suggested method from
International Society for Rock Mechanics (ISRM), 1985



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edunne@tcd.ie

Unconfined Compression Tests On Rock Cores

Project: Hickeys, 43 Parkgate Place
Project No: 8507 - 02 - 19
Delivery Date: 23.05.2019
Test Date: 27.05.2019

<i>Borehole Number</i>	<i>Depth (m)</i>	<i>Average Diameter (mm)</i>	<i>Height (mm)</i>	<i>Length/Dia. (Ratio)</i>	<i>Unconfined Compressive Strength (Mpa)</i>	<i>Density (Mg/m³)</i>
BH - 102	6.92 - 7.05	63.1	120.0	1.90	154.5	2.70
BH - 102	9.46 - 9.58	63.1	87.2	1.38	87.0	2.69
BH - 102	9.75 - 9.85	63.1	107.3	1.70	68.3	2.72
BH - 102	12.25 - 12.45	63.1	153.9	2.44	40.4	2.66
BH - 102	13.35 - 13.50	63.0	129.9	2.06	153.2	2.77
BH - 102	15.00 - 15.33	63.0	153.9	2.44	143.2	2.69
BH - 105	12.66 - 12.98	63.1	78.4	1.24	55.5	2.66
BH - 105	15.00 - 15.26	63.1	112.3	1.78	28.6	2.63
BH - 105	16.07 - 16.39	101.2	252.0	2.49	74.0	2.70

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edunne@tcd.ie

Unconfined Compression Tests On Rock Cores

Project: Hickeys, 43 Parkgate Place
Project No: 8507 - 02 - 19
Delivery Date: 03.05.2019
Test Date: 10.05.2019

Borehole Number	Depth (m)	Average Diameter (mm)	Height (mm)	Length/Dia. (Ratio)	Unconfined Compressive Strength (Mpa)	Density (Mg/m ³)
BH - 106	9.53 - 9.70	101.3	144.8	1.43	94.5	2.67
BH - 106	10.30 - 10.60	101.3	247.0	2.44	67.9	2.71
BH - 107	7.50 - 7.90	101.2	136.6	1.35	120.4	2.67
BH - 107	9.30 - 9.50	101.2	146.2	1.45	62.9	2.76
BH - 107	11.30 - 11.50	101.3	189.0	1.87	68.3	2.71

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Point Load Index Tests (single diametral determination)

Project: Hickeys, 43 Parkgate Place
Project No: 8507 - 02 - 19
Delivery date: 14.05.2019
Test Date: 17.05.2019

Diametric samples Borehole No.	Depth (m)	Is(50) (Mpa)
BH - 101	8.67 - 8.80	2.13
BH - 101	9.30 - 9.40	1.06
BH - 101	10.39 - 10.48	0.78
BH - 101	11.52 - 11.66	3.16
BH - 103	6.54 - 6.70	4.98
BH - 103	7.68 - 7.73	6.14
BH - 103	7.80 - 7.90	1.67
BH - 103	8.20 - 8.30	3.24
BH - 103	8.37 - 8.48	2.20
BH - 103	8.77 - 8.98	4.85
BH - 103	9.25 - 9.32	1.03
BH - 103	10.08 - 10.21	4.74
BH - 103	10.75 - 10.92	5.12
BH - 103	11.70 - 11.78	2.51
BH - 103	12.75 - 12.82	0.33
BH - 103	13.69 - 13.81	1.20
BH - 104	8.48 - 8.59	2.37
BH - 104	9.00 - 9.12	3.62
BH - 104	10.45 - 10.52	1.62
BH - 104	11.43 - 11.59	1.42
BH - 104	12.50 - 12.60	1.14
BH - 104	12.65 - 12.80	3.38
BH - 104	14.87 - 15.10	4.32

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Point Load Index Tests (single diametral determination)

Project: Hickeys, 43 Parkgate Place
Project No: 8507 - 02 - 19
Delivery date: 23.05.2019
Test Date: 29.05.2019

Diametric samples Borehole No.	Depth (m)	Is(50) (Mpa)
BH - 102	6.80 - 6.92	5.04
BH - 102	7.30 - 7.35	5.17
BH - 102	8.02 - 8.20	3.37
BH - 102	8.30 - 8.38	3.90
BH - 102	9.39 - 9.46	3.82
BH - 102	10.00 - 10.13	3.67
BH - 102	11.25 - 11.38	4.21
BH - 102	11.72 - 11.95	4.22
BH - 102	12.45 - 12.53	2.39
BH - 102	12.73 - 12.80	0.58
BH - 102	13.95 - 14.05	2.43
BH - 102	14.90 - 15.00	2.96
BH - 105	11.83 - 11.94	3.81
BH - 105	13.10 - 13.24	3.30
BH - 105	14.05 - 14.13	5.66
BH - 105	14.23 - 14.50	5.02
BH - 105	15.93 - 16.05	3.66

Prof. Brendan O'Kelly

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Point Load Index Tests (single diametral determination)

Project: Hickeys, 43 Parkgate Place
Project No: 8507 - 02 - 19
Delivery date: 03.05.2019
Test Date: 10.05.2019

Diametric samples Borehole No.	Depth (m)	Is(50) (Mpa)
BH - 106	10.75 - 10.80	1.97
BH - 106	11.10 - 11.20	3.20
BH - 106	11.80 - 11.90	2.88
BH - 106	12.60 - 12.70	2.64
BH - 107	8.10 - 8.20	4.75
BH - 107	9.63 - 9.70	2.74
BH - 107	10.50 - 10.60	2.40
BH - 107	11.00 - 11.15	6.45

Prof. Brendan O'Kelly

Specimens prepared and tested in accordance with suggested method from
International Society for Rock Mechanics (ISRM), 1985



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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Catherinestown House
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Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



4225

Attention : Stephen Kealy
Date : 16th April, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/5381 Batch 1
Location : Hickeys 43 Parkgate Place
Date samples received : 2nd April, 2019
Status : Final report
Issue : 1

Twenty nine samples were received for analysis on 2nd April, 2019 of which twenty nine 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.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton
Project Manager

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Please see attached notes for all abbreviations and acronyms		
Sample ID	BH101	BH101	WS104	WS104	WS104	WS106	WS106	WS106	WS106	WS108			
Depth	0.50	1.00	0.50	1.50	2.50	0.50	1.00	2.20	2.80	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	30/03/2019	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	31/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
Antimony	44 ^{AA}	-	5	4	2	3	4	3	2	-	<1	mg/kg	TM30/PM15
Arsenic #	24.1	-	20.3	22.7	21.1	15.1	21.3	13.0	17.6	-	<0.5	mg/kg	TM30/PM15
Barium #	119	-	150	131	88	169	183	68	57	-	<1	mg/kg	TM30/PM15
Cadmium #	0.8	-	0.4	0.5	1.9	0.9	0.9	0.7	0.6	-	<0.1	mg/kg	TM30/PM15
Chromium #	47.9	-	62.2	57.5	71.2	51.4	45.8	70.5	51.7	-	<0.5	mg/kg	TM30/PM15
Copper #	188	-	31	37	11	82	72	43	10	-	<1	mg/kg	TM30/PM15
Lead #	301	-	197	211	31	366	414	58	28	-	<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	<0.1	0.2	<0.1	0.4	0.9	<0.1	<0.1	-	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.7	-	6.4	5.2	3.4	3.9	4.4	4.1	0.7	-	<0.1	mg/kg	TM30/PM15
Nickel #	26.5	-	53.9	48.3	41.8	32.1	45.1	35.0	30.0	-	<0.7	mg/kg	TM30/PM15
Selenium #	1	-	2	2	2	1	1	1	<1	-	<1	mg/kg	TM30/PM15
Zinc #	136	-	102	98	136	198	251	76	140	-	<5	mg/kg	TM30/PM15
Antimony	-	17	-	-	-	-	-	-	-	2	<1	mg/kg	TM30/PM62
Arsenic	-	43.1	-	-	-	-	-	-	-	14.2	<0.5	mg/kg	TM30/PM62
Barium	-	514	-	-	-	-	-	-	-	160	<1	mg/kg	TM30/PM62
Cadmium	-	0.2	-	-	-	-	-	-	-	0.9	<0.1	mg/kg	TM30/PM62
Chromium	-	58.4	-	-	-	-	-	-	-	13.1	<0.5	mg/kg	TM30/PM62
Copper	-	101	-	-	-	-	-	-	-	60	<1	mg/kg	TM30/PM62
Lead	-	290	-	-	-	-	-	-	-	83	<5	mg/kg	TM30/PM62
Mercury	-	0.7	-	-	-	-	-	-	-	<0.1	<0.1	mg/kg	TM30/PM62
Molybdenum	-	8.1	-	-	-	-	-	-	-	2.0	<0.1	mg/kg	TM30/PM62
Nickel	-	75.3	-	-	-	-	-	-	-	29.8	<0.7	mg/kg	TM30/PM62
Selenium	-	2	-	-	-	-	-	-	-	1	<1	mg/kg	TM30/PM62
Zinc	-	156	-	-	-	-	-	-	-	86	<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Please see attached notes for all abbreviations and acronyms		
Sample ID	BH101	BH101	WS104	WS104	WS104	WS106	WS106	WS106	WS106	WS108			
Depth	0.50	1.00	0.50	1.50	2.50	0.50	1.00	2.20	2.80	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	30/03/2019	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	31/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
PAH MS													
Naphthalene #	0.08	<0.40 _{AB}	0.25	0.08	<0.04	5.30	0.31	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.13	<0.30 _{AB}	<0.03	<0.03	<0.03	2.28	0.20	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.09	<0.50 _{AB}	<0.05	<0.05	<0.05	8.10	0.40	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	0.13	<0.40 _{AB}	<0.04	<0.04	<0.04	7.40	0.37	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.33	2.03 _{AB}	0.37	0.31	<0.03	42.47	3.21	<0.03	<0.03	0.16	<0.03	mg/kg	TM4/PM8
Anthracene #	0.44	<0.40 _{AB}	<0.04	<0.04	<0.04	8.10	0.64	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	1.77	1.90 _{AB}	0.13	0.10	<0.03	42.24	4.87	<0.03	<0.03	0.11	<0.03	mg/kg	TM4/PM8
Pyrene #	1.55	1.72 _{AB}	0.13	0.10	<0.03	36.57	4.42	<0.03	<0.03	0.08	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.84	1.48 _{AB}	0.15	0.13	<0.06	19.01	2.19	<0.06	<0.06	0.07	<0.06	mg/kg	TM4/PM8
Chrysene #	0.88	1.17 _{AB}	0.14	0.12	<0.02	20.94	2.98	<0.02	<0.02	0.06	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	1.54	1.84 _{AB}	0.21	0.18	<0.07	34.10	5.11	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.86	0.72 _{AB}	0.08	0.09	<0.04	17.27	2.65	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.48	0.56 _{AB}	0.09	0.07	<0.04	11.58	1.60	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.23	<0.40 _{AB}	<0.04	<0.04	<0.04	4.81	0.64	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.57	0.63 _{AB}	0.11	0.09	<0.04	11.62	1.70	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	0.11	<0.40 _{AB}	<0.04	<0.04	<0.04	2.33	0.29	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 17 Total	11.03	12.05 _{AB}	1.66	1.27	<0.64	274.12	31.58	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.11	1.32 _{AB}	0.15	0.13	<0.05	24.55	3.68	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.43	0.52 _{AB}	0.06	0.05	<0.02	9.55	1.43	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	96 _{AB}	96	95	96	106	97	92	92	97	<0	%	TM4/PM8
Mineral Oil (C10-C40)	146	33	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1 _{SV}	<0.1 _{SV}	<0.1 _{SV}	<0.1	<0.1	<0.1 _{SV}	<0.1 _{SV}	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1 _{SV}	<0.1 _{SV}	<0.1 _{SV}	<0.1	<0.1	<0.1 _{SV}	<0.1 _{SV}	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1 _{SV}	<0.1 _{SV}	<0.1 _{SV}	<0.1	0.1	0.4 _{SV}	<0.1 _{SV}	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	15	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	123	33	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	138	33	<19	<19	<19	<19	<19	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Please see attached notes for all abbreviations and acronyms		
Sample ID	BH101	BH101	WS104	WS104	WS104	WS106	WS106	WS106	WS106	WS108			
Depth	0.50	1.00	0.50	1.50	2.50	0.50	1.00	2.20	2.80	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	30/03/2019	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	31/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	3.7	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TMS/PM8/PM16
>EC12-EC16 #	<4	9	<4	<4	<4	37	<4	<4	<4	<4	<4	mg/kg	TMS/PM8/PM16
>EC16-EC21 #	<7	27	<7	<7	<7	136	23	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	86	115	<7	<7	<7	358	114	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-35 #	86	151	<19	<19	<19	535	137	<19	<19	<19	<19	mg/kg	TMS/PM8/PM16/PM12/PM15
Total aliphatics and aromatics(C5-35)	224	184	<38	<38	<38	535	137	<38	<38	<38	<38	mg/kg	TMS/PM8/PM16/PM12/PM15
MTBE #	<5	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	10	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	14.8	22.0	18.6	15.4	34.1	19.4	27.8	25.1	31.5	17.4	<0.1	%	PM4/PM0
% Dry Matter 105°C	89.5	83.1	81.6	82.4	75.0	81.4	68.3	78.1	79.3	84.3	<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	47.9	-	62.2	57.5	71.2	51.4	45.8	70.5	51.7	-	<0.5	mg/kg	NONE/NONE
Chromium III	-	58.4	-	-	-	-	-	-	-	13.1	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	1.26	NDP	10.83	13.27	1.03	4.43	11.12	4.68	0.52	NDP	<0.02	%	TM21/PM24
Loss on Ignition #	4.3	NDP	8.3	9.2	4.2	4.4	7.0	4.3	2.9	NDP	<1.0	%	TM22/PM0
pH #	10.44	8.67	8.33	8.28	8.08	8.57	8.37	8.50	8.26	9.43	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1011	0.1083	0.1102	0.1095	0.1202	0.1103	0.1316	0.1151	0.1138	0.1071		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS108	WS108	WS108	WS113	WS113	WS113	WS113	WS114	WS114	WS114			
Depth	1.50	2.50	3.50	1.20	1.70	2.30	2.60	0.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
Antimony	3	2	2	2	2	3	2	-	4	3	<1	mg/kg	TM30/PM15
Arsenic #	15.2	10.5	19.2	11.8	7.3	13.9	19.2	-	13.8	14.8	<0.5	mg/kg	TM30/PM15
Barium #	104	88	111	85	64	87	107	-	121	93	<1	mg/kg	TM30/PM15
Cadmium #	2.2	1.7	1.8	0.5	0.3	2.4	1.8	-	0.6	1.7	<0.1	mg/kg	TM30/PM15
Chromium #	55.9	42.8	63.0	111.8	113.4	51.4	75.3	-	90.0	57.3	<0.5	mg/kg	TM30/PM15
Copper #	36	22	27	21	43	35	10	-	534 ^{AA}	43	<1	mg/kg	TM30/PM15
Lead #	47	27	61	131	54	47	27	-	385	64	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	0.2	<0.1	mg/kg	TM30/PM15
Molybdenum #	7.3	4.6	4.7	5.3	7.3	6.8	5.0	-	7.8	5.5	<0.1	mg/kg	TM30/PM15
Nickel #	47.9	35.2	43.5	28.3	21.1	48.1	37.8	-	47.8	44.8	<0.7	mg/kg	TM30/PM15
Selenium #	2	1	2	<1	<1	2	1	-	1	2	<1	mg/kg	TM30/PM15
Zinc #	104	84	142	56	111	104	134	-	153	103	<5	mg/kg	TM30/PM15
Antimony	-	-	-	-	-	-	-	11	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	-	-	-	-	-	9.3	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	-	-	-	-	-	186	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	-	-	-	-	-	0.6	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	-	-	-	-	36.1	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	-	-	-	-	25	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	-	-	-	-	111	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	-	-	-	-	<0.1	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	-	-	-	-	1.2	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	-	-	-	-	36.3	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	-	-	-	-	<1	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	-	-	-	-	101	-	-	<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS108	WS108	WS108	WS113	WS113	WS113	WS113	WS114	WS114	WS114			
Depth	1.50	2.50	3.50	1.20	1.70	2.30	2.60	0.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	0.24	<0.04	<0.04	0.05	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.19	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.13	<0.03	0.38	0.25	<0.03	1.95	0.18	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.53	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	0.06	<0.03	<0.03	2.79	0.07	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	1.97	0.09	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	0.08	<0.06	<0.06	1.33	0.14	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.06	<0.02	0.08	<0.02	<0.02	1.31	0.14	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2.20	0.22	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	1.00	0.07	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.64	0.09	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.27	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.64	0.10	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.09	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	0.88	<0.64	<0.64	15.19	1.17	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.58	0.16	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.62	0.06	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96	87	91	94	95	97	96	93	94	104	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	283	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	5	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	36	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	203	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19	<19	<19	<19	<19	<19	244	<19	<19	<19	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS108	WS108	WS108	WS113	WS113	WS113	WS113	WS114	WS114	WS114			
Depth	1.50	2.50	3.50	1.20	1.70	2.30	2.60	0.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TMS/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TMS/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	<7	68	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-35 #	<19	<19	<19	<19	<19	<19	<19	68	<19	<19	<19	mg/kg	TMS/PM8/PM16/PM12/PM10
Total aliphatics and aromatics(C5-35)	<38	<38	<38	<38	<38	<38	<38	312	<38	<38	<38	mg/kg	TMS/PM8/PM16/PM12/PM10
MTBE #	<5	<5	<5 ^{SV}	<5	<5 ^{SV}	<5	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5 ^{SV}	<5	<5 ^{SV}	<5	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5 ^{SV}	15	<5 ^{SV}	<5	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5 ^{SV}	<5	<5 ^{SV}	<5	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5 ^{SV}	25	<5 ^{SV}	<5	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5 ^{SV}	15	<5 ^{SV}	<5	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	15.8	14.5	48.7	21.1	12.3	18.9	36.0	5.3	23.1	26.2	<0.1	%	PM4/PM0
% Dry Matter 105°C	84.9	85.4	75.6	82.1	89.9	84.1	77.3	94.7	82.2	79.6	<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	55.9	42.8	63.0	111.8	113.4	51.4	75.3	-	90.0	57.3	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	-	-	-	-	36.1	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	1.54	0.62	3.59	0.51	3.09	1.06	0.65	NDP	9.57	2.39	<0.02	%	TM21/PM24
Loss on Ignition #	3.8	2.2	9.4	3.9	4.9	3.1	3.3	NDP	8.9	4.9	<1.0	%	TM22/PM0
pH #	8.35	8.77	7.92	9.42	7.76	8.76	8.62	9.67	8.38	8.62	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1057	0.1055	0.1186	0.1101	0.1005	0.1068	0.1162	0.0953	0.1097	0.1131		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	61-63	64-66	67-69	70-72	73-75	76-78	79-81	82-84	85-87			
Sample ID	WS114	WS115	WS115	WS115	WS117	WS117	WS117	WS117	WS117			
Depth	2.60	0.50	1.50	2.50	0.50	1.50	2.50	3.50	4.00			
COC No / misc												
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1			
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019			
										LOD/LOR	Units	Method No.
Antimony	3	2	2	-	-	2	3	2	2	<1	mg/kg	TM30/PM15
Arsenic #	23.8	11.8	12.1	-	-	8.2	10.6	20.8	12.9	<0.5	mg/kg	TM30/PM15
Barium #	122	89	140	-	-	64	61	148	28	<1	mg/kg	TM30/PM15
Cadmium #	2.1	1.9	2.4	-	-	1.1	1.9	2.2	0.8	<0.1	mg/kg	TM30/PM15
Chromium #	85.1	47.7	42.1	-	-	58.0	49.7	65.1	85.0	<0.5	mg/kg	TM30/PM15
Copper #	19	28	31	-	-	15	27	17	8	<1	mg/kg	TM30/PM15
Lead #	51	24	21	-	-	31	25	43	14	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	6.4	6.5	6.7	-	-	5.2	5.7	5.0	6.2	<0.1	mg/kg	TM30/PM15
Nickel #	45.1	41.1	50.0	-	-	24.7	38.8	54.4	21.1	<0.7	mg/kg	TM30/PM15
Selenium #	2	9	4	-	-	1	3	2	1	<1	mg/kg	TM30/PM15
Zinc #	159	90	98	-	-	62	76	178	60	<5	mg/kg	TM30/PM15
Antimony	-	-	-	2	2	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	-	11.5	8.3	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	-	91	56	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	-	2.0	1.1	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	18.0	10.8	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	29	29	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	22	34	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	<0.1	<0.1	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	2.9	1.9	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	40.6	23.8	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	2	<1	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	106	61	-	-	-	-	<5	mg/kg	TM30/PM62

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	61-63	64-66	67-69	70-72	73-75	76-78	79-81	82-84	85-87			
Sample ID	WS114	WS115	WS115	WS115	WS117	WS117	WS117	WS117	WS117			
Depth	2.60	0.50	1.50	2.50	0.50	1.50	2.50	3.50	4.00			
COC No / misc												
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1			
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019			
										LOD/LOR	Units	Method No.
PAH MS												
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	96	94	89	97	94	94	94	92	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG												
Aliphatics												
>C5-C6 #	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : Solid

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

J E Sample No.	61-63	64-66	67-69	70-72	73-75	76-78	79-81	82-84	85-87			
Sample ID	WS114	WS115	WS115	WS115	WS117	WS117	WS117	WS117	WS117			
Depth	2.60	0.50	1.50	2.50	0.50	1.50	2.50	3.50	4.00			
COC No / misc												
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1			
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019			
										LOD/LOR	Units	Method No.
TPH CWG												
Aromatics												
>C5-EC7 #	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TMS/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TMS/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-35 #	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	mg/kg	TMS/PM8/PM16/PM12/PM15
Total aliphatics and aromatics(C5-35)	<38	<38	<38	<38	<38	<38	<38	<38	<38	<38	mg/kg	TMS/PM8/PM16/PM12/PM15
MTBE #	<5	<5 ^{SV}	<5	<5	<5	<5	<5	<5	77	<5	ug/kg	TM31/PM12
Benzene #	<5	<5 ^{SV}	<5	<5	<5	<5	<5	16	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5 ^{SV}	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5 ^{SV}	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5 ^{SV}	<5	<5	<5	<5	<5	<5	7	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5 ^{SV}	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	43.3	12.7	12.1	15.7	18.9	20.7	14.2	45.1	19.9	<0.1	%	PM4/PM0
% Dry Matter 105°C	77.0	88.0	91.6	76.5	85.4	81.1	85.6	69.6	86.6	<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	85.1	47.7	42.1	-	-	58.0	49.7	65.1	85.0	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	18.0	10.8	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	1.55	0.78	0.55	NDP	NDP	0.69	1.00	1.67	0.52	<0.02	%	TM21/PM24
Loss on Ignition #	5.6	2.6	2.4	NDP	NDP	2.1	2.3	6.6	1.6	<1.0	%	TM22/PM0
pH #	8.42	8.17	8.37	8.67	8.30	8.30	8.46	7.48	8.22	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1171	0.1024	0.0987	0.1171	0.1054	0.1107	0.1051	0.129	0.1039		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : CEN 10:1 1 Batch

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

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	Please see attached notes for all abbreviations and acronyms		
Sample ID	BH101	BH101	WS104	WS104	WS104	WS106	WS106	WS106	WS106	WS108			
Depth	0.50	1.00	0.50	1.50	2.50	0.50	1.00	2.20	2.80	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	30/03/2019	30/03/2019	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	31/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
Dissolved Antimony (A10) #	0.49	0.32	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic (A10) #	0.202	0.031	0.094	<0.025	<0.025	0.030	<0.025	<0.025	<0.025	0.052	<0.025	mg/kg	TM30/PM17
Dissolved Barium (A10) #	<0.03	0.18	<0.03	0.10	0.06	0.16	0.45	<0.03	<0.03	0.18	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium (A10) #	<0.015	0.024	0.049	<0.015	<0.015	0.083	0.445	<0.015	<0.015	0.018	<0.015	mg/kg	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM30/PM17
Dissolved Molybdenum (A10) #	0.04	0.17	0.08	0.05	0.03	<0.02	0.06	0.18	0.03	0.30	<0.02	mg/kg	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	<0.03	mg/kg	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	0.03	<0.03	<0.03	mg/kg	TM30/PM17
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	TM26/PM0
Fluoride	<3	4	<3	7	<3	<3	7	5	3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	95	63	129	285	280	20	52	40	6	287	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	<3	<3	5	<3	5	<3	5	6	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	<2	<2	<2	<2	3	2	2	2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	30	20	20	<20	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	770	960	1000	1270	840	860	950	570	<350	2909	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : CEN 10:1 1 Batch

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

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS108	WS108	WS108	WS113	WS113	WS113	WS113	WS114	WS114	WS114			
Depth	1.50	2.50	3.50	1.20	1.70	2.30	2.60	0.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019			
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	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	LOD/LOR	Units	Method No.
Dissolved Antimony (A10) #	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.71	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic (A10) #	0.030	<0.025	0.043	0.027	0.051	0.069	<0.025	<0.025	<0.025	0.047	<0.025	mg/kg	TM30/PM17
Dissolved Barium (A10) #	0.09	0.03	0.38	0.08	<0.03	0.04	0.04	0.10	0.11	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	0.172	0.026	<0.015	0.028	0.346	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM30/PM17
Dissolved Molybdenum (A10) #	0.21	0.19	0.43	0.12	<0.02	0.18	0.07	0.03	0.04	0.14	<0.02	mg/kg	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium (A10) #	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	TM26/PM0
Fluoride	<3	3	<3	6	6	4	4	<3	9	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	950	55	9	2654	228	119	135	653	434	66	<5	mg/kg	TM38/PM0
Chloride #	29	<3	19	1827	405	143	244	164	9	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	8	3	3	<2	<2	10	<2	<2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	80	30	30	<20	<20	100	<20	<20	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	1510	490	1280	7408	1340	1090	1391	3210	1361	980	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : CEN 10:1 1 Batch

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

J E Sample No.	61-63	64-66	67-69	70-72	73-75	76-78	79-81	82-84	85-87				
Sample ID	WS114	WS115	WS115	WS115	WS117	WS117	WS117	WS117	WS117				
Depth	2.60	0.50	1.50	2.50	0.50	1.50	2.50	3.50	4.00				
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T				
Sample Date	30/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1	1				
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019				
										LOD/LOR	Units	Method No.	
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.06	<0.02	mg/kg	TM30/PM17	
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	0.028	<0.025	<0.025	<0.025	0.066	0.060	<0.025	mg/kg	TM30/PM17	
Dissolved Barium (A10) #	0.05	0.14	0.08	<0.03	0.17	0.20	0.22	0.20	0.06	<0.03	mg/kg	TM30/PM17	
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17	
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17	
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17	
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17	
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM30/PM17	
Dissolved Molybdenum (A10) #	0.07	0.15	0.10	0.15	0.36	0.29	0.21	0.35	0.27	<0.02	mg/kg	TM30/PM17	
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.02	mg/kg	TM30/PM17	
Dissolved Selenium (A10) #	<0.03	0.20	0.20	0.09	0.05	0.05	0.06	<0.03	<0.03	<0.03	mg/kg	TM30/PM17	
Dissolved Zinc (A10) #	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17	
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	TM26/PM0	
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0	
Sulphate as SO4 #	69	14129	29516	12245	29554	14524	13207	14375	8161	<5	mg/kg	TM38/PM0	
Chloride #	16	153	34	23	5	13	<3	9	46	<3	mg/kg	TM38/PM0	
Dissolved Organic Carbon	3	<2	<2	<2	<2	<2	<2	14	3	<2	mg/l	TM60/PM0	
Dissolved Organic Carbon	30	<20	<20	<20	<20	<20	<20	140	30	<20	mg/kg	TM60/PM0	
Total Dissolved Solids #	980	21216	20914	1130	1581	1870	970	780	1030	<350	mg/kg	TM20/PM0	

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30						
Sample ID	BH101	BH101	WS104	WS104	WS104	WS106	WS106	WS106	WS106	WS108						
Depth	0.50	1.00	0.50	1.50	2.50	0.50	1.00	2.20	2.80	0.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	30/03/2019	30/03/2019	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	31/03/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019						
Solid Waste Analysis																
Total Organic Carbon #	1.26	NDP	10.83	13.27	1.03	4.43	11.12	4.68	0.52	NDP	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025 ^{SV}	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	146	33	<30	<30	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	11.03	12.05 ^{BA}	1.66	1.27	<0.64	274.12	31.58	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Mass of raw test portion	0.1011	0.1083	0.1102	0.1095	0.1202	0.1103	0.1316	0.1151	0.1138	0.1071	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	89.5	83.1	81.6	82.4	75.0	81.4	68.3	78.1	79.3	84.3	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.889	0.882	0.88	0.881	0.87	0.879	0.858	0.875	0.877	0.883	-	-	-		l	NONE/PM17
Elate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	Please see attached notes for all abbreviations and acronyms					
Sample ID	WS108	WS108	WS108	WS113	WS113	WS113	WS113	WS114	WS114	WS114						
Depth	1.50	2.50	3.50	1.20	1.70	2.30	2.60	0.50	1.50	2.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	31/03/2019	31/03/2019	31/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019	30/03/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019						
Solid Waste Analysis																
Total Organic Carbon #	1.54	0.62	3.59	0.51	3.09	1.06	0.65	NDP	9.57	2.39	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025 ^{SV}	0.055	<0.025 ^{SV}	<0.025	<0.025	<0.025	<0.025 ^{SV}	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	283	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	0.88	<0.64	<0.64	15.19	1.17	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Mass of raw test portion	0.1057	0.1055	0.1186	0.1101	0.1005	0.1068	0.1162	0.0953	0.1097	0.1131	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	84.9	85.4	75.6	82.1	89.9	84.1	77.3	94.7	82.2	79.6	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.884	0.885	0.871	0.88	0.89	0.883	0.874	0.895	0.881	0.877	-	-	-		l	NONE/PM17
Elate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-	-	-		l	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/5381

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	61-63	64-66	67-69	70-72	73-75	76-78	79-81	82-84	85-87							
Sample ID	WS114	WS115	WS115	WS115	WS117	WS117	WS117	WS117	WS117							
Depth	2.60	0.50	1.50	2.50	0.50	1.50	2.50	3.50	4.00							
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	30/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019	31/03/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1	1	1	1							
Date of Receipt	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019							
										Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.	
Solid Waste Analysis																
Total Organic Carbon #	1.55	0.78	0.55	NDP	NDP	0.69	1.00	1.67	0.52		3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025 ^{SW}	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025		6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035		1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	<30		500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64		100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Mass of raw test portion	0.1171	0.1024	0.0987	0.1171	0.1054	0.1107	0.1051	0.129	0.1039		-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	77.0	88.0	91.6	76.5	85.4	81.1	85.6	69.6	86.6		-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.873	0.888	0.892	0.872	0.885	0.879	0.885	0.861	0.886		-	-	-		l	NONE/PM17
Elate Volume	0.8	0.8	0.79	0.76	0.79	0.78	0.78	0.75	0.8		-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5381	1	BH101	0.50	2	04/04/2019	General Description (Bulk Analysis)	soil.stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	BH101	1.00	5	04/04/2019	General Description (Bulk Analysis)	soil.stones
					04/04/2019	Asbestos Fibres	Fibre Bundles
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	Chrysotile
					04/04/2019	Asbestos Level Screen	less than 0.1%
					13/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					15/04/2019	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
15/04/2019	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)					
19/5381	1	WS104	0.50	8	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS104	1.50	11	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS104	2.50	14	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS106	0.50	17	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5381	1	WS106	0.50	17	04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS106	1.00	20	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS106	2.20	23	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS106	2.80	26	04/04/2019	General Description (Bulk Analysis)	soil/stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS108	0.50	29	04/04/2019	General Description (Bulk Analysis)	Soil/Stones
					04/04/2019	Asbestos Fibres	Fibre Bundles
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	Chrysotile
					04/04/2019	Asbestos Level Screen	less than 0.1%
					13/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					15/04/2019	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					15/04/2019	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
19/5381	1	WS108	1.50	32	04/04/2019	General Description (Bulk Analysis)	soil.stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS108	2.50	35	04/04/2019	General Description (Bulk Analysis)	soil-satones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS108	3.50	38	04/04/2019	General Description (Bulk Analysis)	Soil/Stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS113	1.20	41	04/04/2019	General Description (Bulk Analysis)	soil/stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5381	1	WS113	1.20	41	04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS113	1.70	44	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS113	2.30	47	04/04/2019	General Description (Bulk Analysis)	Soil/Stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS113	2.60	50	04/04/2019	General Description (Bulk Analysis)	soil/stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS114	0.50	53	04/04/2019	General Description (Bulk Analysis)	Soil/Stones
					04/04/2019	Asbestos Fibres	Fibre Bundles
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	Chrysotile
					04/04/2019	Asbestos Level Screen	less than 0.1%
					13/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					15/04/2019	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					15/04/2019	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
19/5381	1	WS114	1.50	56	04/04/2019	General Description (Bulk Analysis)	Soil/Stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS114	2.50	59	04/04/2019	General Description (Bulk Analysis)	soil.stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS114	2.60	62	04/04/2019	General Description (Bulk Analysis)	Soil/Stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS115	0.50	65	04/04/2019	General Description (Bulk Analysis)	soil.stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5381	1	WS115	0.50	65	04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS115	1.50	68	04/04/2019	General Description (Bulk Analysis)	soil/stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS115	2.50	71	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	Fibre Bundles
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	Chrysotile
					04/04/2019	Asbestos Level Screen	less than 0.1%
					13/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					15/04/2019	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					15/04/2019	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
19/5381	1	WS117	0.50	74	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	Fibre Bundles
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	Chrysotile
					04/04/2019	Asbestos Level Screen	less than 0.1%
					13/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					13/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					15/04/2019	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					15/04/2019	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
19/5381	1	WS117	1.50	77	04/04/2019	General Description (Bulk Analysis)	soil-stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS117	2.50	80	04/04/2019	General Description (Bulk Analysis)	soil/stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS117	3.50	83	04/04/2019	General Description (Bulk Analysis)	soil/stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD
19/5381	1	WS117	4.00	86	04/04/2019	General Description (Bulk Analysis)	soil.stones
					04/04/2019	Asbestos Fibres	NAD
					04/04/2019	Asbestos ACM	NAD
					04/04/2019	Asbestos Type	NAD
					04/04/2019	Asbestos Level Screen	NAD

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 19/5381						

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

JE Job No.: 19/5381

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution
BA	x10 Dilution

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/5381

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/5381

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/5381

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 19/5381

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. 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
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				

JE Job No: 19/5381

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

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Attention : Stephen Kealy
Date : 26th April, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/5621 Batch 1
Location : Hickeys 43 Pargate Place
Date samples received : 5th April, 2019
Status : Final report
Issue : 2

Sixteen samples were received for analysis on 5th April, 2019 of which twelve 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.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton BSc

Project Manager

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy
JE Job No.: 19/5621

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12	16-18	19-21	22-24	25-27	28-30	31-33	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS103	WS103	WS103	WS103	WS101	WS101	WS101	WS101	WS101	BH101			
Depth	0.60	1.60	2.60	3.50	0.50	1.00	2.00	3.00	4.00	2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019			
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	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	LOD/LOR	Units	Method No.
Antimony	-	4	7	2	5	-	2	1	1	2	<1	mg/kg	TM30/PM15
Arsenic #	-	6.9	13.4	16.0	11.0	-	21.9	11.5	10.1	19.9	<0.5	mg/kg	TM30/PM15
Barium #	-	142	156	103	51	-	97	59	56	97	<1	mg/kg	TM30/PM15
Cadmium #	-	<0.1	<0.1	1.2	0.5	-	1.7	0.9	0.3	1.6	<0.1	mg/kg	TM30/PM15
Chromium #	-	93.7	88.7	82.2	68.9	-	69.2	80.7	100.7	78.5	<0.5	mg/kg	TM30/PM15
Copper #	-	61	263 ^{AA}	48	30	-	26	11	6	27	<1	mg/kg	TM30/PM15
Lead #	-	145	521	84	31	-	33	16	7	37	<5	mg/kg	TM30/PM15
Mercury #	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	-	7.0	6.5	6.1	5.5	-	5.9	6.0	7.5	7.0	<0.1	mg/kg	TM30/PM15
Nickel #	-	36.5	49.2	41.8	20.5	-	38.4	21.8	10.3	38.3	<0.7	mg/kg	TM30/PM15
Selenium #	-	3	3	1	<1	-	1	<1	<1	<1	<1	mg/kg	TM30/PM15
Zinc #	-	55	75	118	59	-	133	72	31	137	<5	mg/kg	TM30/PM15
Antimony	5	-	-	-	-	5	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	28.5	-	-	-	-	23.1	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	238	-	-	-	-	300	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	0.2	-	-	-	-	1.6	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	20.5	-	-	-	-	25.2	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	187	-	-	-	-	134	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	155	-	-	-	-	312	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	0.1	-	-	-	-	1.1	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	5.7	-	-	-	-	10.2	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	59.1	-	-	-	-	58.1	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	2	-	-	-	-	6	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	194	-	-	-	-	158	-	-	-	-	<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy
JE Job No.: 19/5621

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12	16-18	19-21	22-24	25-27	28-30	31-33	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS103	WS103	WS103	WS103	WS101	WS101	WS101	WS101	WS101	BH101			
Depth	0.60	1.60	2.60	3.50	0.50	1.00	2.00	3.00	4.00	2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019			
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	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	LOD/LOR	Units	Method No.
PAH MS													
Naphthalene #	0.64	<0.04	0.07	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.72	0.13	0.23	<0.03	0.12	0.24	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.37	0.06	0.05	<0.03	0.11	0.23	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	0.36	0.06	0.06	<0.03	0.11	0.22	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.32	0.09	0.08	<0.06	0.09	0.22	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	0.35	0.07	0.10	<0.02	0.10	0.19	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.41	0.09	0.20	<0.07	0.13	0.31	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.15	<0.04	0.10	<0.04	0.05	0.14	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.11	<0.04	0.11	<0.04	<0.04	0.12	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.13	<0.04	0.11	<0.04	<0.04	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 17 Total	3.56	<0.64	1.11	<0.64	0.71	1.87	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.30	0.06	0.14	<0.05	0.09	0.22	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.11	0.03	0.06	<0.02	0.04	0.09	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	90	91	88	91	89	91	92	90	83	<0	%	TM4/PM8
Mineral Oil (C10-C40)	129	<30	<30	<30	141	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	24	<7	<7	<7	30	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	105	<7	<7	<7	111	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	129	<19	<19	<19	141	<19	<19	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16

Exova Jones Environmental

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy
JE Job No.: 19/5621

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12	16-18	19-21	22-24	25-27	28-30	31-33	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS103	WS103	WS103	WS103	WS101	WS101	WS101	WS101	WS101	BH101			
Depth	0.60	1.60	2.60	3.50	0.50	1.00	2.00	3.00	4.00	2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019			
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	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TMS/PM8/PM16
>EC12-EC16 #	8	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TMS/PM8/PM16
>EC16-EC21 #	24	10	<7	<7	9	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	114	<7	<7	<7	72	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-35 #	146	<19	<19	<19	81	<19	<19	<19	<19	<19	<19	mg/kg	TMS/PM8/PM16/PM12/PM10
Total aliphatics and aromatics(C5-35)	275	<38	<38	<38	222	<38	<38	<38	<38	<38	<38	mg/kg	TMS/PM8/PM16/PM12/PM10
MTBE #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	9 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5 ^{SV}	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	19.2	14.3	20.4	30.0	8.8	19.5	28.9	19.7	15.4	33.4	<0.1	%	PM4/PM0
% Dry Matter 105°C	84.3	87.2	81.4	76.5	93.3	83.1	79.4	83.4	88.2	79.1	<0.1	%	NONE/PM4
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	NDP	93.7	88.7	82.2	68.9	NDP	69.2	80.7	100.7	78.5	<0.5	mg/kg	NONE/NONE
Chromium III	20.5	-	-	-	-	25.2	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	NDP	9.50	11.89	2.05	1.00	NDP	0.87	0.29	0.13	0.86	<0.02	%	TM21/PM24
Loss on Ignition #	NDP	6.0	9.6	3.8	1.8	NDP	4.1	1.6	<1.0	3.9	<1.0	%	TM22/PM0
pH #	8.50	8.39	8.53	8.53	8.39	8.64	8.47	8.66	9.08	8.55	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1063	0.1034	0.1111	0.1179	0.097	0.1088	0.1139	0.1082	0.1019	0.1138		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please include all sections of this report if it is reproduced

Exova Jones Environmental

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy
JE Job No.: 19/5621

Report : Solid

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

J E Sample No.	34-36		37-39									LOD/LOR	Units	Method No.		
	Sample ID	Depth	COC No / misc	Containers											Sample Date	Sample Type
	BH101	3.00		V J T	03/04/2019	Soil	1	05/04/2019	BH101	4.00		V J T	03/04/2019	Soil	1	05/04/2019
Please see attached notes for all abbreviations and acronyms																
Antimony	2		1										<1	mg/kg	TM30/PM15	
Arsenic #	13.9		8.4										<0.5	mg/kg	TM30/PM15	
Barium #	73		32										<1	mg/kg	TM30/PM15	
Cadmium #	1.3		0.2										<0.1	mg/kg	TM30/PM15	
Chromium #	85.4		90.4										<0.5	mg/kg	TM30/PM15	
Copper #	14		5										<1	mg/kg	TM30/PM15	
Lead #	19		7										<5	mg/kg	TM30/PM15	
Mercury #	<0.1		<0.1										<0.1	mg/kg	TM30/PM15	
Molybdenum #	5.8		6.8										<0.1	mg/kg	TM30/PM15	
Nickel #	28.6		7.6										<0.7	mg/kg	TM30/PM15	
Selenium #	<1		<1										<1	mg/kg	TM30/PM15	
Zinc #	97		22										<5	mg/kg	TM30/PM15	
Antimony	-		-										<1	mg/kg	TM30/PM62	
Arsenic	-		-										<0.5	mg/kg	TM30/PM62	
Barium	-		-										<1	mg/kg	TM30/PM62	
Cadmium	-		-										<0.1	mg/kg	TM30/PM62	
Chromium	-		-										<0.5	mg/kg	TM30/PM62	
Copper	-		-										<1	mg/kg	TM30/PM62	
Lead	-		-										<5	mg/kg	TM30/PM62	
Mercury	-		-										<0.1	mg/kg	TM30/PM62	
Molybdenum	-		-										<0.1	mg/kg	TM30/PM62	
Nickel	-		-										<0.7	mg/kg	TM30/PM62	
Selenium	-		-										<1	mg/kg	TM30/PM62	
Zinc	-		-										<5	mg/kg	TM30/PM62	

Exova Jones Environmental

Client Name: Ground Investigations Ireland
 Reference: 8507-02-19
 Location: Hickeys 43 Pargate Place
 Contact: Stephen Kealy
 JE Job No.: 19/5621

Report : Solid

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

J E Sample No.	34-36	37-39										LOD/LOR	Units	Method No.	
Sample ID	BH101	BH101													
Depth	3.00	4.00													
COC No / misc															
Containers	V J T	V J T													
Sample Date	03/04/2019	03/04/2019													
Sample Type	Soil	Soil													
Batch Number	1	1													
Date of Receipt	05/04/2019	05/04/2019													
TPH CWG															
Aromatics															
>C5-EC7 #	<0.1	<0.1										<0.1	mg/kg	TM36/PM12	
>EC7-EC8 #	<0.1	<0.1										<0.1	mg/kg	TM36/PM12	
>EC8-EC10 #	<0.1	<0.1										<0.1	mg/kg	TM36/PM12	
>EC10-EC12 #	<0.2	<0.2										<0.2	mg/kg	TM5/PM8/PM16	
>EC12-EC16 #	<4	<4										<4	mg/kg	TM5/PM8/PM16	
>EC16-EC21 #	<7	<7										<7	mg/kg	TM5/PM8/PM16	
>EC21-EC35 #	<7	<7										<7	mg/kg	TM5/PM8/PM16	
Total aromatics C5-35 #	<19	<19										<19	mg/kg	TM5/TM36/PM8/PM12/PM16	
Total aliphatics and aromatics(C5-35)	<38	<38										<38	mg/kg	TM5/TM36/PM8/PM12/PM16	
MTBE #	<5	<5										<5	ug/kg	TM31/PM12	
Benzene #	<5	<5										<5	ug/kg	TM31/PM12	
Toluene #	<5	<5										<5	ug/kg	TM31/PM12	
Ethylbenzene #	<5	<5										<5	ug/kg	TM31/PM12	
m/p-Xylene #	<5	<5										<5	ug/kg	TM31/PM12	
o-Xylene #	<5	<5										<5	ug/kg	TM31/PM12	
PCB 28 #	<5	<5										<5	ug/kg	TM17/PM8	
PCB 52 #	<5	<5										<5	ug/kg	TM17/PM8	
PCB 101 #	<5	<5										<5	ug/kg	TM17/PM8	
PCB 118 #	<5	<5										<5	ug/kg	TM17/PM8	
PCB 138 #	<5	<5										<5	ug/kg	TM17/PM8	
PCB 153 #	<5	<5										<5	ug/kg	TM17/PM8	
PCB 180 #	<5	<5										<5	ug/kg	TM17/PM8	
Total 7 PCBs #	<35	<35										<35	ug/kg	TM17/PM8	
Natural Moisture Content	27.2	5.5										<0.1	%	PM4/PM0	
% Dry Matter 105°C	80.0	93.9										<0.1	%	NONE/PM4	
Hexavalent Chromium #	<0.3	<0.3										<0.3	mg/kg	TM38/PM20	
Chromium III	85.4	90.4										<0.5	mg/kg	NONE/NONE	
Chromium III	-	-										<0.5	mg/kg	NONE/NONE	
Total Organic Carbon #	0.45	0.12										<0.02	%	TM21/PM24	
Loss on Ignition #	2.2	<1.0										<1.0	%	TM22/PM0	
pH #	8.72	9.26										<0.01	pH units	TM73/PM11	
Mass of raw test portion	0.112	0.0954											kg	NONE/PM17	
Mass of dried test portion	0.09	0.09											kg	NONE/PM17	

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy
JE Job No.: 19/5621

Report : CEN 10:1 1 Batch

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

J E Sample No.	1-3	4-6	7-9	10-12	16-18	19-21	22-24	25-27	28-30	31-33	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS103	WS103	WS103	WS103	WS101	WS101	WS101	WS101	WS101	BH101			
Depth	0.60	1.60	2.60	3.50	0.50	1.00	2.00	3.00	4.00	2.00			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019			
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	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	LOD/LOR	Units	Method No.
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	0.082	<0.025	<0.025	<0.025	0.035	<0.025	mg/kg	TM30/PM17
Dissolved Barium (A10) #	0.12	0.06	0.05	<0.03	0.17	0.04	0.05	0.04	<0.03	0.04	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM30/PM17
Dissolved Molybdenum (A10) #	0.12	0.04	<0.02	0.09	0.04	0.09	0.24	0.05	<0.02	0.25	<0.02	mg/kg	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	TM26/PM0
Fluoride	8	<3	<3	<3	<3	4	<3	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	77	453	616	118	797	53	48	22	39	20	<5	mg/kg	TM38/PM0
Chloride #	4	21	14	384	106	4	7	6	118	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	<2	2	<2	<2	2	<2	<2	3	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	20	<20	<20	30	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	1180	1750	2818	1609	2371	880	930	720	660	1070	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy
JE Job No.: 19/5621

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12	16-18	19-21	22-24	25-27	28-30	31-33						
Sample ID	WS103	WS103	WS103	WS103	WS101	WS101	WS101	WS101	WS101	BH101						
Depth	0.60	1.60	2.60	3.50	0.50	1.00	2.00	3.00	4.00	2.00						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019						
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	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	05/04/2019	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																
Total Organic Carbon #	NDP	9.50	11.89	2.05	1.00	NDP	0.87	0.29	0.13	0.86	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 ^{SV}	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	129	<30	<30	<30	141	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	3.56	<0.64	1.11	<0.64	0.71	1.87	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Mass of raw test portion	0.1063	0.1034	0.1111	0.1179	0.097	0.1088	0.1139	0.1082	0.1019	0.1138	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	84.3	87.2	81.4	76.5	93.3	83.1	79.4	83.4	88.2	79.1	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.883	0.887	0.879	0.872	0.894	0.882	0.877	0.882	0.888	0.876	-	-	-		l	NONE/PM17
Elate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
 Reference: 8507-02-19
 Location: Hickeys 43 Pargate Place
 Contact: Stephen Kealy
 JE Job No.: 19/5621

Report : EN12457_2
 Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	34-36	37-39									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	BH101	BH101														
Depth	3.00	4.00														
COC No / misc																
Containers	V J T	V J T														
Sample Date	03/04/2019	03/04/2019														
Sample Type	Soil	Soil														
Batch Number	1	1														
Date of Receipt	05/04/2019	05/04/2019														
Solid Waste Analysis																
Total Organic Carbon #	0.45	0.12									3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025									6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035									1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30									500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	<0.64	<0.64									100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Mass of raw test portion	0.112	0.0954									-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	80.0	93.9									-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.877	0.894									-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.85									-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5621	1	WS103	0.60	2	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	Fibre Bundles
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	Chrysotile
					09/04/2019	Asbestos Level Screen	less than 0.1%
					17/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					17/04/2019	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					17/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					17/04/2019	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					17/04/2019	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
19/5621	1	WS103	1.60	5	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	WS103	2.60	8	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	WS103	3.50	11	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	WS101	0.50	17	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	WS101	1.00	20	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	Fibre Bundles
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	Chrysotile

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5621	1	WS101	1.00	20	09/04/2019	Asbestos Level Screen	less than 0.1%
19/5621	1	WS101	2.00	23	09/04/2019	General Description (Bulk Analysis)	soil/stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	WS101	3.00	26	09/04/2019	General Description (Bulk Analysis)	soil/stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	WS101	4.00	29	09/04/2019	General Description (Bulk Analysis)	soil/stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	BH101	2.00	32	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	BH101	3.00	35	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD
19/5621	1	BH101	4.00	38	09/04/2019	General Description (Bulk Analysis)	soil.stones
					09/04/2019	Asbestos Fibres	NAD
					09/04/2019	Asbestos ACM	NAD
					09/04/2019	Asbestos Type	NAD
					09/04/2019	Asbestos Level Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/5621

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental 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

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/5621

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/5621

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/5621

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 19/5621

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. 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
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				

JE Job No: 19/5621

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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Attention : Stephen Kealy
Date : 1st May, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/5725 Batch 1
Location : Hickeys 43 Pargate Place
Date samples received : 8th April, 2019
Status : Final report
Issue : 1

Five samples were received for analysis on 8th April, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Lucas Halliwell
Project Co-ordinator

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Pargate Place
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5725	1	WS105A	0.50	8	24/04/2019	General Description (Bulk Analysis)	soil-stones
					24/04/2019	Asbestos Fibres	NAD
					24/04/2019	Asbestos ACM	NAD
					24/04/2019	Asbestos Type	NAD
					24/04/2019	Asbestos Level Screen	NAD
19/5725	1	WS105A	1.30	11	18/04/2019	General Description (Bulk Analysis)	soil.stones
					18/04/2019	Asbestos Fibres	NAD
					18/04/2019	Asbestos ACM	NAD
					18/04/2019	Asbestos Type	NAD
					18/04/2019	Asbestos Level Screen	NAD

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/5725

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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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x50 Dilution

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/5725

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/5725

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/5725

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 19/5725

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

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Attention : Stephen Kealy
Date : 9th May, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/5884 Batch 1
Location :
Date samples received : 10th April, 2019
Status : Final report
Issue : 1

Sixteen samples were received for analysis on 10th April, 2019 of which fourteen 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.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton BSc

Project Manager

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	12-14	15-17	18-20	21-23	27-29	30-32	33-35	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS109	WS109	WS109	WS110	WS110	WS110	WS110	WS112	WS112	WS112			
Depth	0.90	1.90	2.90	0.90	1.80	2.90	3.50	0.70	1.70	2.70			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019			
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	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	LOD/LOR	Units	Method No.
Antimony	2	2	2	4	2	2	2	2	2	2	<1	mg/kg	TM30/PM15
Arsenic #	11.3	8.7	9.6	23.9	10.2	15.6	18.6	17.8	15.0	14.4	<0.5	mg/kg	TM30/PM15
Barium #	91	39	51	341	70	74	105	79	74	86	<1	mg/kg	TM30/PM15
Cadmium #	2.2	2.0	1.3	0.4	1.9	1.4	2.2	1.7	1.2	0.8	<0.1	mg/kg	TM30/PM15
Chromium #	30.9	33.5	30.9	31.6	26.0	36.4	40.7	34.7	38.6	32.1	<0.5	mg/kg	TM30/PM15
Copper #	32	25	22	84	29	27	34	37	55	39	<1	mg/kg	TM30/PM15
Lead #	21	21	36	2229	32	61	47	67	83	67	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	0.3	0.1	<0.1	<0.1	<0.1	0.4	0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	3.5	3.8	2.6	5.7	3.2	2.6	2.7	3.4	3.1	2.9	<0.1	mg/kg	TM30/PM15
Nickel #	40.7	27.2	26.8	27.8	36.1	33.1	47.0	39.2	30.6	35.6	<0.7	mg/kg	TM30/PM15
Selenium #	2	<1	<1	2	2	2	2	2	1	3	<1	mg/kg	TM30/PM15
Zinc #	89	72	76	79	90	109	157	113	117	85	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	0.28	<0.03	0.05	0.08	0.06	0.10	0.10	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	0.15	<0.03	<0.03	0.05	<0.03	<0.03	0.05	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	0.15	<0.03	<0.03	<0.03	<0.03	<0.03	0.06	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	0.17	<0.06	<0.06	<0.06	<0.06	<0.06	0.10	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	0.20	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	0.19	<0.07	<0.07	<0.07	<0.07	<0.07	0.16	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	1.33	<0.64	<0.64	<0.64	<0.64	<0.64	0.72	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	100	99	99	99	96	95	95	95	93	95	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	57	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	12-14	15-17	18-20	21-23	27-29	30-32	33-35	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS109	WS109	WS109	WS110	WS110	WS110	WS110	WS112	WS112	WS112	LOD/LOR	Units	Method No.
Depth	0.90	1.90	2.90	0.90	1.80	2.90	3.50	0.70	1.70	2.70			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019			
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	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019			
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TMS/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TMS/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7	57	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aliphatics C5-35	<19	<19	<19	<19	<19	<19	57	<19	<19	<19	<19	mg/kg	TMS/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TMS/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TMS/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	80	<7	79	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-35 #	<19	<19	<19	<19	<19	<19	80	<19	79	<19	<19	mg/kg	TMS/PM8/PM16
Total aliphatics and aromatics(C5-35)	<38	<38	<38	<38	<38	<38	137	<38	79	<38	<38	mg/kg	TMS/PM8/PM16
MTBE #													
MTBE #	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #													
Benzene #	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #													
Toluene #	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #													
Ethylbenzene #	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	10	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #													
m/p-Xylene #	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	10	<5	<5	ug/kg	TM31/PM12
o-Xylene #													
o-Xylene #	<5	<5	<5 ^{SV}	<5 ^{SV}	<5	<5 ^{SV}	<5 ^{SV}	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #													
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #													
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #													
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #													
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #													
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #													
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #													
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content													
Natural Moisture Content	20.5	15.2	14.3	18.7	15.5	29.4	53.6	23.6	21.9	24.3	<0.1	%	PM4/PM0
% Dry Matter 105°C													
% Dry Matter 105°C	84.3	88.4	85.3	84.6	87.8	83.3	66.8	84.4	84.5	81.3	<0.1	%	NONE/PM4
Hexavalent Chromium #													
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III													
Chromium III	30.9	33.5	30.9	31.6	26.0	36.4	40.7	34.7	38.6	32.1	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #													
Total Organic Carbon #	0.68	0.47	1.03	12.36	0.57	1.27	3.36	2.10	2.08	2.22	<0.02	%	TM21/PM24

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	12-14	15-17	18-20	21-23	27-29	30-32	33-35	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS109	WS109	WS109	WS110	WS110	WS110	WS110	WS112	WS112	WS112			
Depth	0.90	1.90	2.90	0.90	1.80	2.90	3.50	0.70	1.70	2.70			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019			
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	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	LOD/LOR	Units	Method No.
Loss on Ignition #	2.7	2.0	2.8	9.2	2.1	3.9	9.6	4.2	4.0	4.1	<1.0	%	TM22/PM0
pH #	8.47	8.61	8.67	8.45	8.68	8.40	7.77	8.34	8.84	9.59	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1073	0.1021	0.105	0.106	0.103	0.1075	0.1348	0.1066	0.1063	0.1102		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : Solid

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

J E Sample No.	Sample ID				Depth	COC No / misc	Containers	Sample Date	Sample Type	Batch Number	Date of Receipt	LOD/LOR	Units	Method No.
	36-38	39-41	42-44	45-47										
	WS102A	WS102A	WS102A	WS102A										
	0.90	1.50	2.50	3.50										
	V J T	V J T	V J T	V J T										
	07/04/2019	07/04/2019	07/04/2019	07/04/2019										
	Soil	Soil	Soil	Soil										
	1	1	1	1										
	10/04/2019	10/04/2019	10/04/2019	10/04/2019										
Antimony	11	4	3	3								<1	mg/kg	TM30/PM15
Arsenic #	23.4	19.7	18.5	9.0								<0.5	mg/kg	TM30/PM15
Barium #	226	288	86	70								<1	mg/kg	TM30/PM15
Cadmium #	0.3	<0.1	1.7	0.6								<0.1	mg/kg	TM30/PM15
Chromium #	59.3	43.7	47.2	53.3								<0.5	mg/kg	TM30/PM15
Copper #	142	181	18	6								<1	mg/kg	TM30/PM15
Lead #	114	179	29	11								<5	mg/kg	TM30/PM15
Mercury #	<0.1	0.2	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Molybdenum #	10.5	9.5	3.0	4.4								<0.1	mg/kg	TM30/PM15
Nickel #	77.7	104.9	34.6	14.2								<0.7	mg/kg	TM30/PM15
Selenium #	3	4	1	<1								<1	mg/kg	TM30/PM15
Zinc #	207	107	128	33								<5	mg/kg	TM30/PM15
PAH MS														
Naphthalene #	0.55	0.10	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.06	<0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	0.05	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.27	0.59	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	0.18	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.65	0.10	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	0.64	0.13	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.46	0.16	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #	0.50	0.22	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.70	0.20	<0.07	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.41	0.10	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.21	0.07	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.08	0.07	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.28	0.09	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 17 Total	6.04	1.83	<0.64	<0.64								<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.50	0.14	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.20	0.06	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	93	96	95								<0	%	TM4/PM8
Mineral Oil (C10-C40)	218	<30	<30	<30								<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : Solid

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

J E Sample No.	36-38	39-41	42-44	45-47															
Sample ID	WS102A	WS102A	WS102A	WS102A															
Depth	0.90	1.50	2.50	3.50															
COC No / misc																			
Containers	V J T	V J T	V J T	V J T															
Sample Date	07/04/2019	07/04/2019	07/04/2019	07/04/2019															
Sample Type	Soil	Soil	Soil	Soil															
Batch Number	1	1	1	1															
Date of Receipt	10/04/2019	10/04/2019	10/04/2019	10/04/2019															
LOD/LOR																			
Units																			
Method No.																			
TPH CWG																			
Aliphatics																			
>C5-C6 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1										<0.1	mg/kg	TM36/PM12			
>C6-C8 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1										<0.1	mg/kg	TM36/PM12			
>C8-C10	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1										<0.1	mg/kg	TM36/PM12			
>C10-C12 #	12.4	<0.2	<0.2	<0.2										<0.2	mg/kg	TM5/PM8/PM16			
>C12-C16 #	16	<4	<4	<4										<4	mg/kg	TM5/PM8/PM16			
>C16-C21 #	34	<7	<7	<7										<7	mg/kg	TM5/PM8/PM16			
>C21-C35 #	156	<7	<7	<7										<7	mg/kg	TM5/PM8/PM16			
Total aliphatics C5-35	218	<19	<19	<19										<19	mg/kg	TM5/TM36/PM8/PM12/PM16			
Aromatics																			
>C5-EC7 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1										<0.1	mg/kg	TM36/PM12			
>EC7-EC8 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1										<0.1	mg/kg	TM36/PM12			
>EC8-EC10 #	<0.1 ^{SV}	<0.1 ^{SV}	<0.1	<0.1										<0.1	mg/kg	TM36/PM12			
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2										<0.2	mg/kg	TM5/PM8/PM16			
>EC12-EC16 #	16	<4	<4	<4										<4	mg/kg	TM5/PM8/PM16			
>EC16-EC21 #	44	<7	<7	<7										<7	mg/kg	TM5/PM8/PM16			
>EC21-EC35 #	191	<7	<7	<7										<7	mg/kg	TM5/PM8/PM16			
Total aromatics C5-35 #	251	<19	<19	<19										<19	mg/kg	TM5/PM8/PM16/PM12/PM16			
Total aliphatics and aromatics(C5-35)	469	<38	<38	<38										<38	mg/kg	TM5/TM36/PM8/PM12/PM16			
MTBE #	<5 ^{SV}	<5 ^{SV}	<5	<5										<5	ug/kg	TM31/PM12			
Benzene #	<5 ^{SV}	<5 ^{SV}	<5	<5										<5	ug/kg	TM31/PM12			
Toluene #	<5 ^{SV}	<5 ^{SV}	<5	<5										<5	ug/kg	TM31/PM12			
Ethylbenzene #	<5 ^{SV}	<5 ^{SV}	<5	<5										<5	ug/kg	TM31/PM12			
m/p-Xylene #	<5 ^{SV}	<5 ^{SV}	<5	<5										<5	ug/kg	TM31/PM12			
o-Xylene #	<5 ^{SV}	<5 ^{SV}	<5	<5										<5	ug/kg	TM31/PM12			
PCB 28 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
PCB 52 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
PCB 101 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
PCB 118 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
PCB 138 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
PCB 153 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
PCB 180 #	<5	<5	<5	<5										<5	ug/kg	TM17/PM8			
Total 7 PCBs #	<35	<35	<35	<35										<35	ug/kg	TM17/PM8			
Natural Moisture Content	25.6	30.1	34.3	7.2										<0.1	%	PM4/PM0			
% Dry Matter 105°C	77.7	75.7	74.7	93.0										<0.1	%	NONE/PM4			
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3										<0.3	mg/kg	TM38/PM20			
Chromium III	59.3	43.7	47.2	53.3										<0.5	mg/kg	NONE/NONE			
Total Organic Carbon #	23.35	27.70	0.61	0.18										<0.02	%	TM21/PM24			

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : CEN 10:1 1 Batch

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

J E Sample No.	1-3	4-6	7-9	12-14	15-17	18-20	21-23	27-29	30-32	33-35	Please see attached notes for all abbreviations and acronyms		
Sample ID	WS109	WS109	WS109	WS110	WS110	WS110	WS110	WS112	WS112	WS112			
Depth	0.90	1.90	2.90	0.90	1.80	2.90	3.50	0.70	1.70	2.70			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019			
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	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	LOD/LOR	Units	Method No.
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	0.039	<0.025	<0.025	<0.025	<0.025	0.037	0.057	0.189	<0.025	mg/kg	TM30/PM17
Dissolved Barium (A10) #	0.06	<0.03	<0.03	0.22	<0.03	<0.03	0.25	0.08	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	0.018	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	0.31	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	TM30/PM17
Dissolved Molybdenum (A10) #	0.08	0.12	0.15	0.04	0.07	0.03	0.12	0.07	0.05	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium (A10) #	0.11	0.04	<0.03	0.04	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/l	TM26/PM0
Fluoride	<3	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	409	184	117	954	212	83	594	1096	177	34	<5	mg/kg	TM38/PM0
Chloride #	40	30	33	11	50	224	331	198	49	57	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	4	<2	<2	<2	<2	2	7	<2	<2	3	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	40	<20	<20	<20	<20	20	70	<20	<20	30	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	1570	730	1161	2121	730	980	2230	2889	740	1040	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : CEN 10:1 1 Batch

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

J E Sample No.	36-38	39-41	42-44	45-47																			
Sample ID	WS102A	WS102A	WS102A	WS102A																			
Depth	0.90	1.50	2.50	3.50																			
COC No / misc																							
Containers	V J T	V J T	V J T	V J T																			
Sample Date	07/04/2019	07/04/2019	07/04/2019	07/04/2019																			
Sample Type	Soil	Soil	Soil	Soil																			
Batch Number	1	1	1	1																			
Date of Receipt	10/04/2019	10/04/2019	10/04/2019	10/04/2019																			
Dissolved Antimony (A10) #	0.32	<0.02	<0.02	<0.02																<0.02	mg/kg	TM30/PM17	
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025																	<0.025	mg/kg	TM30/PM17
Dissolved Barium (A10) #	0.09	0.09	0.08	<0.03																	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005																	<0.005	mg/kg	TM30/PM17
Dissolved Chromium (A10) #	<0.015	0.051	<0.015	<0.015																	<0.015	mg/kg	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07																	<0.07	mg/kg	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05																	<0.05	mg/kg	TM30/PM17
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01																	<0.01	mg/kg	TM30/PM17
Dissolved Molybdenum (A10) #	0.08	0.10	0.09	0.08																	<0.02	mg/kg	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02																	<0.02	mg/kg	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03																	<0.03	mg/kg	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03																	<0.03	mg/kg	TM30/PM17
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05																	<0.05	mg/l	TM26/PM0
Fluoride	4	5	<3	<3																	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	225	71	73	24																	<5	mg/kg	TM38/PM0
Chloride #	<3	7	66	95																	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	2	<2	3	<2																	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	30	<20																	<20	mg/kg	TM60/PM0
Total Dissolved Solids #	930	670	810	810																	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location:
Contact: Stephen Kealy
JE Job No.: 19/5884

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	12-14	15-17	18-20	21-23	27-29	30-32	33-35						
Sample ID	WS109	WS109	WS109	WS110	WS110	WS110	WS110	WS112	WS112	WS112						
Depth	0.90	1.90	2.90	0.90	1.80	2.90	3.50	0.70	1.70	2.70						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019	06/04/2019						
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	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																
Total Organic Carbon #	0.68	0.47	1.03	12.36	0.57	1.27	3.36	2.10	2.08	2.22	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	57	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	<0.64	<0.64	<0.64	1.33	<0.64	<0.64	<0.64	<0.64	<0.64	0.72	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Mass of raw test portion	0.1073	0.1021	0.105	0.106	0.103	0.1075	0.1348	0.1066	0.1063	0.1102	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	84.3	88.4	85.3	84.6	87.8	83.3	66.8	84.4	84.5	81.3	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.883	0.888	0.885	0.884	0.887	0.882	0.855	0.883	0.884	0.879	-	-	-		l	NONE/PM17
Elate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland

Report : EN12457_2

Reference: 8507-02-19

Location: Stephen Kealy

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

Contact: Stephen Kealy

JE Job No.: 19/5884

J E Sample No.	36-38	39-41	42-44	45-47													
Sample ID	WS102A	WS102A	WS102A	WS102A													
Depth	0.90	1.50	2.50	3.50													
COC No / misc																	
Containers	V J T	V J T	V J T	V J T													
Sample Date	07/04/2019	07/04/2019	07/04/2019	07/04/2019													
Sample Type	Soil	Soil	Soil	Soil													
Batch Number	1	1	1	1													
Date of Receipt	10/04/2019	10/04/2019	10/04/2019	10/04/2019													
Solid Waste Analysis											Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.	
Total Organic Carbon #	23.35	27.70	0.61	0.18								3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 ^{SV}	<0.025 ^{SV}	<0.025	<0.025								6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035								1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	218	<30	<30	<30								500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	6.04	1.83	<0.64	<0.64								100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																	
Mass of raw test portion	0.1156	0.1185	0.1209	0.097								-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	77.7	75.7	74.7	93.0								-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.874	0.871	0.869	0.893								-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.9	0.84	0.8								-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location:
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5884	1	WS109	0.90	2	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS109	1.90	5	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS109	2.90	8	01/05/2019	General Description (Bulk Analysis)	soil-stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS110	0.90	13	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS110	1.80	16	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS110	2.90	19	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS110	3.50	22	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location:
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5884	1	WS110	3.50	22	01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS112	0.70	28	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS112	1.70	31	01/05/2019	General Description (Bulk Analysis)	soil/stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS112	2.70	34	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS102A	0.90	37	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS102A	1.50	40	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS102A	2.50	43	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/5884	1	WS102A	3.50	46	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD

Client Name: Ground Investigations Ireland

Matrix : Solid

Reference: 8507-02-19

Location:

Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/5884	1	WS109	0.90	1-3	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS109	1.90	4-6	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS109	2.90	7-9	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS110	0.90	12-14	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS110	1.80	15-17	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS110	2.90	18-20	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS110	3.50	21-23	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS112	0.70	27-29	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS112	1.70	30-32	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS112	2.70	33-35	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS102A	0.90	36-38	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS102A	1.50	39-41	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS102A	2.50	42-44	EPH, GRO, PAH, PCB	Sample holding time exceeded
19/5884	1	WS102A	3.50	45-47	EPH, GRO, PAH, PCB	Sample holding time exceeded

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

JE Job No.: 19/5884

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental 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

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/5884

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/5884

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/5884

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 19/5884

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

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Attention : Stephen Kealy
Date : 2nd May, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/6185 Batch 1
Location : Hickeys 43 Parkgate Place
Date samples received : 15th April, 2019
Status : Final report
Issue : 1

Twelve samples were received for analysis on 15th April, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton BSc

Project Manager

Client Name: Ground Investigations Ireland
 Reference: 8507-02-19
 Location: Hickeys 43 Parkgate Place
 Contact: Stephen Kealy
 JE Job No.: 19/6185

Report : Solid

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

J E Sample No.	16-18	19-21									Please see attached notes for all abbreviations and acronyms		
Sample ID	TP102	TP102											
Depth	1.00	2.00											
COC No / misc													
Containers	V J T	V J T											
Sample Date	11/04/2019	11/04/2019											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	15/04/2019	15/04/2019											
PAH MS													
Naphthalene #	0.59	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.08	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.08	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.42	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	0.22	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	1.09	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	0.94	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.55	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.68	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.99	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.42	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.30	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.35	<0.04									<0.04	mg/kg	TM4/PM8
Coronene	0.11	<0.04									<0.04	mg/kg	TM4/PM8
PAH 17 Total	7.96	<0.64									<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.71	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.28	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	99									<0	%	TM4/PM8
Mineral Oil (C10-C40)	1972	<30									<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 ^{SV}	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 ^{SV}	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 ^{SV}	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	120	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	1757	26									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	1877	26									<19	mg/kg	TM5/PM8/PM16

Exova Jones Environmental

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/6185

Report : CEN 10:1 1 Batch

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

J E Sample No.	16-18	19-21																						
Sample ID	TP102	TP102																						
Depth	1.00	2.00																						
COC No / misc																								
Containers	V J T	V J T																						
Sample Date	11/04/2019	11/04/2019																						
Sample Type	Soil	Soil																						
Batch Number	1	1																						
Date of Receipt	15/04/2019	15/04/2019																						
Dissolved Antimony (A10) #	4.17	0.06																						
Dissolved Arsenic (A10) #	<0.025	<0.025																						
Dissolved Barium (A10) #	0.10	<0.03																						
Dissolved Cadmium (A10) #	<0.005	<0.005																						
Dissolved Chromium (A10) #	<0.015	<0.015																						
Dissolved Copper (A10) #	<0.07	<0.07																						
Dissolved Lead (A10) #	<0.05	<0.05																						
Dissolved Mercury (A10) #	<0.01	<0.01																						
Dissolved Molybdenum (A10) #	0.04	0.08																						
Dissolved Nickel (A10) #	<0.02	<0.02																						
Dissolved Selenium (A10) #	<0.03	<0.03																						
Dissolved Zinc (A10) #	<0.03	<0.03																						
Total Phenols HPLC	<0.05	<0.05																						
Fluoride	<3	4																						
Sulphate as SO4 #	38	<5																						
Chloride #	<3	5																						
Dissolved Organic Carbon	2	2																						
Dissolved Organic Carbon	20	<20																						
Total Dissolved Solids #	1030	820																						

Please see attached notes for all abbreviations and acronyms

LOD/LOR	Units	Method No.
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Client Name: Ground Investigations Ireland
 Reference: 8507-02-19
 Location: Hickeys 43 Parkgate Place
 Contact: Stephen Kealy
 JE Job No.: 19/6185

Report : EN12457_2
 Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	16-18	19-21								Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TP102	TP102													
Depth	1.00	2.00													
COC No / misc															
Containers	V J T	V J T													
Sample Date	11/04/2019	11/04/2019													
Sample Type	Soil	Soil													
Batch Number	1	1													
Date of Receipt	15/04/2019	15/04/2019													
Solid Waste Analysis															
Total Organic Carbon #	NDP	0.94								3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 ^{SV}	<0.025								6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035								1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	1972	<30								500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	7.96	<0.64								100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate															
Mass of raw test portion	0.1138	0.1114								-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	78.8	80.4								-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.876	0.878								-	-	-		l	NONE/PM17
Eluate Volume	0.86	0.85								-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/6185	1	TP102	1.00	17	23/04/2019	General Description (Bulk Analysis)	Soil/Stones
					23/04/2019	Asbestos Fibres	Fibre Bundles
					23/04/2019	Asbestos ACM	ACM Debris
					23/04/2019	Asbestos Type	Chrysotile
					23/04/2019	Asbestos Level Screen	less than 0.1%
					29/04/2019	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					29/04/2019	Total Detailed Gravimetric Quantification (% Asb)	0.006 (mass %)
					29/04/2019	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	0.006 (mass %)
19/6185	1	TP102	2.00	20	23/04/2019	General Description (Bulk Analysis)	Soil/Stones
					23/04/2019	Asbestos Fibres	NAD
					23/04/2019	Asbestos ACM	NAD
					23/04/2019	Asbestos Type	NAD
					23/04/2019	Asbestos Level Screen	NAD

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 19/6185						

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

JE Job No.: 19/6185

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/6185

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/6185

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/6185

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 19/6185

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. 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
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				

JE Job No: 19/6185

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

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Attention : Stephen McLoughlan
Date : 9th May, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/6282 Batch 1
Location : Hickeys 43 Pargate place
Date samples received : 16th April, 2019
Status : Final report
Issue : 1

Fourteen samples were received for analysis on 16th April, 2019 of which eight 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.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton BSc

Project Manager

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan
JE Job No.: 19/6282

Report : Solid

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

J E Sample No.	5-7	8-10	11-13	17-19	22-24	28-30	31-33	34-36					
Sample ID	BH102	BH102	BH102	BH102	BH103	BH103	BH103	BH103					
Depth	1.00	2.00	3.00	5.00	0.50	2.00	3.00	4.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019					
										LOD/LOR	Units	Method No.	
Antimony	4	2	1	1	3	3	2	2		<1	mg/kg	TM30/PM15	
Arsenic #	10.4	12.7	13.0	8.8	13.8	13.8	11.2	10.5		<0.5	mg/kg	TM30/PM15	
Barium #	70	73	102	13	89	145	81	69		<1	mg/kg	TM30/PM15	
Cadmium #	0.8	1.7	2.0	0.3	1.9	2.3	1.4	1.5		<0.1	mg/kg	TM30/PM15	
Chromium #	38.3	39.2	49.9	77.5	35.3	35.9	32.7	59.6		<0.5	mg/kg	TM30/PM15	
Copper #	31	32	30	5	47	73	37	23		<1	mg/kg	TM30/PM15	
Lead #	119	39	39	9	48	56	74	25		<5	mg/kg	TM30/PM15	
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.4	<0.1		<0.1	mg/kg	TM30/PM15	
Molybdenum #	2.9	4.3	3.2	6.5	4.5	4.6	3.5	4.2		<0.1	mg/kg	TM30/PM15	
Nickel #	24.6	35.4	46.3	12.9	41.7	41.6	31.9	33.7		<0.7	mg/kg	TM30/PM15	
Selenium #	1	2	2	<1	2	2	2	2		<1	mg/kg	TM30/PM15	
Zinc #	98	86	165	29	132	100	100	102		<5	mg/kg	TM30/PM15	
PAH MS													
Naphthalene #	0.07	<0.04	<0.04	<0.04	0.13	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	<0.03		<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	0.17	<0.05	<0.05	<0.05		<0.05	mg/kg	TM4/PM8	
Fluorene #	<0.04	<0.04	<0.04	<0.04	0.15	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Phenanthrene #	0.32	<0.03	<0.03	<0.03	1.16	0.10	0.18	<0.03		<0.03	mg/kg	TM4/PM8	
Anthracene #	0.08	<0.04	<0.04	<0.04	0.30	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Fluoranthene #	0.50	<0.03	<0.03	<0.03	1.63	0.06	0.07	<0.03		<0.03	mg/kg	TM4/PM8	
Pyrene #	0.43	<0.03	<0.03	<0.03	1.42	0.06	0.05	<0.03		<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	0.33	<0.06	<0.06	<0.06	1.03	<0.06	0.08	<0.06		<0.06	mg/kg	TM4/PM8	
Chrysene #	0.26	<0.02	0.04	<0.02	0.65	0.04	0.07	<0.02		<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	0.52	<0.07	0.12	<0.07	1.26	<0.07	<0.07	<0.07		<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	0.19	<0.04	<0.04	<0.04	0.60	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	0.18	<0.04	0.08	<0.04	0.41	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	0.08	<0.04	0.07	<0.04	0.17	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	0.20	<0.04	0.10	<0.04	0.42	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
Coronene	0.06	<0.04	<0.04	<0.04	0.09	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8	
PAH 17 Total	3.22	<0.64	<0.64	<0.64	9.63	<0.64	<0.64	<0.64		<0.64	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.37	<0.05	0.09	<0.05	0.91	<0.05	<0.05	<0.05		<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.15	<0.02	0.03	<0.02	0.35	<0.02	<0.02	<0.02		<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	98	97	97	95	96	94	99	96		<0	%	TM4/PM8	
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30	<30	<30		<30	mg/kg	TM5/PM8/PM16	

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan
JE Job No.: 19/6282

Report : Solid

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

J E Sample No.	5-7	8-10	11-13	17-19	22-24	28-30	31-33	34-36						
Sample ID	BH102	BH102	BH102	BH102	BH103	BH103	BH103	BH103						
Depth	1.00	2.00	3.00	5.00	0.50	2.00	3.00	4.00						
COC No / misc														
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1						
Date of Receipt	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019						
											LOD/LOR	Units	Method No.	
TPH CWG														
Aliphatics														
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1			<0.1	mg/kg	TM36/PM12	
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1			<0.1	mg/kg	TM36/PM12	
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1			<0.1	mg/kg	TM36/PM12	
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	mg/kg	TMS/PM8/PM16	
>C12-C16 #	<4	<4	<4	<4	<4	<4	<4	<4			<4	mg/kg	TMS/PM8/PM16	
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TMS/PM8/PM16	
>C21-C35 #	<7	<7	<7	<7	<7	<7	27	<7			<7	mg/kg	TMS/PM8/PM16	
Total aliphatics C5-35	<19	<19	<19	<19	<19	<19	27	<19			<19	mg/kg	TMS/PM8/PM16	
Aromatics														
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1			<0.1	mg/kg	TM36/PM12	
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1			<0.1	mg/kg	TM36/PM12	
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 ^{SV}	<0.1 ^{SV}	<0.1			<0.1	mg/kg	TM36/PM12	
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	mg/kg	TMS/PM8/PM16	
>EC12-EC16 #	<4	<4	<4	<4	<4	<4	<4	<4			<4	mg/kg	TMS/PM8/PM16	
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TMS/PM8/PM16	
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	41	<7			<7	mg/kg	TMS/PM8/PM16	
Total aromatics C5-35 #	<19	<19	<19	<19	<19	<19	41	<19			<19	mg/kg	TMS/PM8/PM16	
Total aliphatics and aromatics(C5-35)	<38	<38	<38	<38	<38	<38	68	<38			<38	mg/kg	TMS/PM8/PM16	
MTBE #														
MTBE #	<5	<5	<5	<5	<5	<5 ^{SV}	<5 ^{SV}	<5			<5	ug/kg	TM31/PM12	
Benzene #														
Benzene #	<5	<5	<5	<5	<5	<5 ^{SV}	<5 ^{SV}	<5			<5	ug/kg	TM31/PM12	
Toluene #														
Toluene #	<5	<5	<5	<5	<5	<5 ^{SV}	<5 ^{SV}	<5			<5	ug/kg	TM31/PM12	
Ethylbenzene #														
Ethylbenzene #	<5	<5	<5	<5	<5	<5 ^{SV}	<5 ^{SV}	<5			<5	ug/kg	TM31/PM12	
m/p-Xylene #														
m/p-Xylene #	<5	<5	<5	<5	<5	<5 ^{SV}	<5 ^{SV}	<5			<5	ug/kg	TM31/PM12	
o-Xylene #														
o-Xylene #	<5	<5	<5	<5	<5	<5 ^{SV}	<5 ^{SV}	<5			<5	ug/kg	TM31/PM12	
PCB 28 #														
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
PCB 52 #														
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
PCB 101 #														
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
PCB 118 #														
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
PCB 138 #														
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
PCB 153 #														
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
PCB 180 #														
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8	
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35			<35	ug/kg	TM17/PM8	
Natural Moisture Content														
Natural Moisture Content	13.0	15.1	37.8	5.7	10.7	19.5	30.9	32.0			<0.1	%	PM4/PM0	
% Dry Matter 105°C														
% Dry Matter 105°C	85.8	83.8	75.9	95.7	88.4	81.2	69.5	90.2			<0.1	%	NONE/PM4	
Hexavalent Chromium #														
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	mg/kg	TM38/PM20	
Chromium III														
Chromium III	38.3	39.2	49.9	77.5	35.3	35.9	32.7	59.6			<0.5	mg/kg	NONE/NONE	
Total Organic Carbon #														
Total Organic Carbon #	1.71	1.18	2.08	0.08	1.16	1.73	3.87	1.28			<0.02	%	TM21/PM24	

Please see attached notes for all abbreviations and acronyms

Exova Jones Environmental

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan
JE Job No.: 19/6282

Report : Solid

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

J E Sample No.	5-7	8-10	11-13	17-19	22-24	28-30	31-33	34-36			Please see attached notes for all abbreviations and acronyms			
Sample ID	BH102	BH102	BH102	BH102	BH103	BH103	BH103	BH103						
Depth	1.00	2.00	3.00	5.00	0.50	2.00	3.00	4.00						
COC No / misc														
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1						
Date of Receipt	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019			LOD/LOR	Units	Method No.	
Loss on Ignition #	3.1	3.3	6.9	<1.0	3.3	4.3	9.1	4.8			<1.0	%	TM22/PM0	
pH #	9.29	8.41	7.83	9.01	8.71	8.47	7.86	8.10			<0.01	pH units	TM73/PM11	
Mass of raw test portion	0.1052	0.1073	0.1183	0.094	0.1013	0.1103	0.13	0.1003				kg	NONE/PM17	
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09				kg	NONE/PM17	

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan
JE Job No.: 19/6282

Report : CEN 10:1 1 Batch

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

J E Sample No.	5-7	8-10	11-13	17-19	22-24	28-30	31-33	34-36					
Sample ID	BH102	BH102	BH102	BH102	BH103	BH103	BH103	BH103					
Depth	1.00	2.00	3.00	5.00	0.50	2.00	3.00	4.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019					
										LOD/LOR	Units	Method No.	
Dissolved Antimony (A10) #	0.07	<0.02	0.03	<0.02	0.09	<0.02	0.05	0.06		<0.02	mg/kg	TM30/PM17	
Dissolved Arsenic (A10) #	0.096	<0.025	<0.025	0.035	<0.025	0.042	<0.025	<0.025		<0.025	mg/kg	TM30/PM17	
Dissolved Barium (A10) #	<0.03	0.09	0.29	<0.03	<0.03	<0.03	0.14	0.20		<0.03	mg/kg	TM30/PM17	
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	mg/kg	TM30/PM17	
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015		<0.015	mg/kg	TM30/PM17	
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07		<0.07	mg/kg	TM30/PM17	
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	mg/kg	TM30/PM17	
Dissolved Mercury (A10) #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	mg/kg	TM30/PM17	
Dissolved Molybdenum (A10) #	<0.02	0.15	0.18	<0.02	0.09	0.06	0.57	0.27		<0.02	mg/kg	TM30/PM17	
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02		<0.02	mg/kg	TM30/PM17	
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		<0.03	mg/kg	TM30/PM17	
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		<0.03	mg/kg	TM30/PM17	
Total Phenols HPLC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	mg/l	TM26/PM0	
Fluoride	<3	<3	<3	<3	<3	<3	<3	<3		<3	mg/kg	TM173/PM0	
Sulphate as SO4 #	35	10	112	13	15	23	297	110		<5	mg/kg	TM38/PM0	
Chloride #	7	109	58	5	5	4	7	4		<3	mg/kg	TM38/PM0	
Dissolved Organic Carbon	2	4	8	<2	2	3	10	7		<2	mg/l	TM60/PM0	
Dissolved Organic Carbon	<20	40	80	<20	<20	30	100	70		<20	mg/kg	TM60/PM0	
Total Dissolved Solids #	500	850	1359	630	610	680	1639	1380		<350	mg/kg	TM20/PM0	

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan
JE Job No.: 19/6282

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	5-7	8-10	11-13	17-19	22-24	28-30	31-33	34-36							
Sample ID	BH102	BH102	BH102	BH102	BH103	BH103	BH103	BH103							
Depth	1.00	2.00	3.00	5.00	0.50	2.00	3.00	4.00							
COC No / misc															
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019	14/04/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1	1	1							
Date of Receipt	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019							
										Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis															
Total Organic Carbon #	1.71	1.18	2.08	0.08	1.16	1.73	3.87	1.28		3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025 ^{SV}	<0.025 ^{SV}	<0.025		6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035		1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30		500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	3.22	<0.64	<0.64	<0.64	9.63	<0.64	<0.64	<0.64		100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate															
Mass of raw test portion	0.1052	0.1073	0.1183	0.094	0.1013	0.1103	0.13	0.1003		-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	85.8	83.8	75.9	95.7	88.4	81.2	69.5	90.2		-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.885	0.883	0.871	0.896	0.888	0.879	0.86	0.89		-	-	-		l	NONE/PM17
Elate Volume	8.57	0.81	0.8	0.89	0.78	0.83	0.76	0.89		-	-	-		l	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/6282	1	BH102	1.00	6	01/05/2019	General Description (Bulk Analysis)	soil-stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH102	2.00	9	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH102	3.00	12	01/05/2019	General Description (Bulk Analysis)	soil-stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH102	5.00	18	01/05/2019	General Description (Bulk Analysis)	soil-sand-stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH103	0.50	23	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH103	2.00	29	01/05/2019	General Description (Bulk Analysis)	soil-stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH103	3.00	32	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/6282	1	BH103	3.00	32	01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD
19/6282	1	BH103	4.00	35	01/05/2019	General Description (Bulk Analysis)	soil.stones
					01/05/2019	Asbestos Fibres	NAD
					01/05/2019	Asbestos ACM	NAD
					01/05/2019	Asbestos Type	NAD
					01/05/2019	Asbestos Level Screen	NAD

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Pargate place
Contact: Stephen McLoughlan

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/6282	1	BH102	1.00	5-7	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH102	2.00	8-10	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH102	3.00	11-13	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH102	5.00	17-19	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH103	0.50	22-24	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH103	2.00	28-30	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH103	3.00	31-33	EPH, PAH, PCB	Sample holding time exceeded
19/6282	1	BH103	4.00	34-36	EPH, PAH, PCB	Sample holding time exceeded

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

JE Job No.: 19/6282

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental 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

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/6282

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/6282

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/6282

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 19/6282

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

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Attention : Stephen Kealy
Date : 9th May, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/6335 Batch 1
Location : Hickeys 43 Parkgate Place
Date samples received : 17th April, 2019
Status : Final report
Issue : 1

Five samples were received for analysis on 17th April, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Phil Sommerton BSc

Project Manager

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/6335

Report : Solid

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

J E Sample No.	1-3	4-6									Please see attached notes for all abbreviations and acronyms			
Sample ID	BH-104	BH-104												
Depth	3.00	4.00												
COC No / misc														
Containers	V J T	V J T												
Sample Date	15/04/2019	15/04/2019												
Sample Type	Soil	Soil												
Batch Number	1	1												
Date of Receipt	17/04/2019	17/04/2019												
											LOD/LOR	Units	Method No.	
Antimony	2	3									<1	mg/kg	TM30/PM15	
Arsenic #	16.1	19.4									<0.5	mg/kg	TM30/PM15	
Barium #	87	402									<1	mg/kg	TM30/PM15	
Cadmium #	0.8	1.1									<0.1	mg/kg	TM30/PM15	
Chromium #	30.5	36.6									<0.5	mg/kg	TM30/PM15	
Copper #	80	111									<1	mg/kg	TM30/PM15	
Lead #	200	232									<5	mg/kg	TM30/PM15	
Mercury #	1.1	0.6									<0.1	mg/kg	TM30/PM15	
Molybdenum #	2.4	4.8									<0.1	mg/kg	TM30/PM15	
Nickel #	36.1	59.8									<0.7	mg/kg	TM30/PM15	
Selenium #	<1	2									<1	mg/kg	TM30/PM15	
Zinc #	108	168									<5	mg/kg	TM30/PM15	
PAH MS														
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8	
Acenaphthylene	<0.03	0.13									<0.03	mg/kg	TM4/PM8	
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8	
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8	
Phenanthrene #	0.46	0.31									<0.03	mg/kg	TM4/PM8	
Anthracene #	0.05	0.16									<0.04	mg/kg	TM4/PM8	
Fluoranthene #	0.52	1.05									<0.03	mg/kg	TM4/PM8	
Pyrene #	0.45	1.09									<0.03	mg/kg	TM4/PM8	
Benzo(a)anthracene #	0.24	0.79									<0.06	mg/kg	TM4/PM8	
Chrysene #	0.30	0.69									<0.02	mg/kg	TM4/PM8	
Benzo(bk)fluoranthene #	0.46	1.59									<0.07	mg/kg	TM4/PM8	
Benzo(a)pyrene #	0.23	0.71									<0.04	mg/kg	TM4/PM8	
Indeno(123cd)pyrene #	0.15	0.56									<0.04	mg/kg	TM4/PM8	
Dibenzo(ah)anthracene #	0.06	0.20									<0.04	mg/kg	TM4/PM8	
Benzo(ghi)perylene #	0.17	0.64									<0.04	mg/kg	TM4/PM8	
Coronene	<0.04	0.12									<0.04	mg/kg	TM4/PM8	
PAH 17 Total	3.09	8.04									<0.64	mg/kg	TM4/PM8	
Benzo(b)fluoranthene	0.33	1.14									<0.05	mg/kg	TM4/PM8	
Benzo(k)fluoranthene	0.13	0.45									<0.02	mg/kg	TM4/PM8	
PAH Surrogate % Recovery	97	91									<0	%	TM4/PM8	
Mineral Oil (C10-C40)	<30	<30									<30	mg/kg	TM5/PM8/PM16	

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/6335

Report : CEN 10:1 1 Batch
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	COC No / misc	Containers	Sample Date	Sample Type	Batch Number	Date of Receipt	LOD/LOR	Units	Method No.
	Sample ID	Depth									
	BH-104	BH-104		V J T	15/04/2019	Soil	1	17/04/2019			
Please see attached notes for all abbreviations and acronyms											
Dissolved Antimony (A10) #	0.03	<0.02							<0.02	mg/kg	TM30/PM17
Dissolved Arsenic (A10) #	0.096	0.050							<0.025	mg/kg	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03							<0.03	mg/kg	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005							<0.005	mg/kg	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015							<0.015	mg/kg	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07							<0.07	mg/kg	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05							<0.05	mg/kg	TM30/PM17
Dissolved Mercury (A10) #	<0.01	<0.01							<0.01	mg/kg	TM30/PM17
Dissolved Molybdenum (A10) #	0.07	0.08							<0.02	mg/kg	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02							<0.02	mg/kg	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03							<0.03	mg/kg	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03							<0.03	mg/kg	TM30/PM17
Total Phenols HPLC	<0.05	<0.05							<0.05	mg/l	TM26/PM0
Fluoride	<3	3							<3	mg/kg	TM173/PM0
Sulphate as SO4 #	428	95							<5	mg/kg	TM38/PM0
Chloride #	8	40							<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	2	2							<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	20							<20	mg/kg	TM60/PM0
Total Dissolved Solids #	1279	800							<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/6335

Report : EN12457_2
Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-3	4-6															
Sample ID	BH-104	BH-104															
Depth	3.00	4.00															
COC No / misc																	
Containers	V J T	V J T															
Sample Date	15/04/2019	15/04/2019															
Sample Type	Soil	Soil															
Batch Number	1	1															
Date of Receipt	17/04/2019	17/04/2019															
Solid Waste Analysis											Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.	
Total Organic Carbon #	3.68	4.14										3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 ^{SV}	<0.025 ^{SV}										6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035										1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30										500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 17	3.09	8.04										100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																	
Mass of raw test portion	0.1087	0.1369										-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	82.9	65.5										-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.881	0.853										-	-	-		l	NONE/PM17
Elate Volume	0.8	0.79										-	-	-		l	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/6335	1	BH-104	3.00	2	30/04/2019	General Description (Bulk Analysis)	soil/stones
					30/04/2019	Asbestos Fibres	NAD
					30/04/2019	Asbestos ACM	NAD
					30/04/2019	Asbestos Type	NAD
					30/04/2019	Asbestos Level Screen	NAD
19/6335	1	BH-104	4.00	5	30/04/2019	General Description (Bulk Analysis)	soil/stones
					30/04/2019	Asbestos Fibres	NAD
					30/04/2019	Asbestos ACM	NAD
					30/04/2019	Asbestos Type	NAD
					30/04/2019	Asbestos Level Screen	NAD

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/6335	1	BH-104	3.00	1-3	EPH, PAH, PCB	Sample holding time exceeded
19/6335	1	BH-104	4.00	4-6	EPH, PAH, PCB	Sample holding time exceeded

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

JE Job No.: 19/6335

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental 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

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/6335

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/6335

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/6335

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 19/6335

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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CH5 2UA

Ground Investigations Ireland
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Ireland

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Attention : Stephen Kealy
Date : 20th May, 2019
Your reference : 8507-02-19
Our reference : Test Report 19/7526 Batch 1
Location : Hickeys, 43 Parkgate Place
Date samples received : 9th May, 2019
Status : Final report
Issue : 1

Five samples were received for analysis on 9th May, 2019 of which five 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.

Compiled By:

Bruce Leslie
Project Co-ordinator

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys, 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/7526

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-7	8-14	15-21	22-28	29-35										LOD/LOR	Units	Method No.
Sample ID	BH101	BH104	BH103	BH107	BH106												
Depth	3.59	4.21	3.83	3.43	3.26												
COC No / misc																	
Containers	V H H N P B O D G	V H H N P B O D G	V H H N P B O D G	V H H N P B O D G	V H H N P B O D G												
Sample Date	08/05/2019 13:30	08/05/2019 14:30	08/05/2019 15:00	08/05/2019 15:30	08/05/2019 16:00												
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water												
Batch Number	1	1	1	1	1												
Date of Receipt	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019												
Dissolved Aluminium #	2.6	40.8	6.6	4.4	<1.5									<1.5	ug/l	TM30/PM14	
Dissolved Antimony #	<2	<2	5	<2	<2									<2	ug/l	TM30/PM14	
Dissolved Arsenic #	<0.9	<0.9	10.6	<0.9	<0.9									<0.9	ug/l	TM30/PM14	
Dissolved Barium #	155.1	11.4	66.6	42.5	17.5									<1.8	ug/l	TM30/PM14	
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5									<0.5	ug/l	TM30/PM14	
Dissolved Boron	512	25	99	263	202									<12	ug/l	TM30/PM14	
Dissolved Cadmium #	<0.03	<0.03	<0.03	<0.03	<0.03									<0.03	ug/l	TM30/PM14	
Dissolved Calcium #	156.7	29.9	107.7	96.2	79.2									<0.2	mg/l	TM30/PM14	
Total Dissolved Chromium #	<0.2	<0.2	0.4	<0.2	1.4									<0.2	ug/l	TM30/PM14	
Dissolved Cobalt #	<0.1	<0.1	1.3	0.2	1.3									<0.1	ug/l	TM30/PM14	
Dissolved Copper #	<3	<3	<3	<3	<3									<3	ug/l	TM30/PM14	
Total Dissolved Iron #	1840.0	17.1	1335.0	160.6	<4.7									<4.7	ug/l	TM30/PM14	
Dissolved Lead #	<0.4	<0.4	<0.4	<0.4	<0.4									<0.4	ug/l	TM30/PM14	
Dissolved Magnesium #	188.2 ^{AA}	4.3	14.1	26.1	28.9									<0.1	mg/l	TM30/PM14	
Dissolved Manganese #	1637.0	24.5	617.3	322.5	635.7									<1.5	ug/l	TM30/PM14	
Dissolved Molybdenum #	2.7	2.5	11.9	10.4	15.3									<0.2	ug/l	TM30/PM14	
Dissolved Nickel #	0.8	1.3	5.6	5.3	9.6									<0.2	ug/l	TM30/PM14	
Dissolved Potassium #	54.3	2.6	14.1	16.9	17.7									<0.1	mg/l	TM30/PM14	
Dissolved Selenium #	<1.2	<1.2	<1.2	<1.2	<1.2									<1.2	ug/l	TM30/PM14	
Dissolved Silver	<5	<5	<5	<5	<5									<5	ug/l	TM30/PM14	
Dissolved Sodium #	1518.0 ^{AB}	17.2	24.6	53.2	110.6									<0.1	mg/l	TM30/PM14	
Dissolved Strontium	1375	110	451	683	514									<5	ug/l	TM30/PM14	
Dissolved Uranium	<5	<5	<5	<5	<5									<5	ug/l	TM30/PM14	
Dissolved Zinc #	3.1	12.4	5.6	7.4	2.8									<1.5	ug/l	TM30/PM14	
Mercury Dissolved by CVAFF #	<0.01	<0.01	<0.01	<0.01	<0.01									<0.01	ug/l	TM61/PM0	
GRO (>C4-C8) #	<10	<10	<10	<10	<10									<10	ug/l	TM36/PM12	
GRO (>C8-C12) #	<10	<10	<10	<10	<10									<10	ug/l	TM36/PM12	
GRO (>C4-C12) #	<10	<10	<10	<10	<10									<10	ug/l	TM36/PM12	
MTBE #	<5	<5	<5	<5	<5									<5	ug/l	TM31/PM12	
Benzene #	<5	<5	<5	<5	<5									<5	ug/l	TM31/PM12	
Toluene #	<5	<5	<5	<5	<5									<5	ug/l	TM31/PM12	
Ethylbenzene #	<5	<5	<5	<5	<5									<5	ug/l	TM31/PM12	
m/p-Xylene #	<5	<5	<5	<5	<5									<5	ug/l	TM31/PM12	
o-Xylene #	<5	<5	<5	<5	<5									<5	ug/l	TM31/PM12	
EPH (C8-C40) #	<10	<10	<10	<10	<10									<10	ug/l	TM5/PM30	
C8-C40 Mineral Oil (Calculation)	<10	<10	<10	<10	<10									<10	ug/l	TM5/PM30	
Fluoride	0.4	0.6	<0.3	<0.3	0.4									<0.3	mg/l	TM173/PM0	
Sulphate as SO4 #	363.5	44.0	21.5	133.4	97.5									<0.5	mg/l	TM38/PM0	
Chloride #	2668.9	31.7	31.7	43.6	159.7									<0.3	mg/l	TM38/PM0	
Nitrate as NO3 #	16.5	2.2	0.4	0.4	1.6									<0.2	mg/l	TM38/PM0	

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
 Reference: 8507-02-19
 Location: Hickeys, 43 Parkgate Place
 Contact: Stephen Kealy
 JE Job No.: 19/7526

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-7	8-14	15-21	22-28	29-35											
Sample ID	BH101	BH104	BH103	BH107	BH106											
Depth	3.59	4.21	3.83	3.43	3.26											
COC No / misc																
Containers	V H HN P BOD G	V H HN P BOD G	V H HN P BOD G	V H HN P BOD G	V H HN P BOD G											
Sample Date	08/05/2019 13:30	08/05/2019 14:30	08/05/2019 15:00	08/05/2019 15:30	08/05/2019 16:00											
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water											
Batch Number	1	1	1	1	1											
Date of Receipt	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019											
														LOD/LOR	Units	Method No.
Nitrite as NO2 [#]	<0.02	<0.02	<0.02	<0.02	<0.02									<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO4 [#]	<0.06	<0.06	<0.06	<0.06	<0.06									<0.06	mg/l	TM38/PM0
MRP Ortho Phosphate as PO4	<0.06	<0.06	<0.06	<0.06	<0.06									<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as N [#]	0.24	0.03	6.88	0.29	0.58									<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<0.006	<0.006	<0.006	<0.006	<0.006									<0.006	mg/l	TM38/PM0
Total Alkalinity as CaCO3 [#]	368	101	674	362	1114									<1	mg/l	TM75/PM0
Carbonate Alkalinity as CaCO3	<1	<1	<1	<1	<1									<1	mg/l	TM75/PM0
Bicarbonate Alkalinity as CaCO3 (water soluble)	368	101	674	362	1114									<1	mg/l	TM75/PM0
BOD (Settled) [#]	<1	<1	11	1	<1									<1	mg/l	TM58/PM0
COD (Settled) [#]	53	9	28	11	22									<7	mg/l	TM57/PM0
Electrical Conductivity @25C [#]	8635	330	735	898	1210									<2	uS/cm	TM76/PM0
pH [#]	7.88	7.01	7.62	7.76	7.84									<0.01	pH units	TM73/PM0
Total Organic Carbon [#]	<2	<2	6	<2	<2									<2	mg/l	TM60/PM0
Total Dissolved Solids [#]	5008	213	448	584	678									<35	mg/l	TM20/PM0
Total Suspended Solids [#]	87	32	1524	231	3048									<10	mg/l	TM37/PM0
Turbidity	59.1	13.0	1705.0AA	241.0	821.0									<0.1	NTU	TM34/PM0
Total Cations	90.72	2.66	7.97	9.69	11.59									<0.00	mmolc/l	TM30/PM14
Total Anions	90.48	3.86	14.82	11.25	28.83									<0.00	mmolc/l	TM0/PM0
% Cation Excess	0.13	-18.40	-30.06	-7.45	-42.65										%	TM0/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys, 43 Parkgate Place
Contact: Stephen Kealy

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 19/7526						

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

JE Job No.: 19/7526

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

JE Job No: 19/7526

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM0	Not available	PM0	No preparation is required.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM34	Turbidity by 2100P Turbidity Meter	PM0	No preparation is required.				
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods USEPA 160.2, EN872:2005 and SMWW 2540D. Gravimetric determination of Total Suspended Solids. Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed.	PM0	No preparation is required.	Yes			

JE Job No: 19/7526

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometrically.	PM0	No preparation is required.	Yes			
TM58	APHA Standard Methods for the examination of water and wastewater (SM 1910). Comparable with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as ammonia, nitrite and organic nitrogen which exert a nitrogenous demand. Determination of Dissolved Oxygen using the Hatch 10000 Dissolved Oxygen Meter.	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1. Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.				
TM75	Modified US EPA method 310.1. Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			



Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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Attention :	Stephen Kealy
Date :	6th June, 2019
Your reference :	8507-02-19
Our reference :	Test Report 19/7173 Batch 1
Location :	Hickeys 43 Parkgate Place
Date samples received :	2nd May, 2019
Status :	Final report
Issue :	1

Four samples were received for analysis on 2nd May, 2019 of which four 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.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Lucas Halliwell
Project Co-ordinator

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/7173

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	10-12							Please see attached notes for all abbreviations and acronyms		
Sample ID	WS107	WS107	WS107	WS107							LOD/LOR	Units	Method No.
Depth	0.50	1.70	2.50	3.50									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	02/05/2019	02/05/2019	02/05/2019	02/05/2019									
Antimony	7	2	2	<1							<1	mg/kg	TM30/PM15
Arsenic [#]	12.8	17.7	10.7	5.6							<0.5	mg/kg	TM30/PM15
Barium [#]	97	97	71	40							<1	mg/kg	TM30/PM15
Cadmium [#]	1.1	1.7	1.5	0.6							<0.1	mg/kg	TM30/PM15
Chromium [#]	45.0	61.8	39.6	57.1							<0.5	mg/kg	TM30/PM15
Copper [#]	39	28	26	12							<1	mg/kg	TM30/PM15
Lead [#]	191	37	39	10							<5	mg/kg	TM30/PM15
Mercury [#]	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Molybdenum [#]	4.1	4.5	3.5	4.3							<0.1	mg/kg	TM30/PM15
Nickel [#]	24.9	37.3	29.2	17.4							<0.7	mg/kg	TM30/PM15
Selenium [#]	1	1	2	<1							<1	mg/kg	TM30/PM15
Zinc [#]	136	121	93	41							<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene [#]	0.14	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Acenaphthene [#]	<0.05	<0.05	<0.05	<0.05							<0.05	mg/kg	TM4/PM8
Fluorene [#]	0.05	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene [#]	0.87	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Anthracene [#]	0.19	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Fluoranthene [#]	1.32	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Pyrene [#]	1.12	<0.03	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	1.13	<0.06	<0.06	<0.06							<0.06	mg/kg	TM4/PM8
Chrysene [#]	0.96	<0.02	<0.02	<0.02							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene [#]	1.98	<0.07	<0.07	<0.07							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	1.06	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene [#]	0.83	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	0.32	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.83	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Coronene	0.15	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
PAH 17 Total	10.95	<0.64	<0.64	<0.64							<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.43	<0.05	<0.05	<0.05							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.55	<0.02	<0.02	<0.02							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	80	82	84							<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30							<30	mg/kg	TM5/PM8/PM16

Exova Jones Environmental

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy
JE Job No.: 19/7173

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

J E Sample No.	Sample Information				LOD/LOR	Units	Method No.
	1-3	4-6	7-9	10-12			
Sample ID	WS107	WS107	WS107	WS107			
Depth	0.50	1.70	2.50	3.50			
COC No / misc							
Containers	V J T	V J T	V J T	V J T			
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019			
Sample Type	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1			
Date of Receipt	02/05/2019	02/05/2019	02/05/2019	02/05/2019			
Please see attached notes for all abbreviations and acronyms							
TPH CWG							
Aliphatics							
>C5-C6 [#]	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 [#]	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 [#]	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 [#]	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 [#]	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 [#]	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM11
Aromatics							
>C5-EC7 [#]	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 [#]	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 [#]	<0.1	<0.1	<0.1 ^{SV}	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 [#]	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 [#]	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 [#]	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 [#]	24	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 [#]	24	<19	<19	<19	<19	mg/kg	TM5/PM8/PM16/PM12/PM11
Total aliphatics and aromatics(C5-35)	<38	<38	<38	<38	<38	mg/kg	TM5/PM8/PM16/PM12/PM11
MTBE[#]	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
Benzene[#]	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
Toluene[#]	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
Ethylbenzene[#]	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
m/p-Xylene[#]	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
o-Xylene[#]	<5	<5	<5 ^{SV}	<5	<5	ug/kg	TM31/PM12
PCB 28[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180[#]	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs [#]	<35	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	14.0	28.9	28.4	13.1	<0.1	%	PM4/PM0
% Dry Matter 105°C	76.0	72.5	72.6	83.9	<0.1	%	NONE/PM4
Hexavalent Chromium [#]	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	45.0	61.8	39.6	57.1	<0.5	mg/kg	NONE/NONE
Total Organic Carbon [#]	3.68	1.03	1.31	0.26	<0.02	%	TM21/PM24

Client Name: Ground Investigations Ireland
 Reference: 8507-02-19
 Location: Hickeys 43 Parkgate Place
 Contact: Stephen Kealy
 JE Job No.: 19/7173

Report : EN12457_2
 Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	7-9	10-12															
Sample ID	WS107	WS107	WS107	WS107															
Depth	0.50	1.70	2.50	3.50															
COC No / misc																			
Containers	V J T	V J T	V J T	V J T															
Sample Date	30/04/2019	30/04/2019	30/04/2019	30/04/2019															
Sample Type	Soil	Soil	Soil	Soil															
Batch Number	1	1	1	1															
Date of Receipt	02/05/2019	02/05/2019	02/05/2019	02/05/2019															
											Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.			
Solid Waste Analysis																			
Total Organic Carbon #	3.68	1.03	1.31	0.26							3	5	6	<0.02	%	TM21/PM24			
Sum of BTEX	<0.025	<0.025	<0.025 ^{8V}	<0.025							6	-	-	<0.025	mg/kg	TM31/PM12			
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035							1	-	-	<0.035	mg/kg	TM17/PM8			
Mineral Oil	<30	<30	<30	<30							500	-	-	<30	mg/kg	TM5/PM8/PM16			
PAH Sum of 17	10.95	<0.64	<0.64	<0.64							100	-	-	<0.64	mg/kg	TM4/PM8			
CEN 10:1 Leachate																			
Mass of raw test portion	0.1187	0.1237	0.1244	0.107							-	-	-		kg	NONE/PM17			
Dry Matter Content Ratio	76.0	72.5	72.6	83.9							-	-	-	<0.1	%	NONE/PM4			
Leachant Volume	0.872	0.866	0.866	0.883							-	-	-		l	NONE/PM17			
Eluate Volume	0.8	0.7	0.7	0.81							-	-	-		l	NONE/PM17			

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/02/8507
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

Note:

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

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

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/7173	1	WS107	0.50	2	29/05/2019	General Description (Bulk Analysis)	Soil/Stones
					29/05/2019	Asbestos Fibres	NAD
					29/05/2019	Asbestos ACM	NAD
					29/05/2019	Asbestos Type	NAD
					29/05/2019	Asbestos Level Screen	NAD
19/7173	1	WS107	1.70	5	29/05/2019	General Description (Bulk Analysis)	Soil/Stones
					29/05/2019	Asbestos Fibres	NAD
					29/05/2019	Asbestos ACM	NAD
					29/05/2019	Asbestos Type	NAD
					29/05/2019	Asbestos Level Screen	NAD
19/7173	1	WS107	2.50	8	29/05/2019	General Description (Bulk Analysis)	Soil/Stones
					29/05/2019	Asbestos Fibres	NAD
					29/05/2019	Asbestos ACM	NAD
					29/05/2019	Asbestos Type	NAD
					29/05/2019	Asbestos Level Screen	NAD
19/7173	1	WS107	3.50	11	29/05/2019	General Description (Bulk Analysis)	Soil/Stones
					29/05/2019	Asbestos Fibres	NAD
					29/05/2019	Asbestos ACM	NAD
					29/05/2019	Asbestos Type	NAD
					29/05/2019	Asbestos Level Screen	NAD

Client Name: Ground Investigations Ireland
Reference: 8507-02-19
Location: Hickeys 43 Parkgate Place
Contact: Stephen Kealy

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/7173	1	WS107	0.50	1-3	EPH, GRO, LOI, PAH, PCB, TOC	Sample holding time exceeded
19/7173	1	WS107	1.70	4-6	EPH, GRO, LOI, PAH, PCB, TOC	Sample holding time exceeded
19/7173	1	WS107	2.50	7-9	EPH, GRO, LOI, PAH, PCB, TOC	Sample holding time exceeded
19/7173	1	WS107	3.50	10-12	EPH, GRO, LOI, PAH, PCB, TOC	Sample holding time exceeded

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

JE Job No.: 19/7173

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. 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.

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 overestimate 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.

Please include all sections of this report if it is reproduced

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

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.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental 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

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/7173

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometric methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range
<p>Notes:</p> <p>*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS</p> <p>**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180</p> <p>***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.</p>	

JE Job No: 19/7173

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/7173

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methylterbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

JE Job No: 19/7173

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

JE Job No: 19/7526

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.				

APPENDIX 7 – Groundwater and Gas Monitoring Monitoring



**GROUND
INVESTIGATIONS
IRELAND**

**Ground Investigations Ireland
Gas Monitoring Field Sheet**

(V1 May 2019)

Project Information

Project Number	8507-02-19	Sample Date	03/05/2019
Client	ARUP	Weather	Dry
Site Name	Hickeys	Weather Previous 24 hours	Dry
Sampler I.D.	PC		

Well Data

Casing Diameter (mm)	100mm	Standpipe Type uPVC etc.	PVC
Standpipe Diameter (mm)	50mm	Total Well Depth (m)	4.0
Stick Up (mm)	Flush	Water Level (mBTOC)	
Cover Condition	Good	Odour	Odourless
Gas Meter Model	Geotech GA 5000	Gas Valve/Cap Condition	In good repair

Gas Data

Sample I.D.	Location Type	CH4 (%)	CO2 (%)	CO (ppm)	H2S (ppm)	O2 (%)	Barometric Pressure	Additional Comment
WS110	Gas well	0.0	2.5	1	1	17.5%		
WS114	Gas well	0.1	3.0	1	1	18.2		
WS117	Gas well	1.4	4.3	1	1	12.7		

Additional Comments/Observations:



Ground Investigations Ireland
Gas Monitoring Field Sheet

(V1 May 2019)

Project Information

Project Number	8507-02-19	Sample Date	30/05/2019
Client	ARUP	Weather	Dry
Site Name	Hickeys	Weather Previous 24 hours	Dry
Sampler I.D.	PC		

Well Data

Casing Diameter (mm)	100mm	Standpipe Type uPVC etc.	PVC
Standpipe Diameter (mm)	50mm	Total Well Depth (m)	4.0
Stick Up (mm)	Flush	Water Level (mBTOC)	
Cover Condition	Good	Odour	Odourless
Gas Meter Model	Geotech GA 5000	Gas Valve/Cap Condition	In good repair

Gas Data

Sample I.D.	Location Type	CH4 (%)	CO2 (%)	CO (ppm)	H2S (ppm)	O2 (%)	Barometric Pressure	Additional Comment
WS110	Gas well	0.0	2.8	2	3	15.6%		
WS114	Gas well	-	-	-	-	-	-	Not Accessible
WS117	Gas well	0.1	3.9	2	3	13.0		

Additional Comments/Observations:



**GROUND
INVESTIGATIONS
IRELAND**

**Ground Investigations Ireland
Gas Monitoring Field Sheet**

(V1 May 2019)

Project Information

Project Number	8507-02-19	Sample Date	13/06/2019
Client	ARUP	Weather	Dry
Site Name	Hickeys	Weather Previous 24 hours	Dry
Sampler I.D.	PC		

Well Data

Casing Diameter (mm)	100mm	Standpipe Type uPVC etc.	PVC
Standpipe Diameter (mm)	50mm	Total Well Depth (m)	4.0
Stick Up (mm)	Flush	Water Level (mBTOC)	
Cover Condition	Good	Odour	Odourless
Gas Meter Model	Geotech GA 5000	Gas Valve/Cap Condition	In good repair

Gas Data

Sample I.D.	Location Type	CH4 (%)	CO2 (%)	N2 (%)	H2S (ppm)	O2 (%)	Barometric Pressure	Flow (l/hr)
WS110	Gas well	0.0	6.7	86	-	6.9	1008	0.2
WS114	Gas well	0.0	5	77	-	17.7	1008	0.01

Additional Comments/Observations:



GROUNDWATER MONITORING - RECENT BOREHOLES

Hickeys - 43 Pargate Place

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL) BEFORE PURGE	GROUNDWATER (mBGL) AFTER PURGE	COMMENT
BH101	03.05.19		3.40	3.44	
BH102	03.05.19				Borehole Not Completed
BH103	03.05.19				Borehole Not Completed
BH104	03.05.19		4.12	4.35	
BH105	03.05.19				Borehole Not Completed
BH106	03.05.19		3.68	4.03	
BH107	03.05.19		3.65	3.73	
BH101	08.05.19			3.59	
BH102	08.05.19				Borehole Not Completed
BH103	08.05.19		3.75	3.83	
BH104	08.05.19			4.10	
BH105	08.05.19				Borehole Not Completed
BH106	08.05.19			3.26	
BH107	08.05.19			3.43	
BH101	30.05.19	14.50		4.02	
BH102	30.05.19				Not Accessible
BH103	30.05.19	15.00		3.88	

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL) BEFORE PURGE	GROUNDWATER (mBGL) AFTER PURGE	COMMENT
BH104	30.05.19	16.20		5.43	
BH105	30.05.19				
BH106	30.05.19	15.50		4.49	
BH107	30.05.19	15.40		4.27	
BH101	13.06.19	11.39	3.44	3.44	
BH102	13.06.19				Not Accessible
BH103	13.06.19	11.07		3.83	
BH104	13.06.19	11.00		4.46	
BH105	13.06.19	10.45		3.14	
BH106	13.06.19	10.32		3.52	
BH107	13.06.19	10.27		3.73	



GROUNDWATER MONITORING

Hickeys - 43 Pargate Place - Historic Boreholes

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL) BEFORE PURGE	GROUNDWATER (mBGL) AFTER PURGE	COMMENT
BH01	03/05/2019	11.18	2.87	2.95	
BH02	03/05/2019	12.00	3.38	3.42	
BH05	03/05/2019	12.30		3.10	Could not purge due to small diameter pipe
BH06	03/05/2019	13.0	3.36	3.36	
WS02	03/05/2019	13.35			No Water
WS06	03/05/2019	13.45	2.34	2.54	
WS05	03/05/2019	13.50			No Water
WS07	03/05/2019				Not Found
WS10	03/05/2019				Not possible to open
WS12	03/05/2019	14.10	3.68	3.72	
WS13	03/05/2019	14.30	3.60	3.60	
WS16	03/05/2019	15.00			No Water
BH01	30/05/2019	14.30		3.22	
BH02	30/05/2019	14.40		3.65	
BH07	30/05/2019	15.20			No Water
BH01	13/06/2019	11.36		3.01	
BH02	13/06/2019	11.33		3.44	

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL) BEFORE PURGE	GROUNDWATER (mBGL) AFTER PURGE	COMMENT
BH05	13/06/2019				Not accessible
BH07	13/06/2019				No Water
WS05	13/06/2019				No Water
WS10	13/06/2019				Not possible to open
WS12	13/06/2019				Not possible to open - covered with cement
WS13	13/06/2019	10.39	3.54		
WS14	13/06/2019				Not possible to open - covered with cement
WS16	13/06/2019				No Water

APPENDIX 8 – Permeability Test Records

Test Type	Slug Test	Diameter of hole (m)	0.10
Well ID	BH101	Depth of test (mbgl)	4.01
Date	10/06/2019	Dimensions of Slug (m)	0.05
Test Start Time	13:15	Test End Time	15:15
Time elapsed (min)	Dipped Waterlevel (mbgl)	Time elapsed (min)	Dipped Waterlevel (mbgl)
0	4.01	35	3.83
0.5	3.84	40	3.82
1	3.84	45	3.82
1.5	3.84	50	3.82
2	3.84	55	3.81
2.5	3.84	60	3.80
3	3.84	75	3.78
3.5	3.84	90	3.77
4	3.84	105	3.77
4.5	3.84	120	3.77
5	3.84		
6	3.84		
7	3.84		
8	3.84		
9	3.84		
10	3.84		
12	3.84		
14	3.84		
16	3.84		
18	3.84		
20	3.83		
22	3.83		
24	3.83		
26	3.83		
28	3.83		
30	3.83		
Comments:	Waterlevel prior to purge (12:45), 3.28mbgl; purged for 90 minutes prior to test.		

Test Type	Slug Test	Diameter of hole (m)	0.10
Well ID	BH106	Depth of test (mbgl)	4.01
Date	10/06/2019	Dimensions of Slug (m)	0.05
Test Start Time	15:20	Test End Time	17:20
Time elapsed (min)	Dipped Waterlevel (mbgl)	Time elapsed (min)	Dipped Waterlevel (mbgl)
0	4.80	35	4.31
0.5	4.46	40	4.29
1	4.42	45	4.27
1.5	4.42	50	4.25
2	4.42	55	4.24
2.5	4.42	60	4.23
3	4.42	75	4.23
3.5	4.42	90	4.23
4	4.42	105	4.23
4.5	4.42	120	4.23
5	4.42		
6	4.41		
7	4.41		
8	4.41		
9	4.40		
10	4.39		
12	4.39		
14	4.38		
16	4.38		
18	4.38		
20	4.37		
22	4.36		
24	4.35		
26	4.35		
28	4.34		
30	4.32		
Comments:	Waterlevel prior to purge (14:50), 4.62mbgl; purged for 1 hour prior to test.		

APPENDIX 9 – Geophysical Survey

AGP19036_01

**REPORT
ON THE
GEOPHYSICAL INVESTIGATION
AT THE
PARKGATE ST. SITE, DUBLIN
FOR
GROUND INVESTIGATIONS IRELAND LIMITED**



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15TH MAY 2019

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	AGP19021		
AUTHOR	CHECKED	REPORT STATUS	DATE
EURGEOL YVONNE O'CONNELL PH.D., M.Sc. (GEOPHYSICS), PGEO	TONY LOMBARD M.Sc (GEOPHYSICS)	V.01	15 TH MAY 2019

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1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by Ground Investigations Ireland Limited to carry out a geophysical survey at the Hickeys Site in Parkgate Street, Dublin. The site is located between Parkgate Street and the River Liffey, west of Sean Heuston Bridge and consists of a building with a car parking area to the west.

The survey was requested to aid in completing the ground model for the site, delineating the possible presence of an infill channel through the site and mapping any variation in the rockhead depth. Site topography ranges from 3.6 MSL southwest of the building, increasing to approx. 5.5 MSL along Parkgate Street, north and north east of the site.

Preliminary trial pit and borehole information provided to assist in the compilation of this report typically indicated 1.8 to 2.5 m made ground predominantly comprising sandy gravelly clay over soft to firm sandy gravelly clay, over loose to medium dense slightly clayey sand/gravel.

The geophysical survey was carried out on the night of April 13th, 2019. The investigation consisted of 4 x P-wave Seismic Refraction profiles coupled with 2 x 2D MASW profiles at accessible locations west and north of the building in addition to 4 x P-wave Seismic Refraction profiles and 4 x 1D MASW profiles within the building.

The geophysical data has been interpreted as indicating 4 subsurface layers across the site:

- **Layer 1** has an average thickness of 0.7 m. This layer has low Vp velocities (average 185 m/s) which would indicate very soft or very loose material. In conjunction with the available borehole and trial pit information this layer is likely to comprise of made ground.
- **Layer 2** has an average thickness of 2.0 m. This layer has an average Vp velocity of 385 m/s which would indicate soft or loose material. This layer has an average Poisson's Ratio of 0.36. In conjunction with the available borehole and trial pit information this layer is likely to comprise of made ground.
- **Layer 3** has an average thickness of 5.5 m. This layer has an average Vp velocity of 1120 m/s which would indicate firm to stiff or medium dense to dense material. The Vs velocities indicate firm/medium dense material in the upper half of the layer and stiff/dense material in the lower half of the layer. This layer has an average Poisson's Ratio of 0.47. In conjunction with the available borehole and trial pit information this layer is likely to comprise of sandy gravelly clay overlying clayey sand/gravel.
- **Layer 4** at an average depth of 8.2 m BGL has an average Vp velocity of 3215 m/s which is indicative of slightly weathered to fresh rock.

The findings of the geophysical investigation should be reviewed on completion of the direct investigation.

2. INTRODUCTION

APEX Geophysics Limited was requested by Ground Investigations Ireland Limited to carry out a geophysical survey at the Hickeys Site in Parkgate Street, Dublin. Available ground investigation data indicates that rockhead levels range from 8 m to 10 m below ground level (BGL), however Geological Survey of Ireland (GSI) Quaternary maps indicate the possible presence of a deep infilled gravel/glacial channel running north-south through the centre of the site. There is also a risk that rockhead levels may dip significantly through the centre of the site. The survey was requested to aid in completing the ground model for the site, delineating the possible presence of an infill channel through the site and mapping any variation in the rockhead depth.

2.1 Survey Objectives

The objectives of the investigation were to provide information on:

- variations in soil thickness and stratigraphy,
- variations in depth to bedrock,
- engineering properties of the overburden and underlying bedrock .

2.2 Site Background

The site is located between Parkgate Street and the River Liffey, west of Sean Heuston Bridge (Figure 2.1). The site consists of an existing building with a car parking area to the west of the building (Figure 2.2). Site topography ranges from 3.6 MSL southwest of the building, increasing to approx. 5.5 MSL along Parkgate Street, north and north east of the site.

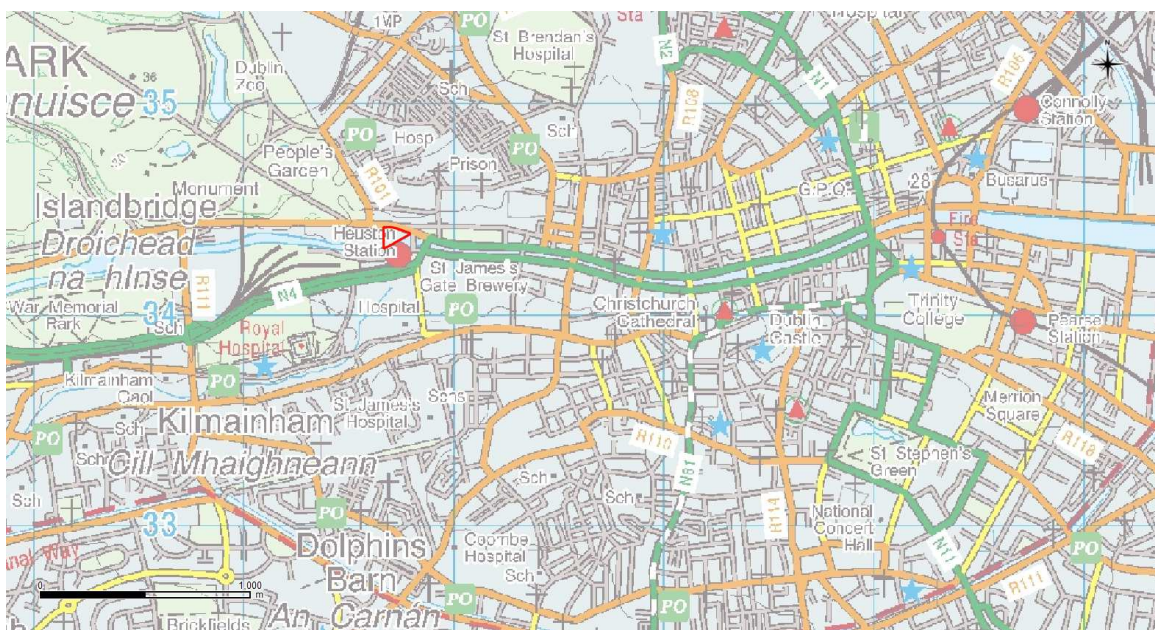


Fig 2.1: Location map (site outlined in red).



Fig 2.2: Aerial photo (site outlined in red).

2.2.1 Soils

The GSI and Teagasc subsoils map for the area (Figure 2.3) indicates that the site is underlain by urban deposits, with till derived from limestone in the broader area, alluvium channels along the River Liffey to the south and along a meltwater channel mapped northwest of the site.

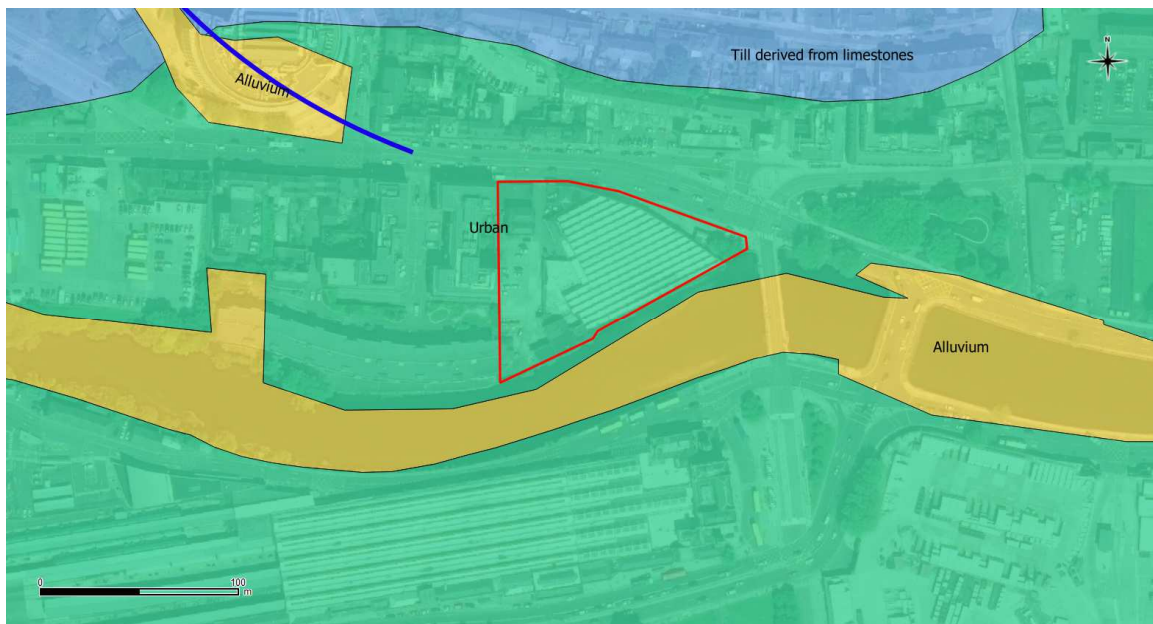


Fig 2.3: The GSI/Teagasc subsoils map (site outlined in red) with meltwater channel mapped as a blue line.

2.2.2 Geology

The GSI 1:100k Bedrock Geology map (Figure 2.4) indicates that the site is underlain by muddy limestone and shale of the Lucan Formation (Calp). The Lucan Formation is classified as a 'Locally Important aquifer – bedrock which is moderately productive only in local zones'.

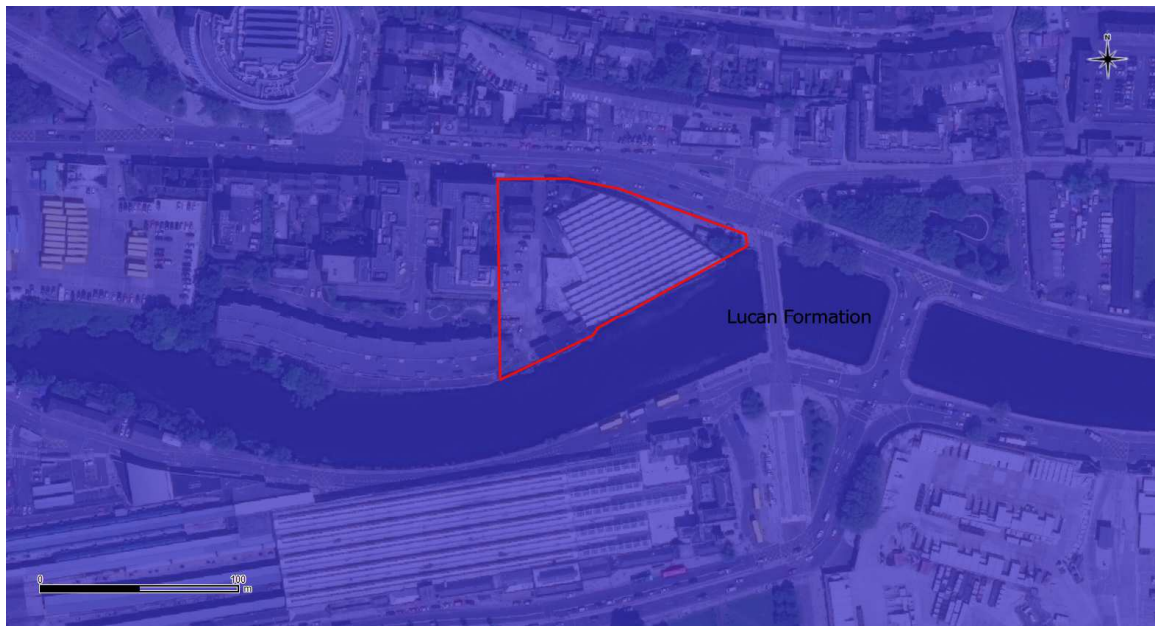


Fig 2.4: The GSI bedrock map (site outlined in red).

2.2.3 Groundwater Vulnerability

The groundwater vulnerability rating for the site (Figure 2.5) is classified as low in the north of the site and moderate in the south of the site.

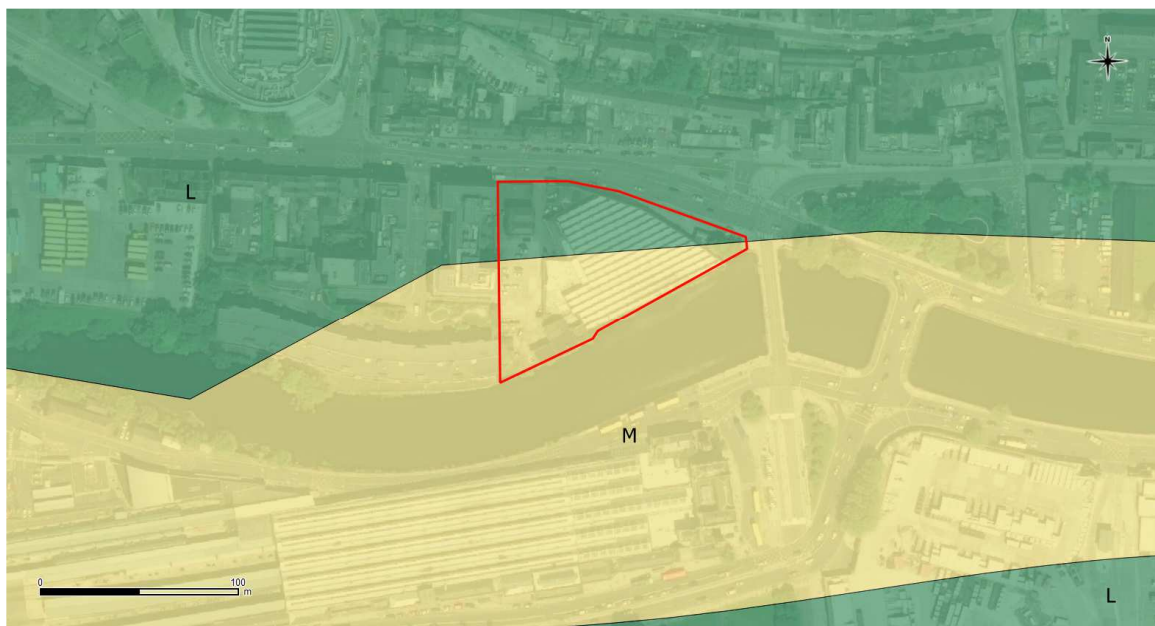


Fig 2.5: The GSI groundwater vulnerability classification map (site outlined in red).

2.2.4 Historical Data

The historical 6 inch sheet for the area indicates channels of alluvium running east-west north of the site and through the site, with a north-south alluvium channel mapped south of the site (Figure 2.5).

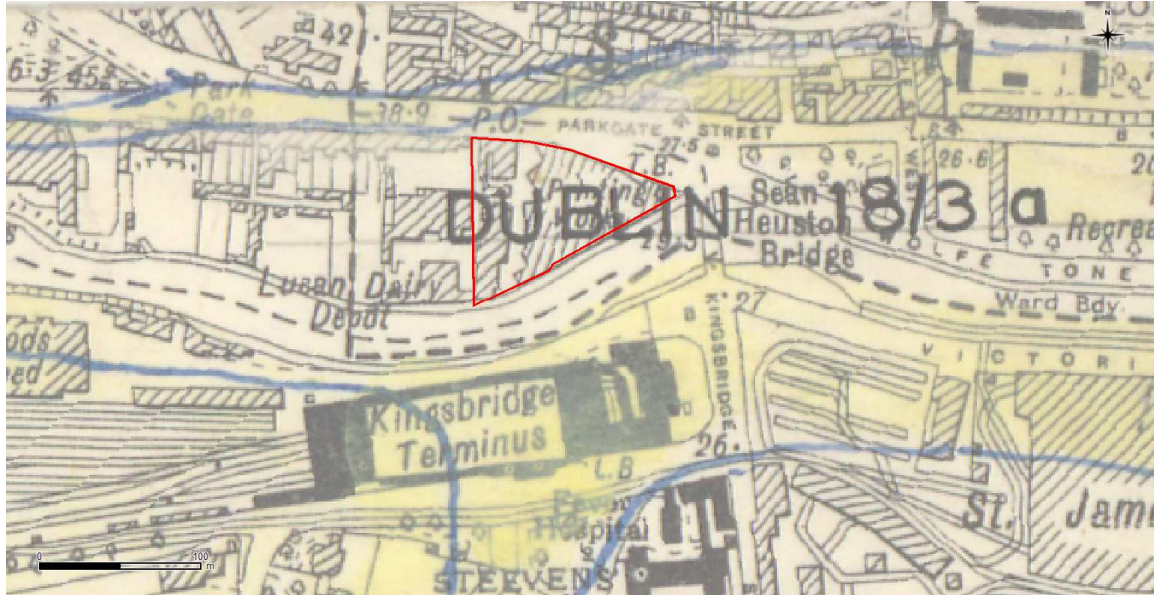


Fig 2.5: The historical 6inch map (site outlined in red, blue outlines alluvium deposits).

2.2.5 Direct Investigation Data

Preliminary trial pit and borehole information was provided to assist in the compilation of this report. The trial pits and boreholes typically indicated 1.8 to 2.5 m made ground predominantly comprising sandy gravelly clay over soft to firm sandy gravelly clay, over loose to medium dense slightly clayey sand/gravel.

2.3 Survey Rationale

The investigation consisted of P-wave Seismic Refraction profiling coupled with 2D and 1D Multichannel Analysis of Surface Wave (MASW) profiling:

P-wave Seismic Refraction profiling measures the P-wave velocity (V_p) 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.

The **MASW** method is used to estimate Shear-wave velocities (V_s) and G_{max} values of the ground material. Overburden material with a $V_s < 175$ m/s is generally classified as soft/loose. The data was acquired using the same acquisition geometry as the P-wave Seismic Refraction profiling.

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. Further information on the detailed methodology of each geophysical method employed in this investigation is given in **APPENDIX A: DETAILED METHODOLOGY**.

3. RESULTS

The survey was carried out on the night of April 13th, 2019. The investigation consisted of 4 x P-wave Seismic Refraction profiles (S5, S6, S7 & S8) coupled with 2 x 2D MASW profiles (M1 & M2) at accessible locations west and north of the building in addition to 4 x P-wave Seismic Refraction profiles (S1, S2, S3 & S4) and 4 x 1D MASW profiles within the building (Figure 3.1).

The Seismic Refraction data quality was fair outside of the building and relatively poor within the building (due to ground conditions e.g. concrete and vibration noise from e.g. vehicle traffic and services). As such, P-wave (V_p) results could only be obtained for one P-wave Seismic Refraction profile (S3) within the building.



Fig 3.1: Aerial photo (site outlined in red).

The geophysical survey locations are indicated on Drawing AGP19036_01 (Appendix B). Geophysical results and interpreted sections are plotted on Drawings AGP19036_02 and AGP19036_03 (Appendix B).

3.1 Seismic Refraction P-wave Velocity Profiling

Eight seismic refraction spreads were acquired (S1-S8). The seismic refraction data for profiles (S3, S5, S6, S7 & S8) indicated 4 velocity layers which have been interpreted as follows:

Layer	Seismic V_p Velocity (m/s)	Average V_p Seismic Velocity (m/s)	Interpretation	Stiffness/ Rock Quality	Excavatability
1	148-364	210	Soil	Soft /Loose	Diggable
2	329-556	405	Soil	Soft-Firm/Loose-medium dense	
3	626-1541	1100	Soil	Firm-Stiff/Medium Dense to Dense	
4	2710-3516	3070	Slightly Weathered – Fresh Bedrock	Good	Break/Blast

3.3 MASW S-wave Velocity Profiling

1D shear-wave velocity (V_s) and G_{max} values were determined for the overburden material for each of the 4 P-wave seismic refraction profiles within the building. These have been plotted on Figures 3.2 and 3.3 together with 1D profiles for S5, S6, S7 and S8 taken from the 2D MASW profiles (M1 & M2).

The shallowest resolvable depth is a function of the shortest wavelength which is related to the geophone spacing. In this survey geophone spacings of 1.5 m to 3 m were employed to obtain a depth of investigation to rockhead. This has allowed the derivation of V_s/G_{max} values from depths of approx. 1 m BGL to depths of 7 to 9 m BGL.

V_s values generally ranged from 135-360 m/s (Figure 3.2). The material in the upper 1 m to 2m is predominantly firm/medium dense (with the exception of S6 near the river). Soft/loose material was indicated from 2 m to 4m for S1, S3, S5 and S6 with firmer, denser material in the upper 4m underlying S2, S4, S7 and S8. The MASW data indicates V_s and G_{max} values increasing with depth indicating stiff cohesive soils or dense non-cohesive soils at depths generally >4 m BGL. V_s values and corresponding soil cohesion ranges are summarised in Figure A.1, Appendix A.

G_{max} values generally ranged from 40-300 MPa (Figure 3.3). A soil density of 2000 kg/m^3 was used in the G_{max} calculations.

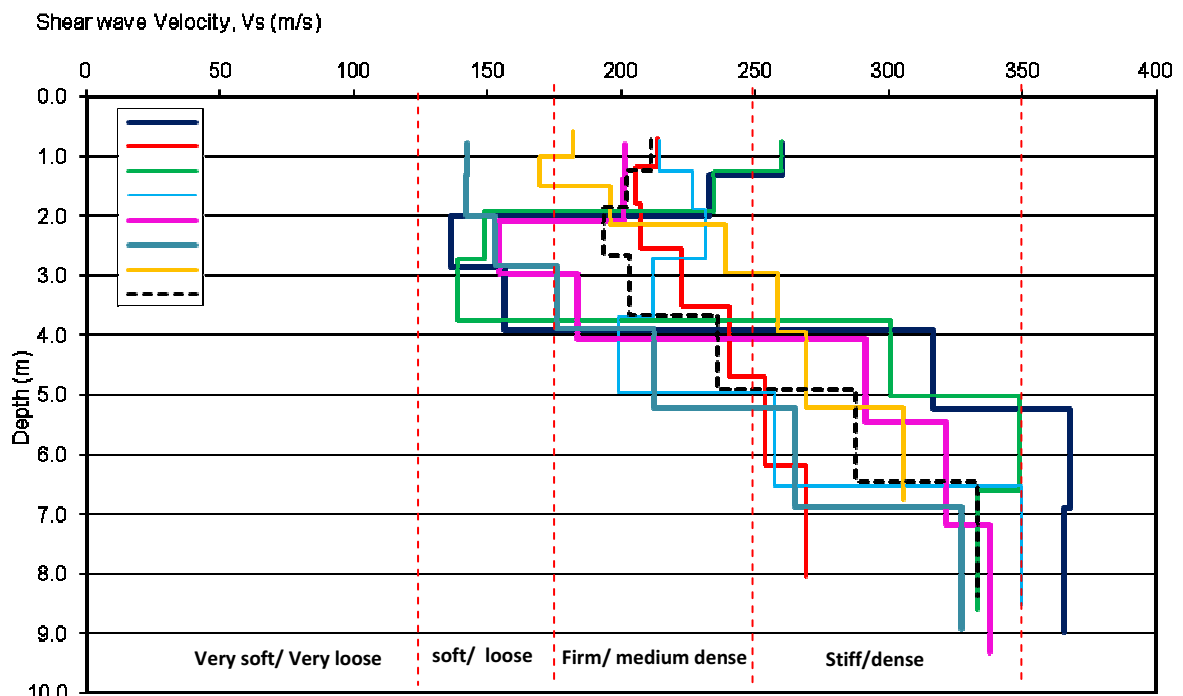


Fig 3.2: V_s values for S1-S8.

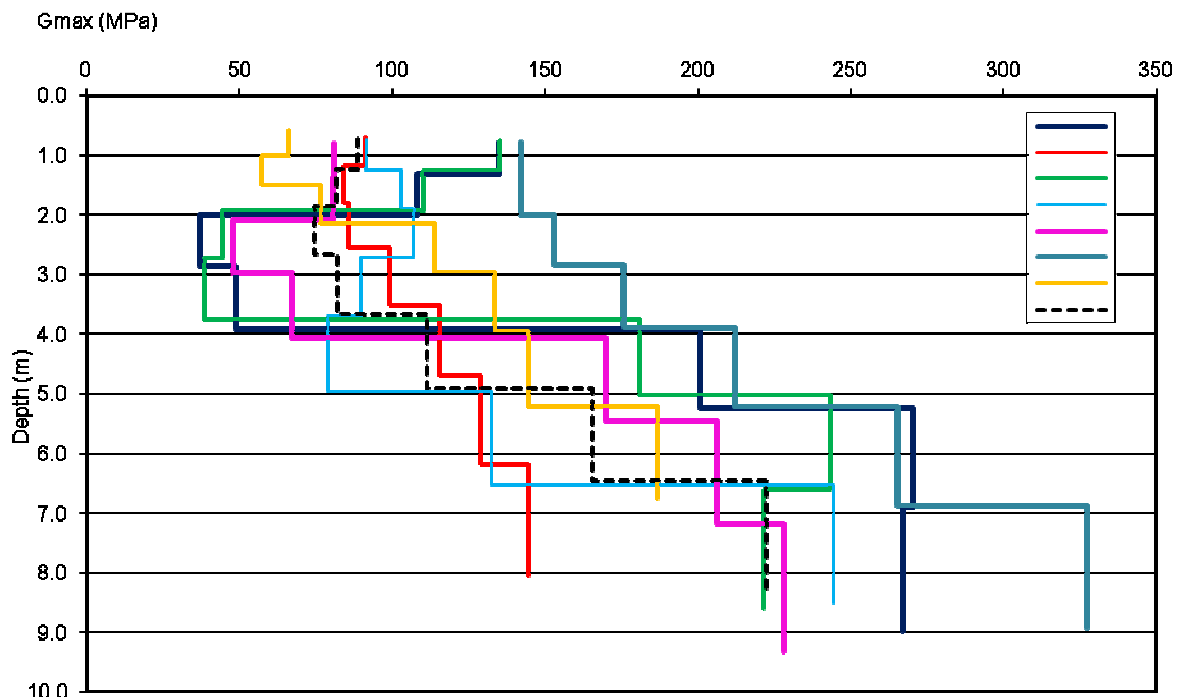


Fig 3.3: Gmax values for S1-S8.

Poisson’s Ratio values have been determined for the soil layers for seismic refraction profiles S3, S5, S6, S7 and S8 (Figure 3.4). An average value of 0.36 has been determined for the upper 2.5 m and an average value of 0.47 has been determined for the underlying soils. No Vs values were determined in the upper c. 1 m.

Profile	Seismic Layer	Depth m BGL	Vp m/s	Vs m/s	Poissons Ratio
S3	Laver 1	1.02	252		
	Layer 2	2.63	429	215	0.33
	Layer 3	7.80	903	280	0.45
S5	Laver 1	0.42	283		
	Layer 2	2.34	467	201	0.39
	Layer 3	6.15	1069	238	0.47
S6	Laver 1	0.70	154		
	Layer 2	2.67	391	146	0.42
	Layer 3	8.35	1071	245	0.47
S7	Laver 1	0.58	174		
	Layer 2	2.03	409	182	0.38
	Layer 3	5.83	1437	268	0.48
S8	Laver 1	0.66	184		
	Layer 2	2.71	341	198	0.26
	Layer 3	7.17	1005	265	0.46
Average	Laver 1	0.7	210		
	Layer 2	2.5	409	188	0.36
	Layer 2	7.1	1097	259	0.47

Fig 3.4: Poisson’s Ratio values determined from Vp & Vs values.

Note: Derived Vp and Vs values have been used for Poisson’s Ratio calculations. These geotechnical parameters should be assessed by a geotechnical engineer.

3.4 Discussion

The combined Vp and Vs results have been summarised on the following basis:

Layer	Ave. Thickness (m)	Ave. Vp (m/s)	Ave. Vs (m/s)	Ave. Poisson's Ratio	Interpretation	Estimated Stiffness/Rock Quality	Estimated Excavatability
1	0.7	185			Made Ground/Soils	Very soft-Very loose	Diggable
2	2.0	385	188	0.36	Made Ground/Soils	Soft-Firm/Loose-Medium dense	
3	5.5	1120	259	0.47	Soils	Firm-stiff/ Medium dense - dense	
4		3215			Slightly Weathered - Fresh Bedrock	Good	Break/Blast

The geophysical data indicates 4 subsurface layers interpreted as follows:

Layer 1 has an average thickness of 0.7 m. This layer has low Vp velocities (average 185 m/s) which would indicate very soft or very loose material. In conjunction with the available borehole and trial pit information this layer is likely to comprise of made ground.

Layer 2 has an average thickness of 2.0 m. This layer has an average Vp velocity of 385 m/s which would indicate soft to firm or loose to medium dense material. This layer has an average Poisson's Ratio of 0.36. In conjunction with the available borehole and trial pit information this layer is likely to comprise of made ground.

Layer 3 has an average thickness of 5.5 m. This layer has an average Vp velocity of 1120 m/s which would indicate firm to stiff or medium dense to dense material. The Vs velocities (see Drawing AGP19036_02) indicate firm/medium dense material in the upper half of the layer and stiff/dense material in the lower half of the layer. This layer has an average Poisson's Ratio of 0.47. In conjunction with the available borehole and trial pit information this layer is likely to comprise of sandy gravelly clay overlying clayey sand/gravel.

Layer 4 at an average depth of 8.2 m BGL has an average Vp velocity of 3215 m/s which is indicative of slightly weathered to fresh rock.

4. RECOMMENDATIONS

The findings of the geophysical investigation should be reviewed on completion of the direct investigation.

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APPENDIX A: DETAILED METHODOLOGY

A combination of geophysical techniques was used to provide a high quality interpretation and reduce any ambiguities, which may otherwise exist.

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 (V_p) 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 V_p velocities while soft, loose or fractured materials have lower V_p 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 (2m spacing). Equipment was carried was 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 (e.g. 46m profile ~16m depth). Shots from seven different positions were taken (2 x off-end, 2 x end, 3 x middle) to ensure optimum coverage of all refractors.

Data Processing

First break picking in digital format was carried out using the FIRSTPIX software program to construct p-wave (V_p) travelttime 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.

First break picking in digital format was carried out using the FIRSTPIX software program to construct travelttime plots for each spread. The recorded data was processed and interpreted using the GREMIX software program. 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. Phantomming of all possible travel time pairs can be carried out by adjusting reciprocal times of off shots. Material types were assigned and estimation made of material properties, cross-referenced to borehole data.

Approximate errors for V_p 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).

Multichannel Analysis of Surface Waves (MASW)

Principles

The Multi-channel Analysis of Surface Waves (MASW) (Park et al., 1998, 1999) utilizes Surface waves (Rayleigh waves) to determine the elastic properties of the shallow subsurface (<15m). Surface waves carry up to two-thirds of the seismic energy but are usually considered as noise in conventional body wave reflection and refraction seismic surveys. The penetration depth of surface waves changes with wavelength, i.e. longer wavelengths penetrate deeper. When the elastic properties of near surface materials vary with depth, surface waves then become dispersive, i.e. propagation velocity changes with frequency. The propagation (or phase) velocity is determined by the average elastic property of the medium within the penetration depth. Therefore the dispersive nature of surface waves may be used to investigate changes in elastic properties of the shallow subsurface. The MASW method employs multi-channel recording and processing techniques (Sheriff and Geldart, 1982) that have similarities to those used in a seismic reflection survey and which allow better waveform analysis and noise elimination.

To produce a shear wave velocity (V_s) profile and a stiffness profile of the subsurface using surface waves the following basic procedure is followed:

- (i) a point source (e.g. a sledgehammer) is used to generate vertical ground motions,
- (ii) the ground motion is measured using low frequency geophones, which are disposed along a straight line directed toward the source,
- (iii) the ground motion is recorded using either a conventional seismograph, oscilloscope or spectrum analyzer,
- (iv) a dispersion curve is produced from a spectral analysis of the data showing the variation of surface wave velocity with wavelength,
- (iv) the dispersion curve is inverted using a modelling and least squares minimization process to produce a subsurface profile of the variation of Surface wave and shear wave velocity with depth.

Data Collection

1D MASW profiles were recorded at each seismic refraction location. The acquisition configuration was the same as used for the seismic refraction acquisition.

Data Processing

MASW processing was carried out using the SURFSEIS processing package developed by Kansa Geological Survey (KGS, 2000). SURFSEIS is designed to generate a shear wave (V_s) velocity profile.

SURFSEIS data processing involves three steps:

- (i) Preparation of the acquired multichannel record. This involves converting data file into the processing format.
- (ii) Production of a dispersion curve from a spectral analysis of the data showing the variation of Rayleigh wave phase velocity with wavelength. Confidence in the dispersion curve can be estimated through a measure of signal to noise ratio (S/N), which is obtained from a coherency analysis. Noise includes both body waves and higher mode surface waves. To obtain an accurate dispersion curve the spectral content and phase velocity characteristics are examined through an overtone analysis of the data.
- (iii) Inversion of the dispersion curve is then carried out to produce a subsurface profile of the variation of shear wave velocity with depth.

The bedrock P-wave velocities were converted to S-wave velocities using the following equation:

$$V_s = \left(\frac{V_p^2 - 2 \cdot v^2}{(1 - v^2)^2} \right)^{0.5}$$

Where V_s = S-wave velocity in m/s, V_p = P-wave velocity in m/s and ν = Poisson's ratio.

The G_{max} values are calculated at each S-wave location using an overburden density of $2,000\text{kg/m}^3$. The G_{max} calculation is: $G_{max} \text{ (Mpa)} = V_s^2 * (\rho / 1000000)$
 where ρ = density (kg/m^3).

V_s values and corresponding soil cohesion ranges are summarised in Figure A.1.

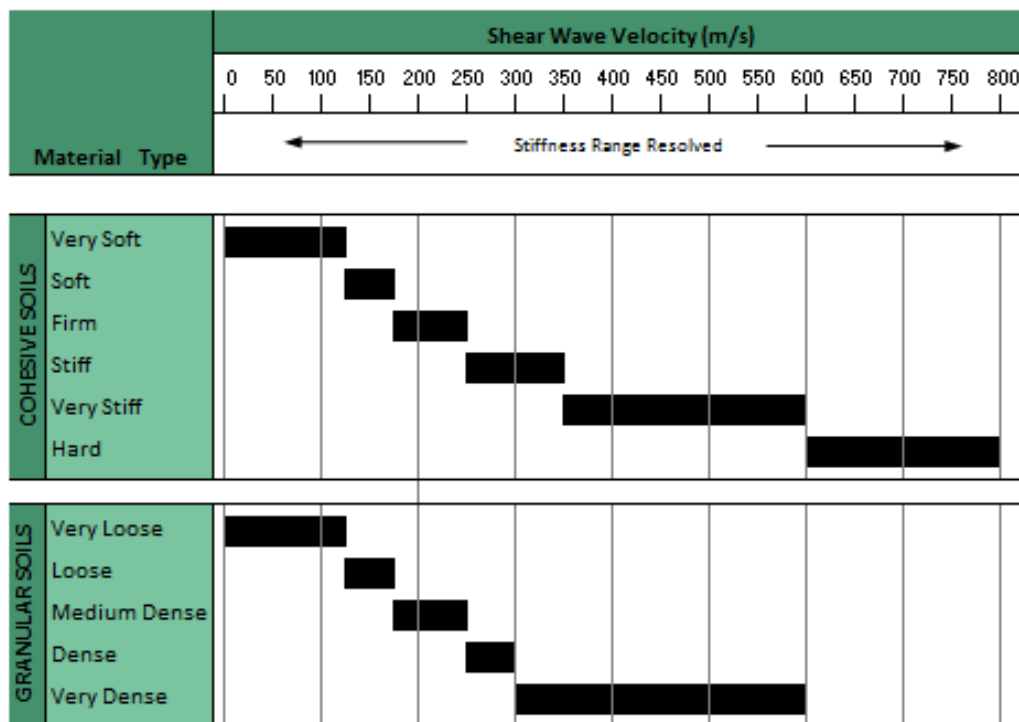


Figure A.1: Shear-wave velocity and corresponding soil cohesion.

Spatial Relocation

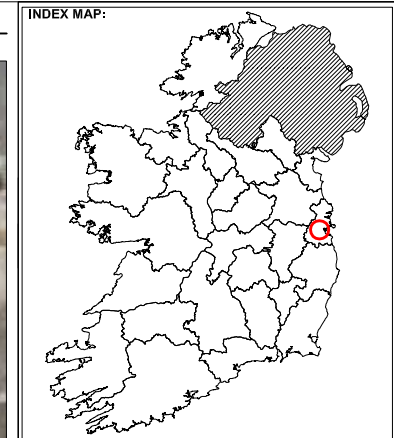
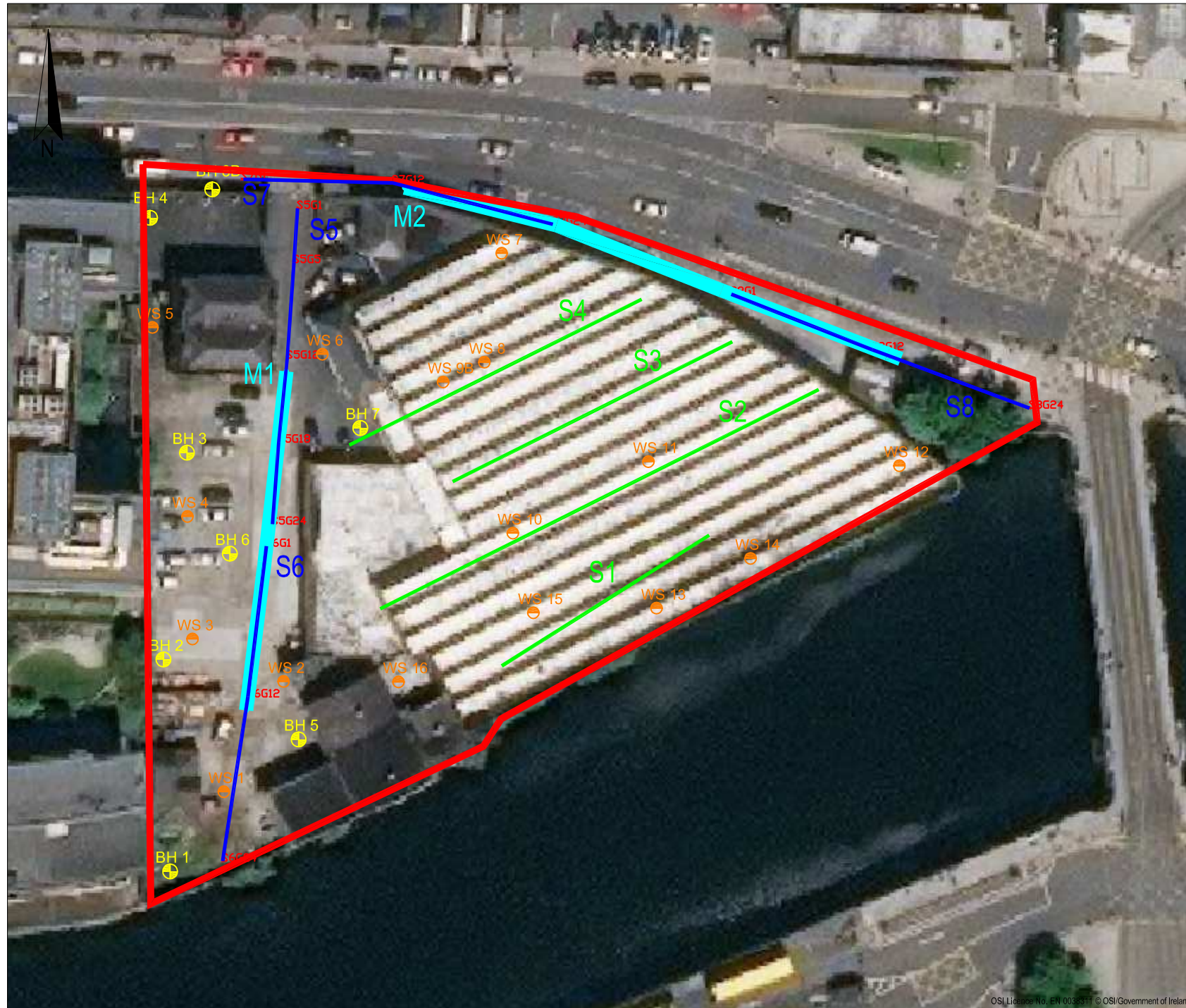
All the geophysical investigation locations were acquired using Trimble Geo 7X high-accuracy GNSS handheld GPS system using the settings listed below. This system allows collecting GPS data with c.20mm accuracy.

Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Meters
Altitude units:	Meters
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

APPENDIX B: DRAWINGS

The information derived from the geophysical investigation is presented in the following drawings:

AGP19036_01	Aerial Photo - Geophysical Locations	1:1250	@ A4
AGP19036_02	Figure 1: Exterior Profile west of the building Figure 2: Exterior Profile north of the building	1:400 1:400	@ A3 @ A3
AGP19036_03	Profile S3 in centre of building	1:400	@ A4



LEGEND:

- 2D MASW profile
- Interior Seismic refraction profile
- Exterior Seismic refraction profile

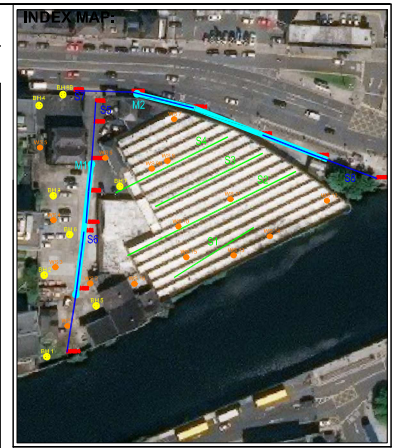
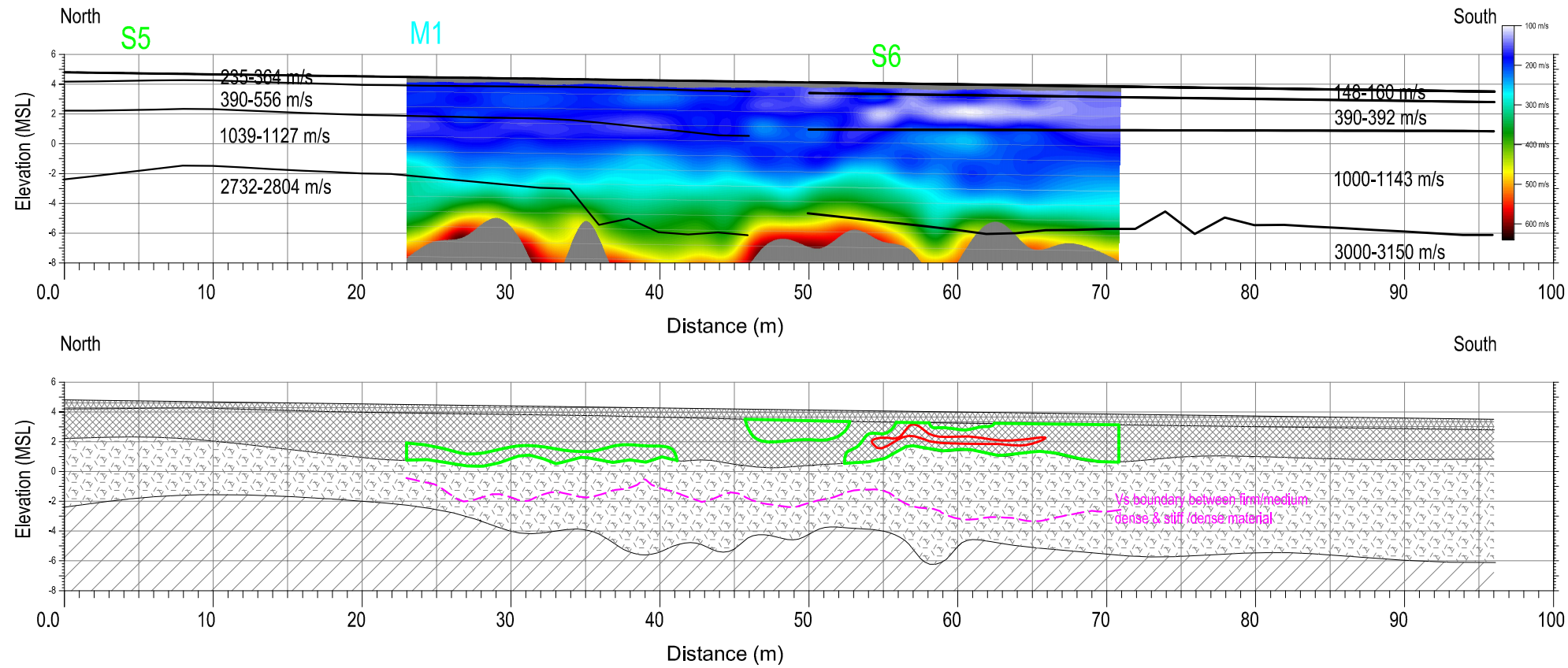
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PROJECT: HICKEY'S, PARKGATE STREET GEOPHYSICAL SURVEY			
CLIENT: ARUP			
DRAWING NO: AGP19036_01			
SCALE: AS INDICATED @ A4			
DATE: 15/05/2019			
Version:	Date:	Drawn By:	Checked:
Draft	10/05/2019	YOC	
01	15/05/2019	YOC	TL

FIGURE 1: EXTERIOR PROFILE WEST OF BUILDING

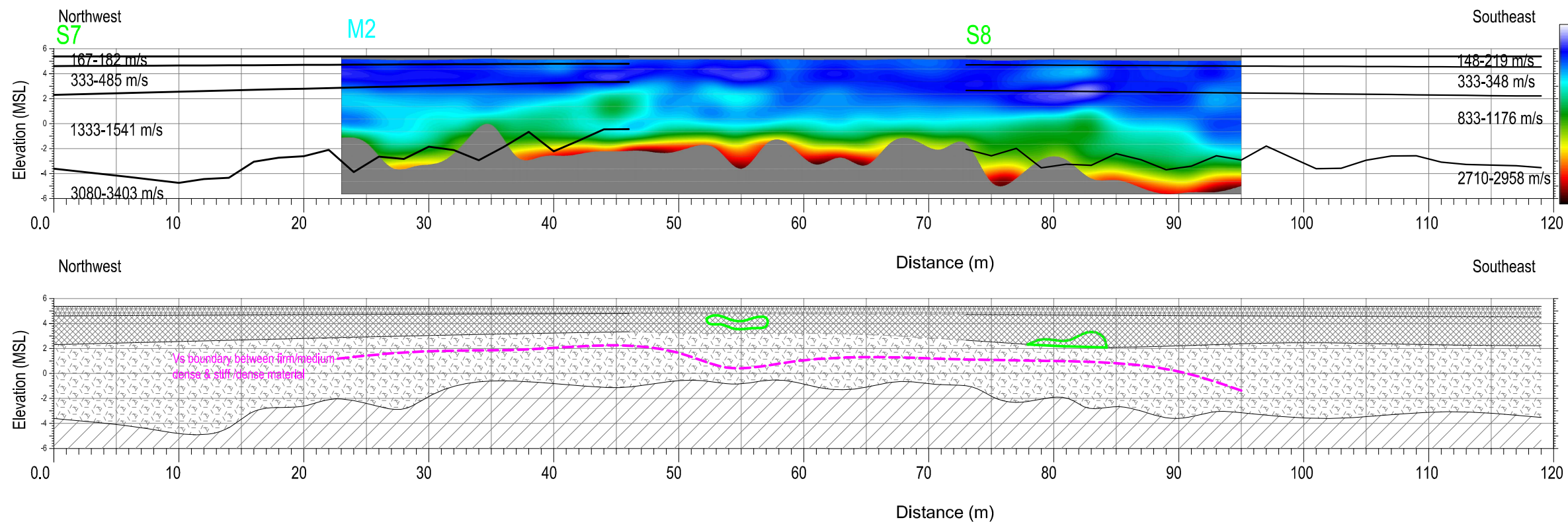
SCALE 1:400



- LEGEND:**
- Very soft/ Very loose SOILS and/or MADE GROUND
 - Soft/ Loose SOILS and/or MADE GROUND
 - Firm-stiff/Medium dense-dense SOILS
 - Slightly weathered - Fresh BEDROCK
 - Very soft/very loose material where Vs < 175 m/s
 - Soft/Loose material where Vs 175-225 m/s
 - Vs boundary between shallower firm/medium dense soils & deeper stiff /dense material

FIGURE 2: EXTERIOR PROFILE NORTH OF BUILDING

SCALE 1:400



The information displayed here is to be used in conjunction with Report AGP19036_01 Report on the Geophysical Investigation at Parkgate St., Dublin for Ground Investigations Ireland Ltd., APEX Geophysics Ltd. 15th May 2019



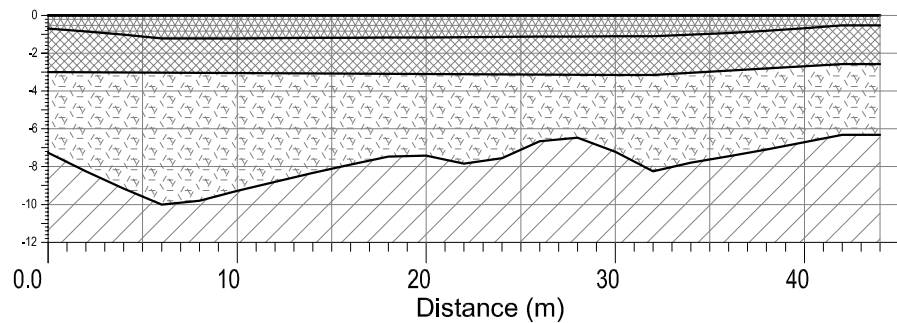
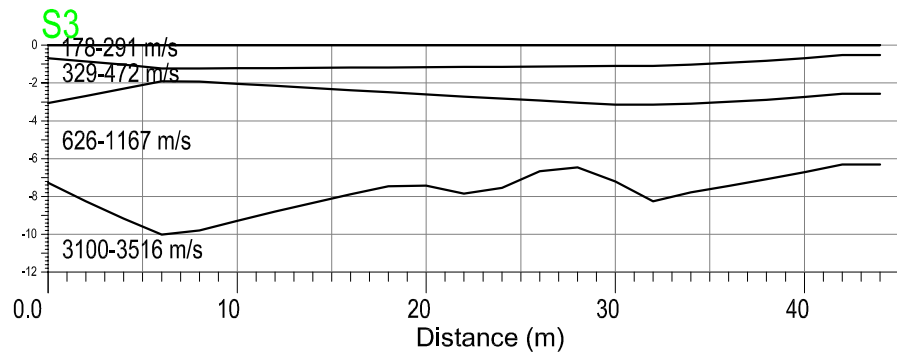
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PROJECT: HICKEY'S, PARKGATE STREET
GEOPHYSICAL SURVEY
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01	15-05-2019	YOC	TL

PROFILE S3 IN CENTRE OF BUILDING

SCALE 1:400



LEGEND:

- Very soft/ Very loose SOILS and/or MADE GROUND
- Soft/ Loose SOILS and/or MADE GROUND
- Firm-stiff/Medium dense-dense SOILS
- Slightly weathered - Fresh BEDROCK

The information displayed here is to be used in conjunction with Report AGP19036_01 Report on the Geophysical Investigation at Parkgate St., Dublin for Ground Investigations Ireland Ltd., APEX Geophysics Ltd. 15th May 2019



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