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# **Ground Investigations Ireland**

# Parkside Phase 4

# **Ground Investigation Report**

## DOCUMENT CONTROL SHEET

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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 insitu 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<sub>50</sub>) 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.

	Allov	vable Beai	ring Capacit	y	
Hole ID	kN/m2	Depth	Hole ID	kN/m2	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



## APPENDIX 2 - Trial Pit Records

				W	ww.gii	.ie					SAC
lachine lethod		T Excavator al Pit	Dimens L x W					Level (mOD) 13.18	Client Cairn Homes		Job Numb
				0.50 x 2.	10m						8658-04
			Locatio		E 741349.	9 N	Dates 03	/05/2019	Engineer DBFL		<b>Sheet</b> 1/1
Depth (m)		Sample / Tes	sts Water (m)		Field Red	ords	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend
							13.08	- (0.10) - 0.10			
								- - - -	MADE GROUND: Brown s fragments of plastic, conc	rete and wood	
								(0.60) 			
							12.48	0.70	Soft to firm light brown slig	ghtly sandy gravelly CLAY	<u></u>
								- 			
								-			
								(1.40)			······································
											· · · · · · · · · · · · · · · · · · ·
							11.08	  2.10			
							11.00		Complete at 2.10m		
an	•			•				•	<b>Remarks</b> Trial pit stable		
	•								No groundwater encountere Soakaway completed in pit Trial pit backfilled upon com	ed ipletion	
	•										
	•										
					•						
	•	•		•	•	•		.   s	cale (approx)	Logged By	Figure No.

Grou	nd Inv	vestigations www.gii.ie	Ireland	Ltd	Site Parkside Phase 4		Trial Pit Number SA02
Machine : 3.5T Excavator Method : Trial Pit		<b>ons</b> D .50 x 2.30m		Level (mOD) 12.38	Cairn Homes		Job Number 8658-04-1
	Location 722	n 2023.4 E 741411.6 N	Dates 03	3/05/2019	Engineer DBFL		<b>Sheet</b> 1/1
Depth (m) Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend
Plan			12.18	(0.60) 0.80 (1.50) 2.30		slightly sandy gravelly Clay wi	
					Trial pit stable No groundwater encountere Soakaway completed in pit Trial pit backfilled upon com	ed	
					ттагра расколеч ирон сот	рюан	
	•		•				

	Grou	nd Inv	vestig www	gation w.gii.ie	ns Irel e	land	Ltd	Site Parkside Phase 4		Trial Pi Numbe <b>TP0</b> 1
Machine: 3.5T Exc Method: Trial Pit	cavator	Dimensi					Level (mOD) 13.00	<b>Client</b> Cairn Homes		Job Numbe 8658-04-
		Location 721	n 1831.9 E 8	52354.6 N	1	Dates 03	/05/2019	Engineer DBFL		<b>Sheet</b> 1/1
Depth (m) San	nple / Tests	Water Depth (m)	Fie	eld Record	ds	Level (mOD)	Depth (m) (Thickness)	C	escription	Legend
0.70 В 1.70 В						12.70 11.90 11.10 10.40	(0.30) (0.30) (0.30) (0.80) (0.80) (0.80) (0.80) (0.80) (0.80) (0.70) (0.70)		mottled grey slightly sandy nts of plastic, wood and brick ightly clayey gravelly Sand v ightly sandy silty Clay with organic odour	
Plan	· · ·	· · · ·	• • • •	• • •	• • •	· · ·	•	Remarks Trial pit stable No groundwater encountere Trial pit backfilled upon com	ed ppletion	
								scale (approx) 1:25	Logged By S. Connolly	Figure No. 8658-04-19.TP

Aachine : 3 5	Grou oT Excavator	Dimensio	www.gii.ie	Ground	Level (mOD)	Parkside Phase 4		ТР02 Јођ
lethod : Tria		Dimensio	0115		13.74	Cairn Homes		Numbe 8658-04-
		Location 721	851.1 E 741318 N	Dates 03	/05/2019	Engineer DBFL		<b>Sheet</b> 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend
70 70 71	в в			13.54 13.24 12.64 11.74	(0.30) (0.60) (0.60) (0.90) (0.90) (0.90) (0.90)	fragments of brick MADE GROUND: Brown s with frequent angular cobb	lightly sandy gravelly Clay wit lightly sandy very gravelly Cla les	
						Trial pit stable No groundwater encountere CBR bag taken at 0.70mBG Trial pit backfilled upon com	d L	
						I nal pit backfilled upon com	pletion	
•					-			

A	Grou	ind In	vestigations I www.gii.ie	reland	Ltd	Site Parkside Phase 4	Trial Pit Number TP03
<b>Aachine :</b> 3. <b>Aethod :</b> Tr	5T Excavator ial Pit	Dimens		Ground	Level (mOD) 11.54	Client Cairn Homes	Job Numbe 8658-04-
		Locatio	<b>n</b> 1885.9 E 741392.1 N	Dates 03	3/05/2019	Engineer DBFL	Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
					 (0.30) 	TOPSOIL	
				11.24	- 0.30 	Soft to firm brown slightly sandy gravelly CLAY with occasional angular cobbles	0 <u>0</u> 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
70	В				(0.70) 		
				10.54	- - - - -	Grey clayey sandy fine to coarse angular to sub-rounded GRAVEL	0 <u>.0</u> 0
			Rapid flow(1) at 1.20m.		(0.60) 		
.60	В			9.94	1.60	Complete at 1.60m	· · · · · · · · · · · · · · · · · · ·
Plan						Remarks	
'lan'.						Trial pit stable	
				•		Groundwater encountered at 1.20mBGL as a rapid flow Trial pit backfilled upon completion Shallow depth due to collpase and groundwater influx	
	· ·		· · ·		· · ·		

	Grou	nd Inv	vestigations www.gii.ie	s Ireland	Ltd	Site Parkside Phase 4	Trial Pit Number TP04
Machine: 3. Method: Tr	5T Excavator ial Pit	Dimensio		Ground	l <b>Level (mOD)</b> 12.93	Client Cairn Homes	Job Number 8658-04-1
		Location 721	932 E 741397.1 N	Dates 0	3/05/2019	Engineer DBFL	<b>Sheet</b> 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Record	s (mOD)	Depth (m) (Thickness)	Description	Legend
				12.7;	(0.20) 0.20 (0.60) (0.60)	TOPSOIL MADE GROUND: Dark brown/grey slightly sandy slightly gravelly Clay with fragments of brick and glass	
.70	В			12.13	- 0.80 - 0.80 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	MADE GROUND: Brown slightly sandy gravelly Clay with fragments of plastic	
.70	В			11.15	- 1.80 - 1.80 	Firm brown/grey slightly sandy slightly gravelly silty CLAY	
				9.93	3.00	Complete at 3.00m	
Plan .					F	Remarks	
						Trial pit stable No groundwater encountered Trial pit backfilled upon completion	
			<b>.</b>				
•	· ·	•	· · ·		 		<b>gure No.</b> 58-04-19.TP

0.70 B (Inickness) TOPSOIL ADE GROUND: Brown st fragments of brick, glass at (1.30)	86: S	Numbo 3658-04 Sheet 1/1 .egend
Depth (m)     Sample / Tests     Water (m)     Field Records     Level (mOD)     Depth (Thickness)     TOPSOIL       70     B     Image: Second	rription Le	1/1
.70 B .70 SOL .70 S	dy slightly gravelly Clay with wood	_egend
.70 В .70 В		
70 B 70 C 70 C		
70 B (1.00) 979 2 60	r mottled black slightly sandy of glass, wood and plastic.	
979 - 260		
Complete at 2.60m		
lan		
Trial pit stable         No groundwater encountered         Trial pit backfilled upon comp	ion	
· · · · · · · · · · · · · · · · · · ·		

	Grou	ind Inv	estigations l www.gii.ie	Site Parkside Phase 4	Trial Pit Number TP06		
Machine : 3.5T Excavator Method : Trial Pit		Dimensions			Level (mOD) 12.51	Client Cairn Homes	Job Number 8658-04-1
		Location 722026.7 E 741386.1 N		Dates 03/05/2019		Engineer DBFL	Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
.70	в			12.31 11.11 9.41	(0.20) 0.20 (1.20) (1.20) (1.70) (1.70) (1.70)	TOPSOIL         MADE GROUND: Dark brown mottled black slightly sandy slightly gravelly Clay with occasional cobbles and fragments of brick         Stiff brown slightly sandy gravelly CLAY with occasional angular cobbles         Complete at 3.10m	
Plan .					•••	<b>temarks</b> Trial pit stable No groundwater encountered Trial pit backfilled upon completion	
					· ·	mai pit backilled upon completion	
		•			•••		
•	· ·	•	· · ·		· · ·		
					s	cale (approx) Logged By Fig	jure No.

Parkside Phase 4 – Trial Pit Photos





TP01



TP01



TP01





TP02



TP02



TP02









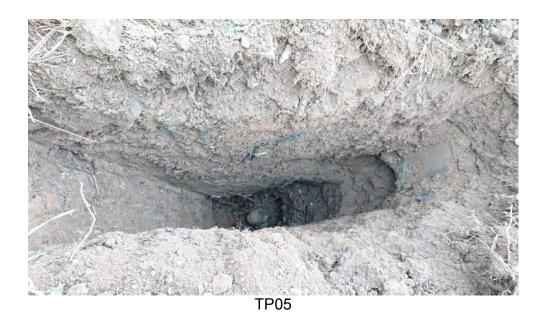




















TP06





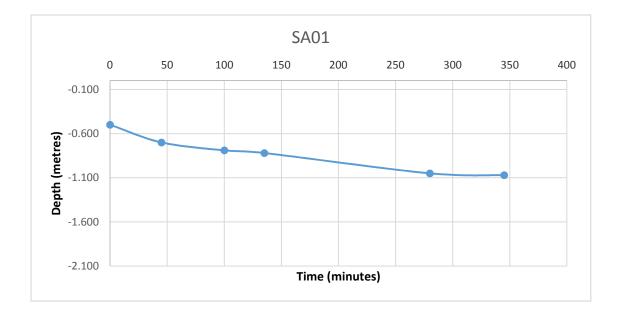
TP06

# **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		r level 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

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	2.100	1.600	0.9	1.7

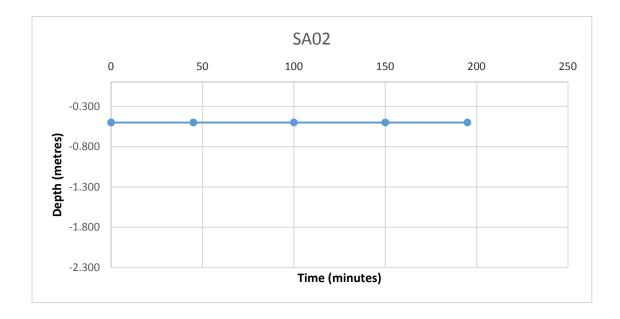




#### SA02 Soakaway Test to BRE Digest 365 Trial Pit Dimensions: 2.40m x 0.50m x 2.30m (L x W x D)

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

Start depth	Depth of Pit	Diff	75% full	25%full
0.50	2.300	1.800	0.95	1.85





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

Excavation	Mathad	Dimension	www.gii.ie	Ground	Level (mOD)	Client	WS-0
	ndowless Sampler	Dimension	15		13.39	Cairn Homes	Numbe 8658-04
		Location 72185	55.1 E 741335.4 N	Dates 09	/05/2019	Engineer DBFL	Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
.70	EN			13.19	(0.20) 0.20 (0.80) (0.80)	TOPSOIL 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.	
				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) - 1.60	Dark brown clayey gravelly fine to coarse SAND.	
.70	EN			11.79	(0.40)	Firm brownish grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	
				11.39	2.00 	Firm grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles	
.70	EN			10.39		Firm grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles	
				9.79	3.60 (0.40)	No recovery	<u>, , , , , , , , , , , , , , , , , , , </u>
				9.39	- 4.00 	Complete at 4.00m	
Remarks					- - - - -	Scale (approx)	Logge By
						(approx) 1:25	PM

Numbo WS-0		Site Parkside Phase 4	_td	and	vestigations Ire www.gii.ie	nd Inv	Grou	RELAND
<b>Job</b> <b>Numb</b> 3658-04		Client Cairn Homes	<b>.evel (mOD)</b> 2.85		ons	Dimensio	Method dowless Sampler	<b>Excavation I</b> Drive-in Wind
<b>Sheet</b> 1/1		Engineer DBFL	05/2019	Dates 10	906.1 E 741355.4 N	Location 7219		
_egend		Description	Depth (m) (Thickness)	Level (mOD)	Field Records	Water Depth (m)	Sample / Tests	Depth (m)
	slightly Gravel with	COBBLELOCK MADE GROUND: Multicoloured subangular to subrour fine to coarse Gravel MADE GROUND: Brownish grey slightly sandy slightly clayey subangular to subrounded fine to coarse Gravel occasional fragments of red brick and concrete. MADE GROUND: Grey sandy clayey subangular to subrounded fine to coarse Gravel with occasional fragments of concrete. Complete at 1.30m	(0.76) (0.76) (0.76) (0.76) (0.76)	12.77 12.61 11.85 11.55			EN	.70
Logge By	Scale (approx)	Si (ap					30m	Remarks Refusal at 1.3
PM	1:25							
•. 9.WS-0	Figure N							

Ground	ound Inv	estigations Ir www.gii.ie	eland	Ltd	Site Parkside Phase 4	Number WS-03
Excavation Method Drive-in Windowless Sampl	Pimensio er	ns		Level (mOD) 13.24	Client Cairn Homes	Job Number 8658-04-19
	Location 7219	13.8 E 741332.9 N	Dates 10	/05/2019	Engineer DBFL	Sheet 1/1
Depth (m) Sample / Te	sts Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend S
0.70 EN 1.70 EN 2.70 EN			13.04 12.44 12.24 11.84 11.44 11.24 10.54 10.54 10.34 10.24	(0.20) 0.20 0.20 0.20 0.20 0.20 0.60) 0.80 0.20) 0.40) 0.40) 0.40) 0.40) 0.40) 0.20) 0.40) 0.20) 0.20) 0.40) 0.200 0.200	TARMACADAM         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.         No recovery         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         Firm grey mottled orange slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles         Firm light brown mottled orange slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles         Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.         Firm light brown slightly gravelly sandy cLAY with occasional subangular to subrounded cobbles.         Firm light brown slightly gravelly sandy cLAY with occasional subangular to subrounded cobbles.         No recovery         Firm grey sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	
Permete			9.54 9.24	(0.70) - 3.70 - 0.30) - 4.00	Subangular to subrounded cobbles. No recovery Complete at 4.00m	
Remarks					Scale (appro	e Logged x) By
					1:25 Figur 8658	PM e No. .04-19.WS-03

	Grou	nd Inv	estigations Ire	eland	Ltd	Site Parkside Phase 4	Number
			www.gii.ie				WS-04
Excavation Drive-in Win	Method dowless Sampler	Dimensio	ons		Level (mOD) 12.90	Client Cairn Homes	Job Number 8658-04-19
		Location		Dates	/05/2019	Engineer	Sheet
		721	931.6 E 741368.2 N	05	105/2019	DBFL	1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Kater Sater
				12.82		COBBLELOCK	
				12.66	(0.16) 0.24	MADE GROUND: Multicoloured subrounded to rounded	
					(0.36)	MADE GROUND: Grey sandy gravelly Clay with occasional subangular to subrounded cobbles and occasional fragments of red brick wood concrete and plastic.	d
				12.30	0.60	MADE GROUND: Brown sandy clayey Gravel with	
0.70	EN				(0.40)	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	- 1.00		
						MADE GROUND: Grey sandy clayey Gravel with occasional subangular to subrounded cobbles and occasional fragments of red brick and concrete	
					- 		
					(1.00)		
					F		
1.70	EN				-		
				40.00			
				10.90	2.00	Complete at 2.00m	
					- -		
					-		
					-		
					- 		
					- - -		
					- 		
					-  -		
					- -		
					-		
					-		
					-		
					-		
<b>Remarks</b> Refusal at 2	.00m				<u> </u>	Scale (appro	Logged k) By
						1:25	РМ
						Figur	∋No.
						8658-	04-19.WS-04

Excavation	Mathad	Dimension	www.gii.ie	Cround		Client	lah	
	ndowless Sampler	Dimension	15		Level (mOD) 13.34	Cairn Homes	Job Numbo 8658-04	
		Location 72194	4.4 E 741339.8 N	Dates 09/	/05/2019	Engineer DBFL		
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	
					 (0.30)	TOPSOIL		
				13.04	0.30 	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.		
70	EN				(0.70) 		<u>, , , , , , , , , , , , , , , , , , , </u>	
				12.34	1.00	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional rootlets	0 <u>0</u> 0 0 0 0 0 0 0 0 0 0	
				11.94	(0.40) 	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles	0.0000 0.0000 0.0000 0.0000 0.000000	
70	EN				(0.60)		**************************************	
				11.34	2.00	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional shell fragments	× · · · · · · · · · · · · · · · · · · ·	
					(0.60)		× · · · · · · · · · · · · · · · · · · ·	
70	EN			10.74	2.60 (0.40)	Firm grey slightly silty slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles and occasional shell fragments.	× • • • • • • • • • • • • • • • • • • •	
				10.34	3.00 (0.40)	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		
					-			
emarks					-	Scale (approx	Logge ) By	
						1:25	, _ <b>,</b> _ <b>,</b>	

ind Inve	estigations Ir www.gii.ie	eland L	td	Site Parkside Phase 4		nber 6-06
Dimension	5			Client Cairn Homes	Nun	nber
Location 72195	1.2 E 741406 N	Dates 10/	05/2019	Engineer DBFL		et 1/1
Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Lege	Water Water
		12.75		TARMACADAM MADE GROUND: Grey sandy clayey Gravel with occasional subangular to subrounded cobbles of concre and occasional fragments of red brick and wood. Complete at 0.75m	e	
	Dimensions Location 72195	WWW.gii.ie Dimensions Location 721951.2 E 741406 N	WWW.gii.ie         Dimensions       Ground L         Location       Dates         721951.2 E 741406 N       Dates         Water       Field Records       Level (mOD)         (m)       12.75	Dimensions     Ground Level (mOD) 12.90       Location 721951.2 E 741406 N     Dates 10/05/2019       Water Depth (m)     Field Records     Level (mOD)     Depth (Thickness)       12.90     10/05/2019     10/05/2019       Water (m)     Field Records     10/05/2019       12.75     0.15       12.75     0.15       12.75     0.15       12.75     0.15	WWW.gli.ie     Ground Level (mOD)     Client       Dimensions     Ground Level (mOD)     12.90     Client       Location     Dates     10/05/2019     Engineer       721951.2 E 741406 N     Depth (m)     Thickness)     Description       Water (m)     Field Records     Level (mOD)     Depth (Thickness)     Description       12.75     -     (0.15)     TARMACADAM       MADE GROUND: Grey sandy clayey Gravel with occasional subangular to subrounded cobbles of concret and occasional fragments of red brick and wood.	WWW.gli.ie     Ground Level (mOD)     Client     Job       Dimensions     Ground Level (mOD)     12.90     Client     Job       Location     Dates     10/05/2019     Engineer     She       Vater     Field Records     Level (mOD)     Depth (mOD)     Thickness)       Vater     Field Records     Location     12.75     0.15       12.75     0.15     TARMACADAM     Tarmachanal of the state of the s

IRELAND	Grou	nd Inve	estigations Ir www.gii.ie	eland	Ltd	Site Parkside Phase 4	Numb	
Excavation I Drive-in Wine	Method dowless Sampler	Dimension	IS		Level (mOD) 12.74	Client Cairn Homes	Job Numb 8658-04	
		Location 72196	61.5 E 741375.9 N	Dates 10	/05/2019	Engineer DBFL		<b>t</b> 1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	d
0.70	EN			12.49	 (0.45) 	TARMACADAM MADE GROUIND: Grey sandy clayey fine to coarse angular to subangular Gravel with occasional subangular to subrounded cobbles and occasional fragments of red brick and concrete. Complete at 0.70m		
<b>Remarks</b> Refusal at 0.	70m	<u>ı  </u>		I		Scale (approx	Logge By	ed
						1:25	PM	
						Figure	<b>No.</b> 4-19.WS-	~

	Grou	nd Inv	estigations Ir www.gii.ie	eland	Ltd	Site Parkside Phase 4	Number WS-08
Excavation Drive-in Win	Method dowless Sampler	Dimension	ıs		Level (mOD) 12.78	Client Cairn Homes	Job Number 8658-04-19
		Location 7219	98.4 E 741398.1 N	Dates 10	)/05/2019	Engineer DBFL	<b>Sheet</b> 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend S
				12.53	(0.25) 0.25 (0.75)	TARMACADAM MADE GROUND: Grey slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and occasional fragments of red brick and wood.	
0.70	EN			11.78	- 1.00 - 1.00 	Firm grey slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles.	
1.70	EN			10.88 10.78	$\vdash$ (0.10)	No recovery Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	
2.70	EN			9.88	- (0.90) 	No recovery	0 0
				9.78	(0.45)	Firm dark brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0
				9.33	(0.55)	No recovery	10,020
				8.78	4.00	Complete at 4.00m	
Remarks					- - - - - - - - -	Saala	Logged
						Scale (approx	
						1:25 Figure 8658-0	PM <b>No.</b> 4-19.WS-08

IRELAND	Grou	nd Inv	vestigations Ir www.gii.ie	eland	Ltd	Site Parkside Phase 4	Number WS-0
Excavation I Drive-in Wind	<b>Method</b> dowless Sampler	Dimensio	ons		<b>Level (mOD)</b> 12.94	Client Cairn Homes	Job Numbe 8658-04-
		Location 7219	966 E 741351.3 N	Dates 09	/05/2019	Engineer DBFL	Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend
				12.74	(0.20) 0.20 (0.60)	TOPSOIL MADE GROUND: Firm brownish grey slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and fragments of shells red brick and granite.	
.70	EN			12.14	- 0.80 - 0.80 	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	
.70	EN			10.94	2.00	Firm light brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	ଚରା (୦୦୦ ବରା (୦୦୦ ବରା (୦୦୦ ବରା ୧୮୦୦ ବରା (୦୦୦ ବରା (୦୦୦ ବରା (୦୦୦ ବରା ୧୮୦୦ ବରା (୦୦୦ ବରା (୦୦୦ ବରା (୦୦୦ ବରା
70	EN			10.04	- (0.90) - (0.90) 	Stiff dark grey slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles.	
					(0.60)	occasional subangular to subrounded cobbles.	
				9.44		Complete at 3.50m	
Remarks efusal at 3.	50m				<u> </u>	Scale (approx)	Logged By
						1:25 Figure	PM <b>No.</b> 4-19.WS-0



### Parkside Phase 4 – Window Sample Photos

WS01



WS02



WS03



WS04



WS05



WS07





WS09

# APPENDIX 5 – Slit Trench Records

t: Address: Commenced: Completed: led by:	DBFL Parkside Phase 4								Survey Point:				
Commenced: Completed:	Parkside Phase 4								E	721828.396	721837 . 854	_	_
Completed:										741831-705	241337-924		
	03/05/2019 03/05/2019								N	T41531.405	741337.326		
eu oj.	Sarah Connolly												
	Ouron Connony								Ground Level	13.975	13.640		(m Ol
				В								С	
	A												
m	0.00			Fence								10.50	
	w			0								E	
m 0.0		3.70		15				6.80	>			-	
0.0													
	N			Λ					1				
	N	1		$\Omega$					1				
				11					1				
0.5													
		1.50	h	11					1.5	0		- 11	
				11								- 11	
1,0													
				1 1					1			11	
				1 1									
	11			-I									
1,5													
Trench Profile: (m)			Zero taken at	West	]	Notes							
Cum	0.50 \$0.50	Î.	Start of ST End of ST	0.00	-								
Grass	0.00 - 10.50		ST Length	10.50	-								
			Max Depth	1.50	1								
		]	Facing Direction	W-E	_								
			Width of ST	0.50				Soil Profile:					
Pipe No.	ø (mm)	Colour - Material	Utility	Depth	Distance from zero		1	From (m)	To (m)	D	escription		
Pipe etc.	so (ment)	CONDUL - MOLETION	Unity	Deput	Distance worn zero	Angle							
								0.00	0.30	TOPSOIL MADE GROUND: Brown sandy gra	welly Clay with transmis of		
								0.50		plastic			
								0.90	1.50	MADE GROUND: Dark brown/grey	y sandy gravelly Clay with		
										Irragments of timber and glass			
												-	
							1			0			
L							1						
DOULUD.													
ROUND													
ELAND												Terra	303-1-0
A													

Parkside Phase 4 – Slit Trench Photos





ST01









ST01





ST01

















ST01



# **APPENDIX 6** – Borehole Records

Image: Constraint of the second sec	A				WV	gations Ire vw.gii.ie			Parkside Phase 4		E	umber 3H01
With Richty Folder Gin Location         Dotation         Diriger         Diriger <t< th=""><th>C M</th><th>ommacchic IC405P</th><th>0</th><th>20</th><th>0mm cas</th><th>ed to 4.90m</th><th></th><th>•</th><th>, I</th><th></th><th>N</th><th>umber</th></t<>	C M	ommacchic IC405P	0	20	0mm cas	ed to 4.90m		•	, I		N	umber
S0         B         Instant         (0.40)         TOPSOL           50         B         Instant         (0.40)         Instant         Inst						741375.6 N	24	2/05/2019- 3/06/2019			SI	
50       B       0.0       11.64       0.0       0.0         60       B       0.1.145       SPT(C) N=7       1.211.2.2.2       10.44       1.60         60       B       0.2.45       SPT(C) N=30       4.457.7.11       1.211.2.2.2       10.44       1.60         50       B       0.2.45       SPT(C) N=50       4.66.10.12.19       1.211.2.2.6 <t< th=""><th>Depth (m)</th><th>Sample</th><th>/ Tests</th><th>Casing Depth (m)</th><th>Water Depth (m)</th><th>Field Records</th><th>Level (mOD)</th><th>Depth (m) (Thickness</th><th>) Description</th><th>Legend</th><th>Water</th><th>Instr</th></t<>	Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness	) Description	Legend	Water	Instr
60         B         Image: Section of the secon of the section of the section of the secon of the s	0.50 1.00-1.45		N=7			1,2/1,2,2,2	11.64	0.40	Firm grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fi to coarse	ne (************************************		
50         B         (3.20)           50         B         9.12/18.26.6           00-4.31         SPT(C) 50/155         9.12/18.26.6           90-4.90         B         2550           90-4.90         CR         ROD           100         100         SCR         ROD           10         14         4.004         8.00           10         56         (3.20)           11         56         (3.20)           12         100         90         8           100         14         10         10         100         90         8           100         100         90         8         100         100         90         8           100         100         90         8         100	1.60 2.00-2.45 2.50	SPT(C)	N=30			4,4/5,7,7,11	10.44		with occasional cobbles and rare boulders. Sa is fine to coarse. Gravel is subrounded fine to	AY ad ad ad ad ad ad ad ad ad ad ad ad ad		
40       B       25/0 SPT (C) 25V0 Water strike(1) at 430m, rose to 420       7.24       4.80         00       TOR	3.00-3.45 3.50		N=50			4,6/9,10,12,19		(3.20)		2010-0010-001 2010-001 2010-0010-001 2010-0010-0		
20     14     10     14     10     14     10     10     10     10     10     10     10     10     10     10     2.84     9.20     100     90     86     100     100     100     100     90     86     100 <td>4.00-4.31 4.40 4.80 4.90-4.90 4.90 5.00</td> <td>В</td> <td></td> <td>RQD</td> <td>FI</td> <td>25/50 50/0 SPT(C) 25*/0 Water strike(1) at 4.80m, rose to</td> <td>7.24</td> <td></td> <td>many subangular cobbles. Sand is fine to coar</td> <td></td> <td><b>∑</b>1</td> <td></td>	4.00-4.31 4.40 4.80 4.90-4.90 4.90 5.00	В		RQD	FI	25/50 50/0 SPT(C) 25*/0 Water strike(1) at 4.80m, rose to	7.24		many subangular cobbles. Sand is fine to coar		<b>∑</b> 1	
14       14       14       14       14       14       14       14       14       16 <td< td=""><td>6.00</td><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	6.00	20										
10       73       10       2.84       9.20         10       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       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with many calcite veins. Partially spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining on fractures 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough       Image: Strong grey very fine to fine grained fossiliferous LIMESTONE with some oxide staining for fractures	7.10											
20       4       4       5       Strong grey very time to time grained tossiliterous 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       8       100       90       86       100       100       90       86       100       100       90       86       100       100       90       86       100       100       90       86       100       100       100       100       100       90       86       100	3.00	73					4.04		with occasional subangular to subrounded cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse	0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -		
cable percussion refusal at 4.90mBGL     Cable percussion refusal at 4.90mBGL       croundwater monitoring standpipe installed     By       chiselling from 4.80m to 4.90m for 1 hour.     1:50	9.10 9.20	100	90	86	4		2.84	9.20	Strong grey very fine to fine grained tossilitero LIMESTONE with many calcite veins. Partially weathered with some oxide staining on fracture 9.20-10.20 - One fracture set. F1: Widely spaced sub-horizontal to 10 degrees,			
Chiselling from 4.80m to 4.90m for 1 hour.         1:50         MMC	Grounḋwate	r monitoring	g standpip	e installe			·			Scale (approx)	Lo B	ogged V
												MMC

		Grou	nd In		gations Ire	land	Ltd	Site Parkside Phase 4		Nur	rehole mber H01
Machine : D C Flush : M W Core Dia: 68	ommacchi IC405P /ater	) & o	20	Diamete 00mm cas 00mm cas	<b>r</b> ed to 4.90m ed to 12.30m		Level (mOD) 12.04	Client Cairn Homes		1	<b>b mber</b> 3-04-19
Method : C		ussion Follow On	Locatio		741375.6 N	Dates 24 28	4/05/2019- 3/06/2019	Engineer DBFL			<b>eet</b> 2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.20 10.70 11.20	98	81	81	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 11.20-12.30 - Two fracture sets. F1: Widely spaced sub-horizontal to 10 degrees, undulating rough. F2: Widely spaced sub-vertical to 85 degrees, undulating rough			المُحْمَّلُةُ مَنْ مَنْ مَنْ مَنْ عَنْ مَنْ عَنْ مَنْ مَنْ عَنْ مَنْ مَنْ مَنْ مَنْ مَنْ مَنْ مَنْ م
12.30						-0.26					
Remarks									Scale (approx)	Log By	gged
									1:50 Figure N 8658-04	No.	MC 3H01

CPGID FORM         Sample / Tests         Catal profile (R)         Field Records         Info (R)         Comparison (R)         Description         Leagent         Info (R)           0.80         B         1.288         0.301 (R)         0.401 (R)         MADE GROUND: Browning ray startly gravity Clark         MADE GROUND: Browning ray startly gravity CLAV (R)         MADE GROUND: Browning ray startly gravity CLAV (R)         MA	М	ommacchio C405P	C	20	<b>Diamete</b> Omm cas	vw.gii.ie r ed to 8.00m ed to 16.10m		<b>Level (mOD)</b> 13.48	Client Cairn Homes		Jo Ni	<b>3H02</b> b umber 58-04-1
0.60         B         13.26         0.32         13.26         0.32           1.00-1.45         SPT(C) N=10         3.223.2.3         11.88         1.60           1.00-1.45         SPT(C) N=10         3.223.2.3         11.88         1.60           1.70         B         3.273.2.3.5         11.88         1.60           2.50         B         10.63         2.28         10.65         2.28           3.40         SPT(C) N=40         S.273.2.3.5         10.65         2.85         10.65         2.85           3.40         SPT(C) N=40         SPT(C) N=40         S.40, 0, 0, 0         10.65         2.85         10.65         2.85           5.60         SPT(C) N=40         SPT(C) N=40         S.40, 0, 0, 0         10.65         2.85         10.65         2.85           5.60         SPT(C) N=40         S.40, 0, 0, 0         10.65         2.85         10.70         10.70         10.75         10.75         10.75         10.75         10.75						741323.3 N	28/05/2019-				SI	heet 1/2
0.80         B         0.40         Council a generation of the second	Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
A 20 43 - - - - - - - - - - - - -	1.00-1.45 1.70 2.00-2.45 2.50 3.40 3.00-3.45 4.00-4.40 4.10 4.60 5.40 5.00-5.45 6.10 5.50-6.85 5.60 7.50	SPT(C) B SPT(C) B SPT(C) B SPT(C) B SPT(C) B SPT(C) B B SPT(C) B	N=13 N=40 50/250 N=41 50/200	RQD	FI	3,2/3,2,3,5 Water strike(1) at 3.00m, rose to 2.92m in 20 mins. 9,8/10,10,10,10 5,9/12,13,14,11 Water strike(2) at 5.00m, rose to 4.10m in 20 mins. 9,8/8,9,12,12	12.88 11.88 10.63 9.38 8.28 7.58 6.48	(0.40) 0.60 (1.00) 1.60 (1.25) 2.85 (1.25) 4.10 (1.25) (1.25) (0.70) 5.90 (0.70) (0.80)	MADE GROUND: Brownish grey sandy gravelly Clay         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         Firm to stiff brownish grey sandy gravelly CLAY with occasional cobbles and rare bouldes. Sand is fine to coarse Gravel is subrounded fine to coarse         Dense brownish grey/dark grey gravelly fine to coarse SAND with occasional cobbles. Gravel is subrounded fine to coarse         Stiff dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders. Sand is fine to coarse. Gravel is subrounded fine to coarse         Stiff dark grey very sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse         Stiff dark grey very sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse         Stiff dark grey sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse         Stiff dark grey sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to coarse. Gravel is subrounded fine to coarse         Stiff brownish grey slightly sandy gravelly CLAY with occasional cobbles. Sand is fine to coarse.         Stiff brownish grey slightly sandy gravelly CLAY with occasional cobbles and boulders. Sand is fin to coarse. Gravel is subrounded fine to coarse         Stiff brownish grey slightly sandy gravelly CLAY with occasional cobbles and boulders. Sand is fin to coarse. Gravel is subrounded fine to coarse		<b>∑</b> 1 <b>∑</b> 2	
0.20       100       - <td>3.00</td> <td>43</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>fine to coarse. Gravel is angular fine to coarse</td> <td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td></td> <td>2 00.5 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td>	3.00	43	-						fine to coarse. Gravel is angular fine to coarse	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		2 00.5 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Remarks Cable percussion refusal at 8.00m BGL Groundwater monitoring standpipe installed			- 19	19	NI			(0.60)	LIMESTONE with frequent calcite veins. Residual weathering 9.20-9.80 - Non Intact			2012 10 10 10 10 10 10 10 10 10 10 10 10 10
chiselling from 7.30m to 7.40m for 0.5 hours. Chiselling from 7.90m to 8.00m for 0.5 hours.	able percus Groundwate	ssion refus r monitoring	al at 8.00r g standpip	n BGL e installe		lling from 7.90m to 8	.00m for 0.	5 hours.	1	Scale (approx)		-

	(	Grou	nd In	vesti ww	gations Ire /w.gii.ie	land	Ltd		Site Parkside Phase 4		N	orehole umber 3H02
Flush : M	ommacchio IC405P /ater		20	<b>Diamete</b> Omm cas Omm cas	<b>r</b> ed to 8.00m ed to 16.10m		<b>Level (mO</b> 13.48	D)	Client Cairn Homes		N	ob umber 58-04-19
Method : C		ssion <sup>-</sup> ollow On	Locatio 72		741323.3 N	Dates 28/05/2019- 01/07/2019			Engineer DBFL		SI	<b>heet</b> 2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thicknes	s)	Description	Legend	Water	Instr
10.30	100	0	0	NI			(1.5	))	LIMESTONE with frequent calcite veins. Distinct to destructed weathering with oxide staining 9.80-11.30 - Non Intact			
11.30				10		2.18			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			
	58	13	13			0.78			CAVITY: Driller notes, open cavity			
12.70 13.10				CAVIT	Y	0.38	(0.4) 13. <sup>-</sup>	·	Medium strong light grey very fine to fine grained LIMESTONE with frequent calcite veins partially			
	92	73	73	4			E		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 14.70	100	20	0	12			(3.0	))	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			
15.30	100	64	30	12					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		10	Complete at 16.10m			
Remarks										Scale (approx)		ogged Y
										1:50 Figure N 8658-0	No.	& MMC .BH02

A			WW	gations Ire /w.gii.ie				Parkside Phase 4	Numbe BH0
thine : Da	indo 2000 ible Percussion	Casing 1 200		r ed to 5.40m	Ground	<b>Level (</b> 11.15	mOD)	Client Cairn Homes	Job Numbe 8658-04
		Location		741402.9 N	Dates 23	6/05/201	19	Engineer DBFL	Sheet 1/1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Dej (n (Thick	pth n) (ness)	Description	Legend
50 100-1.45 10 100-2.45 10 100-3.45 10 100-4.45 10 100-5.20 100-5.	B B SPT(C) N=18 B SPT(C) N=27 B SPT(C) N=26 B SPT(C) N=34 B SPT(C) 50/50 B			3,5/6,4,4,4 3,4/5,8,6,8 3,3/5,6,7,8 Water strike(1) at 3,40m, rose to 3,30m in 20 mins. 4,10/6,6,9,13 10,6/7,10,11,22	6.65 5.85 5.75		0.10 (0.50) 0.60 (3.90) (0.80) 5.30 5.40	TOPSOIL         Stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse.         Stiff brown slightly sandy slightly gravelly CLAY with occasional cobbles and rare boulders. Sand is fine to coarse, gravel is subrounded medium coarse         Very dense brown fine to coarse SAND with frequent angular cobbles         OBSTRUCTION: Presumed boulder         Complete at 5.40m	
emarks fusal at 5.4 rehole back	10mBGL kfilled upon comple m 5.30m to 5.40m f	tion					I	Scale (approx	() Logge By
iselling fror	m 5.30m to 5.40m f	or 0.5 hou	rs.					1:50	ММС
								Figure 8658-	<b>• No.</b> -04-19.BH0

	Grou	nd Inves	stigations Ire www.gii.ie	eland	Ltd	<b>Site</b> Parkside Phase 4		Borehole Number BH04
Machine : Da Method : Ca	ando 2000 able Percussion	Casing Diam	e <b>ter</b> cased to 1.00m		Level (mOD) 13.18	Client Cairn Homes		Job Number 8658-04-19
		Location 721966	E 741351.3 N	Dates 01	/05/2019	Engineer DBFL		<b>Sheet</b> 1/1
Depth (m)	Sample / Tests	Casing Wat Depth Dep (m) (m	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend S
				12.98 12.28 12.18	(0.20) 0.20 (0.70)	TOPSOIL Brownish grey slightly sandy slightly gravelly CLAY occasional cobbles OBSTRUCTION: Presumed boulder Complete at 1.00m	/ with	
<b>Remarks</b> Refusal at 1.( Borehole bac	00mBGL kfilled and moved 1	.00m					Scale (approx)	Logged By
							1:50	MMC
							Figure N 8658-04	<b>o.</b> I-19.BH04

A			WW	gations Ire /w.gii.ie			Site Parkside Phase 4		Boreh Numb BH04
hine : Da	ando 2000		Diamete 0mm cas	<b>r</b> ed to 5.70m	Ground	Level (mOD)	Client Cairn Homes		Job Numb 8658-04
		Locatio	n		Dates 20	)/05/2019	Engineer DBFL		Sheet 1/1
epth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend
) )-1.45 ) )-2.45 ) )-3.45 ) )-4.38 ) )-5.38 )-5.90	B SPT(C) N=10 B SPT(C) N=20 B SPT(C) N=25 B SPT(C) 50/233 B SPT(C) 50/230 SPT(C) 50/50			2,2/3,3,2,2 2,4/6,5,4,5 3,4/6,6,6,7 4,6/12,15,15,8 Water strike(1) at 4,94m. 3,7/14,15,16,5 Water strike(2) at 4.96m. 25/50		(0.17) (0.17) (2.08) (2.08) (2.75) (0.60) 5.60 5.70	TOPSOIL         Firm brown slightly sandy slightly gravelly CLA occasional cobbles. Sand is fine to coarse, grasubrounded medium to coarse         Stiff dark grey slightly sandy slightly gravelly C occasional cobbles and rare boulders. Sand is coarse, gravel is subrounded medium to coarse         Very stiff dark greyish brown sandy gravelly Cl occasional cobbles and rare boulders. Sand is coarse, gravel is subrounded medium to coarse         Very stiff dark greyish brown sandy gravelly Cl occasional cobbles and rare boulders. Sand is coarse, gravel is subrounded medium to coarse         OBSTRUCTION: Presumed boulder         Complete at 5.70m	LAY with fine to se	
ehole bac	70mBGL :kfilled upon comple	tion						Scale (approx)	Logge By
selling fro	m 4.30m for 0.5 ho	urs. Chisel	lling from	5.70m for 0.66 hours	S.			1:50	ММС
								Figure N 8658-04-	

	(	Grou	nd In		gations Ire w.gii.ie	land	Ltd	Site Parkside Phase 4		Νι	orehole umber 8H05
Method : Ca	ommachio	MC405P ssion	20 10		<b>r</b> ed to 3.80m ed to 7.20m		Level (mOD) 12.29	Client Cairn Homes			ob umber 58-04-1
WI	In Rotary r		Locatio		741428.6 N		/05/2019- /06/2019	Engineer DBFL		Sh	n <b>eet</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	В						(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	В						(1.30)				
2.00-2.45 2.20	23 SPT(C) B	N=10			2,2/2,3,2,3	10.09 9.89	2.20 (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		000000000000000000000000000000000000000	
3.00 3.00-3.45 3.30 3.80-3.80	B SPT(C) B	N=22			2,2/4,5,6,7 25/50 50/0 SPT(C) 25*/0		(1.40)	Very stiff dark grey sandy gravelly CLAY with occasional cobbles. Sand is fine to coarse Gravel is subrounded fine to coarse		000000000000000000000000000000000000000	
3.70 3.70 3.80 4.20	<b>TCR</b> 100	<b>SCR</b> 46	<b>RQD</b> 0	<b>FI</b> 15	B	8.49	3.80	Medium strong grey very fine to fine grained fossiliferous LIMESTONE with frequent calcite veins partially weathered with brown clay on fractures 3.70-4.70 - One fracture set. F1: Closely			
4.70	100	74	58	15			(3.40)	<ul> <li>spaced sub-horizontal to 30 degrees, undulating rough</li> <li>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</li> </ul>		1000 0 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
5.80	93	64	54	9				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			<u>े</u>
7.20						5.09		Complete at 7.20m	<u>-</u>		
Remarks Cable percus	ssion refus	al at 3.80r	n BGL	d					Scale (approx)	Lc By	ogged V
Grounḋwater Chiselling fro	monitoring	g standpip	e installe	d					1:50		имс
								-	Figure N 8658-04		BH05

	Grou	nd In		gations Ire /w.gii.ie	land	Ltd	Site Parkside Phase 4	Boreho Numbe BH00
Machine : Da Method : Ca	ando 2000 able Percussion	Casing I 200		<b>r</b> ed to 5.10m		Level (mOE 12.28	Client Cairn Homes	Job Numbe 8658-04-
		Location 722		741408.8 N	Dates 22	2/05/2019	Engineer 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
.00-1.45 .00 2.00-2.45 2.40 3.00-3.45 3.40 4.00-4.45 4.20 5.00-5.20	SPT(C) N=6 B SPT(C) N=8 B SPT(C) N=11 B SPT(C) N=28 B SPT(C) 50/50			1,2/1,2,1,2 2,2/1,2,2,3 1,2/3,2,2,4 Water strike(1) at 3.10m, rose to 3.00m in 20 mins. 3,5/5,6,7,10 9,16/50	10.88 10.68 9.98 8.38 7.28 7.18	⊢ (0.20	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 Firm grey slightly gravelly CLAY. Gravel is subrounded medium to coarse Firm grey sandy slightly gravelly CLAY with occasionalcobbles. Sand is fine to coarse, gravel is subroundedmedium to coarse Stiff grey sandy gravelly CLAY with occasional cobbles and boulders. Sand is fine to coarse, gravel is subrounded medium to coarse	
Remarks Refusal at 5.	10mBGL	tion					Scale (approx)	Logge By
borenole bac Chiselling fro	kfilled upon comple m 5.00m to 5.10m f	uon or 0.5 houi	rs.				1:50	ммс
							Figure	No.

				WV	gations Ire w.gii.ie			Parkside Phase 4		В	umber 8H07
	ommacchic 1C405P			)mm cas	ed to 5.00m		Level (mOD) 12.51	Client Cairn Homes			ob umbei 58-04-
Wethod : C	able Percu vith Rotary F				ed to 7.90m	Dates		Engineer			neet
			722	2034.8 E	741373.4 N	21	/05/2019	DBFL			1/1
Depth (m)	Sample	/ Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Inst
0.50 1.00-1.45 2.00 2.00-2.45 3.00-3.45 3.50 4.00-4.38 4.20 5.00-5.00 5.90 5.90 5.90 5.90 5.90 5.90 5.90 5.90	B BSPT(C) B SPT(C) B SPT(C) B TCR 100	N=9 N=29	RQD 42 68	<b>FI</b> 17 12 8	1,2/2,2,2,3 2,1/2,2,2,3 5,5/7,7,7,8 4,8/13,15,17,5 25/50 50/0 SPT(C) 25*/0 Water strike(1) at 4.80m in 20 mins.	11.11 9.61 7.51 4.61		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 Firm greyish brown sandy gravelly CLAY with occasional cobbles and rare boulders. Sand is fin to coarse Gravel is subrounded fine to coarse 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 Medium strong light grey very fine to fine grained fossiliferous LMESTONE with frequent calcite veins and some pyrite filled vugs partially weathered with some clay smearing on fractures 4.90-5.90 - Two fracture sets. F1: Closely spaced sub-horizontal to 15 degrees, undulating rough. F2: Medium spaced sub-vertical to 60 dergees, undulating rough 5.90-6.90 - Two fracture sets. F1: Closely spaced sub-horizontal to 70 degrees, undulating rough. F2: Widely spaced sub-vertical to 70 degrees, undulating rough 6.90-7.90 - One fracture set. F1: Medium spaced sub-horizontal to 5 degrees, undulating rough. F2: Widely spaced sub-vertical to 70 degrees, undulating rough 6.90-7.90 - One fracture set. F1: Medium spaced sub-horizontal to 5 degrees, undulating rough.			
Remarks Refusal at 5					1	<u> </u>	<u> </u>	1	Scale (approx)	Lo	ogged V
Vavin instal Chiselling fro	led for rota	y follow o 5.00m fo	n or 0.5 hou	rs.					(approx)	-	<b>y</b> MMC
										lo.	

#### Parkside Phase 4

### **Rotary Core Photographs**

BH01







A	A			🖬 Grey Scala 814		Colour Chart R1		EN
2	Client:		DBFL DE PHASE 4 - 1	BELHAYNE	Job Ref: Date:	8658-0		
7.	Site: Borehole		BHOZ	3	Depth: From	and the second se	to 13.30	
ē	Box No:	20	- of		50 60	70	08 06	100
F	>	a						
	Car						119	
E						13-	12 PE	
15			M.		KAT	(D) Q		Antes 1



**BH05** 





BH07





# **APPENDIX 7** – Groundwater Monitoring

## Parkside Phase 4

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

## **GROUNDWATER MONITORING:**



## **APPENDIX 8** – Laboratory Testing



Ground Investigations Ireland Catherinestown House

Hazelhatch Road

Newcastle Co. Dublin Ireland

## Exova Jones Environmental

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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:									
Reference:									
Location:									
Contact:									
JE Job No.:									

Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : Solid

J E Sample No.													
	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
Sample ID	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		e attached n	
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT			
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			Method
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	No.
Antimony	2	3	4	1	2	2	3	2	1	3	<1	mg/kg	TM30/PM15
Arsenic <sup>#</sup>	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 <sup>#</sup>	105	149	163	146	110	187	57	96	80	140	<1	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	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 <sup>#</sup>	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 <sup>#</sup>	35	30	29	19	27	13	25	19	15	34	<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	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 <sup>#</sup>	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 <sup>#</sup>	3	2	2	2	2	<1	2	<1	<1	2	<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	117	117	84	66	93	82	73	67	54	138	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<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 <sup>#</sup>	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	<0.03 <0.03	0.87	0.50	0.43	<0.03	mg/kg	TM4/PM8 TM4/PM8
Pyrene <sup>#</sup> Benzo(a)anthracene <sup>#</sup>	0.28	1.12 0.80	<0.03 <0.06	0.33	0.40	<0.03	<0.05	0.80	0.39	0.37	<0.03 <0.06	mg/kg mg/kg	TM4/PM8
Chrysene <sup>#</sup>	0.20	0.83	<0.00	0.21	0.26	<0.00	<0.00	0.43	0.24	0.25	<0.00	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 <sup>#</sup>	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 <sup>#</sup>	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 <sup>#</sup>	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

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Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : Solid

JE Job No.:	19/7764										_		
J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
Sample ID	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	Please se	e attached n	otes for all
COC No / misc												ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT			
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			LOD/LOR	Units	Method No.
TPH CWG	14/00/2010	14/00/2010	14/00/2010	14/00/2010	14/00/2010	14/00/2010	14/00/2010	14/00/2010	14/00/2010	14/00/2010			
Aliphatics													
>C5-C6 <sup>#</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 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>C6-C8 <sup>#</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 <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	TM5/PM8/PM16
>C12-C16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 # >C21-C35 #	<7	<7	<7	<7	<7	<7	<7	18	14	<7	<7	mg/kg	TM5/PM8/PM16 TM5/PM8/PM16
>C21-C35* >C35-C40	<7 <7	<7 <7	<7 <7	53 <7	<7 <7	<7 <7	<7 <7	61 <7	40 <7	<7 <7	<7 <7	mg/kg	TM5/PM8/PM16 TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	53	<26	<26	<26	79	55	<26	<26	mg/kg mg/kg	TM5/TM38/PM8/PM12/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	TM5/PM8/PM16
>C25-C35	<10	<10	<10	42	<10	<10	<10	44	30	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>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 <sup>#</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 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	mg/kg	TM36/PM12
>EC10-EC12 <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	10	<4	<4	<4	mg/kg	TM5/PM8/PM16 TM5/PM8/PM16
>EC16-EC21 # >EC21-EC35 #	<7 43	<7 77	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	23 128	<7 29	<7 <7	<7 <7	mg/kg mg/kg	TM5/PM8/PM16
>EC35-EC40	43	13	<7	<7	<7	<7	<7	120	36	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	57	90	<26	<26	<26	<26	<26	178	65	<26	<26	mg/kg	TM5/TM38/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	57	90	<52	53	<52	<52	<52	257	120	<52	<52	mg/kg	TM5/TM38/PM8/PM12/PM16
>EC6-EC10 <sup>#</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 <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	TM5/PM8/PM16
>EC25-EC35	39	59	<10	<10	<10	<10	<10	95	32	<10	<10	mg/kg	TM5/PM8/PM16
MTBE <sup>#</sup>	<5 <sup>\$V</sup>	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5 <sup>\$V</sup>	<5	<5	<5	<5 <sup>\$V</sup>	<5 <sup>sv</sup>	<5	ug/kg	TM31/PM12
Benzene <sup>#</sup>	<5 <5 <b>SV</b>	<5	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>	<5	<5	<5	<5 <5	<5 <5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
Toluene <sup>#</sup>	<5 <sup>\$V</sup>	<5	<5 <sup>SV</sup>	<5 <sup>\$V</sup>	<5 <5 <sup>SV</sup>	<5	<5	<5	<5 <sup>SV</sup>	<5 <sup>\$V</sup>	<5	ug/kg	TM31/PM12
Ethylbenzene <sup>#</sup>	<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>\$V</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5 <sup>\$V</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
o-Xylene <sup>#</sup>	<5 <sup>SV</sup>	<5	<5 <sup>\$V</sup>	<5 <sup>SV</sup>	<5 <sup>\$V</sup>	<5	<5	<5	<5 <sup>\$V</sup>	<5 <sup>SV</sup>	<5	ug/kg	TM31/PM12
PCB 28 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 <sup>#</sup>	<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 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs <sup>#</sup>	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

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#### Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : Solid

JE Job No.:	19/7764												
J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
Sample ID	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		e attached n	
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT			
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	LOD/LOR	Units	Method No.
Date of Receipt							14/05/2019			14/05/2019			
Natural Moisture Content Moisture Content (% Wet Weight)	19.3 16.2	45.1 31.1	14.7 12.8	10.1 9.1	24.5 19.7	27.1 21.4	10.8 9.7	10.1 9.2	15.4 13.3	19.0 16.0	<0.1 <0.1	%	PM4/PM0 PM4/PM0
inclotate content (/o frot froight)	10.2	01.1	12.0	0.1	10.1	21.4	0.1	0.2	10.0	10.0	50.1	,0	
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	23.6	27.7	18.4	22.7	23.2	40.3	17.8	19.3	17.1	28.9	<0.5	mg/kg	NONE/NONE
Total Organic Carbon <sup>#</sup>	2.12	3.39	0.80	0.70	1.06	0.53	0.45	0.48	0.59	1.76	<0.02	%	TM21/PM24
рН#	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
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
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

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Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : Solid

JE Job No.:	19/7764												
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	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT												
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												
Batch Number	1	1	1	1	1	1	1	1	1	1		11.25	Method
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	No.
Antimony	3	3	3	2	3	2	3	3	3	3	<1	mg/kg	TM30/PM15
Arsenic <sup>#</sup>	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 <sup>#</sup>	124	65	147	217	260	172	87	103	64	89	<1	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	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 <sup>#</sup>	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 <sup>#</sup>	19	26	21	9	32	26	26	44	26	30	<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	24	17	29	17	35	27	18	67	16	42	<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<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 <sup>#</sup>	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 <sup>#</sup>	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 <sup>#</sup>	1	<1	2	<1	2	1	<1	<1	<1	6	<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	103	75	102	50	159	132	72	131	77	102	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<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:
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Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : Solid

JE Job No.:	19/7764										_		
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	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT			
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			Method
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	No.
TPH CWG													
Aliphatics													
>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	TM5/PM8/PM16
>C12-C16 <sup>#</sup>	<4	<4	<4	10	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 # >C35-C40	<7 <7	<7 <7	<7 <7	42 <7	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	mg/kg	TM5/PM8/PM16 TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	52	<26	<26	<26	<26	<26	<26	<26	mg/kg mg/kg	TMS/FINO/FINITO
>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	TM5/PM8/PM16
>C25-C35	<10	<10	<10	35	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>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 <sup>#</sup>	<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	TM5/PM8/PM16
>EC12-EC16#	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	11	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16 TM5/PM8/PM16
>EC21-EC35 <sup>#</sup> >EC35-EC40	<7 <7	<7 <7	42 11	41 14	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	<7 <7	mg/kg mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	53	66	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM38/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	53	118	<52	<52	<52	<52	<52	<52	<52	mg/kg	TM5/TM38/PM8/PM12/PM16
>EC6-EC10 <sup>#</sup>	<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	TM5/PM8/PM16
>EC25-EC35	<10	<10	35	43	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/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 <sup>#</sup>	<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>\$V</sup> <5 <sup>\$V</sup>	<5	<5 <5	<5	<5	<5	<5	ug/kg	TM31/PM12 TM31/PM12
Ethylbenzene <sup>#</sup>	<5 <5	<5 <5	<5 <sup>sv</sup>	<5 <sup>sv</sup>	<5 <sup>SV</sup>	<5 <5	<5 <5	<5 <5	<5 <5	<5 <5	<5 <5	ug/kg ug/kg	TM31/PM12 TM31/PM12
m/p-Xylene <sup>#</sup> o-Xylene <sup>#</sup>	<5	<5	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>	<5	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
			~J	~3	~3							-9-19	
PCB 28 <sup>#</sup>	<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 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs <sup>#</sup>	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Client Name:
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JE Job No.:

#### Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : Solid

JE Job No.:	19/7764												
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	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT			
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	LOD/LOR	Units	Method
Date of Receipt													No.
Natural Moisture Content Moisture Content (% Wet Weight)	22.8 18.6	12.4 11.0	14.3 12.5	10.7 9.7	28.8 22.3	39.1 28.1	11.5 10.3	19.7 16.4	13.8 12.1	10.4 9.4	<0.1 <0.1	%	PM4/PM0 PM4/PM0
Noisture Content (78 Wet Weight)	10.0	11.0	12.5	5.7	22.5	20.1	10.5	10.4	12.1	5.4	<b>KU</b> .1	70	FIVI4/FIVIO
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	35.5	21.4	22.2	13.8	39.9	45.2	18.4	26.6	22.3	31.3	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.65	0.35	0.72	0.36	1.05	1.22	0.38	2.56	0.38	0.59	<0.02	%	TM21/PM24
рН#	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
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
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name:
Reference:
Location:
Contact:
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#### Report : CEN 10:1 1 Batch

JE Job No.:	19/7764												
J E Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
Sample ID	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	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT												
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												
Batch Number	1	1	1	1	1	1	1	1	1	1			Method
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	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 <sup>#</sup>	<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 <sup>#</sup>	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 <sup>#</sup>	<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 <sup>#</sup>	<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 <0.03	mg/l	TM30/PM17 TM30/PM17										
Dissolved Zinc (A10) # 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 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 <sup>#</sup>	<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
рН	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 <sup>#</sup>	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:
Reference:
Location:
Contact:
JE Job No.:

Ground Investigations Ireland 8658-04-19 Parkside Site Barry Sexton 19/7764

#### Report : CEN 10:1 1 Batch

JE Job No.:	19/7764												
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	Please se	e attached n	otes for all
COC No / misc												ations and a	
Containers	VJT												
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												
Batch Number	1	1	1	1	1	1	1	1	1	1			Method
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	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 <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<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) <sup>#</sup> Dissolved Zinc <sup>#</sup>	<0.03 <0.003	mg/kg	TM30/PM17 TM30/PM17										
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.003	<0.03	mg/l mg/kg	TM30/PM17
Mercury Dissolved by CVAF <sup>#</sup>	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	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 <sup>#</sup>	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 <sup>#</sup>	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
рН	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

Sample ID     WS-01     W       Depth     0.70       COC No / misc     0       Containers     V J T     M       Sample Date     09/05/2019     09/0       Sample Date     09/05/2019     09/0       Batch Number     1     1       Date of Receipt     14/05/2019     14/0       Solid Waste Analysis     0     1       Total Organic Carbon #     2.12     1       Sum of BTEX     <0.025 <sup>SV</sup> <       Sum of BTEX     <0.025 <sup>SV</sup> <       Sum of 6 #     1.15     1       PAH Sum of 6 #     1.15     1       PAH Sum of 6 #     0.22     0       Garhum #     <0.025     0       Carbon ##     <0.025     0       Barium #     <0.025     0       Carbon ##     <0.005     <       Carbon ##     <0.005     <       Chromium #     <0.005     <       Chromium #     <0.005     <       Mercury #     <0.03     0       Molybdenum #     <0.03     0       Nickef*     <0.03        Lead #     <0.03        Antimony #     <0.02        Selenium #     <0.03 <td< th=""><th>Soil 1 4/05/2019 3.39 &lt;0.025 &lt;0.035 &lt;30 5.47 8.91 0.029 0.19 &lt;0.005</th><th>Soil 1 0.80 &lt;0.025<sup>8</sup> &lt;0.035 &lt;0.035 &lt;0.035 &lt;0.035 &lt;0.035 &lt;0.025 0.59 &lt;0.005</th><th>10-12 ws-o2 0.70 V J T 10/05/2019 Soil 1 14/05/2019 0.70 &lt;0.025<sup>\$V</sup> &lt;0.035 53 0.95 1.83</th><th>13-15 WS-03 0.70 V J T 10/05/2019 Soli 1 14/05/2019 1.06 &lt;0.025<sup>\$V</sup> &lt;0.035 &lt;30 1.50 2.83</th><th>16-18 WS-03 1.70 V J T 10/05/2019 Soil 1 14/05/2019 0.53 &lt;0.025 &lt;0.035 &lt;300 &lt;0.22 &lt;0.64</th><th>19-21 WS-03 2.70 V J T 10/05/2019 Soil 1 14/05/2019 0.45 &lt;0.025 &lt;0.035 &lt;0.035 &lt;0.035 &lt;0.02 &lt;0.64</th><th>22-24 ws-04 0.70 V J T 09/05/2019 Soil 1 14/05/2019 0.48 &lt;0.025 &lt;0.035 79 </th><th>25-27 WS-04 1.70 V J T 09/05/2019 Soil 1 14/05/2019 0.59 &lt;0.025<sup>\$V</sup> &lt;0.035</th><th>28-30 wS-05 0.70 V J T 09/05/2019 Soil 1 14/05/2019 1.76 &lt;0.025<sup>\$V</sup></th><th>Inert 3 6</th><th>Stable Non- reactive 5</th><th>Hazardous</th><th>abbrevia</th><th>e attached no attached ac units</th><th></th></td<>	Soil 1 4/05/2019 3.39 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	Soil 1 0.80 <0.025 <sup>8</sup> <0.035 <0.035 <0.035 <0.035 <0.035 <0.025 0.59 <0.005	10-12 ws-o2 0.70 V J T 10/05/2019 Soil 1 14/05/2019 0.70 <0.025 <sup>\$V</sup> <0.035 53 0.95 1.83	13-15 WS-03 0.70 V J T 10/05/2019 Soli 1 14/05/2019 1.06 <0.025 <sup>\$V</sup> <0.035 <30 1.50 2.83	16-18 WS-03 1.70 V J T 10/05/2019 Soil 1 14/05/2019 0.53 <0.025 <0.035 <300 <0.22 <0.64	19-21 WS-03 2.70 V J T 10/05/2019 Soil 1 14/05/2019 0.45 <0.025 <0.035 <0.035 <0.035 <0.02 <0.64	22-24 ws-04 0.70 V J T 09/05/2019 Soil 1 14/05/2019 0.48 <0.025 <0.035 79 	25-27 WS-04 1.70 V J T 09/05/2019 Soil 1 14/05/2019 0.59 <0.025 <sup>\$V</sup> <0.035	28-30 wS-05 0.70 V J T 09/05/2019 Soil 1 14/05/2019 1.76 <0.025 <sup>\$V</sup>	Inert 3 6	Stable Non- reactive 5	Hazardous	abbrevia	e attached no attached ac units	
Depth     0.70       COC No / misc     0       Containers     V J T     N       Sample Date     09/05/2019     09/0       Sample Type     Soil     1       Batch Number     1     1       Date of Receipt     14/05/2019     14/0       Soild Waste Analysis     0     0       Total Organic Carbon "     2.12     13       Sum of BTEX     <0.025 <sup>8V</sup> <	1.70 V J T 99/05/2019 Soil 1 4/05/2019 <0.025 <0.035 <0.035 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	2.70 V J T Soil 1 1 0.80 <0.025 <sup>SV</sup> <0.035 <30 <0.22 <0.64	0.70 V J T 10/05/2019 Soil 1 14/05/2019 0.70 <0.025 <sup>8</sup> V <0.035 53 0.95 1.83 <0.025	0.70 V J T 10/05/2019 Soil 1 14/05/2019 1.06 <0.025 <sup>8V</sup> <0.035 <30 1.50 2.83	1.70 V J T 10/05/2019 Soil 1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	2.70 V J T 10/05/2019 Soil 1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	0.70 V J T 09/05/2019 Soil 1 14/05/2019 0.48 <0.025 <0.035 79	1.70 V J T 09/05/2019 Soil 1 14/05/2019 0.59 <0.025 <sup>\$V</sup> <0.035	0.70 V J T 09/05/2019 Soil 14/05/2019 1.76 <0.025 <sup>\$V</sup>	3	reactive		abbrevia	ations and ac	Method
COC No / misc       V J T       N         Containers       V J T       09/05/2019       09/05         Sample Date       09/05/2019       09/05         Batch Number       1       1         Date of Receipt       14/05/2019       14//         Solid Waste Analysis       2.12       13         Total Organic Carbon "       2.12       13         Sum of BTEX       <0.025 <sup>SW</sup> <10         Sum of BTEX       <0.025 <sup>SW</sup> <10         Sum of 6 "       1.15       14         PAH Sum of 6 "       1.15       14         PAH Sum of 6 "       0.22       00         Arsenic "       <0.025       00         Cadmium "       <0.025       00         Cadmium "       <0.025       00         Mercury "       <0.005       <10         Molybdenum "       0.08       00         Nickel "       0.03       00         Lead "       <0.03       00         Zinc "       <0.03       <10         Selenium "       <0.03       <10         Dissolved Solids "       1419       <10         Dissolved Solids "       1419       1419       1419	V J T soil 1 1 4/05/2019 3.39 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	V J T 9 09/05/2019 Soil 1 0 14/05/2019 0 .80 <0.025 <sup>\$V</sup> <0.035 <30 <0.22 <0.64 -0.22 <0.64 -0.25 0.59 <0.05	V J T 10/05/2019 Soil 1 14/05/2019 0.70 <0.025 <sup>\$V</sup> <0.035 53 0.95 1.83 <0.025	V J T 10/05/2019 Soil 1 14/05/2019 1.06 <0.025 <sup>\$V</sup> <0.035 <30 1.50 2.83	V J T 10/05/2019 Soil 1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	V J T 10/05/2019 Soil 1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	V J T 09/05/2019 Soil 1 14/05/2019 0.48 <0.025 <0.035 79	V J T 09/05/2019 Soil 1 14/05/2019 0.59 <0.025 <sup>\$V</sup> <0.035	V J T 09/05/2019 Soil 1 14/05/2019 1.76 <0.025 <sup>\$V</sup>	3	reactive		abbrevia	ations and ac	Method
Containers     V J T     N       Sample Date     09/05/2019     09/05/2019       Sample Type     Soil       Batch Number     1       Date of Receipt     14/05/2019     14/05       Solid Waste Analysis     2.12     3       Total Organic Carbon     2.12     3       Sum of BTEX     <0.025 <sup>8V</sup> <       Sum of BTEX     <0.025 <sup>8V</sup> <       Sum of T PCBs     <0.035     <       Mineral Oil     <3.00     115     34       PAH Sum of 6 <sup>4T</sup> 1.15     34       PAH Sum of 17     <0.025     0       Cept 10:1 Leachate         Arsenic <sup>4T</sup> <0.025     0       Cadmium <sup>4T</sup> Oybdenum <sup>4T</sup> <0.08        Mickel <sup>4T</sup> Olybdenum <sup>4T</sup> <0.08        Nickel <sup>4T</sup> Olybdenum <sup>4T</sup> Dissolved Organic Carbon         Mass of raw test portion         Diy Matter Content Ratio         Dyn Matter Content Ratio         Divater Content Ratio         Divater Content Ratio <td>99/05/2019 Soil 1 4/05/2019 3.39 &lt;0.025 &lt;0.025 &lt;0.035 &lt;30 5.47 8.91 0.029 0.19 &lt;0.005</td> <td>09/05/2019           Soil           1           0           1           0           4/05/2019           0</td> <td>10/05/2019 Soil 1 14/05/2019 0.70 &lt;0.025<sup>\$Y</sup> &lt;0.035 53 0.95 1.83 &lt;0.025</td> <td>10/05/2019 Soil 1 14/05/2019 1.06 &lt;0.025<sup>8</sup>V &lt;0.035 &lt;30 1.50 2.83</td> <td>10/05/2019 Soil 1 14/05/2019 0.53 &lt;0.025 &lt;0.035 &lt;30 &lt;0.22</td> <td>10/05/2019 Soil 1 14/05/2019 0.45 &lt;0.025 &lt;0.035 &lt;30 &lt;0.22</td> <td>09/05/2019 Soil 1 14/05/2019 0.48 &lt;0.025 &lt;0.035 79</td> <td>09/05/2019 Soil 1 14/05/2019 0.59 &lt;0.025<sup>sv</sup> &lt;0.035</td> <td>09/05/2019 Soil 1 14/05/2019 1.76 &lt;0.025<sup>sv</sup></td> <td>3</td> <td>reactive</td> <td></td> <td>abbrevia</td> <td>ations and ac</td> <td>Method</td>	99/05/2019 Soil 1 4/05/2019 3.39 <0.025 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	09/05/2019           Soil           1           0           1           0           4/05/2019           0	10/05/2019 Soil 1 14/05/2019 0.70 <0.025 <sup>\$Y</sup> <0.035 53 0.95 1.83 <0.025	10/05/2019 Soil 1 14/05/2019 1.06 <0.025 <sup>8</sup> V <0.035 <30 1.50 2.83	10/05/2019 Soil 1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	10/05/2019 Soil 1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	09/05/2019 Soil 1 14/05/2019 0.48 <0.025 <0.035 79	09/05/2019 Soil 1 14/05/2019 0.59 <0.025 <sup>sv</sup> <0.035	09/05/2019 Soil 1 14/05/2019 1.76 <0.025 <sup>sv</sup>	3	reactive		abbrevia	ations and ac	Method
Sample Date     09/05/2019     09/0       Sample Type     Soil     Soil       Batch Number     1       Date of Receipt     14/05/2019     14/0       Soild Waste Analysis     2     1       Total Organic Carbon     2.12     3       Sum of BTEX     <0.025 <sup>84</sup> <	99/05/2019 Soil 1 4/05/2019 3.39 <0.025 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	09/05/2019           Soil           1           0           1           0           4/05/2019           0	10/05/2019 Soil 1 14/05/2019 0.70 <0.025 <sup>\$Y</sup> <0.035 53 0.95 1.83 <0.025	10/05/2019 Soil 1 14/05/2019 1.06 <0.025 <sup>8</sup> V <0.035 <30 1.50 2.83	10/05/2019 Soil 1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	10/05/2019 Soil 1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	09/05/2019 Soil 1 14/05/2019 0.48 <0.025 <0.035 79	09/05/2019 Soil 1 14/05/2019 0.59 <0.025 <sup>sv</sup> <0.035	09/05/2019 Soil 1 14/05/2019 1.76 <0.025 <sup>sv</sup>	3	reactive			Units	
Sample Type     Soil       Batch Number     1       Date of Receipt     14/05/2019     14/0       Solid Waste Analysis     1       Total Organic Carbon "     2.12     3       Sum of BTEX     <0.025 <sup>SW</sup> <0	Soil 1 4/05/2019 3.39 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	Soil 1 0.80 <0.025 <sup>8</sup> <0.035 <0.035 <0.035 <0.035 <0.035 <0.025 0.59 <0.005	Soil 1 14/05/2019 0.70 <0.025 <sup>SV</sup> <0.035 53 0.95 1.83 <0.025	Soil 1 14/05/2019 1.06 <0.025 <sup>SV</sup> <0.035 <30 1.50 2.83	Soil 1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	Soil 1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	Soil 1 14/05/2019 0.48 <0.025 <0.035 79	Soil 1 14/05/2019 0.59 <0.025 <sup>sv</sup> <0.035	Soil 1 14/05/2019 1.76 <0.025 <sup>sv</sup>	3	reactive			Units	
Sample Type     Soil       Batch Number     1       Date of Receipt     14/05/2019     14/0       Solid Waste Analysis     1       Total Organic Carbon "     2.12     3       Sum of BTEX     <0.025 <sup>SW</sup> <0	Soil 1 4/05/2019 3.39 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	Soil 1 0.80 <0.025 <sup>8</sup> <0.035 <0.035 <0.035 <0.035 <0.035 <0.025 0.59 <0.005	Soil 1 14/05/2019 0.025 <sup>59</sup> <0.025 <sup>59</sup> <0.035 53 0.95 1.83 <0.025	Soil 1 14/05/2019 1.06 <0.025 <sup>SV</sup> <0.035 <30 1.50 2.83	Soil 1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	Soil 1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	Soil 1 14/05/2019 0.48 <0.025 <0.035 79	Soil 1 14/05/2019 0.59 <0.025 <sup>sv</sup> <0.035	Soil 1 14/05/2019 1.76 <0.025 <sup>sv</sup>	3	reactive			Units	
Batch Number         1           Date of Receipt         14/05/2019         14/0           Solid Waste Analysis         1         1           Total Organic Carbon "         2.12         3           Sum of BTEX         <0.025 <sup>SV</sup> <0           Sum of BTEX         <0.025 <sup>SV</sup> <0           Sum of PCBs"         <0.035         <0           PAH Sum of 6"         1.15         3           PAH Sum of 6"         1.15         3           PAH Sum of 17         2.00         3           CEN 10: L Leachate             Arsenic"         <0.025         0           Barlum "         0.22         0           Cadmium "         <0.005         <           Copper "         <0.001         <           Molydenum "         0.08         0           Nickel "         0.03         0           Lead "         <0.03            Antimony"         <0.03            Selenium "         <0.03            Zinc "              Massol raw test portion         0.1138         0           Dry Matter Content Ratio	1 4/05/2019 3.39 <0.025 <0.035 5.47 8.91 0.029 0.19 <0.005	1 0.80 <0.025 <sup>\$V</sup> <0.035 <30 <0.22 <0.64 -0.025 0.59 <0.005	1 14/05/2019 0.70 <0.025 <sup>\$V</sup> <0.035 53 0.95 1.83 <0.025	1 14/05/2019 1.06 <0.025 <sup>\$V</sup> <0.035 <30 1.50 2.83	1 14/05/2019 0.53 <0.025 <0.035 <30 <0.22	1 14/05/2019 0.45 <0.025 <0.035 <30 <0.22	1 14/05/2019 0.48 <0.025 <0.035 79	1 14/05/2019 0.59 <0.025 <sup>sv</sup> <0.035	1 14/05/2019 1.76 <0.025 <sup>sv</sup>	3	reactive			Units	
Date of Receipt         14/05/2019         14/05           Solid Waste Analysis         1         14/05/2019         14/05           Total Organic Carbon <sup>4</sup> 2.12         15         15           Sum of BTEX         <0.025 <sup>SV</sup> <15         16           Sum of BTEX         <0.025 <sup>SV</sup> <16         11         15         16           PAH Sum of 6 <sup>®</sup> 1.15         18         11         16         17         16         16         17         16	4/05/2019 3.39 <0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	<ul> <li>14/05/2019</li> <li>0.80</li> <li>0.025<sup>\$V</sup></li> <li>&lt;0.025<sup>\$V</sup></li> <li>&lt;0.025</li> <li>&lt;0.022</li> <li>&lt;0.64</li> <li>&lt;0.025</li> <li>&lt;0.59</li> <li>&lt;0.005</li> </ul>	14/05/2019 0.70 <0.025 <sup>\$V</sup> <0.035 53 0.95 1.83 <0.025	14/05/2019 1.06 <0.025 <sup>\$V</sup> <0.035 <30 1.50 2.83	14/05/2019 0.53 <0.025 <0.035 <30 <0.22	14/05/2019 0.45 <0.025 <0.035 <30 <0.22	14/05/2019 0.48 <0.025 <0.035 79	14/05/2019 0.59 <0.025 <sup>sv</sup> <0.035	14/05/2019 1.76 <0.025 <sup>\$V</sup>	3	reactive			Units	
Solid Waste Analysis         Image: Carbon *         2.12         Image: Carbon *         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00         2.00	3.39 <0.025 <300 5.47 8.91 0.029 0.19 <0.005	0.80 <0.025 <sup>\$V</sup> <0.035 <30 <0.22 <0.64 <0.025 0.59 <0.005	0.70 <0.025 <sup>\$V</sup> <0.035 53 0.95 1.83 <0.025	1.06 <0.025 <sup>\$V</sup> <0.035 <30 1.50 2.83	0.53 <0.025 <0.035 <30 <0.22	0.45 <0.025 <0.035 <30 <0.22	0.48 <0.025 <0.035 79	0.59 <0.025 <sup>sv</sup> <0.035	1.76 <0.025 <sup>sv</sup>		5	6			
Total Organic Carbon         2.12         3           Sum of BTEX         <0.025 <sup>8V</sup> <           Sum of 7 PCBs         <0.035         <           Mineral Oil         <30            PAH Sum of 6         1.15         3           PAH Sum of 6         1.15         3           PAH Sum of 17         2.00         3           CEN 10:1 Leachate             Arsenic         <0.025         C           Cadmium         <0.005             Cadmium         <0.005             Cadmium         <0.005             Copper         <0.007             Mercury         <0.008             Nickel*         0.03             Lead*         <0.03             Antimony         <0.03             Selenium*         <0.03             Dissolved Organic Carbon         40             Mass of raw test portion         0.1138         0            Dry Matter Content Ratio	<0.025 <0.035 <30 5.47 8.91 0.029 0.19 <0.005	<0.025 <sup>8V</sup> <0.035 <30 <0.22 <0.64 <0.025<0.025<0.05	<0.025 <sup>\$V</sup> <0.035 53 0.95 1.83 <0.025	<0.025 <sup>\$V</sup> <0.035 <30 1.50 2.83	<0.025 <0.035 <30 <0.22	<0.025 <0.035 <30 <0.22	<0.025 <0.035 79	<0.025 <sup>sv</sup> <0.035	<0.025 <sup>sv</sup>		5	6			
Sum of BTEX         <0.025 <sup>8V</sup> <0           Sum of 7 PCBs"         <0.035	<0.035 <30 5.47 8.91 0.029 0.19 <0.005	<0.035 <30 <0.22 <0.64 <0.025 0.59 <0.005	<0.035 53 0.95 1.83 <0.025	<0.035 <30 1.50 2.83	<0.035 <30 <0.22	<0.035 <30 <0.22	<0.035 79	<0.035		e			< 0.02	%	TM21/PM24
Mineral Oil         <30	<30 5.47 8.91 0.029 0.19 <0.005	<30 <0.22 <0.64 .0.025 0.59 <0.005	53 0.95 1.83 <0.025	<30 1.50 2.83	<30 <0.22	<30 <0.22	79	<0.035		0	-	-	<0.025	mg/kg	TM31/PM12
PAH Sum of 6 *       1.15       1.15         PAH Sum of 17       2.00       1.15         CEN 10:1 Leachate	5.47 8.91 0.029 0.19 <0.005	<0.22 <0.64 <0.025 0.59 <0.005	0.95 1.83 <0.025	1.50 2.83	<0.22	<0.22			< 0.035	1	-	-	<0.035	mg/kg	TM17/PM8
PAH Sum of 17         2.00         3           CEN 10:1 Leachate         -         -           Arsenic "         -         0.025         0           Barium "         0.22         -         0           Cadmium "         -         0.005         -           Cadmium "         -         0.005         -           Copper "         -         -         -           Mercury "         -         0.001         -           Molybdenum "         0.08         -         -           Nickel "         0.03         -         -           Antimony "         -         -         -         -           Selenium "         -         -         -         -           Jissolved Solids "         1419         -         -           Mass of raw test portion         0.1138         0         -           Dry Matter Content Ratio         79.2         -         -           Leachant Volume         0.856         -         -	8.91 0.029 0.19 <0.005	<0.64 <0.025 0.59 <0.005	1.83	2.83				54	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
CEN 10:1 Leachate	0.029 0.19 <0.005	<0.025 0.59 <0.005	<0.025		<0.64	<0.64	2.57	1.26	1.38	-	-	-	<0.22	mg/kg	TM4/PM8
Arsenic         <0.025	0.19 <0.005	0.59 <0.005					4.79	2.54	2.62	100	-	-	<0.64	mg/kg	TM4/PM8
Arsenic         <0.025	0.19 <0.005	0.59 <0.005													
Barium *         0.22         0           Cadmium *         <0.005	0.19 <0.005	0.59 <0.005		0.005	0.005	0.005	0.005	0.005	0.005	0.5	0	05	0.005		TM30/PM17
Cadmium "         <0.005	<0.005	<0.005		<0.025	<0.025 0.10	<0.025	<0.025 0.27	<0.025 1.59	<0.025 0.10	0.5 20	2 100	25 300	<0.025 <0.03	mg/kg	TM30/PM17 TM30/PM17
Chromium "         <0.015			<0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	0.04	100	5	<0.005	mg/kg mg/kg	TM30/PM17 TM30/PM17
Copper*         <0.07	< 0.015	< 0.015	0.082	<0.005	<0.005	<0.005	0.121	0.223	<0.005	0.5	10	70	<0.005	mg/kg	TM30/PM17
Mercury"         <0.0001	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
Molybdenum *         0.08         Molybdenum *           Nickel *         0.03         Molybdenum *           Lead *         <0.05	<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/PM0
Nickel         0.03         1           Lead         <0.05	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
Lead         <0.05	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
Selenium*     <0.03	<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
Zinc*     <0.03	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
Total Dissolved Solids #     1419       Dissolved Organic Carbon     40       Mass of raw test portion     0.1138       Dry Matter Content Ratio     79.2       Leachant Volume     0.876       Eluate Volume     0.85	<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
Ass of raw test portion 0.1138 0 Dry Matter Content Ratio 79.2 1 Leachant Volume 0.876 0 Eluate Volume 0.85	<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
Mass of raw test portion 0.1138 0 Dry Matter Content Ratio 79.2 1 Leachant Volume 0.876 0 Eluate Volume 0.85	1760	770	1830	810	560	410	2159	4479	1110	4000	60000	100000	<350	mg/kg	TM20/PM0
Dry Matter Content Ratio 79.2 Leachant Volume 0.876 C Eluate Volume 0.85	130	30	<20	40	30	<20	<20	<20	30	500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio 79.2 Leachant Volume 0.85 C	0.1333	0.1031	0.1033	0.1119	0.1162	0.0992	0.1042	0.1063	0.1096	-	-	-		kg	NONE/PM17
Leachant Volume 0.876 0 Eluate Volume 0.85	67.5	87.5	86.7	80.5	77.5	90.4	86.8	85.1	82.5	-	-	-	<0.1	%	NONE/PM4
Eluate Volume 0.85	0.857	0.887	0.886	0.878	0.874	0.89	0.886	0.884	0.881	-	-	-	-	1	NONE/PM17
	0.85	0.7	0.8	0.72	0.6	0.75	0.81	0.85	0.7	-	-	-		I	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
							0.5-			40	00577		_		71405 7714
Sulphate as SO4 # 164 Chloride # <3		56 5	499 7	147 <3	212 6	71 <3	395 11	119 29	51 <3	1000 800	20000 15000	50000 25000	<5 <3	mg/kg mg/kg	TM38/PM0 TM38/PM0
Chloride * <3	14	3			0	2		23	~0	000	13000	20000	29	mg/kg	
	14 14														

 Client Name:
 Ground Investigations Ireland

 Reference:
 8658-04-19

 Location:
 Parkside Site

 Contact:
 Barry Sexton

 JE Job No.:
 19/7764

#### Report : EN12457\_2

JE JOD NO	19/1104															
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	W\$-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				Ploaso so	e attached n	otos for all
COC No / misc															ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT						
										09/05/2019						
Sample Date			10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	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	Inert	Stable Non-	Hazardous	LOD LOR	Units	Method
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		reactive				No.
Solid Waste Analysis																
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 <sup>#</sup> Mineral Oil	<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
PAH Sum of 6	<30 <0.22	<30 <0.22	<30 0.81	52 2.11	<30 <0.22	<30 <0.22	<30 <0.22	<30 1.09	<30 <0.22	<30 <0.22	500	-	-	<30 <0.22	mg/kg mg/kg	TM5/PM8/PM16 TM4/PM8
PAH Sum of 6" PAH Sum of 17	<0.22	<0.22	1.55	3.82	<0.22	<0.22	<0.22	1.90	<0.22	<0.22	- 100	-	-	<0.22	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic "	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium "	0.10	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/PM0
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 <sup>#</sup>	<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	0.03	<0.02 <0.05	<0.02 <0.05	0.4	10 10	40 50	<0.02 <0.05	mg/kg	TM30/PM17 TM30/PM17
Lead <sup>#</sup> Antimony <sup>#</sup>	<0.05 <0.02	<0.05 <0.02	<0.05 <0.02	<0.05	<0.05	<0.05 <0.02	<0.05 <0.02	<0.05 <0.02	<0.03	<0.03	0.06	0.7	5	<0.03	mg/kg mg/kg	TM30/PM17 TM30/PM17
Selenium #	<0.02	<0.02	<0.02	<0.03	<0.02	<0.03	<0.02	<0.02	<0.03	<0.03	0.1	0.5	7	<0.02	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	-	-	-		I	NONE/PM17
Eluate Volume	0.64	0.75	0.8	0.84	0.65	0.71	0.78	0.75	0.7	0.75	-	-	-		I	NONE/PM17
рН "	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

EPH	Interr	oretation	Report
	r		

Matrix	Calid
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Client Name:	Ground Investigations Ireland
Reference:	8658-04-19
Location:	Parkside Site
Contact:	Barry Sexton

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
19/7764	1	WS-01	0.70	1-3	Possible trace PAH's & Naturally occurring compounds
19/7764	1	WS-01	1.70	4-6	Possible PAH's & Naturally occurring compounds
19/7764	1	WS-01	2.70	7-9	No interpretation possible
19/7764	1	WS-02	0.70	10-12	Lubricating oil & Naturally occurring compounds
19/7764	1	WS-03	0.70	13-15	No interpretation possible
19/7764	1	WS-03	1.70	16-18	No interpretation possible
19/7764	1	WS-03	2.70	19-21	No interpretation possible
19/7764	1	WS-04	0.70	22-24	Possible trace Degraded diesel , lubricating oil, PAH's & Naturally occurring compounds
19/7764	1	WS-04	1.70	25-27	Possible trace Degraded diesel , lubricating oil, PAH's & Naturally occurring compounds
19/7764	1	WS-05	0.70	28-30	No interpretation possible
19/7764	1	WS-05	1.70	31-33	No interpretation possible
19/7764	1	WS-05	2.70	34-36	No interpretation possible
19/7764	1	WS-06	0.70	37-39	Naturally occurring compounds
19/7764	1	WS-07	0.70	40-42	Possible trace Degraded diesel, lubricating oil & Naturally occurring compounds
19/7764	1	WS-08	0.70	43-45	No interpretation possible
19/7764	1	WS-08	1.70	46-48	No interpretation possible
19/7764	1	WS-08	2.70	49-51	No interpretation possible
19/7764	1	WS-09	0.70	52-54	No interpretation possible
19/7764	1	WS-09	1.70	55-57	No interpretation possible
19/7764	1	WS-09	2.70	58-60	No interpretation possible

#### Asbestos Analysis

#### Exova Jones Environmental

Client Name: Reference:	Ground Investigations Ireland 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:

1ª Car

#### 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

## Jones Environmental Laboratory

Client Name:
Reference:
Location:
Contact:

Ground Investigations Ireland 19/04/8658 Parkside Site

Location Contact			Parkside Barry Se				
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
		14/0 05			/ /		
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 18/05/2019	Asbestos Type Asbestos Level Screen	NAD
					10/03/2013		
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

## Jones Environmental Laboratory

Client Name:
Reference:
Location:
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Ground Investigations Ireland 19/04/8658 Parkside Site

Contac	Contact:		Barry Se	xton			
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
						Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
					18/05/2019	Asbestos Type	NAD
					18/05/2019	Asbestos Level Screen	NAD
40/7704	4	WS-09	0.70	52	49/05/2040	Concret Description (Bulls Analysis)	
19/7764	1	W3-09	0.70	53	18/05/2019	General Description (Bulk Analysis)	soil.stones
					18/05/2019	Asbestos Fibres	NAD
					18/05/2019	Asbestos ACM	NAD
						Asbestos Type Asbestos Level Screen	NAD
					10/03/2019		
19/7764	1	WS-09	1.70	56	18/05/2019	General Description (Bulk Analysis)	soil-stones
10,1104	•			50		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
					1		

Client Name:Ground Investigations IrelandReference:8658-04-19Location:Parkside SiteContact:Barry Sexton

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason						
	No deviating sample report results for job 19/7764											

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/7764

#### 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 HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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

#### WATERS

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

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

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

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

#### **DEVIATING SAMPLES**

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

#### SURROGATES

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

#### DILUTIONS

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

#### BLANKS

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

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

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

#### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	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
СО	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
ТВ	Trip Blank Sample
OC	Outside Calibration Range

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

#### JE Job No.:

#### 19/7764

4.01/1 4	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
10l/kg; 4mm	filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ва	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)
Мо	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 spectrometic methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional a	nalysis
ТОС	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
Vetals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 ( ICP-OES)
Other	
_	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-Fisch
Dry matter	titration and either volumetric or coulometric detection.
	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
LOI	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range

\*\*\*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.

## Method Code Appendix

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

## Method Code Appendix

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
ТМЗО	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
ТМ30	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
ТМ30	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 Methyltertbutylether, 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 Methyltertbutylether, 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

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

## 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

#### Tel: +44 (0) 1244 833780 Fax: +44 (0) 1244 833781



Barry Sexton
10th June, 2019
8658-04-19
Test Report 19/8807 Batch 1
Parkside Phase 4
31st May, 2019
Final report
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

Client Name: Reference:	Ground In 8658-04-1	vestigatior	ns Ireland				Report : Solid							
Location:	Parkside I						Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub			
Contact:	Barry Sex	ton												
JE Job No.:	19/8807													
J E Sample No.	1	2												
Sample ID	TP01	TP06												
Depth	1.70	1.70									Please se	e attached n	otes for all	
COC No / misc												ations and a		
Containers	т	т												
Sample Date	29/05/2019	29/05/2019												
Sample Type		Soil												
Batch Number														
		1									LOD/LOR	Units	Method No.	
Date of Receipt														
Sulphate as SO4 (2:1 Ext) #	0.0542	0.0181									<0.0015	g/l	TM38/PM20	
рН#	8.18	8.50									<0.01	pH units	TM73/PM11	
	1	1	1	1	1	1	1	1	1	1	1		1	

**Notification of Deviating Samples** 

Client Name:Ground Investigations IrelandReference:8658-04-19Location:Parkside Phase 4Contact:Barry Sexton

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason				
	No deviating sample report results for job 19/8807									

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

### NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/8807

#### 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 HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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

#### WATERS

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

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

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

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

#### **DEVIATING SAMPLES**

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

#### SURROGATES

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

#### DILUTIONS

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

#### BLANKS

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

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

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

#### ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	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
СО	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
ТВ	Trip Blank Sample
OC	Outside Calibration Range

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
ТМ73	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



Issue :

Element Materials Technology Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA P: +44 (0) 1244 833780 F: +44 (0) 1244 833781

W: www.element.com

Ground Investigations Ireland Catherinestown House Hazelhatch Road Newcastle Co. Dublin Ireland ac-ME Barry Sexton Attention : 27th June, 2019 Date : 8658-04-19 Your reference : Test Report 19/9756 Batch 1 Our reference : Parkside Phase 4 Location : Date samples received : 17th June, 2019 Final report Status :

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.

1

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:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9756

#### Report : Solid

EMI JOD NO:	19/9756			 	 	 			
EMT Sample No.	1-3	4-6	7-9						
Sample ID	BH01	BH01	BH01						
Depth	0.50	1.60	2.50						
COC No / misc								e attached n ations and a	
Containers	VJT	VJT	VJT						
Sample Date	12/06/2019	12/06/2019	12/06/2019						
Sample Type	Soil	Soil	Soil						
Batch Number	1	1	1				LOD/LOR	Units	Method
Date of Receipt	17/06/2019	17/06/2019	17/06/2019				LOD/LOK	Onits	No.
Antimony	2	2	2				<1	mg/kg	TM30/PM15
Arsenic <sup>#</sup>	14.9	7.6	9.6				<0.5	mg/kg	TM30/PM15
Barium <sup>#</sup>	213	48	76				<1	mg/kg	TM30/PM15
Cadmium #	2.7	1.3	2.0				<0.1	mg/kg	TM30/PM15
Chromium #	50.4	31.5	28.7				<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	34	19	20				<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	42	16	21				<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1	<0.1	<0.1				<0.1	mg/kg	TM30/PM15
Molybdenum #	3.2	3.2	3.7				<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	53.5	28.7	28.8				<0.7	mg/kg	TM30/PM15
Selenium <sup>#</sup>	2	2	2				<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	156	72	78				<5	mg/kg	TM30/PM15
PAH MS									
Naphthalene #	<0.04	<0.04	<0.04				<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03				<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05				<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04				<0.04	mg/kg	TM4/PM8
Phenanthrene <sup>#</sup>	0.07	<0.03	<0.03				<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04				<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.13	<0.03	<0.03				<0.03	mg/kg	TM4/PM8
Pyrene #	0.10	<0.03	<0.03				<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.10	<0.06	<0.06				<0.06	mg/kg	TM4/PM8
Chrysene <sup>#</sup>	0.08	<0.02	<0.02				<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.13	<0.07	<0.07				<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.07	<0.04	<0.04				<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene <sup>#</sup>	<0.04	<0.04	<0.04				<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04 <0.04	<0.04 <0.04	<0.04 <0.04				<0.04	mg/kg	TM4/PM8 TM4/PM8
Benzo(ghi)perylene <sup>#</sup> Coronene	<0.04	<0.04	<0.04				<0.04 <0.04	mg/kg	TM4/PM8
PAH 6 Total <sup>#</sup>	<0.04 0.33	<0.04	<0.04				<0.04	mg/kg	TM4/PM8
PAH 6 Total PAH 17 Total	0.55	<0.22	<0.22				<0.22	mg/kg mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.68	<0.64	<0.64				<0.64	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.03	<0.02	<0.03				<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1				<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	90	75	71				<0	%	TM4/PM8
<b>, , , , , , , , , ,</b>									
Mineral Oil (C10-C40)	<30	<30	<30				<30	mg/kg	TM5/PM8/PM16



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9756

#### Report : Solid

EWIT JOD NO:	19/9756			 	 	 	 -		
EMT Sample No.	1-3	4-6	7-9						
Sample ID	BH01	BH01	BH01						
Depth	0.50	1.60	2.50				Diagon on	e attached r	otoo for all
COC No / misc								ations and a	
Containers	VJT	VJT	VJT						
Sample Date	12/06/2019	12/06/2019	12/06/2019						
Sample Type	Soil	Soil	Soil						
Batch Number	1	1	1				LOD/LOR	Units	Method No.
Date of Receipt	17/06/2019	17/06/2019	17/06/2019			 			
TPH CWG Aliphatics									
>C5-C6 <sup>#</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>				<0.1	mg/kg	TM36/PM12
>C6-C8 <sup>#</sup>	<0.1	<0.1	<0.1				<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1 <0.1	<0.1				<0.1	mg/kg	TM36/PM12
>C10-C12 <sup>#</sup>	<0.2	<0.2	<0.2				<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 <sup>#</sup>	<4	<4	<4				<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26				<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>				<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
Aromatics		sv	sv						
>C5-EC7#	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>				<0.1	mg/kg	TM36/PM12 TM36/PM12
>EC7-EC8 <sup>#</sup> >EC8-EC10 <sup>#</sup>	<0.1 <0.1	<0.1 <sup>sv</sup>	<0.1 <sup>SV</sup> <0.1 <sup>SV</sup>				<0.1 <0.1	mg/kg mg/kg	TM36/PM12 TM36/PM12
>EC10-EC12 <sup>#</sup>	<0.1	<0.1	<0.1				<0.1	mg/kg	TM5/PM8/PM16
>EC12-EC16 <sup>#</sup>	<4	<4	<4				<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>EC21-EC35#	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26				<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52				<52	mg/kg	TM5/TM38/PM8/PM12/PM16
>EC6-EC10#	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>				<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
	_	ev	ev				_		The
MTBE #	<5	<5 <sup>SV</sup>	<5 <sup>sv</sup>				<5	ug/kg	TM31/PM12
Benzene <sup>#</sup> Toluene <sup>#</sup>	<5 <5	<5 <sup>\$V</sup>	<5 <sup>SV</sup>				<5 <5	ug/kg	TM31/PM12 TM31/PM12
Ethylbenzene <sup>#</sup>	<0 <5	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>				<5 <5	ug/kg ug/kg	TM31/PM12 TM31/PM12
m/p-Xylene #	<5	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>				<5	ug/kg	TM31/PM12
o-Xylene <sup>#</sup>	<5	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>				<5	ug/kg	TM31/PM12
PCB 28 <sup>#</sup>	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 52#	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 118 <sup>#</sup>	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 138 <sup>#</sup>	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 153 <sup>#</sup>	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 180 <sup>#</sup>	<5	<5	<5				<5	ug/kg	TM17/PM8
Total 7 PCBs <sup>#</sup>	<35	<35	<35				<35	ug/kg	TM17/PM8

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9756

Report : Solid

EMI JOD NO:	19/9756								
EMT Sample No.	1-3	4-6	7-9						
Sample ID	BH01	BH01	BH01						
Depth	0.50	1.60	2.50				Please se	e attached n	otes for all
COC No / misc								ations and a	
Containers	VJT	VJT	VJT						
Sample Date	12/06/2019	12/06/2019	12/06/2019						
Sample Type	Soil	Soil	Soil						
Batch Number	1	1	1				LOD/LOR	Units	Method
Date of Receipt	17/06/2019	17/06/2019	17/06/2019				LOD/LOIK	Onito	No.
Natural Moisture Content	41.2	14.2	12.3				<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	29.2	12.5	10.9				<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3				<0.3	mg/kg	TM38/PM20
Chromium III	50.4	31.5	28.7				<0.5	mg/kg	NONE/NONE
Total Organic Carbon <sup>#</sup>	1.53	0.57	0.48				<0.02	%	TM21/PM24
рН <sup>#</sup>	8.12	8.69	8.43				<0.01	pH units	TM73/PM11
p 1	0.12	0.00	0.10				40.01	pri unito	
Mass of raw test portion	0.1156	0.1	0.1024					kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09					kg	NONE/PM17



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9756

#### Report : CEN 10:1 1 Batch

	19/9/50								
EMT Sample No.	1-3	4-6	7-9						
Sample ID	BH01	BH01	BH01						
Depth	0.50	1.60	2.50				Please se	e attached n	otes for all
COC No / misc								ations and a	
Containers	VJT	VJT	VJT						
Sample Date	12/06/2019	12/06/2019	12/06/2019						
Sample Type	Soil	Soil	Soil						
Batch Number	1	1	1						
							LOD/LOR	Units	Method No.
Date of Receipt			17/06/2019			 	 		
Dissolved Antimony#	<0.002	<0.002	<0.002				<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02				<0.02	mg/kg	TM30/PM17
Dissolved Arsenic <sup>#</sup>	<0.0025	<0.0025	<0.0025				<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10)#	<0.025	<0.025	<0.025				<0.025	mg/kg	TM30/PM17
Dissolved Barium <sup>#</sup>	0.011	0.016	0.046				< 0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.11	0.16	0.46				< 0.03	mg/kg	TM30/PM17
Dissolved Cadmium <sup>#</sup>	<0.0005	<0.0005	<0.0005				<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005				<0.005	mg/kg	TM30/PM17
Dissolved Chromium <sup>#</sup>	<0.0015	<0.0015	<0.0015				<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015				<0.015	mg/kg	TM30/PM17
Dissolved Copper <sup>#</sup>	<0.007	<0.007	<0.007				<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) *	<0.07	<0.07	<0.07				<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005				<0.005	mg/l	TM30/PM17
Dissolved Lead (A10)#	<0.05	<0.05	<0.05				<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum <sup>#</sup>	0.003	0.028	0.013				<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03	0.28	0.13				<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002				<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) *	<0.02	<0.02	<0.02				<0.02	mg/kg	TM30/PM17
Dissolved Selenium <sup>#</sup>	<0.003	0.007	0.010				<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) *	<0.03	0.07	0.10				<0.03	mg/kg	TM30/PM17
Dissolved Zinc <sup>#</sup>	<0.003	<0.003	<0.003				<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10)#	<0.03	<0.03	<0.03				<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF <sup>#</sup>	<0.00001	<0.00001	<0.00001				<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF <sup>#</sup>	<0.0001	<0.0001	<0.0001				<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01				<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1				<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3				<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3				<3	mg/kg	TM173/PM0
Sulphate as SO4 <sup>#</sup>	5.5	9.4	51.6				<0.5	mg/l	TM38/PM0
	5.5	9.4	51.6				<0.5	mg/i mg/kg	TM38/PM0 TM38/PM0
Sulphate as SO4 <sup>#</sup> Chloride <sup>#</sup>	1.3	0.5	<0.3				<0.3	mg/l	TM38/PM0
Chloride <sup>#</sup>	1.3	5	<0.3				<0.3	mg/i mg/kg	TM38/PM0 TM38/PM0
UNIONUE	13	5	~3				~3	iiig/kg	110100/ F1010
Dissolved Organic Carbon	5	2	<2				<2	mg/l	TM60/PM0
Dissolved Organic Carbon	50	20	<20				<20	mg/kg	TM60/PM0
рН	7.98	8.09	8.08				<0.01	pH units	TM73/PM0
Total Dissolved Solids <sup>#</sup>	108	80	143				<35	mg/l	TM20/PM0
Total Dissolved Solids <sup>#</sup>	1079	800	1431				<350	mg/kg	TM20/PM0

<b>Element Material</b>	s Tech	nology											
Client Name: Reference: Location:	8658-04-1 Parkside I	Phase 4	ns Ireland			EN12457_ 60g VOC jai	ass jar, T=pl	astic tub					
Contact: EMT Job No:	Barry Sex 19/9756	ton											
EMT Sample No.	1-3	4-6	7-9										
Sample ID	BH01	BH01	BH01										
COC No / misc	0.50	1.60	2.50									e attached n ations and a	
Containers	VJT	VJT	VJT										
Sample Date		12/06/2019	12/06/2019										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1						Stable Non-			1 laite	Method
Date of Receipt	17/06/2019	17/06/2019	17/06/2019					Inert	reactive	Hazardous	LOD LOR	Units	No.
Solid Waste Analysis													
Total Organic Carbon #	1.53	0.57	0.48					3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<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					1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30					500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6	0.33	<0.22	<0.22					-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	0.68	<0.64	<0.64					100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate	0.005	0.005	<0.025					0.5		05	0.005		TM30/PM17
Arsenic #	<0.025	<0.025	<0.025					0.5 20	2 100	25 300	<0.025 <0.03	mg/kg mg/kg	TM30/PM17 TM30/PM17
Barium <sup>#</sup> Cadmium <sup>#</sup>	<0.005	<0.005	< 0.005					0.04	1	5	<0.005		TM30/PM17 TM30/PM17
	<0.005	<0.005	<0.005					0.04	10		<0.005	mg/kg	TM30/PM17 TM30/PM17
Chromium " Copper "	<0.013	<0.013	<0.015					2	50	100	<0.015	mg/kg mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001					0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.03	0.28	0.13					0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel <sup>#</sup>	<0.02	<0.02	<0.02					0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead"	<0.05	<0.05	<0.05					0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony#	<0.02	<0.02	<0.02					0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	< 0.03	0.07	0.10					0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc "	< 0.03	<0.03	<0.03					4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids	1079	800	1431					4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	50	20	<20					500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1156	0.1	0.1024					-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	77.9	89.8	87.9					-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.874	0.89	0.888					-	-	-		I	NONE/PM17
Eluate Volume	0.55	0.75	0.76					-	-	-		I	NONE/PM17
pH <sup>#</sup>	8.12	8.69	8.43					-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1					1	-	-	<0.1	mg/kg	TM26/PM0
T HOHOI	<0.1		50.1								50.1	mg/kg	10120/1 1010
Fluoride	<3	<3	<3					-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	55	94	516					1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride	13	94 5	<3					800	15000	25000	<3	mg/kg	TM38/PM0
Chiolide	13	5	~3					500	10000	20000	~3		11000/11100
													ł

EPH Interpretation Report	EPH In	terpretation	Report
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Matrix		<b>•</b> •• •	
MOtriv		Solid	
	-	JUNU	
		•••••	

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/9756	1	BH01	0.50	1-3	No interpretation possible
19/9756	1	BH01	1.60	4-6	No interpretation possible
19/9756	1	BH01	2.50	7-9	No interpretation possible

Asb	estos	Ana	vsis

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:

1 Alip

## 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	General Description (Bulk Analysis)	soil.stones
					18/06/2019	Asbestos Fibres	NAD
					18/06/2019	Asbestos ACM	NAD
					18/06/2019	Asbestos Type	NAD
					18/06/2019	Asbestos Level Screen	NAD
19/9756	1	BH01	1.60	5	18/06/2019	General Description (Bulk Analysis)	soil.stones
					18/06/2019	Asbestos Fibres	NAD
					18/06/2019	Asbestos ACM	NAD
					18/06/2019	Asbestos Type	NAD
					18/06/2019	Asbestos Level Screen	NAD
19/9756	1	BH01	2.50	8	18/06/2019	General Description (Bulk Analysis)	soil/stones
					18/06/2019	Asbestos Fibres	NAD
					18/06/2019	Asbestos ACM	NAD
					18/06/2019	Asbestos Type	NAD
					18/06/2019	Asbestos Level Screen	NAD

Client Name:Ground Investigations IrelandReference:8658-04-19Location:Parkside Phase 4Contact:Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
					No deviating sample report results for job 19/9756	

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

**EMT Job No:** 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 HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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

#### WATERS

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

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

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

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

#### **DEVIATING SAMPLES**

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

#### SURROGATES

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

#### DILUTIONS

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

#### BLANKS

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

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

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

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.
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	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
СО	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
ТВ	Trip Blank Sample
OC	Outside Calibration Range

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

#### EMT Job No:

	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
10l/kg; 4mm	filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ва	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)
Мо	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 spectrometic 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	
	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
Dry matter	titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to $550 \pm 25$ °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range
Notes:	
*If not suitable d	ue to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS

\*\*\*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.

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

Method Code Appendix

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
ТМЗО	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 Methyltertbutylether, 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 Methyltertbutylether, 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

Method Code Appendix

#### 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	
ТМ73	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
ТМ73	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	



Issue :

Element Materials Technology Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA P: +44 (0) 1244 833780 F: +44 (0) 1244 833781

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Ground Investigations Ireland Catherinestown House Hazelhatch Road Newcastle Co. Dublin Ireland ac.MR Attention : Barry Sexton 1st July, 2019 Date : 8658-04-19 Your reference : Test Report 19/9762 Batch 1 Our reference : Parkside Phase 4 Location : Date samples received : 17th June, 2019 Final report Status :

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.

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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:** 

6 June

Bruce Leslie Project Manager

Please include all sections of this report if it is reproduced



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9762

#### Report : Solid

EMT Job No:	19/9762								 	-		
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		Please se	e attached n	otes for all
COC No / misc											ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT				
Sample Date			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		LOD/LOR	Units	Method No.
Date of Receipt		17/06/2019		17/06/2019				17/06/2019				
Antimony	2	3	2	2	2	2	2	2		<1	mg/kg	TM30/PM15
Arsenic <sup>#</sup>	12.6	27.2	9.7	13.3	13.3	15.9	13.9	12.3		<0.5	mg/kg	TM30/PM15
Barium <sup>#</sup>	137	264	85	133	187	119	126	112		<1	mg/kg	TM30/PM15
Cadmium <sup>#</sup>	1.7	2.5	1.8	1.7	3.1	2.1	2.3	1.9		<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	69.5	89.1	48.6	36.8	60.3	60.4	69.2	45.7		<0.5	mg/kg	TM30/PM15 TM30/PM15
Copper <sup>#</sup> Lead <sup>#</sup>	27 25	30 32	23 14	28 30	31 36	35 192	34 43	33 41		<1 <5	mg/kg	TM30/PM15 TM30/PM15
Lead Mercury <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	43 <0.1	41 <0.1		<0.1	mg/kg mg/kg	TM30/PM15
Molybdenum <sup>#</sup>	5.4	13.7	5.1	4.3	4.0	6.3	5.8	4.6		<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup>	43.0	52.0	27.1	37.3	39.8	39.5	41.1	34.2		<0.7	mg/kg	TM30/PM15
Selenium <sup>#</sup>	1	2	3	4	3	2	1	1		<1	mg/kg	TM30/PM15
Zinc <sup>#</sup>	114	120	67	102	141	160	125	112		<5	mg/kg	TM30/PM15
PAH MS												
Naphthalene <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<0.06	<0.06	<0.06	<0.06	<0.06	0.19	<0.06	0.32		<0.06	mg/kg	TM4/PM8 TM4/PM8
Chrysene <sup>#</sup> Benzo(bk)fluoranthene <sup>#</sup>	<0.02 <0.07	<0.02 <0.07	<0.02 <0.07	<0.02 <0.07	<0.02 <0.07	0.11	<0.02 <0.07	0.26		<0.02 <0.07	mg/kg mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	<0.07	<0.07	<0.07	<0.07	<0.07	0.24	<0.07	0.46		<0.07	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.09	<0.04	0.20		<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.09	<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 <sup>#</sup>	<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
		1			1	I				L		



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9762

#### Report : Solid

EMI JOD NO:	19/9762								 	_		
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		Disession		
COC No / misc											e attached r ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT				
Sample Date		12/06/2019										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1		LOD/LOR	Units	Method No.
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				
TPH CWG												
Aliphatics	-0.1	-0.1	, SV	, SV	-0.1	, SV	-0.1	<0.1 <sup>sv</sup>		-0.1	malka	TM36/PM12
>C5-C6 <sup>#</sup> >C6-C8 <sup>#</sup>	<0.1 <0.1	<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 <sup>sv</sup> <0.1 <sup>sv</sup>	<0.1 <0.1	<0.1 <sup>SV</sup>		<0.1 <0.1	mg/kg mg/kg	TM36/PM12 TM36/PM12
>C8-C10	<0.1	<0.1	<0.1 <0.1	<0.1 <0.1	<0.1	<0.1 <0.1	<0.1	<0.1 <0.1		<0.1	mg/kg	TM36/PM12
>C10-C12 <sup>#</sup>	<0.2	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1		<0.1	mg/kg	TM5/PM8/PM16
>C12-C16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	<4		<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>C21-C35#	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26		<26	mg/kg	TM5/TM38/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>		<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10	<10	<10		<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10	<10	<10		<10	mg/kg	TM5/PM8/PM16
Aromatics	-0.4	.0.1	SV	SV	-0.4	SV	.0.4	SV		.0.4		TM00/DM40
>C5-EC7 <sup>#</sup> >EC7-EC8 <sup>#</sup>	<0.1 <0.1	<0.1 <0.1	<0.1 <sup>sv</sup> <0.1 <sup>sv</sup>	<0.1 <sup>sv</sup> <0.1 <sup>sv</sup>	<0.1 <0.1	<0.1 <sup>SV</sup>	<0.1 <0.1	<0.1 <sup>SV</sup>		<0.1 <0.1	mg/kg mg/kg	TM36/PM12 TM36/PM12
>EC8-EC10 <sup>#</sup>	<0.1	<0.1	<0.1 <0.1	<0.1 <0.1	<0.1	<0.1 <0.1	<0.1	<0.1 <0.1		<0.1	mg/kg	TM36/PM12
>EC10-EC12 <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1		<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	<4		<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>EC21-EC35#	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26	<26	<26		<26	mg/kg	TM5/TM38/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52	<52	<52		<52	mg/kg	TM5/TM38/PM8/PM12/PM16
>EC6-EC10#	<0.1	<0.1	<0.1 <sup>SV</sup>	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>	<0.1	<0.1 <sup>SV</sup>		<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10	<10	<10		<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10		<10	mg/kg	TM5/PM8/PM16
MTBE <sup>#</sup>	<5	<5	<5 <sup>\$V</sup>	<5 <sup>\$V</sup>	<5	<5 <sup>\$V</sup>	<5	<5 <sup>\$V</sup>		<5	ug/kg	TM31/PM12
Benzene <sup>#</sup>	<5	<5	<5 <5 <b>SV</b>	<5 <5 <b>SV</b>	<5	<5 <5	<5	<5 <5 <sup>SV</sup>		<5	ug/kg	TM31/PM12
Toluene <sup>#</sup>	<5	<5	<5 <5 <sup>SV</sup>	<5 <sup>\$V</sup>	<5	<5 <sup>SV</sup>	<5	<5 <5 <sup>SV</sup>		<5	ug/kg	TM31/PM12
Ethylbenzene <sup>#</sup>	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>sv</sup>	<5	<5 <sup>SV</sup>		<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5 <sup>sv</sup>	<5	<5 <sup>\$V</sup>		<5	ug/kg	TM31/PM12
o-Xylene <sup>#</sup>	<5	<5	<5 <sup>SV</sup>	<5 <sup>\$V</sup>	<5	<5 <sup>\$V</sup>	<5	<5 <sup>SV</sup>		<5	ug/kg	TM31/PM12
PCB 28 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 28 PCB 52 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 101 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 118 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 138 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 153 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 180 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
Total 7 PCBs <sup>#</sup>	<35	<35	<35	<35	<35	<35	<35	<35		<35	ug/kg	TM17/PM8



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9762

#### Report : Solid

EMT Job No:	19/9762											
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		Diagon an	o otto oh o d n	atoo for all
COC No / misc											e attached n ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT				
Sample Date								12/06/2019				
Sample Type		Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1				
Date of Receipt										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)		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
рН#	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



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/9762

#### Report : CEN 10:1 1 Batch

EMT Job No:	19/9762								 	_		
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		Please se	e attached n	otes for all
COC No / misc											ations and a	
Containers	VJT											
Sample Date	12/06/2019			12/06/2019	12/06/2019	12/06/2019						
Sample Type												
	Soil											
Batch Number	1	1	1	1	1	1	1	1		LOD/LOR	Units	Method No.
Date of Receipt					17/06/2019	17/06/2019						
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 <0.025	<0.0025	<0.0025	<0.0025 <0.025	<0.0025 <0.025	<0.0025	<0.0025		<0.0025	mg/l	TM30/PM17 TM30/PM17
Dissolved Arsenic (A10) *	<0.025	0.025	<0.025 0.035	<0.025 0.020	<0.025	<0.025 0.010	<0.025 0.033	<0.025 0.023		<0.025 <0.003	mg/kg	TM30/PM17 TM30/PM17
Dissolved Barium <sup>#</sup> Dissolved Barium (A10) <sup>#</sup>	0.020	0.032	0.035	0.020	0.021	0.010	0.033	0.023		<0.003	mg/l mg/kg	TM30/PM17 TM30/PM17
Dissolved Cadmium <sup>#</sup>	<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 <sup>#</sup>	<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	mg/kg	TM30/PM17
Dissolved Lead <sup>#</sup>	<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 #	0.004	0.016	0.007	0.027	0.005	0.010	0.014	0.009		<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.04	0.16	0.07	0.27	0.05	0.10	0.14	0.09		<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	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	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	0.018	<0.003	0.004	<0.003	<0.003	<0.003		<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	< 0.03	< 0.03	0.18	<0.03	0.04	<0.03	<0.03	<0.03		< 0.03	mg/kg	TM30/PM17
Dissolved Zinc <sup>#</sup>	< 0.003	< 0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003		< 0.003	mg/l	TM30/PM17 TM30/PM17
Dissolved Zinc (A10) # Mercury Dissolved by CVAF #	<0.03 <0.00001		<0.03 <0.00001	mg/kg	TM61/PM0							
Mercury Dissolved by CVAF	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	mg/l mg/kg	TM61/PM0
Mercury Dissolved by OVA	40.0001	1010001	40.0001	40.0001	1010001	40.0001	40.0001	40.0001		10.0001		
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	<0.3	<0.3	0.4	<0.3	<0.3		<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	<3	4	<3	<3		<3	mg/kg	TM173/PM0
Sulphate as SO4 #	56.4	6.5	20.8	3.8	27.0	10.5	37.0	34.7		<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	564	65	208	38	270	105	370	347		<5	mg/kg	TM38/PM0
Chloride <sup>#</sup>	2.2	1.1	4.0	<0.3	0.8	0.6	0.5	0.9		<0.3	mg/l	TM38/PM0
Chloride <sup>#</sup>	22	11	40	<3	8	6	5	9		<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	7	<2	<2	3	4	5	2	3		<2	mg/l	TM60/PM0
Dissolved Organic Carbon	70	<20	<20	30	40	50	20	30		<20	mg/kg	TM60/PM0
рН	7.53	7.68	7.91	8.32	8.18	8.25	8.18	8.19		<0.01	pH units	TM73/PM0
Total Dissolved Solids <sup>#</sup>	212	90	92	53	120	127	189	178		<35	mg/l	TM20/PM0
Total Dissolved Solids #	2119	900	920	530	1200	1269	1891	1780		<350	mg/kg	TM20/PM0

Client Name: Reference: Location: Contact: EMT Job No: Barry Sexton

Ground Investigations Ireland 8658-04-19 Parkside Phase 4

#### Report : EN12457\_2

	Barry Sex 19/9762	ton									ì					
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							e attached r	
COC No / misc														abbrev	iations and a	cronyms
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT								
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				Stable Non-				Method
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	reactive	Hazardous	LOD LOR	Units	No.
Solid Waste Analysis																
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 <sup>#</sup> Mineral Oil	<0.035 <30	<0.035 <30	<0.035 <30	<0.035 <30	<0.035 <30	<0.035 <30	<0.035 <30	<0.035 <30			1 500	-	-	<0.035 <30	mg/kg mg/kg	TM17/PM8 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
CEN 10:1 Leachate																
Arsenic" Barium "	<0.025	<0.025	<0.025 0.35	<0.025 0.20	<0.025 0.21	<0.025 0.10	<0.025	<0.025 0.23			0.5 20	2 100	25 300	<0.025 <0.03	mg/kg mg/kg	TM30/PM17 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 <sup>#</sup> Lead <sup>#</sup>	<0.02 <0.05	<0.02 <0.05	<0.02 <0.05	<0.02 <0.05	<0.02	<0.02	<0.02	<0.02 <0.05			0.4	10 10	40 50	<0.02 <0.05	mg/kg mg/kg	TM30/PM17 TM30/PM17
Lead Antimony#	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02	<0.03	<0.03			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 <sup>#</sup>	<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			-	-	-		I	NONE/PM17
Eluate Volume	0.7	0.7	0.8	0.85	0.6	0.76	0.75	0.75			-	-	-		I	NONE/PM17
рН "	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
															39	
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
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Matrix		SO	110
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Client Name:	Ground Investigations Ireland
Reference:	8658-04-19
Location:	Parkside Phase 4
Contact:	Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/9762	1	TP02	1.70	1-3	No interpretation possible
19/9762	1	TP03	0.70	4-6	No interpretation possible
19/9762	1	TP03	1.70	7-9	No interpretation possible
19/9762	1	TP04	0.70	10-12	No interpretation possible
19/9762	1	TP04	1.70	13-15	No interpretation possible
19/9762	1	TP05	0.70	16-18	No interpretation possible
19/9762	1	TP05	1.70	19-21	No interpretation possible
19/9762	1	TP06	0.70	22-24	No interpretation possible

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:
Reference:
Location:

Ground Investigations Ireland 19/04/8658 Parkside Phase 4

Contact	:		Barry Se	xton			
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	Asbestos Type	NAD
					19/06/2019	Asbestos Level Screen	NAD
19/9762	1	TP06	0.70	23		General Description (Bulk Analysis)	soil/stones
						Asbestos Fibres Asbestos ACM	NAD NAD
						Asbestos Type	NAD
						Asbestos Level Screen	NAD

Client Name:Ground Investigations IrelandReference:8658-04-19Location:Parkside Phase 4Contact:Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason					
	No deviating sample report results for job 19/9762										

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

**EMT Job No:** 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 HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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

#### WATERS

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

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

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

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

#### **DEVIATING SAMPLES**

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

#### SURROGATES

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

#### DILUTIONS

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

#### BLANKS

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

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

#### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

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

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

#### **EMT Job No:** 19/9762

### **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.
ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
Indicates analyte found in associated method blank.
Dilution required.
MCERTS accredited.
Not applicable
No Asbestos Detected.
None Detected (usually refers to VOC and/SVOC TICs).
No Determination Possible
Calibrated against a single substance
Surrogate recovery outside performance criteria. This may be due to a matrix effect.
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.
Samples are dried at 35°C ±5°C
Suspected carry over
Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
Matrix Effect
No Fibres Detected
AQC Sample
Blank Sample
Client Sample
Trip Blank Sample
Outside Calibration Range

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

#### EMT Job No: 19/97

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	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
10l/kg; 4mm	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 spectrometic 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	
	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
Dry matter	titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to $550 \pm 25$ °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range
Notes:	lue to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS

\*\*\*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.

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
ТМЗО	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 Methyltertbutylether, 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 Methyltertbutylether, 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

Method Code Appendix

#### 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	
ТМ73	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
ТМ73	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	



Issue :

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Ground Investigations Ireland Catherinestown House Hazelhatch Road Newcastle Co. Dublin Ireland ac-ME Attention : Barry Sexton 3rd July, 2019 Date : 8658-04-19 Your reference : Test Report 19/10073 Batch 1 Our reference : Parkside Phase 4 Location : Date samples received : 21st June, 2019 Final report Status :

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.

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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:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : Solid

EMT Sample No.1-34-67-910-1213-15Sample IDBH02BH02BH02BH02BH03BH03Depth0.801.702.500.901.40COC No / miscVVVVVVContainersV JTV JTV JTV JTV JTSample Date19/06/201919/06/201919/06/201919/06/201919/06/2019Batch Number11111Date of Receipt21/06/201921/06/201921/06/201921/06/201921/06/2019Antimony32232Arsenic #11510111210295Cadmium #2.01.11.62.41.4Chromium #55.640.441.753.540.2Lead #3316162316Mercury #<0.1	Soil 1	Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	Soil 1	Soil 1	28-30 BH05 0.50 V J T 19/06/2019 Soil 1 21/06/2019 2 13.9 180 2.6 62.6 62.6 38 73 <0.1 4.4	abbrevi LOD/LOR	e attached n ations and a mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	
Depth         0.80         1.70         2.50         0.90         1.40           COC No / misc         1.70         2.50         0.90         1.40           Containers         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           Sample Date         19/06/2019         19/06/2019         19/06/2019         19/06/2019         21/06/2019         21/06/2019           Batch Number         1         1         1         1         1           Date of Receipt         21/06/2019         21/06/2019         21/06/2019         21/06/2019         21/06/2019           Antimony         3         2         2         3         2           Barium #         115         101         112         102         95           Cadmium #         2.0         1.1         1.6         2.4         1.4           Chromium #         2.5         40.4         41.7         53.5         40.2           Copper #         2.5         15         20         22         15           Lead #         3.3         16	2.50 V J T 19/06/2019 Soil 1 21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	0.50 V J T 19/06/2019 Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	1.50 V J T 19/06/2019 Soil 1 21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	2.40 V J T 19/06/2019 Soil 1 21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	0.50 V J T 19/06/2019 Soil 1 21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	abbrevi LOD/LOR <1 <0.5 <1 <0.1 <0.5 <1 <5	Units Mg/kg Mg/kg Mg/kg Mg/kg Mg/kg Mg/kg Mg/kg	Method No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
COC No / misc         N         N         N         N           Containers         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           Sample Type         Soil         Soic         Soil         Soil	V J T 19/06/2019 Soil 1 21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	V J T 19/06/2019 Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	V J T 19/06/2019 Soil 1 21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	V J T 19/06/2019 Soil 1 21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	V J T 19/06/2019 Soil 1 21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	abbrevi LOD/LOR <1 <0.5 <1 <0.1 <0.5 <1 <5	Units Mg/kg Mg/kg Mg/kg Mg/kg Mg/kg Mg/kg Mg/kg	Method No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
ContainersV J TV J TV J TV J TV J TV J TSample Date19/06/201919/06/201919/06/201919/06/201919/06/201919/06/2019Sample TypeSoilSoilSoilSoilSoilSoilSoilBatch Number111111Date of Receipt21/06/201921/06/201921/06/201921/06/201921/06/2019Antimony32232Arsenic **115.411.98.218.810.1Barium **11510111210295Cadmium **2.01.11.62.41.4Chromium **55.640.441.753.540.2Copper **2515202215Lead **3316162316Mercury **<0.1<0.1<0.1<0.1<0.1	19/06/2019 Soil 1 21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	19/06/2019 Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	19/06/2019 Soil 1 21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	19/06/2019 Soil 1 21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	19/06/2019 Soil 1 21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	LOD/LOR <1 <0.5 <1 <0.1 <0.5 <1 <1 <5	Units mg/kg mg/kg mg/kg mg/kg mg/kg	Method No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
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         Soil         Soil <t< th=""><th>19/06/2019 Soil 1 21/06/2019 2 8.2 121 1.4 46.8 20 18 &lt;0.1 4.1 40.8 3</th><th>19/06/2019 Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 &lt;0.1 4.0 34.9 1</th><th>19/06/2019 Soil 1 21/06/2019 2 12.8 162 2.4 57.0 18 29 &lt;0.1 4.1</th><th>19/06/2019 Soil 1 21/06/2019 2 12.2 78 1.7 41.8 29 17 &lt;0.1</th><th>19/06/2019 Soil 1 21/06/2019 2 13.9 180 2.6 62.6 38 73 &lt;0.1</th><th>LOD/LOR &lt;1 &lt;0.5 &lt;1 &lt;0.1 &lt;0.5 &lt;1 &lt;1 &lt;5</th><th>mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg</th><th>No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15</th></t<>	19/06/2019 Soil 1 21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	19/06/2019 Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	19/06/2019 Soil 1 21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	19/06/2019 Soil 1 21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	19/06/2019 Soil 1 21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	LOD/LOR <1 <0.5 <1 <0.1 <0.5 <1 <1 <5	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Sample Type         Soil	Soil 1 21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	Soil 1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	Soil 1 21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	Soil 1 21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	Soil 1 21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	LOD/LOR <1 <0.5 <1 <0.1 <0.5 <1 <1 <5	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Batch Number         1         1         1         1         1           Date of Receipt         21/06/2019 <t< th=""><th>1 21/06/2019 2 8.2 121 1.4 46.8 20 18 &lt;0.1 4.1 40.8 3</th><th>1 21/06/2019 2 13.2 120 1.7 51.6 24 30 &lt;0.1 4.0 34.9 1</th><th>1 21/06/2019 2 12.8 162 2.4 57.0 18 29 &lt;0.1 4.1</th><th>1 21/06/2019 2 12.2 78 1.7 41.8 29 17 &lt;0.1</th><th>1 21/06/2019 2 13.9 180 2.6 62.6 38 73 &lt;0.1</th><th>&lt;1 &lt;0.5 &lt;1 &lt;0.1 &lt;0.5 &lt;1 &lt;5</th><th>mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg</th><th>No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15</th></t<>	1 21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	1 21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	1 21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	1 21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	1 21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	<1 <0.5 <1 <0.1 <0.5 <1 <5	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Date of Receipt         21/06/2019         21	21/06/2019 2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	21/06/2019 2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	21/06/2019 2 12.8 162 2.4 57.0 18 29 <0.1 4.1	21/06/2019 2 12.2 78 1.7 41.8 29 17 <0.1	21/06/2019 2 13.9 180 2.6 62.6 38 73 <0.1	<1 <0.5 <1 <0.1 <0.5 <1 <5	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Antimony         3         2         2         3         2           Arsenic <sup>#</sup> 15.4         11.9         8.2         18.8         10.1           Barium <sup>#</sup> 115         101         112         102         95           Cadmium <sup>#</sup> 2.0         1.1         1.6         2.4         1.4           Chromium <sup>#</sup> 55.6         40.4         41.7         53.5         40.2           Copper <sup>#</sup> 25         15         20         22         15           Lead <sup>#</sup> 33         16         16         23         16           Mercury <sup>#</sup> <0.1         <0.1         <0.1         <0.1         <0.1         <0.1	2 8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	2 13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	2 12.8 162 2.4 57.0 18 29 <0.1 4.1	2 12.2 78 1.7 41.8 29 17 <0.1	2 13.9 180 2.6 62.6 38 73 <0.1	<1 <0.5 <1 <0.1 <0.5 <1 <5	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	No. TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Arsenic         15.4         11.9         8.2         18.8         10.1           Barium         115         101         112         102         95           Cadmium         2.0         1.1         1.6         2.4         1.4           Chromium         55.6         40.4         41.7         53.5         40.2           Copper         25         15         20         22         15           Lead         33         16         16         23         16           Mercury         <0.1         <0.1         <0.1         <0.1         <0.1	8.2 121 1.4 46.8 20 18 <0.1 4.1 40.8 3	13.2 120 1.7 51.6 24 30 <0.1 4.0 34.9 1	12.8 162 2.4 57.0 18 29 <0.1 4.1	12.2 78 1.7 41.8 29 17 <0.1	13.9 180 2.6 62.6 38 73 <0.1	<0.5 <1 <0.1 <0.5 <1 <5	mg/kg mg/kg mg/kg mg/kg	TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Barium         115         101         112         102         95           Cadmium         2.0         1.1         1.6         2.4         1.4           Chromium         55.6         40.4         41.7         53.5         40.2           Copper         25         15         20         22         15           Lead         33         16         16         23         16           Mercury         <0.1         <0.1         <0.1         <0.1         <0.1	121 1.4 46.8 20 18 <0.1 4.1 40.8 3	120 1.7 51.6 24 30 <0.1 4.0 34.9 1	162 2.4 57.0 18 29 <0.1 4.1	78 1.7 41.8 29 17 <0.1	180 2.6 62.6 38 73 <0.1	<1 <0.1 <0.5 <1 <5	mg/kg mg/kg mg/kg mg/kg	TM30/PM15 TM30/PM15 TM30/PM15 TM30/PM15
Cadmium#         2.0         1.1         1.6         2.4         1.4           Chromium#         55.6         40.4         41.7         53.5         40.2           Copper#         25         15         20         22         15           Lead#         33         16         16         23         16           Mercury#         <0.1         <0.1         <0.1         <0.1         <0.1	1.4 46.8 20 18 <0.1 4.1 40.8 3	1.7 51.6 24 30 <0.1 4.0 34.9 1	2.4 57.0 18 29 <0.1 4.1	1.7 41.8 29 17 <0.1	2.6 62.6 38 73 <0.1	<0.1 <0.5 <1 <5	mg/kg mg/kg mg/kg	TM30/PM15 TM30/PM15 TM30/PM15
Chromium#         55.6         40.4         41.7         53.5         40.2           Copper#         25         15         20         22         15           Lead#         33         16         16         23         16           Mercury#         <0.1         <0.1         <0.1         <0.1         <0.1	46.8 20 18 <0.1 4.1 40.8 3	51.6 24 30 <0.1 4.0 34.9 1	57.0 18 29 <0.1 4.1	41.8 29 17 <0.1	62.6 38 73 <0.1	<0.5 <1 <5	mg/kg mg/kg	TM30/PM15 TM30/PM15
Copper#         25         15         20         22         15           Lead#         33         16         16         23         16           Mercury#         <0.1         <0.1         <0.1         <0.1         <0.1	20 18 <0.1 4.1 40.8 3	24 30 <0.1 4.0 34.9 1	18 29 <0.1 4.1	29 17 <0.1	38 73 <0.1	<1 <5	mg/kg	TM30/PM15
Lead <sup>#</sup> 33         16         16         23         16           Mercury <sup>#</sup> <0.1         <0.1         <0.1         <0.1         <0.1         <0.1	18 <0.1 4.1 40.8 3	30 <0.1 4.0 34.9 1	29 <0.1 4.1	17 <0.1	73 <0.1	<5		
Mercury <sup>#</sup> <0.1 <0.1 <0.1 <0.1 <0.1 <0.1	<0.1 4.1 40.8 3	<0.1 4.0 34.9 1	<0.1 4.1	<0.1	<0.1		mg/kg	TM30/DM1F
	4.1 40.8 3	4.0 34.9 1	4.1			<0.1		
Molvbdenum* 4.7 3.2 4.0 6.1 3.9	40.8 3	34.9 1		5.5	4.4	1	mg/kg	TM30/PM15
	3	1	50.0		44.0	<0.1	mg/kg	TM30/PM15
Nickel <sup>#</sup> 42.6         32.8         36.4         33.2         28.9           Selenium <sup>#</sup> 1         2         2         3         3			1	38.0 2	41.3 2	<0.7 <1	mg/kg mg/kg	TM30/PM15 TM30/PM15
Selenium*         1         2         2         3         3           Zinc*         116         65         87         178         68	10	97	135	74	150	<5	mg/kg	TM30/PM15
		0.			100	10		11100,11110
PAH MS								
Naphthalene <sup>#</sup> <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 <sup>#</sup> <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 <sup>#</sup> <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 <sup>#</sup> <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	0.11	<0.03 <0.03	<0.03 <0.03	0.34	<0.03 <0.03	mg/kg mg/kg	TM4/PM8 TM4/PM8
Benzo(a)anthracene #         <0.06	<0.05	0.07	<0.05	<0.05	0.21	<0.05	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 <b>#</b> <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	<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 <sup>#</sup> <0.22 <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	1.99	<0.64	mg/kg	TM4/PM8 TM4/PM8
Benzo(b)fluoranthene         <0.05	<0.05 <0.02	0.08	<0.05 <0.02	<0.05 <0.02	0.24	<0.05 <0.02	mg/kg mg/kg	TM4/PM8
Benzo(k)iruoranthene         <1	<0.02	<1	<0.02	<0.02	<1	<0.02	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



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : Solid

EMT Job No:	19/10073												
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	Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT			
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			Method
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	No.
TPH CWG													
Aliphatics													
>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 <sup>#</sup> >C12-C16 <sup>#</sup>	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	<0.2 <4	mg/kg mg/kg	TM5/PM8/PM16 TM5/PM8/PM16
>C12-C18	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35#	<7	<7	<7	58	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	58	<26	<26	<26	<26	<26	<26	<26	mg/kg	TM5/TM38/PM8/PM12/PM18
>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	TM5/PM8/PM16
>C25-C35	<10	<10	<10	45	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics	<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
>C5-EC7 >EC7-EC8 <sup>#</sup>	<0.1	<0.1 <0.1	<0.1 <0.1	<0.1	<0.1 <0.1	<0.1 <0.1	<0.1 <0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 <sup>#</sup>	<0.1	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 <sup>#</sup>	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 Total aliphatics and aromatics(C5-40)	<26 <52	<26 <52	<26 <52	<26 58	<26 <52	<26 <52	<26 <52	<26 <52	<26 <52	<26 <52	<26 <52	mg/kg mg/kg	TM5/TM38/PM8/PM12/PM16 TM5/TM38/PM8/PM12/PM16
>EC6-EC10 <sup>#</sup>	<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	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<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>\$V</sup>	<5 <sup>SV</sup>	<5 <5	<5 <sup>\$V</sup>	<5 <sup>SV</sup>	<5 <sup>SV</sup>	<5	<5	<5	<5	ug/kg	TM31/PM12 TM31/PM12
m/p-Xylene <sup>#</sup> o-Xylene <sup>#</sup>	<5 <5	<5 <sup>°</sup>	<5 <5 <sup>SV</sup>	<5	<5 <sup>°</sup>	<5 <5 <sup>SV</sup>	<5 <5 <sup>SV</sup>	<5 <5	<5 <5	<5 <5	<5 <5	ug/kg ug/kg	TM31/PM12
	10	25	25	10	25	<5	<5	10	10	10	10	ugnig	
PCB 28 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs <sup>#</sup>	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : Solid

EMT Job No:	19/10073												
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		e attached n	
COC No / misc											abbrevi	ations and a	cronyms
Containers	VJT												
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												
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method
Date of Receipt		21/06/2019	21/06/2019		21/06/2019			21/06/2019					No.
Natural Moisture Content	26.4	14.0	14.4	18.4	9.9	14.5	21.1	30.5	13.6	30.9	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	20.9	12.2	12.6	15.5	9.0	12.7	17.4	23.4	12.0	23.6	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	55.6	40.4	41.7	53.5	40.2	46.8	51.6	57.0	41.8	62.6	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.71	0.42	0.49	0.50	0.43	0.48	0.69	0.88	0.43	1.90	<0.02	%	TM21/PM24
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
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
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : Solid

EMT Job No:	19/10073								 	_		
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		Diagon an	o ottoobod r	atoo for all
COC No / misc											e attached r ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT				
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				1
Batch Number	1	1	1	1	1	1	1	1		LOD/LOR	Units	Method No.
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				INO.
Antimony	2	2	3	3	3	2	2	2		<1	mg/kg	TM30/PM15
Arsenic <sup>#</sup>	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 <sup>#</sup>	2.5	3.3	2.6	2.2	2.8	1.9	2.4	1.6		<0.1	mg/kg	TM30/PM15
Chromium <sup>#</sup>	56.0	45.2	64.2	66.8	60.4	57.5	56.6	44.1		<0.5	mg/kg	TM30/PM15
Copper <sup>#</sup>	41	9	47	55	14	32	32	27		<1	mg/kg	TM30/PM15
Lead <sup>#</sup>	45	15	104	99	32	137	528	22		<5	mg/kg	TM30/PM15
Mercury <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM30/PM15 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 TM30/PM15
Nickel <sup>#</sup> Selenium <sup>#</sup>	45.2 2	38.5 1	46.8 2	41.3 2	57.5 2	36.3 1	44.0 2	38.9 2		<0.7 <1	mg/kg mg/kg	TM30/PM15
Zinc <sup>#</sup>	166	67	216	244	108	154	166	74		<5	mg/kg	TM30/PM15
Zinc	100	01	210	244	100	104	100	74		~5	iiig/kg	10130/1 10113
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 <sup>#</sup>	<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 <sup>#</sup>	<0.03 <0.03	<0.03 <0.03	0.08	0.08	<0.03 <0.03	0.46	5.00 3.92	<0.03 <0.03		<0.03 <0.03	mg/kg	TM4/PM8 TM4/PM8
Pyrene #	<0.03	<0.03	0.06	<0.06	<0.03	0.39	2.36	<0.03		<0.03	mg/kg mg/kg	TM4/PM8
Benzo(a)anthracene <sup>#</sup>	<0.08	<0.08	0.08	<0.08	<0.08	0.23	2.50	<0.08		<0.08	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.02	<0.02	<0.07	<0.02	<0.02	0.42	4.23	<0.02		<0.02	mg/kg	TM4/PM8
Benzo(a)pyrene <sup>#</sup>	<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 <sup>#</sup>	<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 <sup>#</sup>	<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
										1		1

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : Solid

EMT Job No:	19/10073									-		
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		Disease		
COC No / misc											e attached r ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT				
Sample Date					19/06/2019					-		
Sample Type												
	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil				
Batch Number	1	1	1	1	1	1	1	1		LOD/LOR	Units	Method No.
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				
TPH CWG Aliphatics												
>C5-C6 <sup>#</sup>	<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 <sup>#</sup>	<0.1	<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 <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	mg/kg	TM5/PM8/PM16
>C12-C16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	<4		<4	mg/kg	TM5/PM8/PM16
>C16-C21#	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
>C21-C35#	<7	54	<7	<7	<7	11	20	<7		<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7	<7	<7		<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	54	<26	<26	<26	<26	<26	<26		<26	mg/kg	TM5/TM38/PM8/PM12/PM16
>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	TM5/PM8/PM16
>C25-C35 Aromatics	<10	55	<10	<10	<10	<10	17	<10		<10	mg/kg	TM5/PM8/PM16
>C5-EC7 <sup>#</sup>	<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 <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	mg/kg	TM36/PM12
>EC8-EC10 <sup>#</sup>	<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	TM5/PM8/PM16
>EC12-EC16 <sup>#</sup>	<4	<4	<4	<4	<4	<4	<4	<4		<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	14	31	<7		<7	mg/kg	TM5/PM8/PM16
>EC21-EC35#	<7	<7	<7	<7	<7	93	161	<7		<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	16	28	<7		<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	123	220	<26		<26	mg/kg	TM5/TM38/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) >EC6-EC10 #	<52 <0.1	54 <0.1	<52 <0.1	<52 <0.1	<52 <0.1	123 <0.1	220 <0.1 <sup>SV</sup>	<52 <0.1		<52 <0.1	mg/kg mg/kg	тм5/тм36/Рм12Рм16
>EC10-EC25	<10	<10	<10	<10	<10	39	<0.1	<10		<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	71	117	<10		<10	mg/kg	TM5/PM8/PM16
MTBE <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5 <sup>\$V</sup>	<5		<5	ug/kg	TM31/PM12
Benzene <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5 <sup>\$V</sup>	<5		<5	ug/kg	TM31/PM12
Toluene <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5 <sup>\$V</sup>	<5		<5	ug/kg	TM31/PM12
Ethylbenzene <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5 <sup>\$V</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 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5 <sup>\$V</sup>	<5		<5	ug/kg	TM31/PM12
PCB 28 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 28	<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 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 138 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 153 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
PCB 180 <sup>#</sup>	<5	<5	<5	<5	<5	<5	<5	<5		<5	ug/kg	TM17/PM8
Total 7 PCBs <sup>#</sup>	<35	<35	<35	<35	<35	<35	<35	<35		<35	ug/kg	TM17/PM8

Client Name:
Reference:
Location:
Contact:
EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : Solid

EMT Job No:	19/10073												
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			Please se	e attached n	otes for all
COC No / misc												ations and a	
Containers	VJT												
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												
Batch Number	1	1	1	1	1	1	1	1					Method
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	No.
Natural Moisture Content	31.0	25.4	27.7	29.1	29.1	26.9	34.3	9.5			<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	23.6	20.3	21.7	22.5	22.5	21.2	25.5	8.7			<0.1	%	PM4/PM0
Hexavalent Chromium # Chromium III	<0.3 56.0	<0.3 45.2	<0.3 64.2	<0.3 66.8	<0.3 60.4	<0.3 57.5	<0.3 56.6	<0.3 44.1			<0.3 <0.5	mg/kg mg/kg	TM38/PM20 NONE/NONE
	50.0	70.2	J.7.2	30.0	00.4	51.5	50.0				×0.J	y/vy	
Total Organic Carbon #	1.10	0.39	1.57	1.38	0.52	3.11	3.38	0.38			<0.02	%	TM21/PM24
рН#	8.08	8.37	7.92	7.74	8.00	8.10	7.90	8.79			<0.01	pH units	TM73/PM11
Mass of raw test portion	0.121	0.1112	0.1185	0.1228	0.1181	0.1148	0.1221	0.1002				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
	1	1	1	1	1	1	1	1	1	1	1		



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : CEN 10:1 1 Batch

Diskweid Ansmary (A10)         -0.02	EMT Job No:	19/10073												
Image: biolog         Image:	EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30			
COC No / mix         Var         Var        Var         Var <t< th=""><th>Sample ID</th><th>BH02</th><th>BH02</th><th>BH02</th><th>BH03</th><th>BH03</th><th>BH03</th><th>BH04A</th><th>BH04A</th><th>BH04A</th><th>BH05</th><th></th><th></th><th></th></t<>	Sample ID	BH02	BH02	BH02	BH03	BH03	BH03	BH04A	BH04A	BH04A	BH05			
Loc border Loc	Depth	0.80	1.70	2.50	0.90	1.40	2.50	0.50	1.50	2.40	0.50	Please se	e attached n	otes for all
Sample DataSample Da	COC No / misc											abbrevi	ations and a	cronyms
Sample TypeSon </th <th>Containers</th> <th>VJT</th> <th></th> <th></th> <th></th>	Containers	VJT												
Batch Numer         1         0 <th< th=""><th>Sample Date</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th>19/06/2019</th><th></th><th></th><th></th></th<>	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			
Date of Nearce Decoded set of NormalVertication VerticationVertication VerticationVertication VerticationControl Vert	Sample Type	Soil												
Date of Nearce Decoded set of NormalVertication VerticationVertication VerticationVertication VerticationControl Vert	Batch Number	1	1	1	1	1	1	1	1	1	1			Marthaut
Disolved Aumony *         -0.0025         -0.0025         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.0055         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005         -0.005	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	
beside Ansmired-0.02												<0.002	ma/l	TM30/PM17
Datacked Aranne (A) -0.002 <b< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td>TM30/PM17</td></b<>													-	TM30/PM17
Desolved Bain Desolved Bain Desolved Gain Desolved Cadmin (A10)0.040.0380.0440.0980.0380.0460.008<		<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0029	<0.0025		TM30/PM17
Desolved Datium (A10)*         0.44         0.45         0.44         0.40         0.35         0.46         0.40         4.003	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
Descrived Cachmin         cl.00005         cl.00007         cl.0007	Dissolved Barium <sup>#</sup>	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 Cadmium (A1)*         c0.005         c0.007         c0.007 <thc>             0.00         c0.007         c0</thc>	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
Disolved Chromiun <sup>4</sup> co.0015         co.0015 <td>Dissolved Cadmium<sup>#</sup></td> <td>&lt;0.0005</td> <td>mg/l</td> <td>TM30/PM17</td>	Dissolved Cadmium <sup>#</sup>	<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 Chronium (A1)*         40.015         40.017         40.007         40.017         40.007         40.017         40.007         40.015	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 Copper*         0.007													-	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         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.07         <0.08         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.01         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.0														
Dissolved Laad         -0.005 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td></th<>													-	
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         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05         <0.05<														
Dissolved Molybdenum*         0.010         0.014         0.009         0.017         0.008         0.011         0.010         0.014         0.002         mgl         TM30PM13           Dissolved Molybdenum (A10)*         0.100         0.414         0.09         4.002         mgl         TM30PM13           Dissolved Mickel (A10)*         4.002         4.002         4.002         4.002         4.002         4.002         mgl         TM30PM13           Dissolved Selenium*         4.003         0.09         0.10         0.03         0.003         4.003													-	
Dissolved Molybdenum (A10)*         0.10         0.14         0.09         0.17         0.08         0.11         0.10         0.13         0.15         c.002         mg/g         TM30PM11           Dissolved Nickal*         c.002         c.003         c.003 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>														
Dissolved Nickel*         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.002         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003         <0.003													-	TM30/PM17
Dissolved Nickel (A10)*         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.02         <0.0														TM30/PM17
Dissolved Selenium (A10)*         <0.00         0.09         0.10         0.03         0.08         0.13         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03         <0.03 </td <td>Dissolved Nickel (A10) #</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>&lt;0.02</td> <td>0.04</td> <td>&lt;0.02</td> <td>mg/kg</td> <td>TM30/PM17</td>	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 Zinc*         c0.003         c0.001         c0.0001         c0	Dissolved Selenium <sup>#</sup>	<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 Zinc (A10)*         c.0.03	Dissolved Selenium (A10) <sup>#</sup>	<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
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         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.00001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001         <0.0001	Dissolved Zinc <sup>#</sup>	<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
Mercury Dissolved by CVAF*         c0.0001         c0.001         c0.011         c0.01         c0.011         c0.01	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
Normalization         Image: Solution         Image: Solut	Mercury Dissolved by CVAF <sup>#</sup>	<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
Phenol         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <0.1         <	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
Fluoride         0.4         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3         <0.3	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
Fluoride       4       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3       <3	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
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/k         TM38/PM0           Sulphate as SO4#         31         28.2         42.2         4.5         25.3         59.7         3.6         1.3         4.6         28.6         <0.5	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
Sulphate as SQ4 <sup>#</sup> 31       282       422       45       253       597       36       13       46       286       <5       mg/kg       TM38/PM0         Chloride <sup>#</sup> <0.3       0.3       0.4       0.7       0.5       <0.3       <0.3       <0.3       2.2       <0.3       mg/kg       TM38/PM0         Chloride <sup>#</sup> <33       0.3       0.4       0.7       0.5       <0.3       <0.3       <0.3       2.2       <0.3       mg/kg       TM38/PM0         Chloride <sup>#</sup> <3       3.3       0.4       0.7       0.5       <0.3       <0.3       <0.3       2.2       <0.3       mg/kg       TM38/PM0         Chloride <sup>#</sup> <3       3.3       0.4       0.7       5       <3       <3       <3       <0.3       <0.3       2.2       <0.3       mg/kg       TM38/PM0         Dissolved Organic Carbon       10       <2       <2       4       <2       <2       3       9       2       10       <2       mg/kg       TM38/PM0         Dissolved Organic Carbon       100       <2       <2       4       <2       <2       3       9       2       100       <20       mg/kg <td>Fluoride</td> <td>4</td> <td>&lt;3</td> <td>&lt;3</td> <td>&lt;3</td> <td>&lt;3</td> <td>&lt;3</td> <td>4</td> <td>&lt;3</td> <td>&lt;3</td> <td>&lt;3</td> <td>&lt;3</td> <td>mg/kg</td> <td>TM173/PM0</td>	Fluoride	4	<3	<3	<3	<3	<3	4	<3	<3	<3	<3	mg/kg	TM173/PM0
Chloride <sup>#</sup> <0.3       0.3       0.4       0.7       0.5       <0.3       <0.3       <0.3       2.2       <0.3       mg/l       TM38/PM0         Chloride <sup>#</sup> <3	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
Chloride <sup>#</sup> 3       3       4       7       5      3      3      3       2.2      3       mg/kg       TM38/PM0         Dissolved Organic Carbon       10       -2       -2       4       -2       -2       3       9       2       10       -2       mg/kg       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 <sup>#</sup> 54       78       105       58       66       120       58       101       68       150       -35       mg/kg       TM20/PM0	Sulphate as SO4 #	31	282	422	45	253	597	36	13	46	286	<5	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	Chloride <sup>#</sup>	<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
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	Chloride <sup>#</sup>	<3	3	4	7	5	<3	<3	<3	<3	22	<3	mg/kg	TM38/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	Dissolved Organic Carbon	10	<2	<2	4	<2	<2	3	9	2	10	<2	mg/l	TM60/PM0
Total Dissolved Solids # 54 78 105 58 66 120 58 101 68 150 <35 mg/l TM20/PM0	Dissolved Organic Carbon	100	<20	<20	40	<20	<20	30	90	20	100	<20	mg/kg	TM60/PM0
	pН	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 #       540       780       1050       580       660       1200       580       1010       680       1501       <350       mg/kg       TM20/PM0         Image: Solids #       Image: Solid #       <													-	TM20/PM0
	Total Dissolved Solids <sup>#</sup>	540	780	1050	580	660	1200	580	1010	680	1501	<350	mg/kg	TM20/PM0



Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : CEN 10:1 1 Batch

EMT Job No:	19/10073								 	_		
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		Please se	o attached r	otos for all
COC No / misc											e attached r ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT				
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		LOD/LOR	Units	Method
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				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 <sup>#</sup>	<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 <sup>#</sup>	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 <sup>#</sup> Dissolved Cadmium (A10) <sup>#</sup>	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005 <0.005		<0.0005 <0.005	mg/l	TM30/PM17 TM30/PM17
Dissolved Cadmium (A10)	<0.005 <0.0015	<0.005	<0.005 <0.0015	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	mg/kg mg/l	TM30/PM17 TM30/PM17
Dissolved Chromium (A10) #	<0.0015	<0.015	<0.015	<0.015	<0.0015	<0.0015	<0.015	<0.015		<0.015	mg/kg	TM30/PM17
Dissolved Copper <sup>#</sup>	<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) <sup>#</sup>	<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 <sup>#</sup>	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 <sup>#</sup>	<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 CVAF #	<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	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 <sup>#</sup>	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
рН	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 <sup>#</sup>	144	119	162	187	112	180	188	67		<35	mg/l	TM20/PM0
Total Dissolved Solids <sup>#</sup>	1441	1190	1619	1871	1120	1801	1880	670		<350	mg/kg	TM20/PM0

Client Name: Reference: Location: Contact: EMT Job No:

Ground Investigations Ireland 8658-04-19 Parkside Phase 4 Barry Sexton 19/10073

#### Report : EN12457\_2

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				Please se	e attached n	otes for all
COC No / misc															ations and a	
Containers	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT	VJT						
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						
											Inert	Stable Non- reactive	Hazardous	LOD LOR	Units	Method No.
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						
Solid Waste Analysis	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
Total Organic Carbon # 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	-	-	<0.02	/o mg/kg	TM21/PM124
Sum of 7 PCBs"	<0.035	<0.025	<0.025	<0.035	<0.025	<0.025	<0.025	<0.035	<0.025	<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
CEN 10:1 Leachate	0	0		0	0	0				0.677	a -	-				TH00 (2) 11-
Arsenic"	<0.025	<0.025	<0.025 0.44	<0.025	<0.025	<0.025 0.46	<0.025	<0.025 <0.03	<0.025	0.029	0.5 20	2 100	25 300	<0.025 <0.03	mg/kg	TM30/PM17 TM30/PM17
Barium <sup>#</sup> Cadmium <sup>#</sup>	< 0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	0.04	100	5	<0.005	mg/kg mg/kg	TM30/PM17
Chromium "	<0.015	<0.005	<0.015	<0.005	<0.005	<0.015	<0.015	<0.015	<0.005	<0.005	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/PM0
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 <sup>#</sup>	<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 <sup>#</sup>	<0.03 540	<0.03 780	<0.03 1050	<0.03 580	<0.03 660	<0.03 1200	<0.03 580	<0.03 1010	<0.03 680	<0.03 1501	4 4000	50 60000	200 100000	<0.03 <350	mg/kg	TM30/PM17 TM20/PM0
Total Dissolved Solids # Dissolved Organic Carbon	100	<20	<20	40	<20	<20	30	90	20	100	500	800	100000	<20	mg/kg mg/kg	TM20/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	-	-	-		1	NONE/PM17
Eluate Volume	0.75	0.75	0.75	0.65	0.8	0.67	0.67	0.7	0.65	0.6	-	-	-		I	NONE/PM17
рН "	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

Client Name: G Reference: 88 Location: P Contact: B EMT Job No: 1

Ground Investigations Ireland 8658-04-19 Parkside Phase 4

#### Report : EN12457\_2

Location:	Parkside I						Solids: V=	60g VOC jar	, J=250g gla	ass jar, T=pl	astic tub					
Contact:	Barry Sex	ton														
EMT Job No:	19/10073															
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						Please se	e attached r	otes for all
COC No / misc															ations and a	
Containers	VJT	VJT														
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														
Batch Number	1	1	1	1	1	1	1	1				Chable Nee				Method
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	No.
Solid Waste Analysis																
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
CEN 10:1 Leachate																
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			-	-	-		1	NONE/PM17
Eluate Volume	0.67	0.7	0.72	0.7	0.55	0.72	0.82	0.65			-	-	-		1	NONE/PM17
рН "	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
Flueride				~				.0							me dire	TM470/DM10
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
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EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/10073	1	BH02	0.80	1-3	No interpretation possible
19/10073	1	BH02	1.70	4-6	No interpretation possible
19/10073	1	BH02	2.50	7-9	No interpretation possible
19/10073	1	BH03	0.90	10-12	Possible lubricating oil
19/10073	1	BH03	1.40	13-15	No interpretation possible
19/10073	1	BH03	2.50	16-18	No interpretation possible
19/10073	1	BH04A	0.50	19-21	No interpretation possible
19/10073	1	BH04A	1.50	22-24	No interpretation possible
19/10073	1	BH04A	2.40	25-27	No interpretation possible
19/10073	1	BH05	0.50	28-30	No interpretation possible
19/10073	1	BH05	1.50	31-33	No interpretation possible
19/10073	1	BH05	3.00	34-36	Possible lubricating oil
19/10073	1	BH06	1.00	37-39	No interpretation possible
19/10073	1	BH06	1.60	40-42	No interpretation possible
19/10073	1	BH06	2.40	43-45	No interpretation possible
19/10073	1	BH07	0.50	46-48	PAH's
19/10073	1	BH07	2.00	49-51	PAH's
19/10073	1	BH07	2.60	52-54	No interpretation possible

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:

MAAD

#### 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	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	BH02	1.70	5	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	BH02	2.50	8	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	BH03	0.90	11	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	BH03	1.40	14	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	BH03	2.50	17	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	0.50	20	26/06/2019	General Description (Bulk Analysis)	soil/stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD

Client Name:
Reference:
Location:

Ground Investigations Ireland 19/04/8658 Parkside Phase 4

Locatio Contact			Parkside Barry Se				
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
10/10075		DUOS	0.50	00	00/00/0015	Concerned Descentrations (De thick in the second	Col.
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 26/06/2019	Asbestos Type Asbestos Level Screen	NAD
					20/00/2019	Asbestos Level Screen	
19/10073	1	BH05	1.50	32	26/06/2019	General Description (Bulk Analysis)	soil-stones
13/100/3		Bride	1.50	52	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:
Reference:
Location:
Contrat

Ground Investigations Ireland 19/04/8658 Parkside Phase 4

Contact	:		Barry Se	xton			
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
						Asbestos Fibres	NAD
						Asbestos ACM	NAD
						Asbestos Type	NAD
					26/06/2019	Asbestos Level Screen	NAD
		DUIDE					
19/10073	1	BH07	2.60	53		General Description (Bulk Analysis)	soil.stones
					26/06/2019	Asbestos Fibres	NAD
					26/06/2019	Asbestos ACM	NAD
					26/06/2019	Asbestos Type Asbestos Level Screen	NAD
					26/06/2019	ASPESIOS FEAGI SCLEGU	

Client Name:Ground Investigations IrelandReference:8658-04-19Location:Parkside Phase 4Contact:Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason					
	No deviating sample report results for job 19/10073										

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

## NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No: 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 HCI (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

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

#### WATERS

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

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

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

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

#### **DEVIATING SAMPLES**

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

#### SURROGATES

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

#### DILUTIONS

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

#### BLANKS

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

#### NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

### **REPORTS FROM THE SOUTH AFRICA LABORATORY**

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

### **Measurement Uncertainty**

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

## ABBREVIATIONS and ACRONYMS USED

ISO17025 (UKAS Ref No. 4225) accredited - UK.
ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
Indicates analyte found in associated method blank.
Dilution required.
MCERTS accredited.
Not applicable
No Asbestos Detected.
None Detected (usually refers to VOC and/SVOC TICs).
No Determination Possible
Calibrated against a single substance
Surrogate recovery outside performance criteria. This may be due to a matrix effect.
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.
Samples are dried at 35°C ±5°C
Suspected carry over
Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
Matrix Effect
No Fibres Detected
AQC Sample
Blank Sample
Client Sample
Trip Blank Sample
Outside Calibration Range

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

#### **EMT Job No:** 19/10073

MI JOB NO:	19/100/3
Leachate tests	
101/1/201 1000	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
10l/kg; 4mm	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)
Мо	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 spectrometic methods after distillation)* (BY HPLC - EMT)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional a	nalysis
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	
	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-Fische
Dry matter	titration and either volumetric or coulometric detection.
	I.S. EN 15169 Difference in mass after heating in a furnace up to $550 \pm 25$ °C.
LOI	

\*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS \*\*PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

\*\*\*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.

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
ТМЗО	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
ТМЗО	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
ТМЗО	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 Methyltertbutylether, 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 Methyltertbutylether, 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	
ТМ73	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
ТМ73	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	



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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												
Borehole Number	Depth (m)			Length/Dia. (Ratio)	Unconfined Compressive Strength (Mpa)	Density (Mg/m <sup>3</sup> )								
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



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## Point Load Index Tests (single diametral determination)

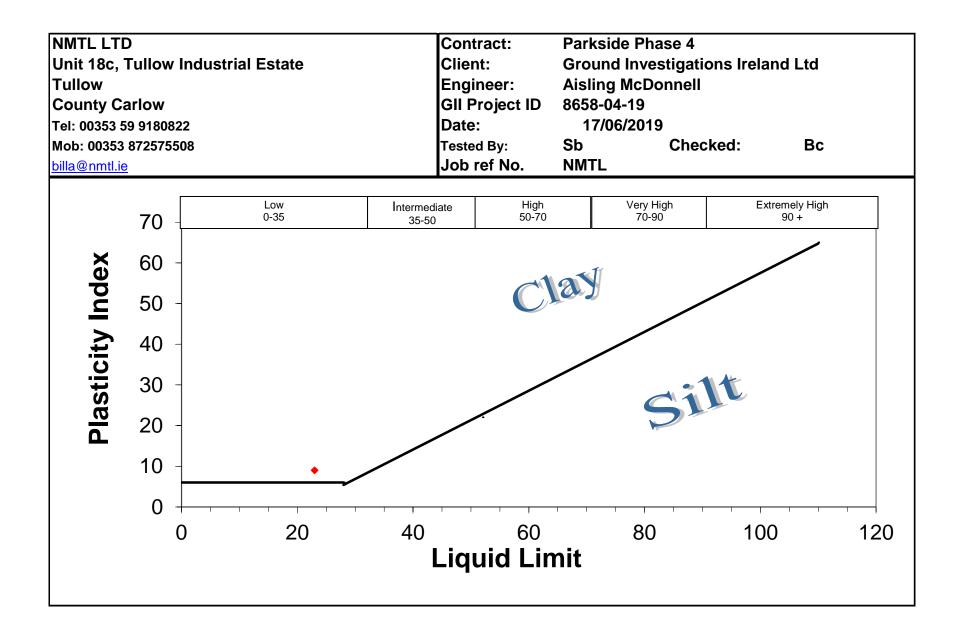
Project:	Parkside Phase 4	
Project No:	8658 - 04 - 19	
Delivery date:	24.07.2019	
Test Date:	30.07.2019	
Diametric samples		
Borehole No.	Depth (m)	Is(50) (Mpa)
BH - 01	9.70 - 10.10	5.54
BH - 05	5.00 - 5.20	4.01
BH - 05	6.90 - 7.20	5.58
BH - 07	6.30 - 6.60	4.72

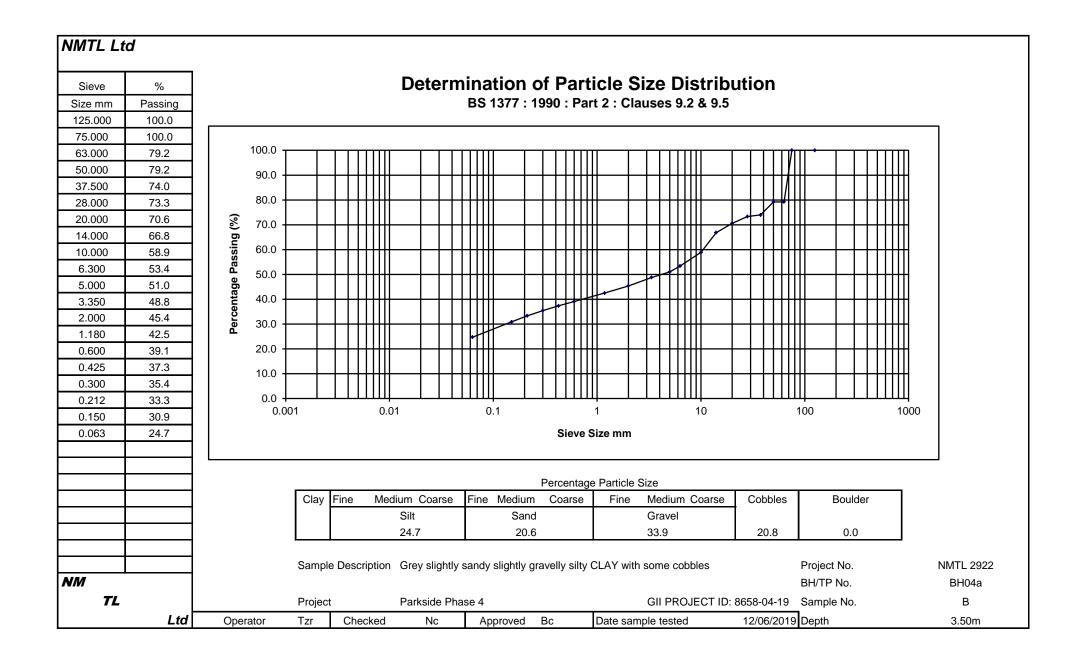
Prof. Brendan O'Kelly

Specimens prepared and tested in accordance with suggested method from International Society for Rock Mechanics (ISRM), 1985 National Materials Testing Laboratory Ltd.

							301411417		ILSI KI					
				Particle			Index Properties		Bulk	Cell	Undrained Triaxial Tests		Lab	
BH/TP	Depth	sample	Moisture	Density	<425um	LL	PL	PI	Density	Presssure	Compressive	Strain at	Vane	Remarks
No	m	No.	%	Mg/m3	%	%	%	%	Mg/m3	kPa	Stress kPa	Failure %	kPa	
BH04a	3.50	В	11.4		37.3	23	14	9						
							+	l			<u> </u>			+
<u> </u>	<u> </u>		<u> </u>				+	l			ł			+
NMTL		Notes :	1	l			1	1		<u> </u>	Job ref No.	NMTL	GII Project ID:	8658-04-19
	1	110163.	1. All BS to	ests carried	d out using p	oreferred (	(definitive) i	method ur	nless otherw	vise stated.	Location	Parkside F		0000-0-13

## SUMMARY OF TEST RESULTS





#### NATIONAL MATERIALS TESTING LABORATORY LTD.

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

Force Measuring I Preperatic Remoul	BS 1377: P																		
Force Measuring I Preperatic Remoul		Part 4 · 199∩	) .7 4			Date	12-Jun-16	(	0.900										
Preperatic Remoul	Device	VJT-08211					Test 1		-										
				al moistur	e content	t			-								•		
Surcharge	10 kPa	0		Mean Ca		4.33	N/Div		-										
Penetration	Force Gaug	ge		Force on		4.33	N/Div	(	0.800										
of plunger	reading		1	plunger		California Bearing R	atio Results		1								1		
mm	divisions			kN		%			]										
	Тор	Bottom			Bottom	Тор	Base												
0.00	0.0	0.0		0.000	0.000			(	0.700							/			
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 1.50	38.0 44.0	27.0 32.0		0.165	0.117			(	0.600									-	
1.50	44.0 52.0	32.0 36.0		0.191 0.225	0.139 0.156				1					1					
2.00	52.0 59.0	41.0		0.225	0.156				1										
2.00	59.0 66.0	46.0		0.235	0.178			z	1				/						
2.23 2.50	74.0	40.0 51.0		0.280	0.199	2.43	1.67	ہ <u>ہ</u>	0.500				1						
2.75	81.0	55.0		0.351	0.238	2.75		jge ,										1	
3.00	87.0	60.0		0.377	0.260			In					Ĩ						
3.25	92.0	64.0		0.398	0.277			d	-			1							
3.50	96.0	69.0		0.416	0.299			P	-										
3.75	104.0	73.0		0.450	0.316			ຍິ	0.400									_	
4.00	110.0	77.0		0.476	0.333			Force on plunger kN	+					T					
4.25	118.0	81.0		0.511	0.351			-	1										
4.50	125.0	84.0		0.541	0.364				1										
4.75	130.0	88.0		0.563	0.381				1		1								
5.00	136.0	91.0		0.589	0.394	2.94	1.97	(	0.300										
5.25	141.0	95.0		0.611	0.411				1										
5.50	148.0	98.0		0.641	0.424				1		× _/	Ĩ							
5.75	153.0	101.0		0.662	0.437				]	· · · · · ·									
6.00	160.0	105.0		0.693	0.455			(	0.200										
6.25	165.0	108.0		0.714	0.468					/									
6.50	171.0	111.0		0.740	0.481				4		1								
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			(	0.100									-	
7.50 Moisture content o	192.0	121.0	Tor	0.831 Middlo	0.524 Rose	Specimer ut a	4520		1	× ×									
Moisture content a Container No.	aner test		Top Tray	Middle Tray	Base Tray	Specimen wt g Diameter mm	4520 152		1										
Mass of wet soil +	container	c		1725.6			152		1.										
Mass of dry soil +		g g		1431.7	1318.6		121.0	,	0.000 ¥										
Weight of containe		y g	143.3	1431.7	146.0			(	-+ 000.0 0.00	1.00 2	2.00 3.	00 4.	.00 5	5.00	6.	00 7	7.00	8.00	
Mass of moisture		g		293.91		Average MC %	22.98		2.50						0.				
Dry weight		g		1244.44		Density Mg/m3	1.96					Penetrat	ion mm						
Moisture content		9 %	22.12	23.62		Dry Density Mg/m3	1.59						_						
noistare combin		70		20.02	20.21	2., Donoty mg/mo	1.00						Base						
NM																Date	Project No.	NMT	TL2922
	1					Project	Parkside Pha	260 /	1					<u> </u>	Tab	10 km 10		TDO	
TL						FIUJECI.	Fainsine Pha	ase 4	t					Operato	-	12-Jun-16	Trial Pit No.	TP0	1
Ltd	l										GII Proje	ct ID 8658	3-04-19	Checked			Sample No.	В	
														Approve	d Bc		Depth	0.70	/m

#### NATIONAL MATERIALS TESTING LABORATORY LTD.

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

Soil Description	Brown slid	httly gravel	lly slightly sar	ndy SII														
Son Description	ושטוט sligi	nuy yravei	ny angriny Sal	nuy SIL	IJULAT	Date	12-Jun-16	1.200	1	1								_
Test Method	BS 1377: F																	
Force Measuring		VJT-0821					Test 1											
Preperatic Remo		5 kg ramme							1									
Surcharge	10 kPa				ibration	4.33	N/Div		-									
Penetration of plunger	Force Gau reading	ge		orce on unger		4.33 California Bearing F	N/Div											
mm	divisions			kN		California Bearing P		1.000										
	Тор	Bottom			Bottom	Тор	Base	1.000										
0.00	0.0	0.0		0.000	0.000	TOP	Duse		-									
0.25	8.0	7.0		0.035	0.030													
0.50	14.0	11.0	C	0.061	0.048											×	1	
0.75	20.0	17.0	C	0.087	0.074				1									
1.00	28.0	22.0		0.121	0.095				1									
1.25	35.0	27.0		0.152	0.117			0.800	4									
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			z	1									
2.25 2.50	68.0 <b>76.0</b>	50.0 <b>55.0</b>		0.294 <b>0.329</b>	0.217 <b>0.238</b>	2.49	1.80	plunger kN 0.600	-									
2.75	85.0	<b>55.0</b> 62.0		0.368	0.268	2.43	1.00	ige	]									
3.00	93.0	69.0		0.300	0.200			n	1							T		
3.25	102.0	76.0		0.442	0.329			<b>a</b> 0.600	1					<u> </u>				
3.50	109.0	84.0		0.472	0.364			5	-				×					
3.75	118.0	90.0		0.511	0.390			Force										
4.00	125.0	96.0	C	0.541	0.416			Ē	1			× 1						
4.25	133.0	104.0	C	0.576	0.450				-			×						
4.50	141.0	110.0		0.611	0.476							*						
4.75	148.0	117.0		0.641	0.507			0.400										
5.00	156.0	123.0		0.675	0.533	3.38	2.66	0.400										
5.25 5.50	163.0 171.0	129.0 136.0		0.706 0.740	0.559 0.589				1									
5.50 5.75	171.0	136.0		0.740 0.775	0.589				4		/							
6.00	179.0	141.0		0.805	0.641						/	ŕ						
6.25	192.0	153.0		0.831	0.662													
6.50	199.0	160.0		0.862	0.693				1									
6.75	205.0	165.0		0.888	0.714			0.200										
7.00	211.0	170.0		0.914	0.736				1									
7.25	217.0	176.0		0.940	0.762					1								
7.50	223.0	181.0		0.966	0.784				1 /									
Moisture content	after test			/iddle -	Base	Specimen wt g	5110			T								
Container No.	L conteiner	~		Tray	Tray	Diameter mm	152											
Mass of wet soil Mass of dry soil ·		g		600.8 439.9	2068.9 1862.0	Length mm	127.0	0.000										
Weight of contain		g g		439.9 148.0	1862.0			0.000	<b>*</b>	.00 2.	00 3.	00 4.	00 5	.00	6.	00	7.00	8.00
Mass of moisture		g		60.90		Average MC %	12.39								0.			
Dry weight		g		291.90		Density Mg/m3	2.22					Penetrat	ion mm					
Moisture content	t	%		12.45			1.97					<b>—</b> ← Тор	Base					
NM						<b>.</b>										Date	Project No.	NMTL292
TL						Project:	Parkside P	hase 4						Operator	Tch	12-Jun-16	Trial Pit No.	TP02
Lt	a					-					GII Projec	t ID 8658	8-04-19	Checked	Nc		Sample No.	В
	1										,		-	Approved			Depth	0.70m
															•			