



**GROUND  
INVESTIGATIONS  
IRELAND**

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# Ground Investigations Ireland

## Parkside Phase 4

## Ground Investigation Report

### ***DOCUMENT CONTROL SHEET***

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Engineer	DBFL
Client	Cairn Homes
Project No	8658-04-19
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## **1.0 Preamble**

On the instructions of DBFL Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between May and June 2019 at the site of the proposed residential development in Balgriffin, Co. Dublin.

## **2.0 Overview**

### **2.1. Background**

It is proposed to construct a new residential development with associated services, access roads and car parking at the proposed site. The site is currently occupied by a disused school and is on the Belmayne Road, Balgriffin, Co. Dublin. The proposed construction is envisaged to consist of conventional foundations and 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 8 No. Trial Pits to a maximum depth of 3.1m BGL
- Carry out 2 No. Soakaway tests to determine a soil infiltration value to BRE digest 365
- Carry out 9 No. Window Sample Boreholes to recover soil samples
- Carry out 1 No. Slit trench to identify existing services
- Carry out 7 No. Cable Percussion boreholes to a maximum depth of 8.0m BGL
- Carry out 4 No. Rotary Core Follow-on Boreholes to a maximum depth of 16.1m BGL
- Installation of 4 No. Groundwater monitoring wells
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

## **3.0 Subsurface Exploration**

### **3.1. General**

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

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

### **3.2. Trial Pits**

The trial pits were excavated using a 3.5T tracked excavator at the locations shown in the exploratory hole location plan in Appendix 1. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

### **3.3. Soakaway Testing**

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

### **3.4. Window Sampling**

The window sampling was carried out at the locations shown in the location plan in Appendix 1 using a Dando Terrier/Tecop Tec 10 percussion drilling rig. The window sampling consists of a 1m long steel tube with a cutting edge and an internal plastic liner which is mechanically driven into the ground utilising a 50kg weight falling a height of 500mm. Upon completion of the 1m sample, the tube is withdrawn and the plastic liner removed and sealed for logging and sub sampling by a Geotechnical Engineer/Engineering Geologist. The tube is replaced in the borehole and a subsequent 1m sample can be recovered. Occasionally outer casing or a reduced diameter tube is utilised to enable the window sample to progress in difficult drilling conditions. Geotechnical or environmental soil samples can be recovered from each of the liners following logging. The window sample records are provided in Appendix 4 of this Report.

### **3.5. Slit Trenching**

The slit trench was excavated at the location shown in the exploratory hole location plan in Appendix 1 to identify and locate existing services and to obtain a soil profile. The soil was excavated by slowly stripping the length of the excavation with a toothless bucket in order to avoid damaging any services that may be underlying. A spotter was also used to watch the trench while excavating to alert the driver when services were visible. The soils and services were then logged and photographed for each excavation by a Geotechnical Engineer/Engineering Geologist. The excavation was then backfilled and reinstated in

accordance with the project specification. The slit trench records with associated photos are provided in Appendix 5 of this Report.

### **3.6. Cable Percussion Boreholes**

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

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata. Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 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 6 of this Report.

### **3.7. Rotary Boreholes**

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

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the "overshoot" recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or

water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary follow-on borehole logs are provided in Appendix 6 of this Report.

### **3.8. Surveying**

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

### **3.9. Groundwater Monitoring Installations**

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

### **3.10. 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), pH and sulphate testing was carried out by Jones Environmental Laboratory in the UK.

Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), hydrometer and California Bearing Ratio (CBR) tests were carried out in NMTL's Geotechnical Laboratory in Carlow.

Rock strength testing including Point Load ( $Is_{50}$ ) and Unconfined Compressive Strength (UCS) testing was carried out in Trinity College Dublin's Geotechnical Laboratory

The results of the laboratory testing are included in Appendix 5 of this Report.

## 4.0 Ground Conditions

### 4.1. General

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

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

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

**TOPSOIL:** Topsoil was encountered in most of the exploratory holes and was present to a maximum depth of 0.4m BGL. Tarmac or Cobblelock surfacing was present in the remaining exploratory holes typically to depths of between 0.08m BGL to 0.25m BGL.

**MADE GROUND:** Made Ground deposits were encountered beneath the Topsoil or from the surface and was present to depths of between 0.6m and 2.6m BGL. These deposits were described generally as *brown slightly sandy slightly gravelly CLAY with occasional cobbles and fragments of concrete, red brick, glass and plastic.*

**COHESIVE DEPOSITS:** Cohesive deposits were encountered beneath the Made Ground or Topsoil and were described typically as *brown/grey slightly sandy slightly gravelly CLAY with occasional cobbles and boulders* overlying a *stiff dark grey/ black slightly sandy slightly gravelly CLAY with occasional cobbles and boulders.* The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. The strength of the cohesive deposits typically increased with depth and was firm to stiff or stiff below 2.0m BGL in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

**GRANULAR DEPOSITS:** The granular deposits were encountered within the cohesive deposits and were typically described as *Grey clayey sandy subangular to subrounded fine to coarse GRAVEL.* The secondary sand and 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.

**BEDROCK:** The rotary core boreholes recovered Medium strong or strong grey fine grained LIMESTONE with calcite veins. Rare visible pyrite veins were noted during logging which are typically present within the Calp Limestone.



The depth to rock varies from 3.8m BGL in BH05 to a maximum of 9.2m BGL in BH01 and BH02. 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 BH01, BH02, BH05, BH07 to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 7 of this Report.

#### **4.3. Laboratory Testing**

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 20.6% and 33.9% generally with fines contents of 24.7%.

The CBR testing on remoulded samples gave results ranging between 1.67% and 3.38% for the cohesive deposits.

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

The results of the Waste Acceptance Criterial Test Suite are presented with the individual parameter limits for "Inert" "Non Hazardous" and "Hazardous" as outlined within European Council Directive 1999 131/EC Article 16 Annex II, "Criteria and procedures for the acceptance of waste at landfills". The intended disposal site should be consulted to ensure compliance with their specific requirements.

The results from the completed laboratory testing is included in Appendix 8 of this report.

### **5.0 Recommendations & Conclusions**

#### **5.1. General**

The recommendations given and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between exploratory hole locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the exploratory holes. Limited information has been provided at the ground investigation stage and any designs based on the recommendations or

conclusions should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory hole logs.

## 5.2. Foundations

Recommended allowable bearing capacities for conventional strip or pad foundations on the cohesive deposits at each borehole location are listed in the table below.

Allowable Bearing Capacity					
Hole ID	kN/m <sup>2</sup>	Depth	Hole ID	kN/m <sup>2</sup>	Depth
BH01	150	1.60	BH05	150	2.40
BH02	100	1.70	BH06	70	2.00
BH03	150	1.00	BH06	100	3.00
BH04 (A)	80	1.00	BH07	70	1.00
BH04 (A)	150	2.00	BH07	150	3.00
BH05	80	1.00			

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

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

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

The pH and sulphate testing completed on samples recovered from the trial pits indicates the pH results are near neutral and the sulphate results are low, when compared to the guideline values from BRE Special Digest 1:2005. No special precautions are required for concrete foundations to prevent sulphate attack.

## 5.3. External Pavements

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

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

#### **5.4. Excavations**

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

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

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

The groundwater and stability noted on the trial pit logs should be consulted when determining the most appropriate construction methods for excavations.

Excavations in the upper cohesive and weathered rock deposits are expected to be excavatable with conventional excavation equipment, with zones of more intact bedrock below this depth requiring rock breaking techniques. Based on the fracture spacing, the rock strength testing and Pettifer & Fookes (1994) Revised Excavatability Graph, the Calp Limestone ranges from hard digging to hard ripping, however the zones recovered as non-intact should be easy to hard digging.

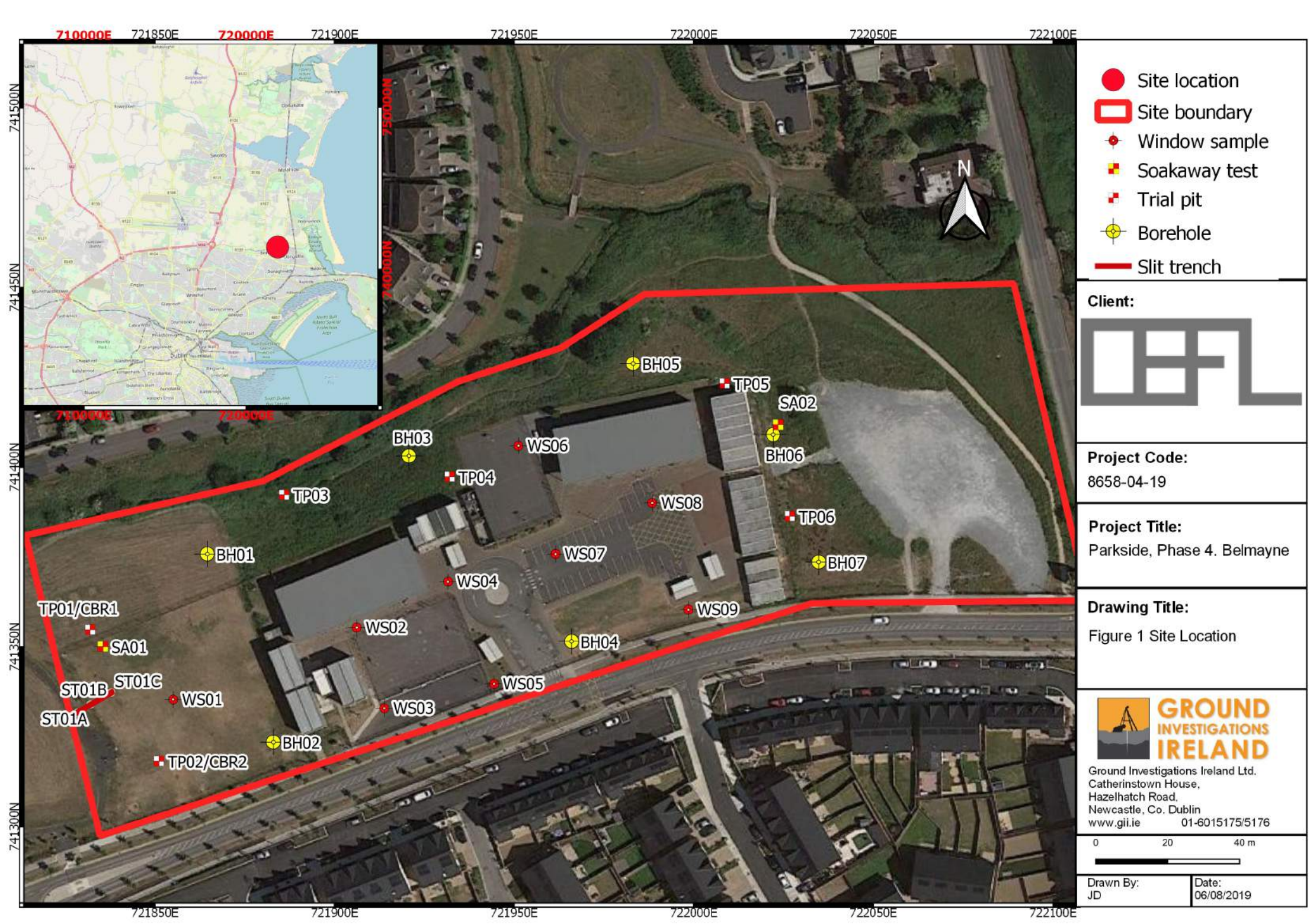
Any material to be removed off site should be disposed of to a suitably licenced landfill.

#### **5.5. Soakaway Design**

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

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

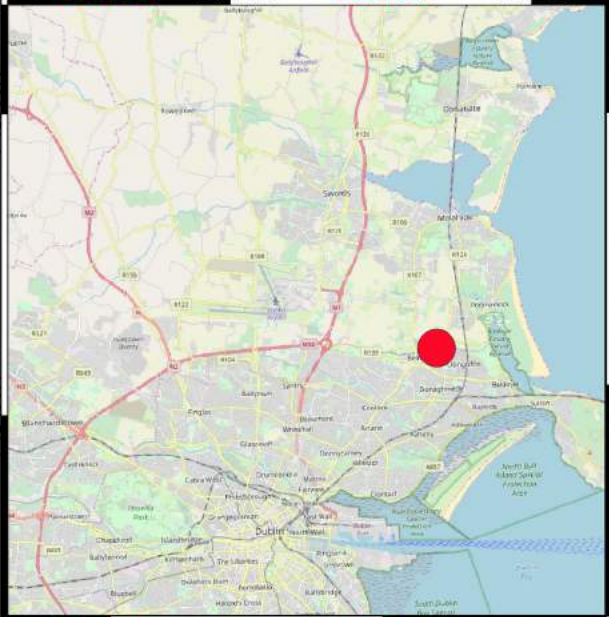
# **APPENDIX 1 - Site Location Plan**



710000E 721850E 720000E 721900E 721950E 722000E 722050E 722100E

741500N  
741450N  
741400N  
741350N  
741300N

- Site location
- Site boundary
- Window sample
- Soakaway test
- Trial pit
- ⊙ Borehole
- Slit trench



**Client:**

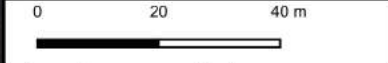
**Project Code:**  
8658-04-19

**Project Title:**  
Parkside, Phase 4, Belmoyne

**Drawing Title:**  
Figure 1 Site Location



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Drawn By: JD Date: 06/08/2019

715000E 720000E

721850E 721900E 721950E 722000E 722050E 722100E

## **APPENDIX 2 – Trial Pit Records**



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**SA01**

<b>Machine :</b> 3.5T Excavator	<b>Dimensions</b> L x W x D 2.30 x 0.50 x 2.10m	<b>Ground Level (mOD)</b> 13.18	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method :</b> Trial Pit	<b>Location</b> 721835.4 E 741349.9 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				13.08	0.10	TOPSOIL		
					(0.60)	MADE GROUND: Brown sandy gravelly Clay with fragments of plastic, concrete and wood		
				12.48	0.70	Soft to firm light brown slightly sandy gravelly CLAY		
					(1.40)			
				11.08	2.10	Complete at 2.10m		

<b>Plan</b> .	<b>Remarks</b> Trial pit stable No groundwater encountered Soakaway completed in pit Trial pit backfilled upon completion		
	<table border="1"> <tr> <td><b>Scale (approx)</b> 1:25</td> <td><b>Logged By</b> S. Connolly</td> <td><b>Figure No.</b> 8658-04-19.SA01</td> </tr> </table>	<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly
<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly	<b>Figure No.</b> 8658-04-19.SA01	



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**SA02**

<b>Machine</b> : 3.5T Excavator	<b>Dimensions</b> L x W x D 2.40 x 0.50 x 2.30m	<b>Ground Level (mOD)</b> 12.38	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Trial Pit	<b>Location</b> 722023.4 E 741411.6 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				12.18	(0.20) 0.20	TOPSOIL		
					(0.60)	MADE GROUND: Brown slightly sandy gravelly Clay with fragments of metal and brick		
				11.58	0.80	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay with raw cobbles and fragments of concrete, plastic and metal		
					(1.50)			
				10.08	2.30	Complete at 2.30m		

<b>Plan</b>	<p><b>Remarks</b></p> <p>Trial pit stable No groundwater encountered Soakaway completed in pit Trial pit backfilled upon completion</p>		
	<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly	<b>Figure No.</b> 8658-04-19.SA02





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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**TP01**

<b>Machine</b> : 3.5T Excavator	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 13.00	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Trial Pit	<b>Location</b> 721831.9 E 852354.6 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	B			12.70	0.30	TOPSOIL		
					(0.80)	MADE GROUND: Brown mottled grey slightly sandy gravelly Clay with fragments of plastic, wood and brick		
1.70	B			11.90	1.10	MADE GROUND: Grey slightly clayey gravelly Sand with fragments of brick		
					(0.70)	MADE GROUND: Grey slightly sandy silty Clay with fragments of brick. Strong organic odour		
				10.40	2.60	Complete at 2.60m		

<b>Plan</b> .	<b>Remarks</b> Trial pit stable No groundwater encountered Trial pit backfilled upon completion		
	<table border="1"> <tr> <td><b>Scale (approx)</b> 1:25</td> <td><b>Logged By</b> S. Connolly</td> <td><b>Figure No.</b> 8658-04-19.TP01</td> </tr> </table>	<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly
<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly	<b>Figure No.</b> 8658-04-19.TP01	



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**TP02**

<b>Machine</b> : 3.5T Excavator <b>Method</b> : Trial Pit	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 13.74	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721851.1 E 741318 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	B			13.54	(0.20)	TOPSOIL		
					0.20	MADE GROUND: Brown slightly sandy gravelly Clay with fragments of brick		
1.70	B			12.64	(0.30)	MADE GROUND: Brown slightly sandy very gravelly Clay with frequent angular cobbles		
					0.50	Stiff brown sandy gravelly CLAY with frequent angular cobbles and rare boulders		
				11.74	2.00	Complete at 2.00m		

<b>Plan</b>	<b>Remarks</b>	
.	Trial pit stable	
.	No groundwater encountered	
.	CBR bag taken at 0.70mBGL	
.	Trial pit backfilled upon completion	
.	<b>Scale (approx)</b>	<b>Logged By</b>
.	1:25	S. Connolly
.	<b>Figure No.</b>	
.	8658-04-19.TP02	



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**TP03**

<b>Machine</b> : 3.5T Excavator <b>Method</b> : Trial Pit	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 11.54	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721885.9 E 741392.1 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	B		Rapid flow(1) at 1.20m.	11.24	(0.30)	TOPSOIL		
					0.30	Soft to firm brown slightly sandy gravelly CLAY with occasional angular cobbles		
1.60	B		Rapid flow(1) at 1.20m.	10.54	(0.70)			∇ <sub>1</sub>
					1.00	Grey clayey sandy fine to coarse angular to sub-rounded GRAVEL		
				9.94	1.60	Complete at 1.60m		

<b>Plan</b> .	<b>Remarks</b> Trial pit stable Groundwater encountered at 1.20mBGL as a rapid flow Trial pit backfilled upon completion Shallow depth due to collapse and groundwater influx		
	<table border="1"> <tr> <td><b>Scale (approx)</b> 1:25</td> <td><b>Logged By</b> S. Connolly</td> <td><b>Figure No.</b> 8658-04-19.TP03</td> </tr> </table>	<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly
<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly	<b>Figure No.</b> 8658-04-19.TP03	



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**TP04**

<b>Machine :</b> 3.5T Excavator <b>Method :</b> Trial Pit	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.93	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721932 E 741397.1 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	B			12.73	0.20	TOPSOIL		
					(0.60)	MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with fragments of brick and glass		
1.70	B			12.13	0.80	MADE GROUND: Brown slightly sandy gravelly Clay with fragments of plastic		
					(1.00)			
				11.13	1.80	Firm brown/grey slightly sandy slightly gravelly silty CLAY		
				9.93	3.00	Complete at 3.00m		

<b>Plan</b> .	<b>Remarks</b> Trial pit stable No groundwater encountered Trial pit backfilled upon completion		
	<table border="1"> <tr> <td><b>Scale (approx)</b> 1:25</td> <td><b>Logged By</b> S. Connolly</td> <td><b>Figure No.</b> 8658-04-19.TP04</td> </tr> </table>	<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly
<b>Scale (approx)</b> 1:25	<b>Logged By</b> S. Connolly	<b>Figure No.</b> 8658-04-19.TP04	



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**TP05**

<b>Machine</b> : 3.5T Excavator <b>Method</b> : Trial Pit	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.39	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 722008.5 E 741423.1 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	B			12.09	(0.30)	TOPSOIL		
					0.30	MADE GROUND: Brown sandy slightly gravelly Clay with fragments of brick, glass and wood		
1.70	B			10.79	(1.30)			
					1.60	MADE GROUND: Brown/grey mottled black slightly sandy gravelly Clay with fragments of glass, wood and plastic. Slight organic odour		
				9.79	2.60	Complete at 2.60m		

<b>Plan</b>	<b>Remarks</b>
. . . . .	Trial pit stable No groundwater encountered Trial pit backfilled upon completion
. . . . .	
. . . . .	
. . . . .	
. . . . .	
. . . . .	
	<b>Scale (approx)</b> 1:25
	<b>Logged By</b> S. Connolly
	<b>Figure No.</b> 8658-04-19.TP05



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**Site**  
Parkside Phase 4

**Trial Pit Number**  
**TP06**

<b>Machine</b> : 3.5T Excavator <b>Method</b> : Trial Pit	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.51	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 722026.7 E 741386.1 N	<b>Dates</b> 03/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	B			12.31	(0.20)	TOPSOIL		
					0.20	MADE GROUND: Dark brown mottled black slightly sandy slightly gravelly Clay with occasional cobbles and fragments of brick		
1.70	B			11.11	(1.20)			
					1.40	Stiff brown slightly sandy gravelly CLAY with occasional angular cobbles		
				9.41	(1.70)			
					3.10	Complete at 3.10m		

<b>Plan</b> .	<b>Remarks</b> Trial pit stable No groundwater encountered Trial pit backfilled upon completion	<b>Scale (approx)</b>	<b>Logged By</b>	<b>Figure No.</b>
		1:25	S. Connolly	8658-04-19.TP06

Parkside Phase 4 – Trial Pit Photos



TP01



TP01



TP01



TP01





TP02



TP02



TP02



TP02



TP03



TP03



TP03



TP03



TP04



TP04



TP04



TP04



TP05



TP05



TP05



TP05





TP06



TP06



TP06



TP06

## **APPENDIX 3 – Soakaway Test Results**

**SA01**

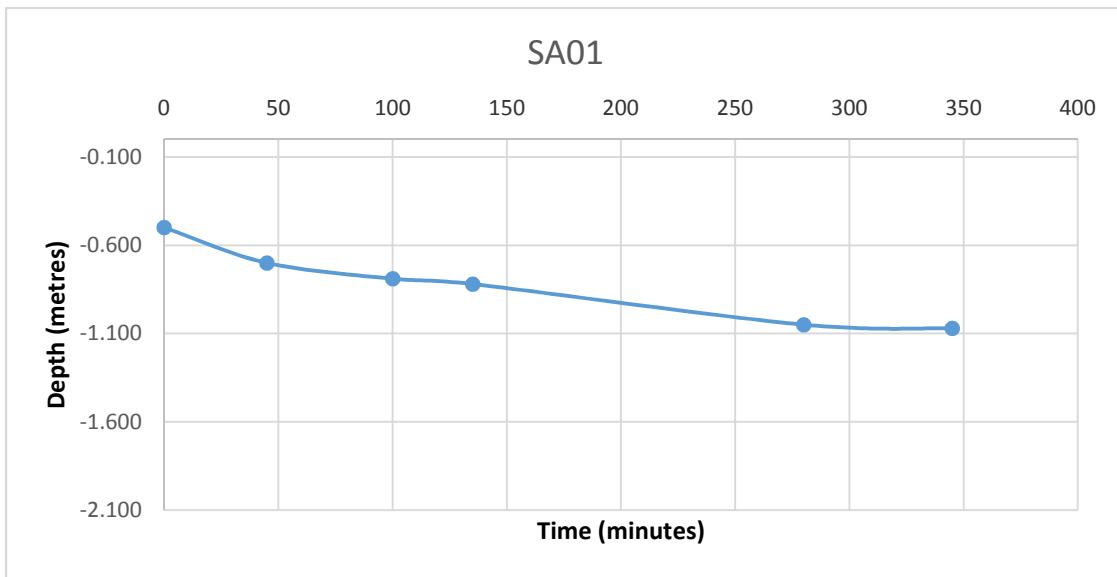
**Soakaway Test to BRE Digest 365**

**Trial Pit Dimensions: 2.30m x 0.50m x 2.10m (L x W x D)**

Date	Time	Water level (m bgl)
03/05/2019	0	-0.500
03/05/2019	45	-0.700
03/05/2019	100	-0.790
03/05/2019	135	-0.820
03/05/2019	280	-1.050
03/05/2019	345	-1.070

**\*Soakaway failed - Pit backfilled**

<b>Start depth</b>	<b>Depth of Pit</b>	<b>Diff</b>	<b>75% full</b>	<b>25%full</b>
<b>0.50</b>	<b>2.100</b>	<b>1.600</b>	<b>0.9</b>	<b>1.7</b>



**SA02**

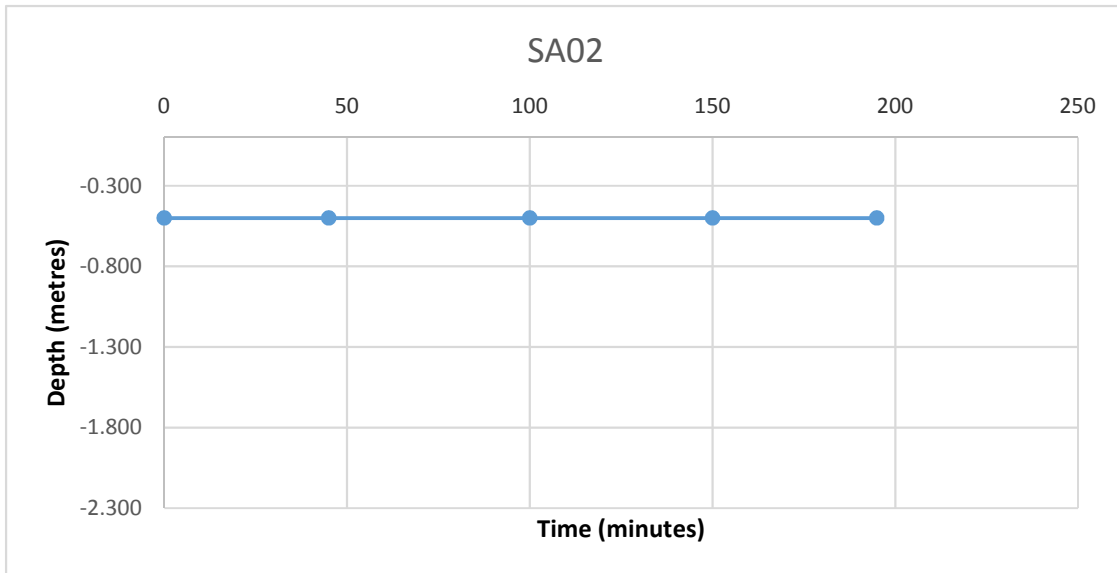
**Soakaway Test to BRE Digest 365**

**Trial Pit Dimensions: 2.40m x 0.50m x 2.30m (L x W x D)**

Date	Time	Water level (m bgl)
03/05/2019	0	-0.500
03/05/2019	45	-0.500
03/05/2019	100	-0.500
03/05/2019	150	-0.500
03/05/2019	195	-0.500

**\*Soakaway failed - Pit backfilled**

<b>Start depth</b>	<b>Depth of Pit</b>	<b>Diff</b>	<b>75% full</b>	<b>25%full</b>
<b>0.50</b>	<b>2.300</b>	<b>1.800</b>	<b>0.95</b>	<b>1.85</b>



## **APPENDIX 4 – Window Sample Records**



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**Site**  
Parkside Phase 4

**Number**  
**WS-01**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 13.39	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721855.1 E 741335.4 N	<b>Dates</b> 09/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			13.19	(0.20) 0.20	TOPSOIL		
					(0.80)	MADE GROUND: Grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional fragments of wood granite plastic shells and red brick.		
1.70	EN			12.39	1.00 (0.35)	MADE GROUND: Grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional fragments of red brick.		
				12.04	1.35 (0.25)	Dark brown clayey gravelly fine to coarse SAND.		
2.70	EN			11.79	1.60 (0.40)	Firm brownish grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
				11.39	2.00 (1.00)	Firm grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				10.39	3.00 (0.60)	Firm grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				9.79	3.60 (0.40)	No recovery		
				9.39	4.00	Complete at 4.00m		

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b> 8658-04-19.WS-01	



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**Site**  
Parkside Phase 4

**Number**  
**WS-02**

**Excavation Method**  
Drive-in Windowless Sampler

**Dimensions**

**Ground Level (mOD)**  
12.85

**Client**  
Cairn Homes

**Job Number**  
8658-04-19

**Location**  
721906.1 E 741355.4 N

**Dates**  
10/05/2019

**Engineer**  
DBFL

**Sheet**  
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			12.77	(0.08) 0.08	COBBLELOCK		
				12.61	(0.16) 0.24	MADE GROUND: Multicoloured subangular to subrounded fine to coarse Gravel		
					(0.76)	MADE GROUND: Brownish grey slightly sandy slightly clayey subangular to subrounded fine to coarse Gravel with occasional fragments of red brick and concrete.		
				11.85	1.00 (0.30)	MADE GROUND: Grey sandy clayey subangular to subrounded fine to coarse Gravel with occasional fragments of concrete.		
				11.55	1.30	Complete at 1.30m		

**Remarks**  
Refusal at 1.30m

**Scale (approx)**  
1:25

**Logged By**  
PM

**Figure No.**  
8658-04-19.WS-02





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**Site**  
Parkside Phase 4

**Number**  
**WS-03**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 13.24	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721913.8 E 741332.9 N	<b>Dates</b> 10/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			13.04	(0.20)	TARMACADAM		
					0.20	MADE GROUND: Light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional fragments of red brick cloth material and wood.		
1.70	EN			12.44	0.80	No recovery		
					(0.20)			
2.70	EN			12.24	1.00	MADE GROUND: Brownish grey mottled orange slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and occasional fragments of granite wood and brick and rootlets		
					(0.40)			
				11.84	1.40	Firm grey mottled orange slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.40)			
				11.44	1.80	Firm light brown mottled orange slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.20)			
				11.24	2.00	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
					(0.70)			
				10.54	2.70	Firm light brown slightly gravelly sandy CLAY with occasional subangular to subrounded cobbles.		
					(0.20)			
				10.34	2.90	No recovery		
					(0.10)			
				10.24	3.00	Firm grey sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
					(0.70)			
				9.54	3.70	No recovery		
					(0.30)			
				9.24	4.00	Complete at 4.00m		

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b> 8658-04-19.WS-03	



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**Site**  
Parkside Phase 4

**Number**  
**WS-04**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.90	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721931.6 E 741368.2 N	<b>Dates</b> 09/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			12.82	(0.08)	COBBLELOCK		
				12.66	(0.16)	MADE GROUND: Multicoloured subrounded to rounded fine to coarse Gravel		
				12.30	(0.24)	MADE GROUND: Grey sandy gravelly Clay with occasional subangular to subrounded cobbles and occasional fragments of red brick wood concrete and plastic.		
				12.30	(0.36)	MADE GROUND: Brown sandy clayey Gravel with occasional subangular to subrounded cobbles and occasional fragments of red brick concrete and rare metal fragments.		
				11.90	(0.40)	MADE GROUND: Grey sandy clayey Gravel with occasional subangular to subrounded cobbles and occasional fragments of red brick and concrete		
1.70	EN			11.90	(1.00)			
				10.90	(2.00)	Complete at 2.00m		

<b>Remarks</b> Refusal at 2.00m	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b> 8658-04-19.WS-04	



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**Site**  
Parkside Phase 4

**Number**  
**WS-05**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 13.34	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721944.4 E 741339.8 N	<b>Dates</b> 09/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			13.04	(0.30)	TOPSOIL		
					0.30	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
1.70	EN			12.34	(0.70)	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional rootlets		
					1.00	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional rootlets		
2.70	EN			11.94	(1.40)	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
					1.40	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				11.34	(2.00)	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional shell fragments		
					2.00	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional shell fragments		
				10.74	(2.60)	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional shell fragments.		
					2.60	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional shell fragments.		
				10.34	(3.00)	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
					3.00	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
				9.94	(3.40)	No recovery		
					(0.60)			
				9.34	(4.00)	Complete at 4.00m		

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b>	8658-04-19.WS-05



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**Site**  
Parkside Phase 4

**Number**  
**WS-06**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.90	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721951.2 E 741406 N	<b>Dates</b> 10/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			12.75	(0.15)	TARMACADAM		
					0.15	MADE GROUND: Grey sandy clayey Gravel with occasional subangular to subrounded cobbles of concrete and occasional fragments of red brick and wood.		
					(0.60)			
				12.15	0.75	Complete at 0.75m		

<b>Remarks</b> Refusal at 0.75m	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b> 8658-04-19.WS-06	



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**Site**  
Parkside Phase 4

**Number**  
**WS-07**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.74	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721961.5 E 741375.9 N	<b>Dates</b> 10/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			12.49	(0.25)	TARMACADAM		
					0.25	MADE GROUND: Grey sandy clayey fine to coarse angular to subangular Gravel with occasional subangular to subrounded cobbles and occasional fragments of red brick and concrete.		
				12.04	0.70	Complete at 0.70m		

<b>Remarks</b> Refusal at 0.70m	<b>Scale (approx)</b> 1:25	<b>Logged By</b> PM
	<b>Figure No.</b> 8658-04-19.WS-07	



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**Site**  
Parkside Phase 4

**Number**  
**WS-08**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.78	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721998.4 E 741398.1 N	<b>Dates</b> 10/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			12.53	(0.25)	TARMACADAM		
					0.25	MADE GROUND: Grey slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and occasional fragments of red brick and wood.		
1.70	EN			11.78	(0.75)			
					1.00	Firm grey slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles.		
2.70	EN			10.88	(0.90)			
					1.90	No recovery		
				10.78	(0.10)			
					2.00	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
				9.88	(0.90)			
					2.90	No recovery		
				9.78	(0.10)			
					3.00	Firm dark brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
				9.33	(0.45)			
					3.45	No recovery		
				8.78	(0.55)			
					4.00	Complete at 4.00m		

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b> 8658-04-19.WS-08	



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**Site**  
Parkside Phase 4

**Number**  
**WS-09**

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 12.94	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
	<b>Location</b> 721966 E 741351.3 N	<b>Dates</b> 09/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	EN			12.74	(0.20)	TOPSOIL		
					0.20	MADE GROUND: Firm brownish grey slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and fragments of shells red brick and granite.		
1.70	EN			12.14	(0.60)			
					0.80	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
2.70	EN			10.94	(1.20)			
					2.00	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
				10.04	(0.90)			
					2.90	Stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
				9.44	3.50	Complete at 3.50m		

<b>Remarks</b> Refusal at 3.50m	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	PM
	<b>Figure No.</b> 8658-04-19.WS-09	

## Parkside Phase 4 – Window Sample Photos



WS01



WS02





WS03



WS04



WS05



WS07



WS08

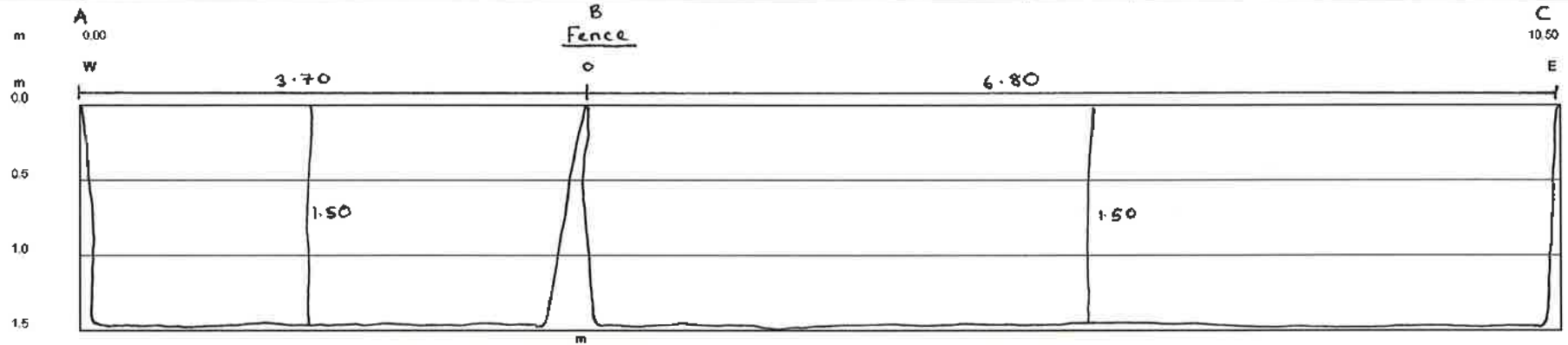


WS09

## **APPENDIX 5 – Slit Trench Records**

**SLIT TRENCH RECORD - SLIT TRENCH ST-01**

Contract No.:	8658-04-19	Survey Point:	A	B/C
Client:	DBFL	E	721828.396	721837.854
Site Address:	Parkside Phase 4	N	741831.705	<del>741837.822</del>
Date Commenced:	03/05/2019	Ground Level	13.975	13.640 (m OD)
Date Completed:	03/05/2019			
Logged by:	Sarah Connolly			



Trench Profile: (m)

Grass	0.00 - 10.50

Zero taken at	West
Start of ST	0.00
End of ST	10.50
ST Length	10.50
Max Depth	1.50
Facing Direction	W-E
Width of ST	0.50

Notes

Pipe No.	ø (mm)	Colour - Material	Utility	Depth	Distance from zero	Angle

Soil Profile:

From (m)	To (m)	Description
0.00	0.30	TOPSOIL
0.30	0.90	MADE GROUND: Brown sandy gravelly Clay with fragments of plastic
0.90	1.50	MADE GROUND: Dark brown/grey sandy gravelly Clay with fragments of timber and glass



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 Email: info@gi.ie

Parkside Phase 4 – Slit Trench Photos



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## **APPENDIX 6 – Borehole Records**



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH01**

<b>Machine</b> : Dando 2000 & Commacchio MC405P	<b>Casing Diameter</b> 200mm cased to 4.90m 100mm cased to 12.30m	<b>Ground Level (mOD)</b> 12.04	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion with Rotary Follow On	<b>Location</b> 721864.6 E 741375.6 N	<b>Dates</b> 24/05/2019- 28/06/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 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				11.64	(0.40) 0.40	TOPSOIL			
1.00-1.45	SPT(C) N=7			1,2/1,2,2,2		(1.20)	Firm grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse			
1.60	B				10.44	1.60	Stiff dark grey slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse			
2.00-2.45	SPT(C) N=30			4,4/5,7,7,11						
2.50	B									
3.00-3.45	SPT(C) N=50			4,6/9,10,12,19		(3.20)				
3.50	B									
4.00-4.31	SPT(C) 50/155			9,12/18,26,6						
4.40	B			25/50 50/0						
4.80	B			SPT(C) 25*/0						
4.90-4.90	<b>TCR</b>	<b>SCR</b>	<b>RQD</b>	<b>FI</b>	7.24	4.80	Very stiff grey slightly sandy gravelly CLAY with many subangular cobbles. Sand is fine to coarse. Gravel is subangular fine to coarse		▼	
4.90	100									
5.00				Water strike(1) at 4.80m, rose to 4.72m in 20 mins.						
	20									
6.00						(3.20)				
	14									
7.10										
	56									
8.00					4.04	8.00	Very stiff dark grey slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse			
	73					(1.20)				
9.10										
9.20					2.84	9.20	Strong grey very fine to fine grained fossiliferous LIMESTONE with many calcite veins. Partially weathered with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough			
	100	90	86							

<b>Remarks</b> Cable percussion refusal at 4.90mBGL Groundwater monitoring standpipe installed Chiselling from 4.80m to 4.90m for 1 hour.	<b>Scale (approx)</b> 1:50	<b>Logged By</b> MMC
<b>Figure No.</b> 8658-04-19.BH01		





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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH01**

**Machine** : Dando 2000 & Commacchio  
**Flush** : MC405P Water  
**Core Dia**: 68 mm  
**Method** : Cable Percussion with Rotary Follow On

**Casing Diameter**  
200mm cased to 4.90m  
100mm cased to 12.30m

**Ground Level (mOD)**  
12.04

**Client**  
Cairn Homes  
**Job Number**  
8658-04-19

**Location**  
721864.6 E 741375.6 N

**Dates**  
24/05/2019-28/06/2019

**Engineer**  
DBFL  
**Sheet**  
2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.20											
10.70				4			(3.10)	10.20-11.20 - Two fracture sets. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 85 degrees, undulating rough			
11.20	98	81	81	4				11.20-12.30 - Two fracture sets. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 85 degrees, undulating rough			
12.30						-0.26	12.30	Complete at 12.30m			

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	MMC
	<b>Figure No.</b> 8658-04-19.BH01	



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH02**

<b>Machine</b> : Dando 2000 & Commacchio MC405P	<b>Casing Diameter</b> 200mm cased to 8.00m 100mm cased to 16.10m	<b>Ground Level (mOD)</b> 13.48	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion with Rotary Follow On	<b>Location</b> 721882.9 E 741323.3 N	<b>Dates</b> 28/05/2019-01/07/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.80	B				13.28	(0.20)	TOPSOIL			
1.00-1.45	SPT(C) N=10			3,2/2,3,2,3	12.88	(0.40)	MADE GROUND: Brownish grey sandy gravelly Clay			
1.70	B				11.88	0.60	Firm brownish grey slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse			
2.00-2.45	SPT(C) N=13			3,2/3,2,3,5		(1.00)				
2.50	B					1.60	Firm to stiff brownish grey sandy gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse			
3.40	B				10.63	2.85	Dense brownish grey/dark grey gravelly fine to coarse SAND with occasional cobbles. Gravel is subrounded fine to coarse		▼1	
3.00-3.45	SPT(C) N=40			Water strike(1) at 3.00m, rose to 2.92m in 20 mins. 9,8/10,10,10,10		(1.25)				
4.00-4.40	SPT(C) 50/250				9.38	4.10	Stiff dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse		▼2	
4.10	B					(1.10)				
5.40	B				8.28	5.20	Stiff dark grey very sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse		▼2	
5.00-5.45	SPT(C) N=41			Water strike(2) at 5.00m, rose to 4.10m in 20 mins. 9,8/8,9,12,12		(0.70)				
6.10	B				7.58	5.90	Stiff dark grey sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse			
6.50-6.85	SPT(C) 50/200				6.48	7.00	Stiff brownish grey slightly sandy gravelly CLAY with occasional cobbles and boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse			
6.60	B			11,14/16,16,18		(1.10)				
7.50	B				5.68	7.80	Very stiff greyish brown slightly sandy gravelly CLAY with occasional angular cobbles. Sand is fine to coarse. Gravel is angular fine to coarse			
8.00	TCR	SCR	RQD	FI		7.80				
	43	-				(1.40)				
9.20	100	-			4.28	9.20	Weak light grey very fine to fine grained LIMESTONE with frequent calcite veins. Residual weathering			
9.50						(0.60)	9.20-9.80 - Non Intact			
	100	19	19	NI	3.68	9.80	Weak light grey very fine to fine grained			

<b>Remarks</b> Cable percussion refusal at 8.00m BGL Groundwater monitoring standpipe installed Chiselling from 7.30m to 7.40m for 0.5 hours. Chiselling from 7.90m to 8.00m for 0.5 hours.	<b>Scale (approx)</b> 1:50	<b>Logged By</b> SC & MMC
<b>Figure No.</b> 8658-04-19.BH02		



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH02**

<b>Machine</b> : Dando 2000 & Commacchio <b>Flush</b> : MC405P Water <b>Core Dia</b> : 68 mm	<b>Casing Diameter</b> 200mm cased to 8.00m 100mm cased to 16.10m	<b>Ground Level (mOD)</b> 13.48	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion with Rotary Follow On	<b>Location</b> 721882.9 E 741323.3 N	<b>Dates</b> 28/05/2019-01/07/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.30							(1.50)	LIMESTONE with frequent calcite veins. Distinct to destructed weathering with oxide staining 9.80-11.30 - Non Intact			
11.30	100	0	0	NI		2.18	11.30	Medium strong light grey very fine to fine grained LIMESTONE with frequent calcite veins partially weathered with oxide staining 11.30-12.70 - Two fracture sets. F1: Closely spaced sub-horizontal to 45 degrees, undulating rough. F2: Closely spaced sub-vertical to 85 degrees, undulating rough			
11.90				10			(1.40)				
12.70	58	13	13			0.78	12.70	CAVITY: Driller notes, open cavity			
13.10				CAVITY		0.38	13.10	Medium strong light grey very fine to fine grained LIMESTONE with frequent calcite veins partially weathered with oxide staining 13.10-14.30 - Two fracture sets. F1: Medium spaced sub-horizontal to 20 degrees, undulating rough. F2: Widely spaced sub-vertical to 90 degrees, undulating rough			
14.30	100	20	0				(3.00)	14.30-15.30 - Two fracture sets. F1: Closely spaced sub-horizontal to 25 degrees, undulating rough. F2: Closely spaced sub-vertical to 70 degrees, undulating rough			
14.70				12							
15.30	100	64	30					15.30-16.10 - Two fracture sets. F1: Closely spaced sub-horizontal to 25 degrees, undulating rough. F2: Closely spaced sub-vertical to 70 degrees, undulating rough			
16.10						-2.62	16.10	Complete at 16.10m			

<b>Remarks</b>	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	SC & MMC
	<b>Figure No.</b> 8658-04-19.BH02	



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH03**

<b>Machine</b> : Dando 2000	<b>Casing Diameter</b> 200mm cased to 5.40m	<b>Ground Level (mOD)</b> 11.15	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion	<b>Location</b> 721920.7 E 741402.9 N	<b>Dates</b> 23/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30	B				11.05	0.10	TOPSOIL		
0.90	B					(0.50)	Stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse, gravel is subrounded medium to coarse		
1.00-1.45	SPT(C) N=18			3,5/6,4,4,4	10.55	0.60	Stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse, gravel is subrounded medium to coarse		
1.40	B								
2.00-2.45	SPT(C) N=27			3,4/5,8,6,8					
2.00	B					(3.90)			
2.50	B								
3.00-3.45	SPT(C) N=26			3,3/5,6,7,8					
3.50	B			Water strike(1) at 3.40m, rose to 3.30m in 20 mins.					
4.00-4.45	SPT(C) N=34			4,10/6,6,9,13					
4.20	B				6.65	4.50	Very dense brown fine to coarse SAND with frequent angular cobbles		
4.60	B					(0.80)			
5.00-5.20	SPT(C) 50/50			10,6/7,10,11,22	5.85	5.30			
5.00	B				5.75	5.40	OBSTRUCTION: Presumed boulder		
							Complete at 5.40m		

<b>Remarks</b> Refusal at 5.40mBGL Borehole backfilled upon completion Chiselling from 5.30m to 5.40m for 0.5 hours.	<b>Scale (approx)</b> 1:50	<b>Logged By</b> MMC
<b>Figure No.</b> 8658-04-19.BH03		



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH04**

<b>Machine</b> : Dando 2000	<b>Casing Diameter</b> 200mm cased to 1.00m	<b>Ground Level (mOD)</b> 13.18	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion	<b>Location</b> 721966 E 741351.3 N	<b>Dates</b> 01/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					12.98	(0.20) 0.20	TOPSOIL		
						(0.70)	Brownish grey slightly sandy slightly gravelly CLAY with occasional cobbles		
					12.28 12.18	0.90 1.00	OBSTRUCTION: Presumed boulder		
							Complete at 1.00m		

<b>Remarks</b> Refusal at 1.00mBGL Borehole backfilled and moved 1.00m	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	MMC
	<b>Figure No.</b> 8658-04-19.BH04	



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH04(A)**

<b>Machine :</b> Dando 2000	<b>Casing Diameter</b> 200mm cased to 5.70m	<b>Ground Level (mOD)</b>	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method :</b>	<b>Location</b>	<b>Dates</b> 20/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B					0.17	TOPSOIL		
1.00-1.45	SPT(C) N=10			2,2/3,3,2,2		(2.08)	Firm brown slightly sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse, gravel is subrounded medium to coarse		
1.50	B								
2.00-2.45	SPT(C) N=20			2,4/6,5,4,5		2.25	Stiff dark grey slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse, gravel is subrounded medium to coarse		
2.40	B								
3.00-3.45	SPT(C) N=25			3,4/6,6,6,7					
3.50	B					(2.75)			
4.00-4.38	SPT(C) 50/233			4,6/12,15,15,8					
4.50	B								
5.00-5.38	SPT(C) 50/230			Water strike(1) at 4.94m. 3.7/14,15,16,5 Water strike(2) at 4.96m.		5.00 (0.60)	Very stiff dark greyish brown sandy gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse, gravel is subrounded medium to coarse		▽
5.70-5.90	SPT(C) 50/50			25/50		5.60 5.70	OBSTRUCTION: Presumed boulder Complete at 5.70m		

<b>Remarks</b> Refusal at 5.70mBGL Borehole backfilled upon completion Chiselling from 4.30m for 0.5 hours. Chiselling from 5.70m for 0.66 hours.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	MMC
	<b>Figure No.</b> 8658-04-19.BH04(A)	



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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH05**

<b>Machine</b> : Dando 2000 & Commachio MC405P	<b>Casing Diameter</b> 200mm cased to 3.80m 100mm cased to 7.20m	<b>Ground Level (mOD)</b> 12.29	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion with Rotary Follow On	<b>Location</b> 721983.1 E 741428.6 N	<b>Dates</b> 22/05/2019- 28/06/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B					(0.90)	MADE GROUND: Brown grey sandy gravelly Clay with fragments of brick. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse			
1.00-1.45	SPT(C) N=10			2,2/2,2,3,3	11.39	0.90	Firm grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse			
1.50	B					(1.30)				
2.00-2.45	23 SPT(C) N=10			2,2/2,3,2,3	10.09	2.20				
2.20	B				9.89	(0.20) 2.40	Firm to stiff grey slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse Gravel is subrounded fine to coarse			
3.00-3.45	B SPT(C) N=22			2,2/4,5,6,7		(1.40)	Very stiff dark grey sandy gravelly CLAY with occasional cobbles. Sand is fine to coarse Gravel is subrounded fine to coarse			
3.30	B									
3.80-3.80				25/50 50/0 SPT(C) 25*/0 B						
3.70	<b>TCR</b>	<b>SCR</b>	<b>RQD</b>	<b>FI</b>	8.49	3.80				
3.80	100	46	0	15			Medium strong grey very fine to fine grained fossiliferous LIMESTONE with frequent calcite veins partially weathered with brown clay on fractures			
4.20							3.70-4.70 - One fracture set. F1: Closely spaced sub-horizontal to 30 degrees, undulating rough			
4.70	100	74	58	15		(3.40)	4.70-5.80 - Two fracture sets. F1: Closely spaced sub-horizontal to 20 degrees, undulating rough. F2: Medium spaced sub-vertical to 80 degrees, undulating rough			
5.80							5.80-7.20 - Two fracture sets. F1: Closely spaced sub-horizontal to 20 degrees, undulating rough. F2: Medium spaced sub-vertical to 70 degrees, undulating rough			
7.20					5.09	7.20	Complete at 7.20m			

<b>Remarks</b> Cable percussion refusal at 3.80m BGL Groundwater monitoring standpipe installed Chiselling from 3.70m to 3.80m for 1 hour.	<b>Scale (approx)</b> 1:50	<b>Logged By</b> MMC
<b>Figure No.</b> 8658-04-19.BH05		



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Site  
Parkside Phase 4

Borehole Number  
**BH06**

<b>Machine</b> : Dando 2000	<b>Casing Diameter</b> 200mm cased to 5.10m	<b>Ground Level (mOD)</b> 12.28	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion	<b>Location</b> 722022.1 E 741408.8 N	<b>Dates</b> 22/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45 1.00	SPT(C) N=6 B			1,2/1,2,1,2	10.88	(1.40)	MADE GROUND: Brownish grey slightly sandy slightly gravelly Clay with fragments of brick. Sand is fine to coarse, gravel is subrounded medium coarse		
1.60	B				10.68	1.40 (0.20) 1.60	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse, gravel is subrounded medium to coarse		
2.00-2.45	SPT(C) N=8			2,2/1,2,2,3	9.98	(0.70)	Firm grey slightly gravelly CLAY. Gravel is subrounded medium to coarse		
2.40	B					2.30	Firm grey sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse, gravel is subrounded medium to coarse		
3.00-3.45	SPT(C) N=11			1,2/3,2,2,4	8.38	(1.60)			
3.40	B			Water strike(1) at 3.10m, rose to 3.00m in 20 mins.					▼1
4.00-4.45	SPT(C) N=28			3,5/5,6,7,10	7.28	3.90	Stiff grey sandy gravelly CLAY with occasional cobbles and boulders. Sand is fine to coarse, gravel is subrounded medium to coarse		
4.20	B				7.18	(1.10)			
5.00-5.20	SPT(C) 50/50			9,16/50		5.00 5.10	OBSTRUCTION: Presumed boulder Complete at 5.10m		

<b>Remarks</b> Refusal at 5.10mBGL Borehole backfilled upon completion Chiselling from 5.00m to 5.10m for 0.5 hours.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	MMC
	<b>Figure No.</b> 8658-04-19.BH06	





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**Site**  
Parkside Phase 4

**Borehole Number**  
**BH07**

<b>Machine</b> : Dando 2000 & Commacchio MC405P	<b>Casing Diameter</b> 200mm cased to 5.00m 100mm cased to 7.90m	<b>Ground Level (mOD)</b> 12.51	<b>Client</b> Cairn Homes	<b>Job Number</b> 8658-04-19
<b>Method</b> : Cable Percussion with Rotary Follow On	<b>Location</b> 722034.8 E 741373.4 N	<b>Dates</b> 21/05/2019	<b>Engineer</b> DBFL	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50	B					(1.40)	MADE GROUND: Brownish grey slightly sandy slightly gravelly Clay with occasional cobbles and fragments of brick. Sand is fine to coarse. Gravel is subrounded fine to coarse			
1.00 1.00-1.45	B SPT(C) N=9			1,2/2,2,2,3	11.11	1.40	Firm greyish brown sandy gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse Gravel is subrounded fine to coarse			
2.00 2.00-2.45	B SPT(C) N=9			2,1/2,2,2,3		(1.50)				
2.60	B				9.61	2.90	Stiff dark grey very sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse			
3.00-3.45	SPT(C) N=29			5,5/7,7,7,8						
3.50	B									
4.00-4.38	SPT(C) 50/230			4,8/13,15,17,5		(2.10)				
4.20	B									
5.00-5.00 5.00	<b>TCR</b> <b>SCR</b> <b>RQD</b> <b>FI</b>			25/50 50/0 SPT(C) 25*/0 Water strike(1) at 4.90m, rose to 4.80m in 20 mins.	7.51	5.00	Medium strong light grey very fine to fine grained fossiliferous LIMESTONE with frequent calcite veins and some pyrite filled vugs partially weathered with some clay smearing on fractures		▽1	
5.90	100   57   42			17			4.90-5.90 - Two fracture sets. F1: Closely spaced sub-horizontal to 15 degrees, undulating rough. F2: Medium spaced sub-vertical to 60 degrees, undulating rough			
6.30				12		(2.90)	5.90-6.90 - Two fracture sets. F1: Closely spaced sub-horizontal to 20 degrees, undulating rough. F2: Widely spaced sub-vertical to 70 degrees, undulating rough			
6.90	100   73   68			8			6.90-7.90 - One fracture set. F1: Medium spaced sub-horizontal to 5 degrees, undulating rough			
7.90					4.61	7.90	Complete at 7.90m			

<b>Remarks</b> Refusal at 5.00mBGL Wavin installed for rotary follow on Chiselling from 4.90m to 5.00m for 0.5 hours.	<b>Scale (approx)</b> 1:50	<b>Logged By</b> MMC
<b>Figure No.</b> 8658-04-19.BH07		

Parkside Phase 4

Rotary Core Photographs

BH01



BH02





BH05



BH07



## **APPENDIX 7 – Groundwater Monitoring**

## Parkside Phase 4

### GROUNDWATER MONITORING:

BOREHOLE	DATE	GROUNDWATER (mBGL )	COMMENT
BH01	02/08/2019	0.66	
BH02	02/08/2019	2.88	
BH05	02/08/2019	2.60	
BH07	02/08/2019	2.72	



## **APPENDIX 8 – Laboratory Testing**





# Exova Jones Environmental

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

Unit 3 Deeside Point  
Zone 3  
Deeside Industrial Park  
Deeside  
CH5 2UA

Ground Investigations Ireland  
Catherinestown House  
Hazelhatch Road  
Newcastle  
Co. Dublin  
Ireland

Tel: +44 (0) 1244 833780

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**Attention :** Barry Sexton  
**Date :** 24th May, 2019  
**Your reference :** 8658-04-19  
**Our reference :** Test Report 19/7764 Batch 1  
**Location :** Parkside Site  
**Date samples received :** 14th May, 2019  
**Status :** Final report  
**Issue :** 1

Twenty samples were received for analysis on 14th May, 2019 of which twenty 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**  
Senior Project Manager

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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	WS-01	WS-01	WS-01	WS-02	WS-03	WS-03	WS-03	WS-04	WS-04	WS-05			
Depth	0.70	1.70	2.70	0.70	0.70	1.70	2.70	0.70	1.70	0.70			
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	09/05/2019	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019			
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	LOD/LOR	Units	Method No.
Antimony	2	3	4	1	2	2	3	2	1	3	<1	mg/kg	TM30/PM15
Arsenic #	12.0	24.6	11.2	9.1	12.7	7.3	12.7	10.0	7.2	15.5	<0.5	mg/kg	TM30/PM15
Barium #	105	149	163	146	110	187	57	96	80	140	<1	mg/kg	TM30/PM15
Cadmium #	1.7	2.2	2.0	1.2	2.4	0.8	2.2	0.8	0.6	2.4	<0.1	mg/kg	TM30/PM15
Chromium #	23.6	27.7	18.4	22.7	23.2	40.3	17.8	19.3	17.1	28.9	<0.5	mg/kg	TM30/PM15
Copper #	35	30	29	19	27	13	25	19	15	34	<1	mg/kg	TM30/PM15
Lead #	49	53	48	14	29	22	17	28	26	50	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	2.5	3.0	4.4	2.5	3.2	2.3	4.3	0.9	0.8	3.3	<0.1	mg/kg	TM30/PM15
Nickel #	33.4	39.7	43.8	28.4	38.8	30.4	37.9	17.9	17.6	44.5	<0.7	mg/kg	TM30/PM15
Selenium #	3	2	2	2	2	<1	2	<1	<1	2	<1	mg/kg	TM30/PM15
Zinc #	117	117	84	66	93	82	73	67	54	138	<5	mg/kg	TM30/PM15
<b>PAH MS</b>													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	0.06	<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 #	0.16	0.26	<0.03	0.13	0.25	<0.03	<0.03	0.33	0.29	0.25	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	0.12	<0.04	0.04	0.07	<0.04	<0.04	0.12	0.09	0.07	<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.31	1.29	<0.03	0.37	0.46	<0.03	<0.03	0.87	0.50	0.43	<0.03	mg/kg	TM4/PM8
Pyrene #	0.26	1.12	<0.03	0.33	0.40	<0.03	<0.03	0.80	0.39	0.37	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.23	0.80	<0.06	0.21	0.35	<0.06	<0.06	0.45	0.24	0.30	<0.06	mg/kg	TM4/PM8
Chrysene #	0.20	0.83	<0.02	0.17	0.26	<0.02	<0.02	0.42	0.21	0.25	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.38	1.87	<0.07	0.26	0.47	<0.07	<0.07	0.78	0.35	0.43	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.19	0.93	<0.04	0.15	0.25	<0.04	<0.04	0.40	0.16	0.23	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.14	0.70	<0.04	0.09	0.16	<0.04	<0.04	0.26	0.12	0.15	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	0.13	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.13	0.68	<0.04	0.08	0.16	<0.04	<0.04	0.26	0.13	0.14	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	0.12	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	1.15	5.47	<0.22	0.95	1.50	<0.22	<0.22	2.57	1.26	1.38	<0.22	mg/kg	TM4/PM8
PAH 17 Total	2.00	8.91	<0.64	1.83	2.83	<0.64	<0.64	4.79	2.54	2.62	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.27	1.35	<0.05	0.19	0.34	<0.05	<0.05	0.56	0.25	0.31	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.11	0.52	<0.02	0.07	0.13	<0.02	<0.02	0.22	0.10	0.12	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90	93	79	97	88	83	60 <sup>sv</sup>	95	93	98	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	53	<30	<30	<30	79	54	<30	<30	mg/kg	TM5/PM8/PM16

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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	WS-01	WS-01	WS-01	WS-02	WS-03	WS-03	WS-03	WS-04	WS-04	WS-05			
Depth	0.70	1.70	2.70	0.70	0.70	1.70	2.70	0.70	1.70	0.70			
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	09/05/2019	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019			
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	LOD/LOR	Units	Method No.
TPH CWG													
<b>Aliphatics</b>													
>C5-C6 #	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	0.8 <sup>SV</sup>	<0.1 <sup>SV</sup>	<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	18	14	<7	<7	mg/kg	TMS/PM8/PM16
>C21-C35 #	<7	<7	<7	53	<7	<7	<7	61	40	<7	<7	mg/kg	TMS/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	53	<26	<26	<26	79	55	<26	<26	mg/kg	TMS/PM8/PM16
>C6-C10	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	0.8 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	37	27	<10	<10	mg/kg	TMS/PM8/PM16
>C25-C35	<10	<10	<10	42	<10	<10	<10	44	30	<10	<10	mg/kg	TMS/PM8/PM16
<b>Aromatics</b>													
>C5-EC7 #	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<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	10	<4	<4	<4	mg/kg	TMS/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	23	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	43	77	<7	<7	<7	<7	<7	128	29	<7	<7	mg/kg	TMS/PM8/PM16
>EC35-EC40	14	13	<7	<7	<7	<7	<7	17	36	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-40	57	90	<26	<26	<26	<26	<26	178	65	<26	<26	mg/kg	TMS/PM8/PM16
Total aliphatics and aromatics(C5-40)	57	90	<52	53	<52	<52	<52	257	120	<52	<52	mg/kg	TMS/PM8/PM16
>EC6-EC10 #	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	<10	62	<10	<10	<10	mg/kg	TMS/PM8/PM16
>EC25-EC35	39	59	<10	<10	<10	<10	<10	95	32	<10	<10	mg/kg	TMS/PM8/PM16
MTBE #	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
Benzene #	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
Toluene #	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
o-Xylene #	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<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



**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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	WS-05	WS-05	WS-06	WS-07	WS-08	WS-08	WS-08	WS-09	WS-09	WS-09			
Depth	1.70	2.70	0.70	0.70	0.70	1.70	2.70	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	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019			
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	LOD/LOR	Units	Method No.
Antimony	3	3	3	2	3	2	3	3	3	3	<1	mg/kg	TM30/PM15
Arsenic #	12.0	10.3	14.1	10.7	16.3	12.6	10.3	15.4	11.0	11.5	<0.5	mg/kg	TM30/PM15
Barium #	124	65	147	217	260	172	87	103	64	89	<1	mg/kg	TM30/PM15
Cadmium #	1.8	1.9	1.2	0.4	3.4	1.7	1.8	2.2	1.7	4.3	<0.1	mg/kg	TM30/PM15
Chromium #	35.5	21.4	22.2	13.8	39.9	45.2	18.4	26.6	22.3	31.3	<0.5	mg/kg	TM30/PM15
Copper #	19	26	21	9	32	26	26	44	26	30	<1	mg/kg	TM30/PM15
Lead #	24	17	29	17	35	27	18	67	16	42	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	3.7	2.5	1.3	0.6	3.2	2.4	3.0	2.4	2.6	4.0	<0.1	mg/kg	TM30/PM15
Nickel #	33.8	38.5	25.2	13.5	52.2	44.3	36.4	35.4	37.0	41.4	<0.7	mg/kg	TM30/PM15
Selenium #	1	<1	2	<1	2	1	<1	<1	<1	6	<1	mg/kg	TM30/PM15
Zinc #	103	75	102	50	159	132	72	131	77	102	<5	mg/kg	TM30/PM15
<b>PAH MS</b>													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	0.15	0.33	0.06	<0.03	<0.03	0.14	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	0.11	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	0.26	0.71	0.06	<0.03	<0.03	0.31	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	0.24	0.61	0.06	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	0.18	0.33	<0.06	<0.06	<0.06	0.19	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	0.17	0.33	0.04	<0.02	<0.02	0.20	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	0.26	0.63	<0.07	<0.07	<0.07	0.34	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	0.13	0.33	<0.04	<0.04	<0.04	0.18	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	0.08	0.23	<0.04	<0.04	<0.04	0.13	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	0.08	0.21	<0.04	<0.04	<0.04	0.13	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	0.81	2.11	<0.22	<0.22	<0.22	1.09	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	1.55	3.82	<0.64	<0.64	<0.64	1.90	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	0.19	0.45	<0.05	<0.05	<0.05	0.24	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	0.07	0.18	<0.02	<0.02	<0.02	0.10	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	130	95	96	91	92	82	95	94	93	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	52	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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	WS-05	WS-05	WS-06	WS-07	WS-08	WS-08	WS-08	WS-09	WS-09	WS-09			
Depth	1.70	2.70	0.70	0.70	0.70	1.70	2.70	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	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019			
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	LOD/LOR	Units	Method No.
TPH CWG													
<b>Aliphatics</b>													
>C5-C6 #	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<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	<0.2	mg/kg	TMS/PM8/PM16
>C12-C16 #	<4	<4	<4	10	<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	42	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	52	<26	<26	<26	<26	<26	<26	<26	mg/kg	TMS/PM8/PM16
>C6-C10	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	14	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
>C25-C35	<10	<10	<10	35	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
<b>Aromatics</b>													
>C5-EC7 #	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<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	<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	11	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC21-EC35 #	<7	<7	42	41	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC35-EC40	<7	<7	11	14	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-40	<26	<26	53	66	<26	<26	<26	<26	<26	<26	<26	mg/kg	TMS/PM8/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	53	118	<52	<52	<52	<52	<52	<52	<52	mg/kg	TMS/PM8/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	13	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
>EC25-EC35	<10	<10	35	43	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
MTBE #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<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



**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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	WS-01	WS-01	WS-01	WS-02	WS-03	WS-03	WS-03	WS-04	WS-04	WS-05			
Depth	0.70	1.70	2.70	0.70	0.70	1.70	2.70	0.70	1.70	0.70			
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	09/05/2019	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019			
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	LOD/LOR	Units	Method No.
Dissolved Antimony #	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved 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 #	<0.0025	0.0029	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	0.029	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.022	0.019	0.059	0.023	0.010	0.010	0.007	0.027	0.159	0.010	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.22	0.19	0.59	0.23	0.10	0.10	0.07	0.27	1.59	0.10	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	0.0082	<0.0015	<0.0015	<0.0015	0.0121	0.0223	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	0.082	<0.015	<0.015	<0.015	0.121	0.223	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	0.08	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.008	0.014	0.026	0.005	0.008	0.002	0.006	0.003	0.006	0.009	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.08	0.14	0.26	0.05	0.08	0.02	0.06	0.03	0.06	0.09	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.003	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	0.03	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved 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 #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	4	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	16.4	1.4	5.6	49.9	14.7	21.2	7.1	39.5	11.9	5.1	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	164	14	56	499	147	212	71	395	119	51	<5	mg/kg	TM38/PM0
Chloride #	<0.3	1.4	0.5	0.7	0.3	0.6	<0.3	1.1	2.9	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	<3	14	5	7	<3	6	<3	11	29	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	4	13	3	<2	4	3	<2	2	2	3	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	40	130	30	<20	40	30	<20	<20	<20	30	<20	mg/kg	TM60/PM0
pH	7.74	7.49	7.43	11.38	8.12	7.62	7.60	11.64	12.12	8.20	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	142	176	77	183	81	56	41	216	448	111	<35	mg/l	TM20/PM0
Total Dissolved Solids #	1419	1760	770	1830	810	560	410	2159	4479	1110	<350	mg/kg	TM20/PM0



**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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	WS-05	WS-05	WS-06	WS-07	WS-08	WS-08	WS-08	WS-09	WS-09	WS-09			
Depth	1.70	2.70	0.70	0.70	0.70	1.70	2.70	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	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019			
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	LOD/LOR	Units	Method No.
Dissolved Antimony #	<0.002	<0.002	<0.002	0.003	0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	0.03	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.010	0.006	0.032	0.020	0.029	0.007	0.016	0.024	0.004	0.005	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.10	0.06	0.32	0.20	0.29	0.07	0.16	0.24	0.04	0.05	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	0.0058	0.0029	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	0.058	0.029	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	0.015	<0.002	<0.002	0.008	<0.002	0.014	0.005	0.004	0.011	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	0.15	<0.02	<0.02	0.08	<0.02	0.14	0.05	0.04	0.11	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	0.003	0.003	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved 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 #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	4	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	21.1	7.7	37.2	66.2	9.9	<0.5	3.4	11.6	3.2	1.8	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	211	77	372	662	99	<5	34	116	32	18	<5	mg/kg	TM38/PM0
Chloride #	0.4	<0.3	1.1	0.3	1.0	0.7	<0.3	0.9	<0.3	<0.3	<0.3	mg/l	TM38/PM0
Chloride #	4	<3	11	<3	10	7	<3	9	<3	<3	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	2	<2	<2	<2	7	12	<2	10	<2	<2	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	70	120	<20	100	<20	<20	<20	mg/kg	TM60/PM0
pH	7.56	7.80	11.58	11.14	8.12	7.90	8.34	7.96	8.30	8.29	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	97	106	279	276	156	96	89	159	89	66	<35	mg/l	TM20/PM0
Total Dissolved Solids #	970	1061	2789	2760	1561	960	890	1590	890	660	<350	mg/kg	TM20/PM0

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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						
<b>Sample ID</b>	WS-01	WS-01	WS-01	WS-02	WS-03	WS-03	WS-03	WS-04	WS-04	WS-05						
<b>Depth</b>	0.70	1.70	2.70	0.70	0.70	1.70	2.70	0.70	1.70	0.70						
<b>COC No / misc</b>																
<b>Containers</b>	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						
<b>Sample Date</b>	09/05/2019	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019						
<b>Sample Type</b>	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
<b>Batch Number</b>	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
<b>Date of Receipt</b>	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019						
<b>Solid Waste Analysis</b>																
Total Organic Carbon #	2.12	3.39	0.80	0.70	1.06	0.53	0.45	0.48	0.59	1.76	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 <sup>SV</sup>	<0.025	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<0.025	<0.025	<0.025	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	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	53	<30	<30	<30	79	54	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	1.15	5.47	<0.22	0.95	1.50	<0.22	<0.22	2.57	1.26	1.38	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	2.00	8.91	<0.64	1.83	2.83	<0.64	<0.64	4.79	2.54	2.62	100	-	-	<0.64	mg/kg	TM4/PM8
<b>CEN 10:1 Leachate</b>																
Arsenic #	<0.025	0.029	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.22	0.19	0.59	0.23	0.10	0.10	0.07	0.27	1.59	0.10	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	0.082	<0.015	<0.015	<0.015	0.121	0.223	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	0.08	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM17
Molybdenum #	0.08	0.14	0.26	0.05	0.08	0.02	0.06	0.03	0.06	0.09	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	0.03	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	1419	1760	770	1830	810	560	410	2159	4479	1110	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	40	130	30	<20	40	30	<20	<20	<20	30	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1138	0.1333	0.1031	0.1033	0.1119	0.1162	0.0992	0.1042	0.1063	0.1096	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	79.2	67.5	87.5	86.7	80.5	77.5	90.4	86.8	85.1	82.5	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.876	0.857	0.887	0.886	0.878	0.874	0.89	0.886	0.884	0.881	-	-	-		l	NONE/PM17
Eluate Volume	0.85	0.85	0.7	0.8	0.72	0.6	0.75	0.81	0.85	0.7	-	-	-		l	NONE/PM17
pH #	8.21	7.93	8.78	11.14	8.52	8.17	8.92	11.56	12.10	8.62	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	<3	4	<3	<3	<3	<3	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	164	14	56	499	147	212	71	395	119	51	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	14	5	7	<3	6	<3	11	29	<3	800	15000	25000	<3	mg/kg	TM38/PM0

Please see attached notes for all abbreviations and acronyms

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Site  
**Contact:** Barry Sexton  
**JE Job No.:** 19/7764

**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						
Sample ID	WS-05	WS-05	WS-06	WS-07	WS-08	WS-08	WS-08	WS-09	WS-09	WS-09						
Depth	1.70	2.70	0.70	0.70	0.70	1.70	2.70	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	09/05/2019	09/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	09/05/2019	09/05/2019	09/05/2019						
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	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	14/05/2019	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
<b>Solid Waste Analysis</b>																
Total Organic Carbon #	0.65	0.35	0.72	0.36	1.05	1.22	0.38	2.56	0.38	0.59	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<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	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	52	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	0.81	2.11	<0.22	<0.22	<0.22	1.09	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	1.55	3.82	<0.64	<0.64	<0.64	1.90	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
<b>CEN 10:1 Leachate</b>																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.10	0.06	0.32	0.20	0.29	0.07	0.16	0.24	0.04	0.05	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	0.058	0.029	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM10
Molybdenum #	<0.02	0.15	<0.02	<0.02	0.08	<0.02	0.14	0.05	0.04	0.11	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	0.03	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	0.03	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	970	1061	2789	2760	1561	960	890	1590	890	660	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	70	120	<20	100	<20	<20	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1102	0.0999	0.0953	0.0982	0.1165	0.1259	0.1019	0.1113	0.1031	0.1011	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	81.3	90.5	94.1	91.9	77.3	71.4	88.5	81.2	87.3	89.4	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.879	0.891	0.894	0.892	0.874	0.864	0.888	0.879	0.887	0.889	-	-	-		l	NONE/PM17
Eluate Volume	0.64	0.75	0.8	0.84	0.65	0.71	0.78	0.75	0.7	0.75	-	-	-		l	NONE/PM17
pH #	7.39	8.81	11.30	11.28	8.52	8.02	8.89	7.95	8.81	8.65	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	<3	<3	<3	<3	4	<3	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	211	77	372	662	99	<5	34	116	32	18	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	4	<3	11	<3	10	7	<3	9	<3	<3	800	15000	25000	<3	mg/kg	TM38/PM0

Please see attached notes for all abbreviations and acronyms



**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Site  
**Contact:** Barry Sexton

**Note:**

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

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

Where the sample is not taken by a 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
19/7764	1	WS-01	0.70	2	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-01	1.70	5	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-01	2.70	8	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-02	0.70	11	18/05/2019	General Description (Bulk Analysis)	Soil/Stone
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-03	0.70	14	18/05/2019	General Description (Bulk Analysis)	Soil/Stone
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-03	1.70	17	18/05/2019	General Description (Bulk Analysis)	Soil/Stone
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-03	2.70	20	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD

**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Site  
**Contact:** Barry Sexton

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/7764	1	WS-03	2.70	20	18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-04	0.70	23	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-04	1.70	26	18/05/2019	General Description (Bulk Analysis)	Soil/Stone
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-05	0.70	29	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-05	1.70	32	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-05	2.70	35	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-06	0.70	38	18/05/2019	General Description (Bulk Analysis)	Soil/Stone
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-07	0.70	41	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-08	0.70	44	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-08	1.70	47	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD

**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Site  
**Contact:** Barry Sexton

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/7764	1	WS-08	1.70	47	18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-08	2.70	50	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-09	0.70	53	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-09	1.70	56	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
19/7764	1	WS-09	2.70	59	18/05/2019	General Description (Bulk Analysis)	soil-stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD





# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/7764

## 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.: 19/7764

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><b>Notes:</b></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: 19/7764

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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
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
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: 19/7764

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
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
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

JE Job No: 19/7764

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
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
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		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.	PM0	No preparation is required.			AR	Yes
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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**Attention :** Barry Sexton  
**Date :** 10th June, 2019  
**Your reference :** 8658-04-19  
**Our reference :** Test Report 19/8807 Batch 1  
**Location :** Parkside Phase 4  
**Date samples received :** 31st May, 2019  
**Status :** Final report  
**Issue :** 1

Two samples were received for analysis on 31st May, 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.

**Compiled By:**

**Phil Sommerton BSc**

Senior Project Manager







# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/8807

## 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 $\pm$ 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



Ground Investigations Ireland  
Catherinestown House  
Hazelhatch Road  
Newcastle  
Co. Dublin  
Ireland



**Attention :** Barry Sexton  
**Date :** 27th June, 2019  
**Your reference :** 8658-04-19  
**Our reference :** Test Report 19/9756 Batch 1  
**Location :** Parkside Phase 4  
**Date samples received :** 17th June, 2019  
**Status :** Final report  
**Issue :** 1

Three samples were received for analysis on 17th June, 2019 of which three 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**  
Senior Project Manager

Please include all sections of this report if it is reproduced















**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton

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

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

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

Signed on behalf of Element Materials Technology:



Ryan Butterworth  
 Asbestos Team Leader

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/9756	1	BH01	0.50	2	18/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					18/06/2019	<b>Asbestos Fibres</b>	NAD
					18/06/2019	<b>Asbestos ACM</b>	NAD
					18/06/2019	<b>Asbestos Type</b>	NAD
					18/06/2019	<b>Asbestos Level Screen</b>	NAD
19/9756	1	BH01	1.60	5	18/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					18/06/2019	<b>Asbestos Fibres</b>	NAD
					18/06/2019	<b>Asbestos ACM</b>	NAD
					18/06/2019	<b>Asbestos Type</b>	NAD
					18/06/2019	<b>Asbestos Level Screen</b>	NAD
19/9756	1	BH01	2.50	8	18/06/2019	<b>General Description (Bulk Analysis)</b>	soil/stones
					18/06/2019	<b>Asbestos Fibres</b>	NAD
					18/06/2019	<b>Asbestos ACM</b>	NAD
					18/06/2019	<b>Asbestos Type</b>	NAD
					18/06/2019	<b>Asbestos Level Screen</b>	NAD



## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No: 19/9756

### 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

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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.

**Measurement Uncertainty**

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

**ABBREVIATIONS and ACRONYMS USED**

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NAD	No Asbestos Detected.
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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 Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

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

EMT Job No: 19/9756

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 - EMT)
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><b>Notes:</b></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>	



EMT Job No: 19/9756

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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
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
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

EMT Job No: 19/9756

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
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
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

EMT Job No: 19/9756

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
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
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		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.	PM0	No preparation is required.			AR	Yes
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	

Ground Investigations Ireland  
Catherinestown House  
Hazelhatch Road  
Newcastle  
Co. Dublin  
Ireland



**Attention :** Barry Sexton  
**Date :** 1st July, 2019  
**Your reference :** 8658-04-19  
**Our reference :** Test Report 19/9762 Batch 1  
**Location :** Parkside Phase 4  
**Date samples received :** 17th June, 2019  
**Status :** Final report  
**Issue :** 1

Eight samples were received for analysis on 17th June, 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:**



**Bruce Leslie**  
Project Manager

Please include all sections of this report if it is reproduced

# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/9762

**Report : Solid**

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24						
Sample ID	TP02	TP03	TP03	TP04	TP04	TP05	TP05	TP06						
Depth	1.70	0.70	1.70	0.70	1.70	0.70	1.70	0.70						
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						
Sample Date	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1						
Date of Receipt	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019						
										LOD/LOR	Units	Method No.		
Antimony	2	3	2	2	2	2	2	2		<1	mg/kg	TM30/PM15		
Arsenic #	12.6	27.2	9.7	13.3	13.3	15.9	13.9	12.3		<0.5	mg/kg	TM30/PM15		
Barium #	137	264	85	133	187	119	126	112		<1	mg/kg	TM30/PM15		
Cadmium #	1.7	2.5	1.8	1.7	3.1	2.1	2.3	1.9		<0.1	mg/kg	TM30/PM15		
Chromium #	69.5	89.1	48.6	36.8	60.3	60.4	69.2	45.7		<0.5	mg/kg	TM30/PM15		
Copper #	27	30	23	28	31	35	34	33		<1	mg/kg	TM30/PM15		
Lead #	25	32	14	30	36	192	43	41		<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 #	5.4	13.7	5.1	4.3	4.0	6.3	5.8	4.6		<0.1	mg/kg	TM30/PM15		
Nickel #	43.0	52.0	27.1	37.3	39.8	39.5	41.1	34.2		<0.7	mg/kg	TM30/PM15		
Selenium #	1	2	3	4	3	2	1	1		<1	mg/kg	TM30/PM15		
Zinc #	114	120	67	102	141	160	125	112		<5	mg/kg	TM30/PM15		
PAH MS														
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8		
Acenaphthylene	<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	mg/kg	TM4/PM8		
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04		<0.04	mg/kg	TM4/PM8		
Phenanthrene #	0.05	<0.03	<0.03	<0.03	<0.03	0.11	<0.03	0.20		<0.03	mg/kg	TM4/PM8		
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06		<0.04	mg/kg	TM4/PM8		
Fluoranthene #	0.08	<0.03	<0.03	<0.03	<0.03	0.21	0.06	0.42		<0.03	mg/kg	TM4/PM8		
Pyrene #	0.07	<0.03	<0.03	<0.03	<0.03	0.17	0.05	0.36		<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	0.19	<0.06	0.32		<0.06	mg/kg	TM4/PM8		
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	0.11	<0.02	0.26		<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	0.24	<0.07	0.46		<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.12	<0.04	0.26		<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.09	<0.04	0.16		<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	mg/kg	TM4/PM8		
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.09	<0.04	0.15		<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	mg/kg	TM4/PM8		
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	0.75	<0.22	1.45		<0.22	mg/kg	TM4/PM8		
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	1.33	<0.64	2.65		<0.64	mg/kg	TM4/PM8		
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	0.17	<0.05	0.33		<0.05	mg/kg	TM4/PM8		
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	0.13		<0.02	mg/kg	TM4/PM8		
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1		<1	mg/kg	TM4/PM8		
PAH Surrogate % Recovery	90	85	88	87	94	92	94	92		<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



# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/9762

**Report : Solid**

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24			Please see attached notes for all abbreviations and acronyms			
Sample ID	TP02	TP03	TP03	TP04	TP04	TP05	TP05	TP06						
Depth	1.70	0.70	1.70	0.70	1.70	0.70	1.70	0.70						
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						
Sample Date	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1						
Date of Receipt	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019			LOD/LOR	Units	Method No.	
Natural Moisture Content	32.9	31.3	12.5	13.0	32.1	21.6	26.0	24.8			<0.1	%	PM4/PM0	
Moisture Content (% Wet Weight)	24.8	23.8	11.1	11.5	24.3	17.8	20.6	19.9			<0.1	%	PM4/PM0	
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	69.5	89.1	48.6	36.8	60.3	60.4	69.2	45.7			<0.5	mg/kg	NONE/NONE	
Total Organic Carbon #	1.14	0.46	0.48	0.55	1.14	1.93	0.90	4.36			<0.02	%	TM21/PM24	
pH #	7.89	8.24	8.73	8.63	7.82	8.28	8.08	7.96			<0.01	pH units	TM73/PM11	
Mass of raw test portion	0.1211	0.1179	0.1035	0.1052	0.1183	0.117	0.1104	0.1099				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	





**Element Materials Technology**

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/9762

**Report :** EN12457\_2  
**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24							
Sample ID	TP02	TP03	TP03	TP04	TP04	TP05	TP05	TP06							
Depth	1.70	0.70	1.70	0.70	1.70	0.70	1.70	0.70							
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							
Sample Date	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019	12/06/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1	1	1							
Date of Receipt	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019	17/06/2019							
									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.	
<b>Solid Waste Analysis</b>															
Total Organic Carbon #	1.14	0.46	0.48	0.55	1.14	1.93	0.90	4.36	3	5	6	<0.02	%	TM21/PM24	
Sum of BTEX	<0.025	<0.025	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<0.025	<0.025 <sup>SV</sup>	<0.025	<0.025 <sup>SV</sup>	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 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	0.75	<0.22	1.45	-	-	-	<0.22	mg/kg	TM4/PM8	
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	1.33	<0.64	2.65	100	-	-	<0.64	mg/kg	TM4/PM8	
<b>CEN 10:1 Leachate</b>															
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17	
Barium #	0.20	0.32	0.35	0.20	0.21	0.10	0.33	0.23	20	100	300	<0.03	mg/kg	TM30/PM17	
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17	
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17	
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17	
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0	
Molybdenum #	0.04	0.16	0.07	0.27	0.05	0.10	0.14	0.09	0.5	10	30	<0.02	mg/kg	TM30/PM17	
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17	
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17	
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17	
Selenium #	<0.03	<0.03	0.18	<0.03	0.04	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17	
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17	
Total Dissolved Solids #	2119	900	920	530	1200	1269	1891	1780	4000	60000	100000	<350	mg/kg	TM20/PM0	
Dissolved Organic Carbon	70	<20	<20	30	40	50	20	30	500	800	1000	<20	mg/kg	TM60/PM0	
Mass of raw test portion	0.1211	0.1179	0.1035	0.1052	0.1183	0.117	0.1104	0.1099	-	-	-		kg	NONE/PM17	
Dry Matter Content Ratio	74.5	76.2	86.6	86.0	75.8	77.1	81.5	82.0	-	-	-	<0.1	%	NONE/PM4	
Leachant Volume	0.869	0.872	0.886	0.885	0.871	0.873	0.88	0.88	-	-	-		l	NONE/PM17	
Eluate Volume	0.7	0.7	0.8	0.85	0.6	0.76	0.75	0.75	-	-	-		l	NONE/PM17	
pH #	7.89	8.24	8.73	8.63	7.82	8.28	8.08	7.96	-	-	-	<0.01	pH units	TM73/PM11	
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0	
Fluoride	<3	<3	<3	<3	<3	4	<3	<3	-	-	-	<3	mg/kg	TM173/PM0	
Sulphate as SO4 #	564	65	208	38	270	105	370	347	1000	20000	50000	<5	mg/kg	TM38/PM0	
Chloride #	22	11	40	<3	8	6	5	9	800	15000	25000	<3	mg/kg	TM38/PM0	

Please see attached notes for all abbreviations and acronyms



**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton

**Note:**

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

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

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

Signed on behalf of Element Materials Technology:



Ryan Butterworth  
 Asbestos Team Leader

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/9762	1	TP02	1.70	2	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD
					19/06/2019	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP03	0.70	5	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD
					19/06/2019	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP03	1.70	8	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD
					19/06/2019	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP04	0.70	11	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD
					19/06/2019	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP04	1.70	14	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD
					19/06/2019	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP05	0.70	17	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD
					19/06/2019	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP05	1.70	20	19/06/2019	General Description (Bulk Analysis)	soil/stones
					19/06/2019	Asbestos Fibres	NAD
					19/06/2019	Asbestos ACM	NAD

**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/9762	1	TP05	1.70	20	19/06/2019	<b>Asbestos Type</b>	NAD
					19/06/2019	<b>Asbestos Level Screen</b>	NAD
19/9762	1	TP06	0.70	23	19/06/2019	<b>General Description (Bulk Analysis)</b>	soil/stones
					19/06/2019	<b>Asbestos Fibres</b>	NAD
					19/06/2019	<b>Asbestos ACM</b>	NAD
					19/06/2019	<b>Asbestos Type</b>	NAD
					19/06/2019	<b>Asbestos Level Screen</b>	NAD



## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No: 19/9762

### 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.

**Measurement Uncertainty**

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

**ABBREVIATIONS and ACRONYMS USED**

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

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

EMT Job No: 19/9762

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 - EMT)
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><b>Notes:</b></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>	



EMT Job No: 19/9762

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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
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
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

EMT Job No: 19/9762

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
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
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

EMT Job No: 19/9762

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
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
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		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.	PM0	No preparation is required.			AR	Yes
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	

Ground Investigations Ireland  
Catherinestown House  
Hazelhatch Road  
Newcastle  
Co. Dublin  
Ireland



**Attention :** Barry Sexton  
**Date :** 3rd July, 2019  
**Your reference :** 8658-04-19  
**Our reference :** Test Report 19/10073 Batch 1  
**Location :** Parkside Phase 4  
**Date samples received :** 21st June, 2019  
**Status :** Final report  
**Issue :** 1

Eighteen samples were received for analysis on 21st June, 2019 of which eighteen 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**  
Senior Project Manager

Please include all sections of this report if it is reproduced

# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report : Solid**

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

EMT 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	BH02	BH02	BH02	BH03	BH03	BH03	BH04A	BH04A	BH04A	BH05			
Depth	0.80	1.70	2.50	0.90	1.40	2.50	0.50	1.50	2.40	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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019			
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	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	LOD/LOR	Units	Method No.
Antimony	3	2	2	3	2	2	2	2	2	2	<1	mg/kg	TM30/PM15
Arsenic #	15.4	11.9	8.2	18.8	10.1	8.2	13.2	12.8	12.2	13.9	<0.5	mg/kg	TM30/PM15
Barium #	115	101	112	102	95	121	120	162	78	180	<1	mg/kg	TM30/PM15
Cadmium #	2.0	1.1	1.6	2.4	1.4	1.4	1.7	2.4	1.7	2.6	<0.1	mg/kg	TM30/PM15
Chromium #	55.6	40.4	41.7	53.5	40.2	46.8	51.6	57.0	41.8	62.6	<0.5	mg/kg	TM30/PM15
Copper #	25	15	20	22	15	20	24	18	29	38	<1	mg/kg	TM30/PM15
Lead #	33	16	16	23	16	18	30	29	17	73	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	4.7	3.2	4.0	6.1	3.9	4.1	4.0	4.1	5.5	4.4	<0.1	mg/kg	TM30/PM15
Nickel #	42.6	32.8	36.4	33.2	28.9	40.8	34.9	50.0	38.0	41.3	<0.7	mg/kg	TM30/PM15
Selenium #	1	2	2	3	3	3	1	1	2	2	<1	mg/kg	TM30/PM15
Zinc #	116	65	87	178	68	78	97	135	74	150	<5	mg/kg	TM30/PM15
<b>PAH MS</b>													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.21	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.11	<0.03	<0.03	0.34	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.11	<0.03	<0.03	0.30	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.07	<0.06	<0.06	0.21	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.08	<0.02	<0.02	0.20	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.11	<0.07	<0.07	0.33	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	0.16	<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	0.12	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.12	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.28	<0.22	<0.22	1.07	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1.99	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	0.24	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.09	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	78	96	71	96	89	74	79	84	70	75	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	58	<30	<30	<30	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report : Solid**

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
Sample ID	BH02	BH02	BH02	BH03	BH03	BH03	BH04A	BH04A	BH04A	BH05			
Depth	0.80	1.70	2.50	0.90	1.40	2.50	0.50	1.50	2.40	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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019			
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	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	LOD/LOR	Units	Method No.
TPH CWG													
<b>Aliphatics</b>													
>C5-C6 #	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<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	58	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	58	<26	<26	<26	<26	<26	<26	<26	mg/kg	TMS/PM8/PM16
>C6-C10	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
>C25-C35	<10	<10	<10	45	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
<b>Aromatics</b>													
>C5-EC7 #	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<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	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TMS/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	<26	mg/kg	TMS/PM8/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	58	<52	<52	<52	<52	<52	<52	<52	mg/kg	TMS/PM8/PM16
>EC6-EC10 #	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TMS/PM8/PM16
MTBE #	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<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

Please see attached notes for all abbreviations and acronyms



# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report : Solid**

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54						
Sample ID	BH05	BH05	BH06	BH06	BH06	BH07	BH07	BH07						
Depth	1.50	3.00	1.00	1.60	2.40	0.50	2.00	2.60						
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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1						
Date of Receipt	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019						
										LOD/LOR	Units	Method No.		
Antimony	2	2	3	3	3	2	2	2		<1	mg/kg	TM30/PM15		
Arsenic #	13.6	15.0	17.2	17.1	17.4	12.0	14.9	11.5		<0.5	mg/kg	TM30/PM15		
Barium #	168	143	130	146	168	108	144	66		<1	mg/kg	TM30/PM15		
Cadmium #	2.5	3.3	2.6	2.2	2.8	1.9	2.4	1.6		<0.1	mg/kg	TM30/PM15		
Chromium #	56.0	45.2	64.2	66.8	60.4	57.5	56.6	44.1		<0.5	mg/kg	TM30/PM15		
Copper #	41	9	47	55	14	32	32	27		<1	mg/kg	TM30/PM15		
Lead #	45	15	104	99	32	137	528	22		<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 #	4.1	4.3	5.3	5.0	6.5	4.6	4.9	4.4		<0.1	mg/kg	TM30/PM15		
Nickel #	45.2	38.5	46.8	41.3	57.5	36.3	44.0	38.9		<0.7	mg/kg	TM30/PM15		
Selenium #	2	1	2	2	2	1	2	2		<1	mg/kg	TM30/PM15		
Zinc #	166	67	216	244	108	154	166	74		<5	mg/kg	TM30/PM15		
PAH MS														
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.28	<0.04		<0.04	mg/kg	TM4/PM8		
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.16	<0.03		<0.03	mg/kg	TM4/PM8		
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	<0.05		<0.05	mg/kg	TM4/PM8		
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.31	<0.04		<0.04	mg/kg	TM4/PM8		
Phenanthrene #	<0.03	<0.03	0.05	<0.03	<0.03	0.30	3.61	<0.03		<0.03	mg/kg	TM4/PM8		
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	0.54	<0.04		<0.04	mg/kg	TM4/PM8		
Fluoranthene #	<0.03	<0.03	0.08	0.08	<0.03	0.46	5.00	<0.03		<0.03	mg/kg	TM4/PM8		
Pyrene #	<0.03	<0.03	0.06	0.06	<0.03	0.39	3.92	<0.03		<0.03	mg/kg	TM4/PM8		
Benzo(a)anthracene #	<0.06	<0.06	0.08	<0.06	<0.06	0.23	2.36	<0.06		<0.06	mg/kg	TM4/PM8		
Chrysene #	<0.02	<0.02	0.05	<0.02	<0.02	0.27	2.50	<0.02		<0.02	mg/kg	TM4/PM8		
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	0.42	4.23	<0.07		<0.07	mg/kg	TM4/PM8		
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.19	2.05	<0.04		<0.04	mg/kg	TM4/PM8		
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	1.48	<0.04		<0.04	mg/kg	TM4/PM8		
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	0.42	<0.04		<0.04	mg/kg	TM4/PM8		
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	1.37	<0.04		<0.04	mg/kg	TM4/PM8		
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.27	<0.04		<0.04	mg/kg	TM4/PM8		
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	1.37	14.13	<0.22		<0.22	mg/kg	TM4/PM8		
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	2.68	28.66	<0.64		<0.64	mg/kg	TM4/PM8		
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	0.30	3.05	<0.05		<0.05	mg/kg	TM4/PM8		
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	0.12	1.18	<0.02		<0.02	mg/kg	TM4/PM8		
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1		<1	mg/kg	TM4/PM8		
PAH Surrogate % Recovery	98	70	78	91	72	103	112	97		<0	%	TM4/PM8		
Mineral Oil (C10-C40)	<30	54	<30	<30	<30	<30	<30	<30		<30	mg/kg	TM5/PM8/PM16		

Please see attached notes for all abbreviations and acronyms



# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report : Solid**

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54					
Sample ID	BH05	BH05	BH06	BH06	BH06	BH07	BH07	BH07					
Depth	1.50	3.00	1.00	1.60	2.40	0.50	2.00	2.60					
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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019					
										LOD/LOR	Units	Method No.	
TPH CWG													
<b>Aliphatics</b>													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1		<0.1	mg/kg	TM36/PM12	
>C6-C8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1		<0.1	mg/kg	TM36/PM12	
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<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	54	<7	<7	<7	11	20	<7		<7	mg/kg	TMS/PM8/PM16	
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TMS/PM8/PM16	
Total aliphatics C5-40	<26	54	<26	<26	<26	<26	<26	<26		<26	mg/kg	TMS/PM8/PM16/PM12/PM15	
>C6-C10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1		<0.1	mg/kg	TM36/PM12	
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10		<10	mg/kg	TMS/PM8/PM16	
>C25-C35	<10	55	<10	<10	<10	<10	17	<10		<10	mg/kg	TMS/PM8/PM16	
<b>Aromatics</b>													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1		<0.1	mg/kg	TM36/PM12	
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1		<0.1	mg/kg	TM36/PM12	
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<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	14	31	<7		<7	mg/kg	TMS/PM8/PM16	
>EC21-EC35 #	<7	<7	<7	<7	<7	93	161	<7		<7	mg/kg	TMS/PM8/PM16	
>EC35-EC40	<7	<7	<7	<7	<7	16	28	<7		<7	mg/kg	TMS/PM8/PM16	
Total aromatics C5-40	<26	<26	<26	<26	<26	123	220	<26		<26	mg/kg	TMS/PM8/PM16/PM12/PM15	
Total aliphatics and aromatics(C5-40)	<52	54	<52	<52	<52	123	220	<52		<52	mg/kg	TMS/PM8/PM16/PM12/PM15	
>EC6-EC10 #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1		<0.1	mg/kg	TM36/PM12	
>EC10-EC25	<10	<10	<10	<10	<10	39	68	<10		<10	mg/kg	TMS/PM8/PM16	
>EC25-EC35	<10	<10	<10	<10	<10	71	117	<10		<10	mg/kg	TMS/PM8/PM16	
MTBE #	<5	<5	<5	<5	<5	<5	<5 <sup>SV</sup>	<5		<5	ug/kg	TM31/PM12	
Benzene #	<5	<5	<5	<5	<5	<5	<5 <sup>SV</sup>	<5		<5	ug/kg	TM31/PM12	
Toluene #	<5	<5	<5	<5	<5	<5	<5 <sup>SV</sup>	<5		<5	ug/kg	TM31/PM12	
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5 <sup>SV</sup>	<5		<5	ug/kg	TM31/PM12	
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5 <sup>SV</sup>	<5		<5	ug/kg	TM31/PM12	
o-Xylene #	<5	<5	<5	<5	<5	<5	<5 <sup>SV</sup>	<5		<5	ug/kg	TM31/PM12	
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8	
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8	
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8	
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8	
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8	
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8	
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	

Please see attached notes for all abbreviations and acronyms



# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report :** CEN 10:1 1 Batch

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

EMT 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	BH02	BH02	BH02	BH03	BH03	BH03	BH04A	BH04A	BH04A	BH05			
Depth	0.80	1.70	2.50	0.90	1.40	2.50	0.50	1.50	2.40	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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019			
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	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	LOD/LOR	Units	Method No.
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved 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 #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0029	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.029	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.004	0.036	0.044	0.009	0.038	0.046	0.004	<0.003	0.004	0.018	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.04	0.36	0.44	0.09	0.38	0.46	0.04	<0.03	0.04	0.18	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.010	0.014	0.009	0.017	0.008	0.011	0.010	0.004	0.013	0.015	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.10	0.14	0.09	0.17	0.08	0.11	0.10	0.04	0.13	0.15	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	0.009	0.010	0.003	0.008	0.013	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	0.09	0.10	0.03	0.08	0.13	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	4	<3	<3	<3	<3	<3	4	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	3.1	28.2	42.2	4.5	25.3	59.7	3.6	1.3	4.6	28.6	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	31	282	422	45	253	597	36	13	46	286	<5	mg/kg	TM38/PM0
Chloride #	<0.3	0.3	0.4	0.7	0.5	<0.3	<0.3	<0.3	<0.3	2.2	<0.3	mg/l	TM38/PM0
Chloride #	<3	3	4	7	5	<3	<3	<3	<3	22	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	10	<2	<2	4	<2	<2	3	9	2	10	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	100	<20	<20	40	<20	<20	30	90	20	100	<20	mg/kg	TM60/PM0
pH	8.91	8.24	7.87	8.27	7.96	8.11	8.14	8.21	7.96	8.21	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	54	78	105	58	66	120	58	101	68	150	<35	mg/l	TM20/PM0
Total Dissolved Solids #	540	780	1050	580	660	1200	580	1010	680	1501	<350	mg/kg	TM20/PM0

# Element Materials Technology

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report :** CEN 10:1 1 Batch

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

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54						
Sample ID	BH05	BH05	BH06	BH06	BH06	BH07	BH07	BH07						
Depth	1.50	3.00	1.00	1.60	2.40	0.50	2.00	2.60						
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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1						
Date of Receipt	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019						
										LOD/LOR	Units	Method No.		
Dissolved Antimony #	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002		<0.002	mg/l	TM30/PM17		
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02		<0.02	mg/kg	TM30/PM17		
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	0.0075	<0.0025	<0.0025	0.0041	<0.0025		<0.0025	mg/l	TM30/PM17		
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	0.075	<0.025	<0.025	0.041	<0.025		<0.025	mg/kg	TM30/PM17		
Dissolved Barium #	0.031	0.008	0.023	0.022	0.038	0.021	0.026	0.008		<0.003	mg/l	TM30/PM17		
Dissolved Barium (A10) #	0.31	0.08	0.23	0.22	0.38	0.21	0.26	0.08		<0.03	mg/kg	TM30/PM17		
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	mg/l	TM30/PM17		
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	mg/kg	TM30/PM17		
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015		<0.0015	mg/l	TM30/PM17		
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015		<0.015	mg/kg	TM30/PM17		
Dissolved Copper #	<0.007	<0.007	<0.007	0.010	<0.007	<0.007	<0.007	<0.007		<0.007	mg/l	TM30/PM17		
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	0.10	<0.07	<0.07	<0.07	<0.07		<0.07	mg/kg	TM30/PM17		
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	mg/l	TM30/PM17		
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	mg/kg	TM30/PM17		
Dissolved Molybdenum #	0.012	0.007	0.008	0.009	<0.002	0.008	0.007	0.014		<0.002	mg/l	TM30/PM17		
Dissolved Molybdenum (A10) #	0.12	0.07	0.08	0.09	<0.02	0.08	0.07	0.14		<0.02	mg/kg	TM30/PM17		
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002		<0.002	mg/l	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 #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003		<0.003	mg/l	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 #	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	0.004	<0.003		<0.003	mg/l	TM30/PM17		
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	0.04	<0.03		<0.03	mg/kg	TM30/PM17		
Mercury Dissolved by CVA#	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		<0.00001	mg/l	TM61/PM0		
Mercury Dissolved by CVA#	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	mg/kg	TM61/PM0		
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	mg/l	TM26/PM0		
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM26/PM0		
Fluoride	<0.3	<0.3	<0.3	0.5	<0.3	<0.3	<0.3	<0.3		<0.3	mg/l	TM173/PM0		
Fluoride	<3	<3	<3	5	<3	<3	<3	<3		<3	mg/kg	TM173/PM0		
Sulphate as SO4 #	31.9	4.5	14.7	0.6	10.3	24.3	17.9	5.5		<0.5	mg/l	TM38/PM0		
Sulphate as SO4 #	319	45	147	6	103	243	179	55		<5	mg/kg	TM38/PM0		
Chloride #	1.0	1.3	1.3	1.5	<0.3	1.6	1.2	<0.3		<0.3	mg/l	TM38/PM0		
Chloride #	10	13	13	15	<3	16	12	<3		<3	mg/kg	TM38/PM0		
Dissolved Organic Carbon	4	2	4	13	4	10	13	4		<2	mg/l	TM60/PM0		
Dissolved Organic Carbon	40	20	40	130	40	100	130	40		<20	mg/kg	TM60/PM0		
pH	8.05	8.14	8.21	8.07	8.01	8.12	8.07	8.08		<0.01	pH units	TM73/PM0		
Total Dissolved Solids #	144	119	162	187	112	180	188	67		<35	mg/l	TM20/PM0		
Total Dissolved Solids #	1441	1190	1619	1871	1120	1801	1880	670		<350	mg/kg	TM20/PM0		

Please see attached notes for all abbreviations and acronyms

**Element Materials Technology**

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report :** EN12457\_2  
**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30						
Sample ID	BH02	BH02	BH02	BH03	BH03	BH03	BH04A	BH04A	BH04A	BH05						
Depth	0.80	1.70	2.50	0.90	1.40	2.50	0.50	1.50	2.40	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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019						
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	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
<b>Solid Waste Analysis</b>																
Total Organic Carbon #	0.71	0.42	0.49	0.50	0.43	0.48	0.69	0.88	0.43	1.90	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<0.025	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<0.025 <sup>SV</sup>	<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	58	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.28	<0.22	<0.22	1.07	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1.99	100	-	-	<0.64	mg/kg	TM4/PM8
<b>CEN 10:1 Leachate</b>																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.029	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.04	0.36	0.44	0.09	0.38	0.46	0.04	<0.03	0.04	0.18	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM17
Molybdenum #	0.10	0.14	0.09	0.17	0.08	0.11	0.10	0.04	0.13	0.15	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	0.09	0.10	0.03	0.08	0.13	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	540	780	1050	580	660	1200	580	1010	680	1501	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	100	<20	<20	40	<20	<20	30	90	20	100	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1056	0.103	0.1028	0.103	0.0997	0.1016	0.1109	0.1226	0.1027	0.1178	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	85.3	87.3	87.4	87.1	90.1	88.3	81.5	73.5	87.2	76.6	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.884	0.887	0.887	0.887	0.89	0.888	0.88	0.868	0.887	0.873	-	-	-		l	NONE/PM17
Eluate Volume	0.75	0.75	0.75	0.65	0.8	0.67	0.67	0.7	0.65	0.6	-	-	-		l	NONE/PM17
pH #	8.59	8.45	8.40	8.67	8.41	8.44	8.61	8.46	8.70	8.25	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	4	<3	<3	<3	<3	<3	4	<3	<3	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	31	282	422	45	253	597	36	13	46	286	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	3	4	7	5	<3	<3	<3	<3	22	800	15000	25000	<3	mg/kg	TM38/PM0

Please see attached notes for all abbreviations and acronyms

**Element Materials Technology**

**Client Name:** Ground Investigations Ireland  
**Reference:** 8658-04-19  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton  
**EMT Job No:** 19/10073

**Report :** EN12457\_2  
**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	31-33	34-36	37-39	40-42	43-45	46-48	49-51	52-54							
Sample ID	BH05	BH05	BH06	BH06	BH06	BH07	BH07	BH07							
Depth	1.50	3.00	1.00	1.60	2.40	0.50	2.00	2.60							
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	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019	19/06/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1	1	1							
Date of Receipt	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019	21/06/2019							
									Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.	
<b>Solid Waste Analysis</b>															
Total Organic Carbon #	1.10	0.39	1.57	1.38	0.52	3.11	3.38	0.38	3	5	6	<0.02	%	TM21/PM24	
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025 <sup>SV</sup>	<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	54	<30	<30	<30	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16	
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	1.37	14.13	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8	
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	2.68	28.66	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8	
<b>CEN 10:1 Leachate</b>															
Arsenic #	<0.025	<0.025	<0.025	0.075	<0.025	<0.025	0.041	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17	
Barium #	0.31	0.08	0.23	0.22	0.38	0.21	0.26	0.08	20	100	300	<0.03	mg/kg	TM30/PM17	
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17	
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17	
Copper #	<0.07	<0.07	<0.07	0.10	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17	
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0	
Molybdenum #	0.12	0.07	0.08	0.09	<0.02	0.08	0.07	0.14	0.5	10	30	<0.02	mg/kg	TM30/PM17	
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17	
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17	
Antimony #	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17	
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17	
Zinc #	<0.03	<0.03	<0.03	0.04	<0.03	<0.03	0.04	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17	
Total Dissolved Solids #	1441	1190	1619	1871	1120	1801	1880	670	4000	60000	100000	<350	mg/kg	TM20/PM0	
Dissolved Organic Carbon	40	20	40	130	40	100	130	40	500	800	1000	<20	mg/kg	TM60/PM0	
Mass of raw test portion	0.121	0.1112	0.1185	0.1228	0.1181	0.1148	0.1221	0.1002	-	-	-		kg	NONE/PM17	
Dry Matter Content Ratio	74.1	81.1	75.8	73.0	76.2	78.7	73.7	89.9	-	-	-	<0.1	%	NONE/PM4	
Leachant Volume	0.869	0.879	0.871	0.867	0.872	0.876	0.868	0.89	-	-	-		l	NONE/PM17	
Eluate Volume	0.67	0.7	0.72	0.7	0.55	0.72	0.82	0.65	-	-	-		l	NONE/PM17	
pH #	8.08	8.37	7.92	7.74	8.00	8.10	7.90	8.79	-	-	-	<0.01	pH units	TM73/PM11	
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0	
Fluoride	<3	<3	<3	5	<3	<3	<3	<3	-	-	-	<3	mg/kg	TM173/PM0	
Sulphate as SO4 #	319	45	147	6	103	243	179	55	1000	20000	50000	<5	mg/kg	TM38/PM0	
Chloride #	10	13	13	15	<3	16	12	<3	800	15000	25000	<3	mg/kg	TM38/PM0	

Please see attached notes for all abbreviations and acronyms



**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton

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

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

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

Signed on behalf of Element Materials Technology:



Ryan Butterworth  
 Asbestos Team Leader

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/10073	1	BH02	0.80	2	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD
					26/06/2019	<b>Asbestos Type</b>	NAD
					26/06/2019	<b>Asbestos Level Screen</b>	NAD
19/10073	1	BH02	1.70	5	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD
					26/06/2019	<b>Asbestos Type</b>	NAD
					26/06/2019	<b>Asbestos Level Screen</b>	NAD
19/10073	1	BH02	2.50	8	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD
					26/06/2019	<b>Asbestos Type</b>	NAD
					26/06/2019	<b>Asbestos Level Screen</b>	NAD
19/10073	1	BH03	0.90	11	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD
					26/06/2019	<b>Asbestos Type</b>	NAD
					26/06/2019	<b>Asbestos Level Screen</b>	NAD
19/10073	1	BH03	1.40	14	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil.stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD
					26/06/2019	<b>Asbestos Type</b>	NAD
					26/06/2019	<b>Asbestos Level Screen</b>	NAD
19/10073	1	BH03	2.50	17	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil/stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD
					26/06/2019	<b>Asbestos Type</b>	NAD
					26/06/2019	<b>Asbestos Level Screen</b>	NAD
19/10073	1	BH04A	0.50	20	26/06/2019	<b>General Description (Bulk Analysis)</b>	soil/stones
					26/06/2019	<b>Asbestos Fibres</b>	NAD
					26/06/2019	<b>Asbestos ACM</b>	NAD



**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/10073	1	BH04A	0.50	20	26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH04A	1.50	23	26/06/2019	General Description (Bulk Analysis)	soil/stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH04A	2.40	26	26/06/2019	General Description (Bulk Analysis)	soil/stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH05	0.50	29	26/06/2019	General Description (Bulk Analysis)	Soil
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH05	1.50	32	26/06/2019	General Description (Bulk Analysis)	soil-stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH05	3.00	35	26/06/2019	General Description (Bulk Analysis)	Soil
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH06	1.00	38	26/06/2019	General Description (Bulk Analysis)	Soil
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH06	1.60	41	26/06/2019	General Description (Bulk Analysis)	soil-stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH06	2.40	44	26/06/2019	General Description (Bulk Analysis)	soil/stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH07	0.50	47	26/06/2019	General Description (Bulk Analysis)	soil/stones
					26/06/2019	Asbestos Fibres	NAD

**Client Name:** Ground Investigations Ireland  
**Reference:** 19/04/8658  
**Location:** Parkside Phase 4  
**Contact:** Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/10073	1	BH07	0.50	47	26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH07	2.00	50	26/06/2019	General Description (Bulk Analysis)	Soil
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
19/10073	1	BH07	2.60	53	26/06/2019	General Description (Bulk Analysis)	soil.stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD



## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No: 19/10073

### 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.

**Measurement Uncertainty**

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

**ABBREVIATIONS and ACRONYMS USED**

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

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

EMT Job No: 19/10073

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 - EMT)
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><b>Notes:</b></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>	

EMT Job No: 19/10073

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.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
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
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

EMT Job No: 19/10073

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
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
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



EMT Job No: 19/10073

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
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
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		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.	PM0	No preparation is required.			AR	Yes
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	



**Trinity College Dublin**  
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### **Unconfined Compression Tests On Rock Cores**

**Project:** Parkside Phase 4  
**Project No:** 8658 - 04 - 19  
**Delivery Date:** 26.07.2019  
**Test Date:** 30.07.2019

<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/m<sup>3</sup>)</i>
BH - 01	9.10 - 9.60	63.1	153.5	2.43	78.8	2.68
BH - 05	4.70 - 5.00	63.2	153.6	2.43	102.4	2.72

Prof. B. O'Kelly

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



**Trinity College Dublin**  
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### **Point Load Index Tests (single diametral determination)**

**Project:** Parkside Phase 4  
**Project No:** 8658 - 04 - 19  
**Delivery date:** 24.07.2019  
**Test Date:** 30.07.2019

#### **Diametric samples**

<b>Borehole No.</b>	<b>Depth (m)</b>	<b>Is(50) (Mpa)</b>
BH - 01	9.70 - 10.10	5.54
BH - 05	5.00 - 5.20	4.01
BH - 05	6.90 - 7.20	5.58
BH - 07	6.30 - 6.60	4.72

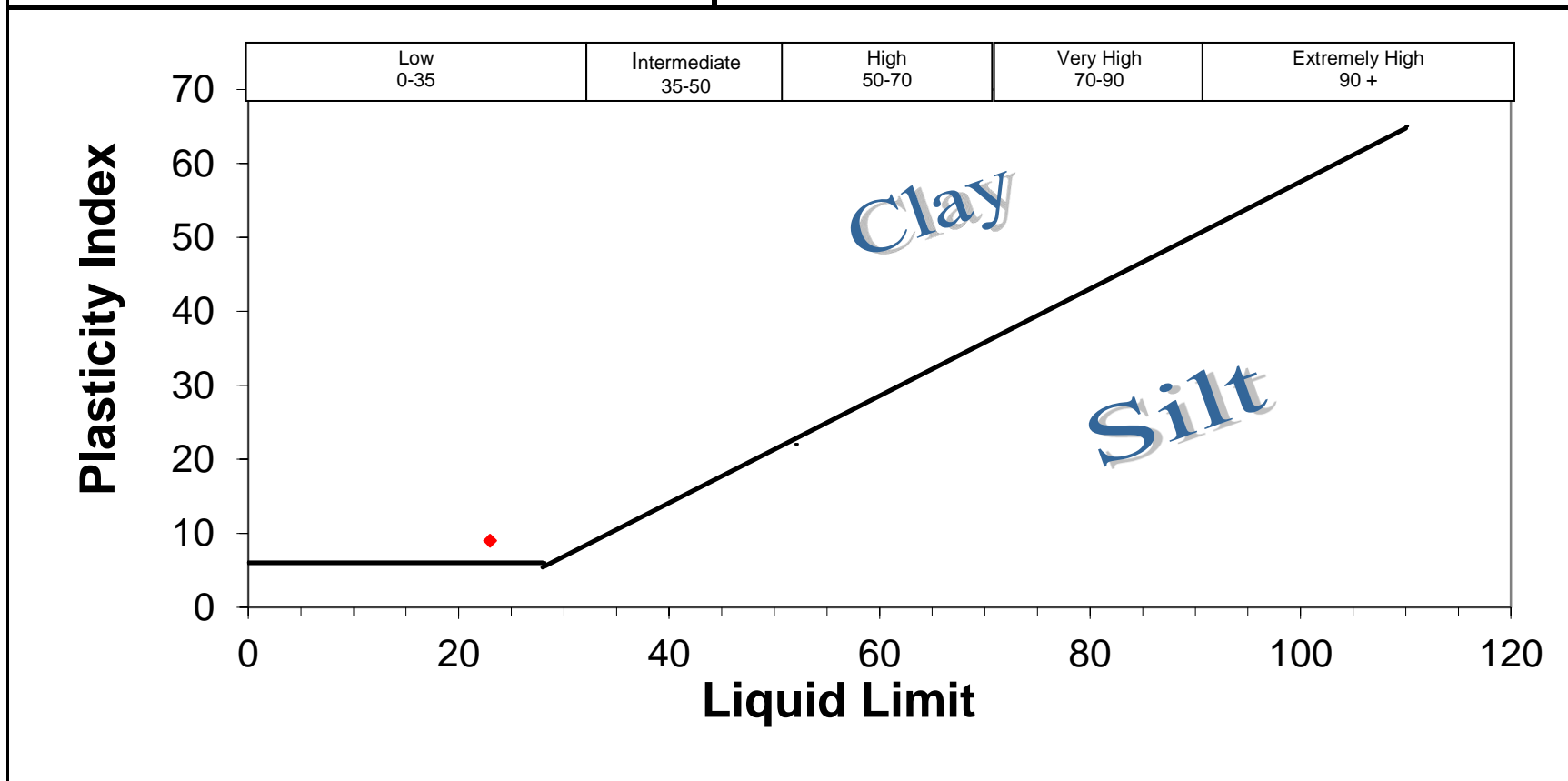
Prof. Brendan O'Kelly

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



**NMTL LTD**  
Unit 18c, Tullow Industrial Estate  
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Tel: 00353 59 9180822  
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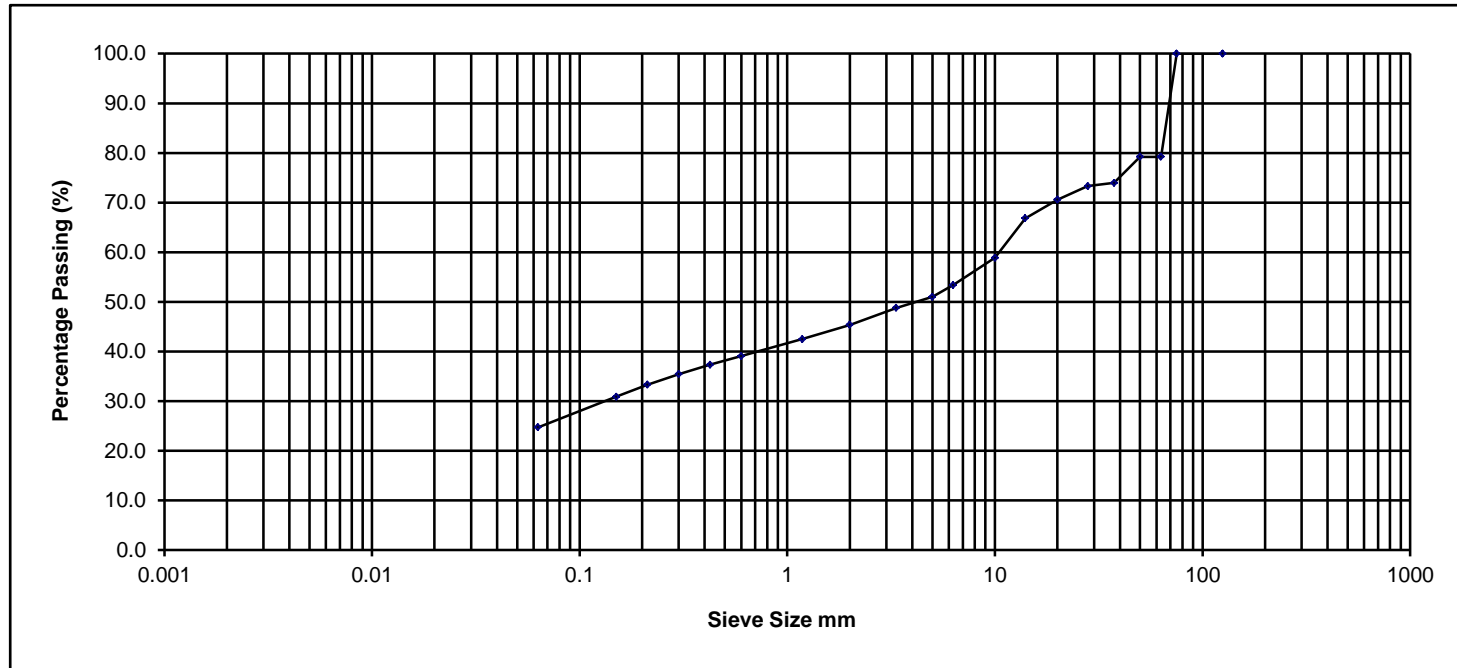
**Contract:** Parkside Phase 4  
**Client:** Ground Investigations Ireland Ltd  
**Engineer:** Aisling McDonnell  
**GII Project ID** 8658-04-19  
**Date:** 17/06/2019  
**Tested By:** Sb **Checked:** Bc  
**Job ref No.** NMTL



**NMTL Ltd**

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	79.2
50.000	79.2
37.500	74.0
28.000	73.3
20.000	70.6
14.000	66.8
10.000	58.9
6.300	53.4
5.000	51.0
3.350	48.8
2.000	45.4
1.180	42.5
0.600	39.1
0.425	37.3
0.300	35.4
0.212	33.3
0.150	30.9
0.063	24.7

### Determination of Particle Size Distribution BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5



Percentage Particle Size

Clay	Fine			Medium			Coarse			Cobbles	Boulder
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse		
	Silt			Sand			Gravel				
	24.7			20.6			33.9			20.8	0.0

Sample Description Grey slightly sandy slightly gravelly silty CLAY with some cobbles

Project No.

NMTL 2922

BH/TP No.

BH04a

Project Parkside Phase 4

GII PROJECT ID: 8658-04-19

Sample No.

B

**NM**  
**TL**

**Ltd**

Operator

Tzr

Checked

Nc

Approved

Bc

Date sample tested

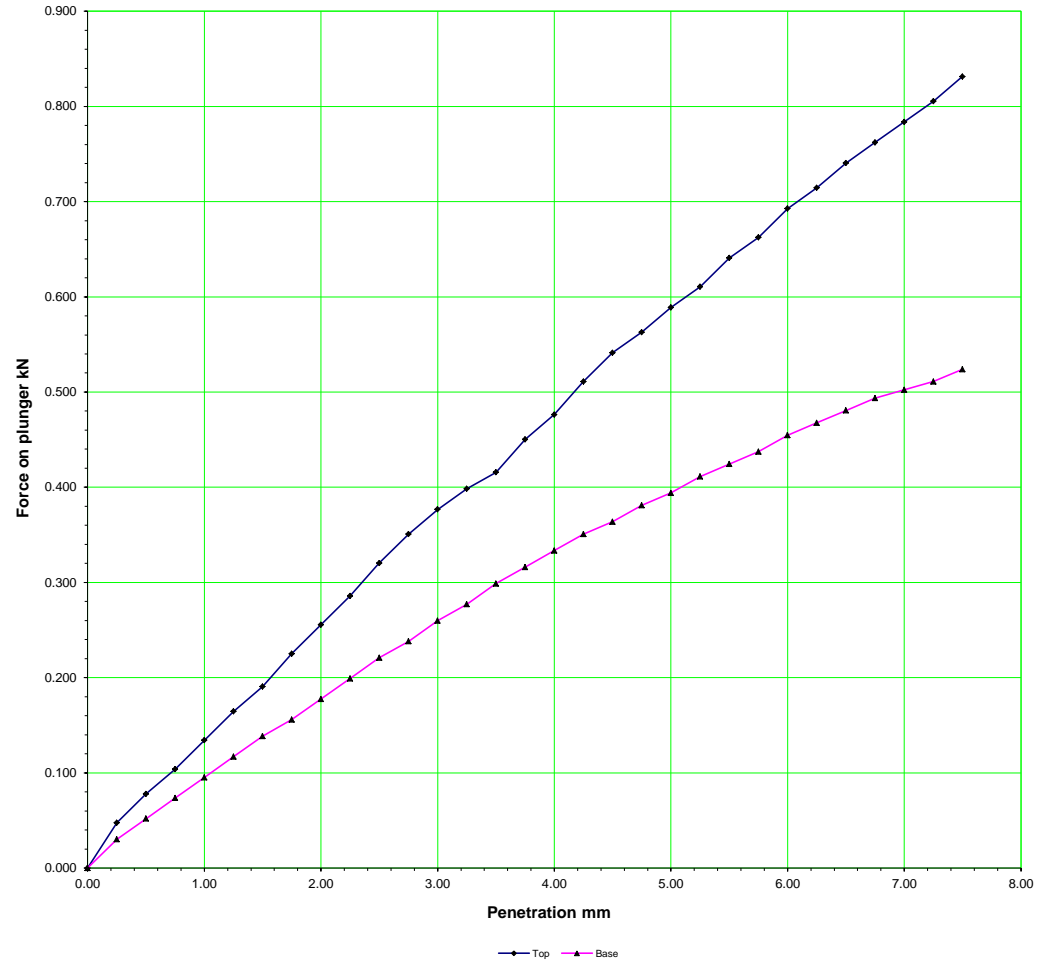
12/06/2019

Depth

3.50m

DETERMINATION OF THE CALIFORNIA BEARING RATIO TEST  
BS 1377 : PART 4 : CLAUSE 7 : 1990

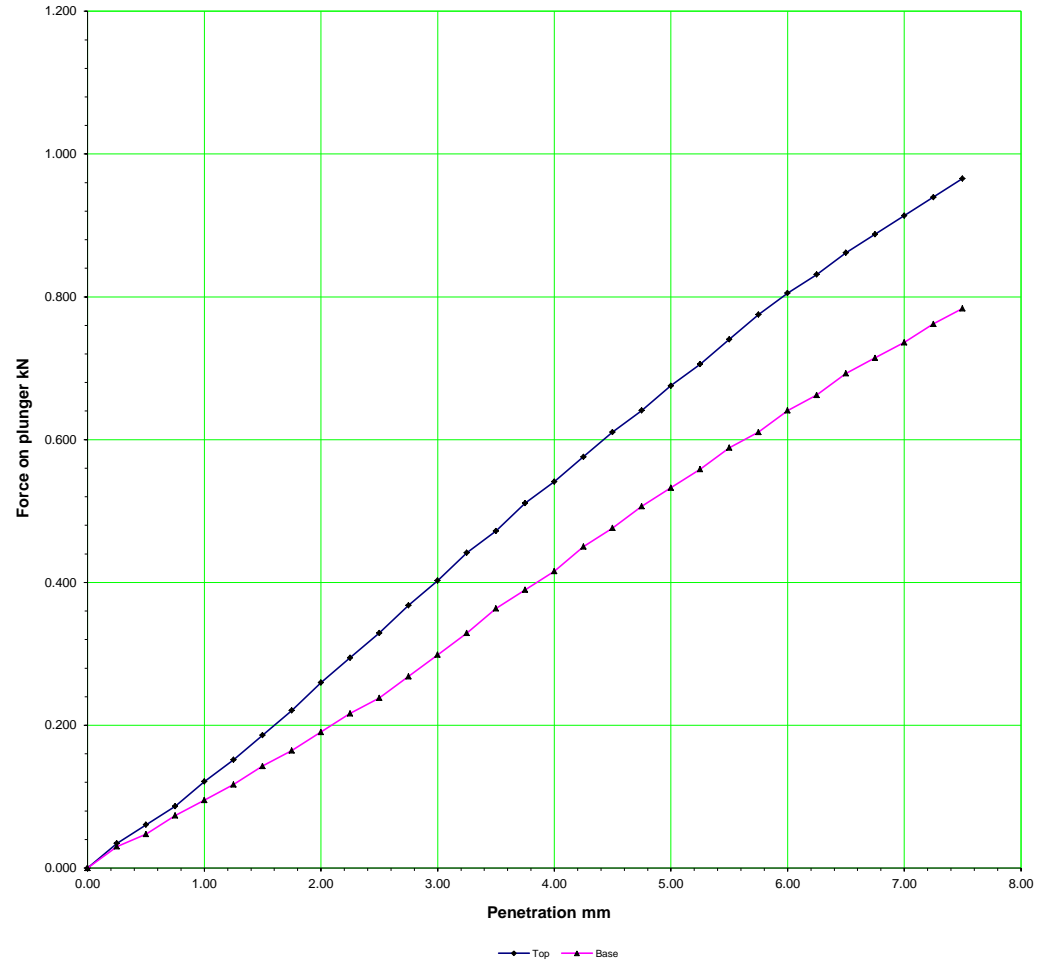
Soil Description	Brown slightly gravelly slightly sandy SILT/CLAY				Date	12-Jun-16	
Test Method	BS 1377: Part 4 : 1990 :7.4					Test 1	
Force Measuring Device	VJT-08211						
Preparatic Remoulded with 2.5 kg rammer at natural moisture content							
Surcharge	10 kPa		Mean Calibration	4.33	N/Div		
Penetration of plunger	Force Gauge reading divisions		Force on plunger kN	4.33	N/Div		
	mm				California Bearing Ratio Results %		
	Top	Bottom	Top	Bottom	Top	Base	
0.00	0.0	0.0	0.000	0.000			
0.25	11.0	7.0	0.048	0.030			
0.50	18.0	12.0	0.078	0.052			
0.75	24.0	17.0	0.104	0.074			
1.00	31.0	22.0	0.134	0.095			
1.25	38.0	27.0	0.165	0.117			
1.50	44.0	32.0	0.191	0.139			
1.75	52.0	36.0	0.225	0.156			
2.00	59.0	41.0	0.255	0.178			
2.25	66.0	46.0	0.286	0.199			
<b>2.50</b>	<b>74.0</b>	<b>51.0</b>	<b>0.320</b>	<b>0.221</b>	<b>2.43</b>	<b>1.67</b>	
2.75	81.0	55.0	0.351	0.238			
3.00	87.0	60.0	0.377	0.260			
3.25	92.0	64.0	0.398	0.277			
3.50	96.0	69.0	0.416	0.299			
3.75	104.0	73.0	0.450	0.316			
4.00	110.0	77.0	0.476	0.333			
4.25	118.0	81.0	0.511	0.351			
4.50	125.0	84.0	0.541	0.364			
4.75	130.0	88.0	0.563	0.381			
<b>5.00</b>	<b>136.0</b>	<b>91.0</b>	<b>0.589</b>	<b>0.394</b>	<b>2.94</b>	<b>1.97</b>	
5.25	141.0	95.0	0.611	0.411			
5.50	148.0	98.0	0.641	0.424			
5.75	153.0	101.0	0.662	0.437			
6.00	160.0	105.0	0.693	0.455			
6.25	165.0	108.0	0.714	0.468			
6.50	171.0	111.0	0.740	0.481			
6.75	176.0	114.0	0.762	0.494			
7.00	181.0	116.0	0.784	0.502			
7.25	186.0	118.0	0.805	0.511			
7.50	192.0	121.0	0.831	0.524			
Moisture content after test		Top	Middle	Base	Specimen wt g	4520	
Container No.		Tray	Tray	Tray	Diameter mm	152	
Mass of wet soil + container	g	1656.7	1725.6	1590.8	Length mm	127.0	
Mass of dry soil + container	g	1382.5	1431.7	1318.6			
Weight of container	g	143.3	187.3	146.0			
Mass of moisture	g	274.15	293.91	272.18	Average MC %	22.98	
Dry weight	g	#####	1244.44	1172.57	Density Mg/m3	1.96	
Moisture content	%	22.12	23.62	23.21	Dry Density Mg/m3	1.59	



<p>NM</p> <p>TL</p> <p>Ltd</p>	<p>Project: Parkside Phase 4</p>	<p>GII Project ID 8658-04-19</p>	Date	12-Jun-16	Project No.	NMTL2922
			Operator	Tch	Trial Pit No.	TP01
			Checked	Nc	Sample No.	B
			Approved	Bc	Depth	0.70m

DETERMINATION OF THE CALIFORNIA BEARING RATIO TEST  
BS 1377 : PART 4 : CLAUSE 7 : 1990

Soil Description	Brown slightly gravelly slightly sandy SILT/CLAY					Date	12-Jun-16	
Test Method	BS 1377: Part 4 : 1990 :7.4					Test 1		
Force Measuring Device	VJT-08211					Mean Calibration	4.33 N/Div	
Preparatic Remoulded with 2.5 kg rammer at natural moisture content								
Surcharge	10 kPa					Force on	4.33 N/Div	
Penetration of plunger	Force Gauge reading divisions	plunger		California Bearing Ratio Results				
mm	mm	mm	mm	%	Top	Base		
0.00	0.0	0.0	0.000	0.000				
0.25	8.0	7.0	0.035	0.030				
0.50	14.0	11.0	0.061	0.048				
0.75	20.0	17.0	0.087	0.074				
1.00	28.0	22.0	0.121	0.095				
1.25	35.0	27.0	0.152	0.117				
1.50	43.0	33.0	0.186	0.143				
1.75	51.0	38.0	0.221	0.165				
2.00	60.0	44.0	0.260	0.191				
2.25	68.0	50.0	0.294	0.217				
<b>2.50</b>	<b>76.0</b>	<b>55.0</b>	<b>0.329</b>	<b>0.238</b>	<b>2.49</b>	<b>1.80</b>		
2.75	85.0	62.0	0.368	0.268				
3.00	93.0	69.0	0.403	0.299				
3.25	102.0	76.0	0.442	0.329				
3.50	109.0	84.0	0.472	0.364				
3.75	118.0	90.0	0.511	0.390				
4.00	125.0	96.0	0.541	0.416				
4.25	133.0	104.0	0.576	0.450				
4.50	141.0	110.0	0.611	0.476				
4.75	148.0	117.0	0.641	0.507				
<b>5.00</b>	<b>156.0</b>	<b>123.0</b>	<b>0.675</b>	<b>0.533</b>	<b>3.38</b>	<b>2.66</b>		
5.25	163.0	129.0	0.706	0.559				
5.50	171.0	136.0	0.740	0.589				
5.75	179.0	141.0	0.775	0.611				
6.00	186.0	148.0	0.805	0.641				
6.25	192.0	153.0	0.831	0.662				
6.50	199.0	160.0	0.862	0.693				
6.75	205.0	165.0	0.888	0.714				
7.00	211.0	170.0	0.914	0.736				
7.25	217.0	176.0	0.940	0.762				
7.50	223.0	181.0	0.966	0.784				
Moisture content after test		Top	Middle	Base	Specimen wt g	5110		
Container No.		Tray	Tray	Tray	Diameter mm	152		
Mass of wet soil + container	g	1943.3	1600.8	2068.9	Length mm	127.0		
Mass of dry soil + container	g	1750.2	1439.9	1862.0				
Weight of container	g	187.5	148.0	187.5				
Mass of moisture	g	193.10	160.90	206.96	Average MC %	12.39		
Dry weight	g	#####	1291.90	1674.49	Density Mg/m3	2.22		
Moisture content	%	12.36	12.45	12.36	Dry Density Mg/m3	1.97		



<b>NM</b>  <b>TL</b>  <b>Ltd</b>	<b>Project: Parkside Phase 4</b>	<b>GII Project ID 8658-04-19</b>	Date	12-Jun-16	Project No.	NMTL2922
			Operator	Tch	Trial Pit No.	TP02
			Checked	Nc	Sample No.	B
			Approved	Bc	Depth	0.70m