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Ground Investigations Ireland

Rialto Cinema Site

Ground Investigation Report

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1.0 Preamble

On the instructions of MMOS Consulting Engineers, a site investigation was carried out by Ground Investigations Ireland Ltd., between July and September 2018 at the site of the proposed residential development at the old Rialto Cinema Site in Rialto, Co. Dublin.

2.0 Overview

2.1. Background

The proposed development entails the construction of multi storey student accommodation development of max. 7 stories over open basement. The site measures circa 0.3 Ha and is bounded by the South Circular Road on its northern boundary, Apartment Blocks and a road and pavement area on the western and southern boundary's, a terraced house with back garden and industrial units/large sheds on its eastern boundary. The site is currently occupied by a disused cinema and is situated in Rialto adjacent to the South Circular Road in Dublin City and is approximately 150m North of the Royal Canal.

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 5 No. Trial Pits to a maximum depth of 2.9m BGL
- Carry out 5 No. Foundation Inspection Pits to determine existing foundation details
- Carry out 2 No. Cable Percussion boreholes to a maximum depth of 3.9m BGL
- Installation of 2 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 JCB 3CX 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 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 and associated photos which are provided in Appendix 2 of this Report.

3.3. Foundation Pits

The foundation inspection pits were excavated at the locations shown in the exploratory hole location plan in Appendix 1. The exposed foundations were logged and sketched prior to backfilling and reinstatement. The logs and sketches are provided in Appendix 3 of this Report.

3.4. 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 4 of this Report.

3.5. Groundwater Monitoring Installations

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

3.6. 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 tests were carried out in NMTL's Geotechnical Laboratory in Carlow.

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;

- Concrete
- Made Ground
- Cohesive Deposits
- Granular Deposits

CONCRETE: Reinforced concrete surfacing was encountered in all of the exploratory holes excavated on site and was present typically to a depth of 0.2m BGL. TP05 had concrete beneath the Made Ground to a maximum depth of 0.6m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the concrete and was present to a varying depth of between 0.9m and 2.2m BGL. These deposits were described generally as *Grey black silty slightly sandy slightly gravelly Clay and contained fragments of redbrick, wood and metal.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *Very soft brown grey sandy silty slightly sandy slightly gravelly CLAY* overlying a *Firm to stiff dark grey brown slightly sandy subangular to angular gravelly CLAY with rare cobbles.* The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered below the Made Ground in TP03 and below the cohesive deposits in BH1 only and were typically described as Medium dense grey brown sandy sub angular to angular GRAVEL with frequent angular cobbles. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs. Based on the SPT N values the deposits are typically medium .

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 BH1 and BH2 to allow the equilibrium groundwater level to be determined. The groundwater monitoring is included in Appendix 6 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 to high plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 7% and 34% generally with fines contents of 39 to 59%. 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-3.

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 indicate that the Total Organic Content is above the stable non-reactive limit in TP03 at 1.20m BGL (5.97% vs 5%) and above the hazardous limit in TP05 at 1.0m BGL (11.72% vs 6%). The results also indicate that the Molybdenum content is above the inert limits in TP01, TP03 and TP05 and again indicate that the Antimony content is above the inert limits in TP01 and TP03. Furthermore the results indicate that the Sulphate as SO4 is above the inert limits in TP01 and TP05. Traces of Asbestos (less than 0.1%) were

detected in TP01 at 1.0m BGL. Consultation is advised with a specialist environmental consultant or local landfill operators regarding the disposal of this material. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present or the previous site use or location indicate a risk of environmental variation.

The results from the completed laboratory testing is included in Appendix 5 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

Due to the anticipated high structure loads, presence of Made Ground and soft compressible Cohesive deposits beneath the footprint of the proposed structure, piled foundations are recommended for the proposed building. The type, size and depth of the pile foundations should be confirmed by a specialist piling contractor based on the loading from the proposed building. The floor slab is recommended be suspended and also supported on the building piles.

Negative skin friction from the very soft cohesive deposits should be considered in the pile design due to the possibility of loading from working platforms or the adjacent pavement make up.

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 high, when compared to the guideline values from BRE Special Digest 1:2005. Special precautions are required for concrete foundations to prevent sulphate attack.

5.3. Excavations

Short term temporary excavations in the soft cohesive deposits will be unstable and will require the sides to be supported if the excavation is below 1.25m BGL or is required to permit man entry.

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.

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

GROUND IRELAND	Gro	und In	vestigation www.gii.ie	Site Rialto Cinema Site		Trial Pit Number TP01		
Machine : Jo Method : T	CB 3CX rial Pit	Dimensions		Ground	Level (mOD)	Client Murphy Matson O' Sullivar	1	Job Number 7847-06-18
		Locatio	n	Dates 20)/07/2018	Engineer	Engineer	
Depth (m)	Sample / Test	s Water Depth (m)	Field Record	s Level (mOD)	Depth (m) (Thickness)	D	escription	Legend Safe
0.50	В				(0.20) 0.20 0.20 0.40 (0.80)	REINFORCED CONCRET MADE GROUND: Brown t with fragments of redbrick MADE GROUND: Grey bl gravelly Clay with fragmer	TE black slightly sandy gravelly ack silty slightly sandy slight ts of redbrick.	Clay Vi
1.20	В				- 1.20 	Soft to firm orange brown gravelly CLAY with rare ar	grey mottled sandy slightly gular to subangular cobbles	
2.00	В					Complete at 2.00m		
Plan .						Remarks Groundwater encountered a	it 1.7m BGL in Trial Pit.	
						I nal Pit sidewalls are stable Trial Pit backfilled upon com	pletion.	
· ·	· ·		· ·	 	 			
					s	Scale (approx) 1:25	Logged By CCostigan	Figure No. 7847-06-18.TP01

	Grou	ind In	vestigatior	Site Rialto Cinema Site		-	Trial Pit Number TP02			
Machine : J Method : T	CB 3CX rial Pit	Dimensi	ions	Gro	ound L	₋evel (mOD)	Client Murphy Matson O' Sullivar	1	i 78	Job Number 847-06-18
		Location	ı	Dat	tes 20/	07/2018	Engineer		\$	Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Recor	rds (m	evel IOD)	Depth (m) (Thickness)	D	escription	Le	Aater Kater
0.50	В					(0.20) 0.20 (0.20) 0.20 0.20) 0.40 (0.80)	REINFORCED CONCRET MADE GROUND: Brown t with fragments of redbrick MADE GROUND: Grey bla gravelly Clay with fragmer	TE plack slightly sandy gravelly ack silty slightly sandy slight ts of redbrick.	Clay dy	
1.00	В					 	Soft to firm orange brown gravelly CLAY with rare ar	grey mottled sandy slightly igular to subangular cobbles	s. <u>ماريد</u> بور بور	
1.80	В					2.00 	Firm to stiff dark grey sligh with occasional angular to	tty sandy slightly gravelly C subangular cobbles.		୧୯ ସୁକାର ସୁକାର ସୁକାର ୧୦ ସୁକାର ସୁକାର ସୁକାର ୧୦ ସୁକାର ସୁକାର ସୁକାର ସୁକାର ୧୦ ସୁକାର ସୁକାର ସୁକାର ସୁକାର
2.80	В					2.90	Complete at 2.90m			
Plan					-		Remarks			
	· ·	•	· ·	· ·	•		Groundwater encountered a Trial Pit sidewalls collasping Trial Pit backfilled upon com	it 1.8m BGL in Trial Pit. 1.5m BGL in Trial Pit. pletion.		
 	· ·	•	· ·	· ·						
						. s	Scale (approx) 1:25	Logged By CCostigan	Figure N 7847-06	lo. -18.TP02

	Ground Investigations Ireland Ltd								Trial Pit Number TP03
Machine : J	chine : JCB 3CX Dimensions		Ground	Level (mOD)	Client Murphy Matson O' Sulliva	Client			
Metrica . 1									7847-06-18
		Locati	on		Dates 20	0/07/2018	Engineer		Sheet 1/1
Depth (m)	Sample / Te	sts Water Depth (m)	, n Field R	ecords	Level (mOD)	Depth (m) (Thickness)	D	escription	Legend S
0.50	в					(0.20) 0.20 0.20	REINFORCED CONCRET MADE GROUND: Grey br Clay with fragments of red	rE own black sandy slightly gra brick.	Ivelly
1.20	в					(1.20)			
						(0.70)	Orange brown grey mottle with rare angular to suban	d clayey slightly gravelly SA gular cobbles.	ND
2.00	В					2.10	Complete at 2.10m		
Plan .				·		· ·	Groundwater encountered a	t 1.5m BGL in Trial Pit.	
						· ·	Trial Pit backfilled upon com	pletion.	
· ·									
· ·		 	· ·		· ·				
						-			
							scale (approx) 1:25	Logged By CCostigan	Figure No. 7847-06-18.TP03

	Grou	nd In	vestigation www.gii.ie	Site Rialto Cinema Site		Trial Pit Number TP04		
Machine : Jo Method : T	CB 3CX rial Pit	Dimens	ions	Ground	d Level (mOD)	Client Murphy Matson O' Sullivar	Client Murphy Matson O' Sullivan	
		Locatio	n	Dates 2	0/07/2018	Engineer		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Record	ls (mOD)	Depth (m) (Thickness)	D	escription	Legend S
					- (0.20) - 0.20 - (0.20)	REINFORCED CONCRET MADE GROUND: Grey br with fragments of redbrick	E own slightly sandy gravelly (Clay
0.50	В				 	MADE GROUND: Grey sil with fragments of redbrick	ty sandy slightly gravelly Cla and concrete.	iy
1.20	В				1.30 1.30 	Complete at 1.30m		
					- 			
					- - - - - -			
					- - - - - -			
Plan .						Remarks		
						Groundwater encountered a Trial Pit sidewalls collasping Trial Pit backfilled upon com	t 0.6m BGL in Trial Pit. 0.5m BGL in Trial Pit. pletion.	
					s	Scale (approx)	Logged By	Figure No.
						1:25	CCostigan	7847-06-18.TP04

	Grou	nd In	vestigation www.gii.ie	Site Rialto Cinema Site		Trial Pit Number TP05		
Machine:J Method :⊤	CB 3CX rial Pit	Dimensi	ons	Ground	Level (mOD)	Client Murphy Matson O' Sullivar	1	Job Number 7847-06-18
		Location	1	Dates 20	0/07/2018	Engineer		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Record	ds (mOD)	Depth (m) (Thickness)	D	escription	Legend S
0.40	в				(0.20) 0.20 (0.20) 0.40 (0.20) 0.60	REINFORCED CONCRET MADE GROUND: Brown b with fragments of redbrick CONCRETE MADE GROUND: Black bi gravelly CLAY with fragme organic remains.	E black slightly sandy gravelly and concrete. rown slightly sandy slightly nts of redbrick, wood, metal	Clay
1.00	В				- (1.60)			
2.20	В				2.20	Soft to firm orange brown slightly gravelly CLAY with cobbles. Complete at 2.50m	grey mottled slightly sandy rare angular to subangular	6 - 7 - 4 -
Plan .					'	Remarks Groundwater encountered a Trial Pit sidewalls collasping	t 2.0m BGL in Trial Pit. 0.5m BGL in Trial Pit	
						Trial Pit backfilled upon com	pletion.	
· ·	· ·		 	· ·	· ·			
					<mark>.</mark>	Scale (approx)	Logged By	Figure No.
						1:25	CCostigan	7847-06-18.TP05

APPENDIX 3 – Foundation Pit Records

x	GROUND	Ground Investigations Ireland Ltd., Catherinestown House
	INVESTIGATIONS	Hazelhatch Road,
		Newcastle, Co Dublin.
	IKELAND	Email: info@gii.ie Web: gii.ie
	1.1m 2.0m	0-0.2m Reinforced Concrete
		0.2-0.4m Made Ground: Brown black slightly sandy gravelly
		Clay with fragments of redbrick.
\		0.4-1.2m Made Ground: Grey black slightly sandy gravelly
		Clay with fragments of redbrick
		1.20-2.0m Soft to firm orange brown grey mottled sandy
		slightly gravelly Clay with rare angular to subangular cobbles
		2.00m Complete at 2.00m
Remarks:		
Excavating from 0	untered at 1.7m BGL in Trial Pit	
Trial Pit sidewalls	are stable	
Trial Pit backfilled	upon completion	
Samples [.]		
B 0.5m		
B 1.0m		
B 1.7m		
Project	Rialto Cinema Site	
Client	Murphy Matson O' Sullivan	TP1
Contractor Ground Investigations Ireland Ltd		

	GROUND	Ground Investigations Ireland Ltd.,
		Hazelhatch Road,
	INVESTIGATIONS	Newcastle, Co Dublin.
		Tel: 01 601 5175 / 5176 Fax: 01 601 5173
		Email: Info@gil.ie web: gil.ie
		วและแก้การและกับและแก้การและกับและแก่การแก่การกับและแก้การแก่การกับและแก้การการกับและแก้การการกับและแก้การการกั
		GL
		0-0 2m Reinforced Concrete
		0.2.0 4m Made Cround: Brown black elightly conductoryally Class
		J.2-0.411 Wade Ground. Drown black signity salidy gravely Clay
		0.4.1.2m Mode Cround: Crou black aliability and the service life Class
		U.4 I.2(II) Made Ground: Grey black slightly sandy gravelly Clay
		1.20-2.0m Soft to firm orange brown grey mottled sandy slightly
		gravelly Clay with rare angular to subangular cobbles
		2.9m Complete at 2.9m
Romarks:)และแก่สุดและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและแส้งและ
Groundwater enco	untered at 1 8m BGL in Trial Pit	
Trial Pit sidewalls	collapsing 1.5m BGL in Trial Pit	
Trial Pit backfilled	upon completion	
Samples:		
B 0.5		
В 1.0		
В1.8 В 2 0		
D 2.0		
Proiect	Rialto Cinema Site	
Client	Murphy Matson O' Sullivan	ТD2
Contractor	Ground Investigations Iroland Ltd	164
Contractor	Ground investigations freidnu Llu	

		Ground Investigations Ireland Ltd., Catherinestown House, Hazelhatch Road, Newcastle, Co. Dublin
		Tel: 01 601 5175 / 5176 Fax: 01 601 5173
		Email: info@gii.ie Web: gii.ie
0.25m		
	1.2m 1.35m	0-0.2m Reinforced Concrete
		U.2-1.4M Made Ground: Grey brown black sandy slightly gravelly Clay with fragments of redbrick
	0.15m	1.4-2.10m Soft to firm orange brown grev mottled clavev
		slightly gravelly SAND with rare angular to subangular cobbles
		2.10m Complete at 2.10m
Remarks:		
Groundwater enco	ountered at 1.5m BGL in Trial Pit	
Trial Pit sidewalls	upon completion	
Samples		
B 0.5m		
B 1.2m		
B 2.0m		
Project	Rialto Cinema Site	TRA
Client	Inurphy Matson O' Sullivan	1P3
Contractor	Ground Investigations Ireland Ltd	

^	GROUND		Grouna Investigations Ireland Ltd., Catherinestown House,	
	INVESTIGATIONS		Hazelhatch Road,	
			Newcastle, Co Dublin. Tel: 01 601 5175 / 5176 Fax: 01 601 5173	
	IKCLAND		Email: info@gii.ie Web: gii.ie	
GL				
	0.3			
		1.2m		
		0-0.2m Reinforced Concrete		
		0.2-0.4m Made Ground: Grov	brown slightly sandy gravelly Clay with from	ante
		of redbrick	stown signing sandy gravely oldy with lidgill	ion ito
		0.4-1.3m Made Ground Grov	silty sandy slightly gravelly Clay with fragmer	nts
		of redbrick and concrete	Siny carry signay gravery city with fragmen	
		1.30m Complete at 1.30m		
Remarks:				
Groundwater enco	untered at 0.6m BGL in Trial Pit			
Trial Pit sidewalls	collapsing 0.5m BGL in Trial Pit			
Trial Pit backfilled	upon completion			
Samples:				
B 0.5m				
B 1.2m				
Project	Rialto Cinema Site			
Client	Murphy Matson O' Sullivan		TP4	
Contractor	Ground Investigations Ireland Ltd			

	GROUND	Ground Investigations Ireland Ltd., Catherinestown House, Hazelhatch Road
	INVESTIGATIONS	Newcastle, Co Dublin.
		Tel: 01 601 5175 / 5176 Fax: 01 601 5173
		Email: into@gii.ie Web: gii.ie
		GL GL
	1.5m	0.2m Reinforced Concrete
		2-0 40m Made Ground: Brown black slightly sandy gravelly Clay with
		igments of redbrick and concrete
		60.2.20m Made Cround Black brown slightly apped all ability are value
		av with fragments of redbrick wood match and argonic remains
		ay wan nagments or records, wood, metal and organic remains
		abily gravely CLAX with rare angular to sub angular cobblea
	SI .	
		50m Complete at 2.50m
Remarks:		
Groundwater enco	ountered at 2.0m BGL in Trial Pit	
Trial Pit sidewalls	collapsing 0.5m BGL in Trial Pit	
TTIAL PIT DACKTIILED		
Samples:		
B 0.4m		
B 1.0m		
B 2.2m		
Project	Rialto Cinema Site	
Client	Murphy Matson O' Sullivan	ТР5
Contractor	Ground Investigations Ireland I to	

APPENDIX 4 - Cable Percussion Borehole Records

Ground	nd In	vesti	gations Ire	land	Ltd	Site Rialto Cinema Site	Boreho Numbe BH1		
Machine : Dando 2000 Method : Cable Percussion	Casing I	Diamete) mm to 3	r 3.0 m	Ground	Level (mOD)	Client Murphy Matson O' Sullivan	J N 784	ob umber 47-06-18	
	Location	ı		Dates	/08/2018	Engineer		s	heet 1/1
Depth (m) Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.50 B 1.00-1.45 SPT(C) N=1 2.00-2.45 SPT(C) N=12 3.00-3.00 SPT(C) 50*/0 3.00 B			0,1/0,0,0,1 1,2/4,3,3,2 Water strike(1) at 2.20m, rose to 1.80m in 20 mins. 25,25/50			CONCRTETE MADE GROUND: Black silty slightly sandy gravelly Clay with rare fragments of red brick and mortar. Very soft brown grey silty slightly sandy slightly gravelly CLAY. Medium dense grey brown fine to coarse sandy subangular to angular GRAVEL. Medium dense grey slightly sandy angular GRAVEL with frequent angular cobbles. OBSTRUCTUION: Presumed Boulder/Rock Complete at 3.00m		Σ1	
Remarks Groundwater encountered at 2.2 Refusal at 3.0m due to boulder/rr Standpipe installed 3.0m BGL in Chiselling from 3.00m to 3.00m f	m BGL in I ock. Borehole. or 1.0 hou	Borehole r.					Scale (approx) 1:50 Figure I		ostigan

Ground	ind In	vesti	gations Ire	land	Ltd	Site Rialto Cinema Site		Borehole Number BH2
Machine : Dando 2000 Method : Cable Percussion	Casing 20	Diameter 0 mm to 0	r).8 m	Ground	Level (mOD)	Client Murphy Matson O' Sullivan		Job Number 7847-06-18
	Locatio	n		Dates	9/08/2018	Engineer		Sheet 1/1
Depth (m) Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend S
						CONCRTETE MADE GROUND: Black sity slightly sandy gravelly with rare fragments of red brick and mortar. OBSTRUCTION: Presumed Concrete/Boulder. Complete at 0.80m	Clay	
Remarks Groundwater encountered at 2. Refusal at 0.8m due to concrete Moved Borehole 5m and comm Chiselling from 0.80m to 0.80m	Im BGL in enced Bore for 1.0 hou	Borehole. chole 2A. r.				_	Scale (approx) 1:50 Figure N 7847-0	Logged By CCostigan o. 6-18.BH2

	Grou	nd In	vesti	gations Ire	land	Ltd		Site Rialto Cinema Site	Bore Num BH:		10le Der 2A	
Machine : Da	ando 2000	Casing	Diamete	r	Ground	Level	(mOD)	Client		J	ob	
Method : Ca	able Percussion	20	0 mm to 3	3.9 m				Murphy Matson O' Sullivan		78	umt 47-0)er 6-18
		Locatio	n		Dates		10	Engineer		Sheet		
					05	9/06/20	10				1/*	1
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	De ((Thic	epth m) kness)	Description	Legend	Water	In	str
0.50 1.00-1.45 1.00 2.00-2.45 2.00 3.00-3.45 3.00 3.90	B SPT(C) N=2 B SPT(C) N=7 B SPT(C) N=21 B			1,0/0,1,1,0 1,0/0,2,2,3 Water strike(1) at 2.10m, rose to 1.70m in 20 mins. 2,2/4,5,6,6			0.10 (1.00) 1.10 (0.90) 2.00 (0.30) 2.30 (1.50) 3.80 3.90	CONCRTETE MADE GROUND: Black silty slightly sandy gravelly Clay with rare fragments of red brick and mortar. Very soft brown grey silty slightly sandy slightly gravelly CLAY. Soft to firm brown grey silty slightly sandy slightly gravelly CLAY. Firm to stiff dark grey brown slightly sandy subangular to angular gravelly CLAY with rare cobbles. OBSTRUCTUION: Presumed Boulder/Rock Complete at 3.90m		▼ 1		
Remarks Groundwater Refusal at 3. Standpipe ins Chiselling fro	r encountered at 2.1 9m due to boulder/ro stalled 3.9m BGL in 5m 3.00m to 3.00m fo	m BGL in bck. Borehole. por 1.0 hou	Borehole r.						Scale (approx) 1:50 Figure I 7847-0	L B CC No.	ogg y costi	ed Igan

APPENDIX 5 – Laboratory Testing







National Materials Testing Laboratory Ltd.

				Particle			Index Pro	perties	Bulk	Cell	Undrained Triax	kial 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	
TP1	1.70	В	17.7		85.9	31	16	15						
TP2	1.80	В	23.0		83.2	28	18	10						
TP5	2.20	В	84.8		55.3	66	45	21						
NMTL	ļ	Notes :									Job ref No.	NMTL 2659		Table
			1. All BS tests carried out using preferred (definitive) method unless otherwise stated. Location Rialto Cinema											

SUMMARY OF TEST RESULTS



LONES JONES ENVIRONMENTAL

Ground Investigations Ireland Catherinestown House

Hazelhatch Road

Newcastle Co. Dublin Ireland

Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8P

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

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



Attention :	Aisling McDonnell
Date :	13th August, 2018
Your reference :	7847-06-18
Our reference :	Test Report 18/11911 Batch 1
Location :	Rialto Cinema
Date samples received :	30th July, 2018
Status :	Final report
Issue :	1

Six samples were received for analysis on 30th July, 2018 of which six 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:

h lun

Bruce Leslie Project Co-ordinator

Client Name:	Ground In	vestigatior	ns Ireland				Report :	Solid					
Reference:	7847-06-1	18											
Location:	Aisling M	ema					Solids: V=	60g VOC ja	r, J=250g gl	ass jar, T=p	plastic tub		
JF Job No ·	18/11911	Donnen											
	10,11011	1	1	1							1		
J E Sample No.	1-3	4-6	7-9	10	11	12							
Sample ID	TP01	TP03	TP05	TP01	TP02	TP05							
Depth	1.00	1.20	1.00	1.70	1.80	2.20					Ploaso co	o attachad a	otos for all
COC No / misc											abbrevi	ations and a	cronyms
Contoinoro	VIT	VIT	VIT	-	-	Ŧ							
Containers	VJI	VJI	VJI										
Sample Date	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1						Unite	Method
Date of Receipt	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018					LOD/LOK	Offics	No.
Antimony	-	3	3	-	-	-					<1	mg/kg	TM30/PM15
Arsenic [#]	-	20.0	21.8	-	-	-					<0.5	mg/kg	TM30/PM15
Barium [#]	-	161	176	-	-	-					<1	mg/kg	TM30/PM15
Cadmium [#]	-	2.4	1.9	-	-	-					<0.1	mg/kg	TM30/PM15
Chromium [#]	-	41.6	73.9	-	-	-					<0.5	mg/kg	TM30/PM15
Copper [#]	-	89	111	-	-	-					<1	mg/kg	TM30/PM15
Lead [#]	-	142	311	-	-	-					<5	mg/kg	TM30/PM15
Mercury [#]	-	<0.1	1.3	-	-	-					<0.1	mg/kg	TM30/PM15
Molybdenum [#]	-	4.0	6.9	-	-	-					<0.1	mg/kg	TM30/PM15
Nickel [#]	-	42.8	49.6	-	-	-					<0.7	mg/kg	TM30/PM15
Selenium *	-	3	4	-	-	-					<1	mg/kg	TM30/PM15
Zinc*	-	157	404	-	-	-					<5	mg/kg	TM30/PM15
Antimony	3	-	-	-	-	-					<1	mg/kg	TM30/PM62
Arsenic	29.3	-	-	-	-	-					<0.5	mg/kg	TM30/PM62
Cadmium	1.0	-	-	-	-	-					<0.1	mg/kg	TM30/PM62
Chromium	26.0	_	_	_	_	_					<0.1	ma/ka	TM30/PM62
Copper	115	-	-	-	-	-					<1	ma/ka	TM30/PM62
Lead	342	-	-	-	-	-					<5	mg/kg	TM30/PM62
Mercury	1.1	-	-	-	-	-					<0.1	mg/kg	TM30/PM62
Molybdenum	8.7	-	-	-	-	-					<0.1	mg/kg	TM30/PM62
Nickel	53.8	-	-	-	-	-					<0.7	mg/kg	TM30/PM62
Selenium	1	-	-	-	-	-					<1	mg/kg	TM30/PM62
Zinc	217	-	-	-	-	-					<5	mg/kg	TM30/PM62

Client Name: Reference: Location: Contact: JE Job No.:	Ground In 7847-06-1 Rialto Cin Aisling Mo 18/11911	ovestigation 18 Jema CDonnell	ns Ireland				Report : Solids: V=	Solid 60g VOC ja	-, J=250g gl	ass jar, T=p	lastic tub		
J E Sample No.	1-3	4-6	7-9	10	11	12							
Sample ID	TP01	TP03	TP05	TP01	TP02	TP05							
	1.00		1.00	4 70	1.00								
Depth	1.00	1.20	1.00	1.70	1.80	2.20					Please se	e attached n	otes for all
COC No / misc											abbievi	allons and ad	lonyms
Containers	VJT	VJT	VJT	т	т	т							
Sample Date	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018							
Sampla Tuna	Coil	Soil	Roil	Soil	Soil	Soil							
Sample Type	301	301	301	3011	3011	3011							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method
Date of Receipt	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018							No.
PAH MS													
Naphthalene #	0.05	0.10	0.22	-	-	-					<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	0.07	-	-	-					<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	0.30	-	-	-					<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	0.33	-	-	-					<0.04	mg/kg	TM4/PM8
Phenanthrene [#]	0.58	0.19	2.24	-	-	-					<0.03	mg/kg	TM4/PM8
Anthracene #	0.12	<0.04	0.46	-	-	-					<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.83	0.06	4.33	-	-	-					<0.03	mg/kg	TM4/PM8
Pyrene *	0.78	0.06	4.11	-	-	-					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.46	0.10	1.87	-	-	-					<0.06	mg/kg	TM4/PM8
Chrysene [#]	0.48	0.07	1.68	-	-	-					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.83	0.11	3.03	-	-	-					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.42	0.07	1.42	-	-	-					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene [#]	0.25	<0.04	1.20	-	-	-					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.09	<0.04	0.33	-	-	-					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.29	0.06	1.20	-	-	-					<0.04	mg/kg	TM4/PM8
Coronene	0.05	<0.04	0.17	-	-	-					<0.04	mg/kg	TM4/PM8
PAH 6 Total [#]	2.62	0.30	11.18	-	-	-					<0.22	mg/kg	TM4/PM8
PAH 17 Total	5.23	0.82	22.96	-	-	-					<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.60	0.08	2.18	-	-	-					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.23	0.03	0.85	-	-	-					<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	-	-	-					<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	107	101	96	-	-	-					<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	41	-	-	-					<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 [#]	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	-	-	-					<0.1	mg/kg	TM36/PM12
>C6-C8 [#]	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	-	-	-					<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	-	-	-					<0.1	mg/kg	TM36/PM12
>C10-C12#	<0.2	<0.2	<0.2	-	-	-					<0.2	mg/kg	TM5/PM8/PM1
>C12-C16 [#]	<4	<4	<4	-	-	-					<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	-	-	-					<7	mg/kg	TM5/PM8/PM16
>C21-C35#	<7	<7	41	-	-	-					<7	mg/kg	TM5/PM8/PM1
>C35-C40	<7	<7	<7	-	-	-					<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	41	-	-	-					<26	mg/kg	TM5/TM38/PM8/PM12/PM1
>C6-C10	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	-	-	-					<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	-	-	-					<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	44	-	-	-					<10	mg/kg	TM5/PM8/PM16
	1	1	1	1	1	1				1			1

Client Name: Reference: Location: Contact: JE Job No.:	Ground In 7847-06-1 Rialto Cin Aisling Mo 18/11911	ovestigation 18 ema cDonnell	ns Ireland				Report : Solids: V=	Solid 60g VOC ja	r, J=250g gl	ass jar, T=p	lastic tub		
J E Sample No.	1-3	4-6	7-9	10	11	12							
Sample ID	TP01	TP03	TP05	TP01	TP02	TP05							
Dent	4.00	1.00	4.00	4 70	4.00	0.00							
Depth	1.00	1.20	1.00	1.70	1.80	2.20					Please se	e attached n	otes for all
COC No / misc											abbievi	alions and a	STOTIYITIS
Containers	VJT	VJT	VJT	т	т	т							
Sample Date	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
	001	001	001	001	- CON	001							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method
Date of Receipt	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018							INU.
TPH CWG													
Aromatics													
>C5-EC7#	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	-	-	-					<0.1	mg/kg	TM36/PM12
>EC7-EC8#	<0.1 ^{SV}	<0.1	<0.1 ^{SV}	-	-	-					<0.1	mg/kg	TM36/PM12
>EC8-EC10 [#]	<0.1	<0.1	<0.1	-	-	-					<0.1	mg/kg	TM36/PM12
>EC10-EC12#	<0.2	<0.2	<0.2	-	-	-					<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 *	<4 ³	<4	<4 ³	-	-	-					<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7°*	</td <td>22°*</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td><!--</td--><td>mg/kg</td><td></td></td>	22°*	-	-	-					</td <td>mg/kg</td> <td></td>	mg/kg	
>EC21-EC35*	54 ⁰¹	</td <td>181°°</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td><!--</td--><td>mg/kg</td><td>TM5/PM8/PM16</td></td>	181°°	-	-	-					</td <td>mg/kg</td> <td>TM5/PM8/PM16</td>	mg/kg	TM5/PM8/PM16
>EC30-EC40	17 	<1	<7	-	-	-					<1	mg/kg	
Total alighatics and aromatics(C5-40)	71	<52	203	_	_	_					<52	ma/ka	TM5/TM36/PM8/PM12/PM1
>EC6-EC10 [#]	_0_1SV	<0.1	244 _0_1SV	_	-	-					<0.1	ma/ka	TM36/PM12
>EC10-EC25	16 ^{SV}	<10	67 ^{SV}	-	-	-					<10	ma/ka	TM5/PM8/PM16
>EC25-EC35	54 ^{sv}	<10	157 ^{SV}	-	-	-					<10	ma/ka	TM5/PM8/PM16
												0.0	
MTBE [#]	<5 ^{sv}	<5	<5 ^{sv}	-	-	-					<5	ug/kg	TM31/PM12
Benzene [#]	<5 ^{SV}	<5	<5 ^{SV}	-	-	-					<5	ug/kg	TM31/PM12
Toluene #	<5 ^{\$V}	<5	<5 ^{\$V}	-	-	-					<5	ug/kg	TM31/PM12
Ethylbenzene [#]	<5 ^{\$V}	<5	<5 ^{\$V}	-	-	-					<5	ug/kg	TM31/PM12
m/p-Xylene [#]	<5 ^{SV}	<5	<5 ^{\$V}	-	-	-					<5	ug/kg	TM31/PM12
o-Xylene [#]	<5 ^{\$V}	<5	<5 ^{\$V}	-	-	-					<5	ug/kg	TM31/PM12
PCB 28 [#]	<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"	<5	<5	<5	-	-	-					<5	ug/kg	TM17/PM8
PCB 138"	<5	<5	<5	-	-	-					<5	ug/kg	TM17/PM8
PCB 153"	<0	<0	<0	-	-	-					<0	ug/kg	
PCB 180	<35	<35	<35	-	-	-					<35	ug/kg	TM17/PM8
Total 7 PCBs	<35	<35	<35	-	-	-					<35	ug/kg	TIVIT7/FIVIO
Natural Moisture Content	32.2	42.5	117.7	-	-	-					<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	24.4	29.8	54.1	-	-	-					<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	-	-	-					<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	-	-	0.1000	0.0269	1.7672					<0.0015	g/l	TM38/PM20
Chromium III	-	41.6	73.9	-	-	-					<0.5	mg/kg	NONE/NONE
Chromium III	26.0	-	-	-	-	-					<0.5	mg/kg	NONE/NONE
Total Organic Carbon [#]	NDP	5.97	11.72	-	-	-					<0.02	%	TM21/PM24
рН#	7.88	7.93	7.37	8.06	8.54	7.41					<0.01	pH units	TM73/PM11
	1	1	1	1	1	1	1		1		1		1

Client Name: Reference: Location:	Ground In 7847-06-1 Rialto Cin	vestigatior 8 ema	ns Ireland				Report : Solids: V=	Solid 60g VOC jar	r, J=250g gl	ass jar, T=p	lastic tub		
Contact: JE Job No.:	Aisling Mo 18/11911	Donnell							,	, , , , , , , , , , , , , , , , , , ,			
J E Sample No.	1-3	4-6	7-9	10	11	12							
Sample ID	TP01	TP03	TP05	TP01	TP02	TP05							
Depth	1.00	1.20	1.00	1.70	1.80	2.20					Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and ac	cronyms
Containers	VJT	VJT	VJT	т	т	т							
Sample Date	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018	27/07/2018							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method
Date of Receipt	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018							NO.
Mass of raw test portion	0.1211	0.1219	0.121	-	-	-						kg	NONE/PM17
mass of diled test portion	0.09	0.09	0.09	-	-	-						ку	

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

Ground Investigations Ireland 7847-06-18 Rialto Cinema Aisling McDonnell 18/11911

Report : CEN 10:1 1 Batch

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

J E Sample No.	1-3	4-6	7-9									
Sample ID	TP01	TP03	TP05									
Depth	1.00	1.20	1.00							Please se	o attachad n	otos for all
COC No / misc										abbrevi	ations and a	cronyms
Containors	VIT	VIT	VIT									
Containers	VJI	VJI	VJI									
Sample Date	27/07/2018	27/07/2018	27/07/2018									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1								Unite	Method
Date of Receipt	30/07/2018	30/07/2018	30/07/2018							LOD/LOIX	Offits	No.
Dissolved Antimony#	0.014	0.010	0.004							<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.14	0.10	0.04							<0.02	mg/kg	TM30/PM17
Dissolved Arsenic [#]	0.0056	<0.0025	0.0043							<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.056	<0.025	0.043							<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.028	0.018	0.066							<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.28	0.18	0.66							<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<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#	<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 [#]	0.011	0.010	<0.007							<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	0.11	0.10	<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 [#]	0.094	0.077	0.058							<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.94	0.77	0.58							<0.02	mg/kg	TM30/PM17
Dissolved Nickel [#]	0.004	0.004	<0.002							<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	0.04	0.04	<0.02							<0.02	mg/kg	TM30/PM17
Dissolved Selenium [#]	<0.003	<0.003	<0.003							<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03							<0.03	mg/kg	TM30/PM17
Dissolved Zinc [#]	0.006	0.005	<0.003							<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.06	0.05	<0.03							<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001							<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<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 *	103.94	45.14	179.53							<0.05	mg/l	TM38/PM0
Sulphate as SO4 #	1038.9	451.5	1795.9							<0.5	mg/kg	TM38/PM0
Chloride [#]	0.5	0.9	0.7							<0.3	mg/l	TM38/PM0
Chloride [#]	5	9	7							<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	11	12	6							<2	mg/l	TM60/PM0
Dissolved Organic Carbon	110	120	60							<20	mg/kg	TM60/PM0
рН	7.97	8.17	8.02							<0.01	pH units	TM73/PM0
Total Dissolved Solids *	263	163	319							<35	mg/l	TM20/PM0
Total Dissolved Solids *	2629	1630	3191							<350	mg/kg	1M20/PM0
	1	1	1	1	1	1	1	1		1		1

Exova Jones Envir	onment	al												
Client Name: Reference: Location: Contact:	Ground In 7847-06-1 Rialto Cin Aisling Mo	nvestigation 18 ema cDonnell	ns Ireland		Report : Solids: V=	EN12457 _ 60g VOC ja	_ 2 r, J=250g gla	ass jar, T=p	lastic tub					
JE Job No.:	18/11911	-							•					
J E Sample No.	1-3	4-6	7-9											
Sample ID	TP01	TP03	TP05											
Denth	1.00	4.00	4.00											
Depth	1.00	1.20	1.00									Please se abbrevi	e attached n ations and a	otes for all cronyms
COC No / misc														, .
Containers	VJT	VJT	VJT	 										
Sample Date	27/07/2018	27/07/2018	27/07/2018											
Sample Type	Soil	Soil	Soil											
Batch Number	1	1	1							Stable Non-		100100	Linite	Method
Date of Receipt	30/07/2018	30/07/2018	30/07/2018						Inert	reactive	Hazardous	LOD LOR	Units	No.
Solid Waste Analysis														
Total Organic Carbon #	NDP	5.97	11.72						3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 ^{sv}	<0.025	<0.025 ^{sv}						6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs#	<0.035	<0.035	<0.035						1	-	-	<0.035	mg/kg	TM17/PM8
	<30	<30	41						500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6"	5.23	0.30	22.96						- 100	-	-	<0.22	mg/kg	TM4/PM8
	0.20	0.02	22.00						100			40.01	ingrig	
CEN 10:1 Leachate														
Arsenic"	0.056	<0.025	0.043						0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.28	0.18	0.66						20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium "	<0.005	<0.005	<0.005						0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium "	<0.015	<0.015	<0.015						0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper"	<0.0001	<0.001	<0.07						2	0.2	100	<0.07	mg/kg	TM30/PM17
Melcury Molybdenum #	0.94	0.77	0.58						0.5	10	30	<0.02	ma/ka	TM30/PM17
Nickel [#]	0.04	0.04	<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 #	0.14	0.10	0.04						0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium *	<0.03	<0.03	<0.03						0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc "	0.06	0.05	<0.03						4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids	2629	1630	3191						4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	110	120	60						500	000	1000	<20	mg/kg	TIVIOU/FIVIO
Mass of raw test portion	0.1211	0.1219	0.121						-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	74.6	73.7	74.2						-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.869	0.868	0.869						-	-	-		I	NONE/PM17
Eluate Volume	0.7	0.7	0.75						-	-	-		I.	NONE/PM17
	_	_	_											
рН "	7.88	7.93	7.37						-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<01						1	-	_	<0.1	ma/ka	TM26/PM0
T HONO	50.1	50.1										<0.1	ilig/kg	11120/11110
Fluoride	<3	<3	<3						-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	1038.9	451.5	1795.9						1000	20000	50000	<0.5	mg/kg	TM38/PM0
Chloride #	5	9	7						800	15000	25000	<3	mg/kg	TM38/PM0

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EPH interpretation Report	EPH	Interp	oretation	Report
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Ground Investigations Ireland
7847-06-18
Rialto Cinema
Aisling McDonnell

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
18/11911	1	TP01	1.00	1-3	PAH's
18/11911	1	TP03	1.20	4-6	No interpretation possible
18/11911	1	TP05	1.00	7-9	PAH's

Client Name:	Ground Investigations Ireland
Reference:	18/06/7847
Location:	Rialto Cinema
Contact:	Aisling McDonnell

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, lie outside the scope of our UKAS accreditation.

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

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/11911	1	TP01	1.00	2	09/08/2018	General Description (Bulk Analysis)	Soil/Stones
					09/08/2018	Asbestos Fibres	Fibre Bundles
					09/08/2018	Asbestos ACM	NAD
					09/08/2018	Asbestos Type	Chrysotile
					09/08/2018	Asbestos Level Screen	less than 0.1%
18/11911	1	TP03	1.20	5	09/08/2018	General Description (Bulk Analysis)	Soil/Stones
					09/08/2018	Asbestos Fibres	NAD
					09/08/2018	Asbestos ACM	NAD
					09/08/2018	Asbestos Type	NAD
					09/08/2018	Asbestos Level Screen	NAD
18/11911	1	TP05	1.00	8	09/08/2018	General Description (Bulk Analysis)	Soil/Stones
					09/08/2018	Asbestos Fibres	NAD
					09/08/2018	Asbestos ACM	NAD
					09/08/2018	Asbestos Type	NAD
					09/08/2018	Asbestos Level Screen	NAD

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Matrix : Solid

Client Name:	Ground Investigations Ireland
Reference:	7847-06-18
Location:	Rialto Cinema
Contact:	Aisling McDonnell

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	NDP Reason
18/11911	1	TP01	1.00	1-3	Asbestos detected in sample

Notification of Deviating Samples

Client Name:Ground Investigations IrelandReference:7847-06-18Location:Rialto CinemaContact:Aisling McDonnell

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason							
	No deviating sample report results for job 18/11911												

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.: 18/11911

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

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

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

Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description		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.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	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 USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	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		MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			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 EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 $^\circ\text{C}.$			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.	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.	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+), 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes

Test Method No.	Description	Prep Method No. (if appropriate)	Description		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+), 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
ТМЗ8	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+), 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.			AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
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
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			AR	Yes
NONE	No Method Code	PM17	Modified method 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.				

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
NONE	No Method Code	PM17	Modified method 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	

Appendix - Methods used for WAC (2	2003/33	/EC)
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Leachate tests						
10l/kg· 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and					
101/ kg, 411111	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 analysis						
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					
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 due to LOI **PCB-28, PCB-52, PCB-1(D, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS 01, 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.

APPENDIX 6 – Groundwater Monitoring



GROUNDWATER MONITORING

Rialto Cinema Site

BOREHOLE	DATE	TIME	GROUNDWATER (mBGL)	Comments
BH01	23/08/2018	14.42	0.57	
BH02	23/08/2018	14.45	0.98	