southern scientific services ltd.

Trial Hole Assessment
Application for Substitute Consent for proposed development on Tulla Road, Ennis, Co. Clare

Requested By:	Valley Healthcare Fund - Infrastructure Investment Fund ICAV
Prepared By:	Michael Murphy Southern Scientific Services Ltd
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Report Prepared By	Michael Murphy	Michael Murphy
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Introduction

The purpose of the trial hole assessment is to determine if waste material is present in the material underground and to give an estimation of proportion and also to categorise the soil component of the waste in one of three categories, inert, stable non-reactive, or hazardous in accordance with the waste acceptance criteria directive 1999/31/EU and accompanying regulations.

Site description

The site is relatively flat, with a slight elevation 0.75m over the developed ground, a residential area, to the east, but roughly at the same level as the developed lands to the west, along the Tulla Rd. The ground is made up of deposited materials mainly inert material such as soil, stone, gravel and boulders. A surface drain at the eastern edge of the site runs along the circumference of the site towards the Fergus channel. The drain is approximately 0.75m-1m deep, below existing ground level. It was dry on the day of observation 14th January 2022. It was populated by mature vegetation of wetland species, predominantly soft rush and some iris.

The site itself is free draining, with no signs of ponding, or saturation. Vegetation types confirm the free draining nature of the soil. Trial hole data confirms this, with much evidence of stone, gravel and boulders rather than heavy clays.

Groundwater was observed at 2.8-3.4metres below existing ground level, within the interface of the made-up ground and the original native ground. Trial hole evidence indicates that the original native ground was not well drained and there is evidence in the level of peat in trial holes 3,4, and 5 to suggest that the virgin ground was saturated for much of the time. Groundwater direction of flow is inevitably towards the Fergus channel. Groundwater flow is slow by virtue of the flat terrain, the proximity to the tidal Fergus channel, and the general topography of the region within and outside the town being prone to long periods of saturation to ground surface in the native terrain.

Trial Hole Assessment

Five trial holes were excavated on-site on the 14th January 2022. The location of the trial holes on-site is presented in Figure 1 below. The trial hole locations were selected to best represent the size and shape of the site. Trial holes were excavated to approximately 6 metres, and approximately 2 m x 4 m in surface dimension. During each 1 meter of depth, the excavated material was set aside of the trial hole as a discrete sample pile. See Appendix I for site photographs and Appendix II for Trial Hole Logs. The material was examined visually for evidence of waste materials glass, ceramics, bricks, blocks, asbestos rope or insulation, plastic, metals, fabrics, cardboard, degradable waste, electrical devices, and any other extraneous objects or signs that could be construed as waste in the meaning of the term defined in regulations. A soil description was made using standard procedures, e.g soil structure, texture, colour, compaction, mottling, bedding planes, water ingress etc. All observations and measurements were entered in a trial hole log. The trial hole log is presented in appendix II. At each 1 meter depth, a methane gas measurement was taken using a methane gas monitoring measuring down to 10ppm. Once the soil observations and characterisations were completed and recorded, the soil piles were mixed initially using the bucket of the excavator. Coning and quartering was used to reduce the size of the pile to a quantity that could be managed with a hand tool. Further coning and quartering was carried out until a 5kg sample was isolated. This sample was transferred to a plastic bag for transport to the laboratory. This procedure was repeated for each of the 5 trial holes. A total of 25 samples were collected at the site.

Figure 1. Location of 5 trial holes on site.

Laboratory analysis

Further coning and quartering occurred in the laboratory to reduce each sample size to about 2kg. A portion of each sample was placed in large flat trays for air drying over two to three days in a convection oven at 40°C. The remainder of the sample was retained. Dried samples were sieved through a 2mm sieve to exclude gravel. WAC analysis was performed as prescribed directive 1999/31/EU known as the Waste Acceptance Criteria (WAC). The analytical method for analysis of metals in soil/sediment that is best suited to the guide values for the Waste Acceptance Criteria (WAC) is the water based leaching method, BS EN 12457-3.

Methodologies for other test parameters are as follows:

(a) PAH/PCB/TBT/DBT/Pesticides: adopted from EPA methods 1699,3550 and 8270; GCMSMS
(b) Pesticides: (MCPA/acid herbicides) UHP LCMSMS adopted from USEPA 8318, 8321A and 8321B.
(c) Solvents: GCMS Headspace based on USEPA 624

(d) TOC/TN/TIC (i) TOC analysis in liquid samples by Standard Methods for the examination of water and wastewater, APHA, 2021; TC/TIC/ TN analysis by Leco elemental analyser.

(e) Organic matter: Furnace gravimetric method.

Discussion of Results

All 25 samples were analysed for the 58 tests that make up the WAC criteria (see Appendix III) for deciding on whether to categorise soil **as inert, stable non-reactive or hazardous**. The limits of the WAC directive are shown in tables 1 and 2 below. For the convenience of viewing, the data at a glance all of the data is presented in Tables 3 to7 which show test parameters in column 1 on the left-hand side, sample identifications (e.g TR1.1 is trial hole 1 sample depth 0-1m below ground level). Columns on the right-hand side show the WAC limit values, where green shading represents the inert limits, yellow shading represents the stable non-reactive limits, and red represents the non-hazardous limits. The central body of the excel sheet shows the individual data values, where those shaded in green are those within the inert limit, those shaded on yellow within the stable non-reactive limit and those shaded in red represent those within the hazardous limit.

Table 1 Metal in soil concentration guide values based on WAC Directive and determined by BS EN 12457-parts 1-3.

Metals, inorganic elements and ions and organics in Eluate expressed as mg/kg from a 10:1 eluate preparation of the soil/sediment with water as per EN 12457-part 2

Parameter	Inert waste	Stable Non-reactive hazardous waste	Hazardous Waste
Arsenic,As	0.5	2	25
Barium,Ba	20	100	300
Cadmium,Cd	0.04	1	5
Chromium,Cr	0.5	10	70
Copper,Cu	2	50	100
Mercury,Hg	0.01	0.2	2
Molybdenum,Mo	0.5	10	30
Nickel,Ni	0.4	10	40

Parameter	Inert waste	Stable Non-reactive hazardous waste	Hazardous Waste
Lead,Pb	0.5	10	50
Antimony,Sb	0.06	0.7	5
Selenium,Se	0.1	0.5	7
Zinc, Zn	4	50	200
Chloride,Cl	800	15000	25000
Fluoride,F	10	150	500
Sulphate as SO4	1000	20000	50000
Total dissolved solids (TDS)	4000	60000	100000
Phenol Index	1	-	-
Dissolved Organic Carbon (DOC)	500	800	1000

Table 2 Substances that characterise soils/sediment/waste as inert or otherwise based on direct analysis. Concentration guide values based on WAC Directive.

Parameter	Inert as per WAC	Stable non-reactive hazardous as per WAC	Hazardous waste as per WAC	Dutch Intervention value
Total Organic Carbon, w/w %	3	5	6	-
Loss on ignition %	-	-	10	-
Benzene, Xylene, Toluene, Ethylbenzene; BTEX mg/kg	6	-	-	Benzene 1.1 Ethylbenzene 110 Toluene 320 Xylenes 17
Polychlorinated Byphenyls (7 congeners) mg/kg	1	-	-	1

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Parameter	Inert as per WAC	Stable non-reactive hazardous as per WAC	Hazardous waste as per WAC	Dutch Intervention value
Mineral oils (C10-C40) mg/kg	500	-	-	5000
Polyaromatic hydrocarbons (14-16 congeners) mg/kg	100	-	-	40
pH	-	>6	-	
Acid neutralisation capacity, pH4, mol/kg	-	To be evaluated	To be evaluated	
Acid neutralisation capacity, pH 7, mol/kg	-	To be evaluated	To be evaluated	
Organotin pesticides TBT,DBT mg/kg	-	-	-	2.4
MCPA pesticide,mg/kg	-	-	-	4
Organochlorines mg/kg	-	-	-	Chlordane 4 DDT1.7 DDE2.3 DDD34 Aldrin 0.32 Drins Sum 4 Endosulphan 4 Alpha HCH 17 Beta HCH 1.6 Lindane 1.2 Heptachlor 4 Heptachlor epoxide 4

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Parameter	Inert as per WAC	Stable non-reactive hazardous as per WAC	Hazardous waste as per WAC	Dutch Intervention value
Triazine pesticides,mg/kg	-	-	-	Atrazine 7.1
Carbamate pesticides mg/kg	-	-	-	Carbaryl 0.45 Carbofuran 0.017

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Table 3. Test Parameters for Trial Hole 1

	Job Number	22-16786									
	Sample ID	53382	53383	53384	53385	53386	53387	53388	53389	53390	53391
	Client Sample Reference	TRH 1.1 - 0.1m	TRH 1.1 - 0.1m	TRH 1.2 - 1-2m	TRH 1.2 - 1-2m	TRH 1.3 - 2-3m	TRH 1.3 - 2-3m	TRH 1.4 - 3.4m	TRH 1.4 - 3.4m	TRH 1.5 - 4-5m	TRH 1.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Antimony	mg/Kg d.w		< 0.01		< 0.01		0.01		0.02		0.02
Arsenic	mg/Kg d.w		0.02		0.01		0.02		0.04		0.03
Barium (Ba)	mg/Kg d.w		0.66		0.08		0.26		0.20		0.21
Benzene	mg/Kg d.w	< 0.02		< 0.02		< 0.02		< 0.02		< 0.02	
Cadmium	mg/Kg d.w		< 0.005		< 0.005		< 0.005		< 0.005		< 0.005
Chloride	mg/Kg d.w		28.1		25.5		7.8		17.6		30.3
Chromium	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Copper	mg/Kg d.w		0.14		0.04		0.06		0.08		0.17
Dissolved Organic Carbon (DOC)	mg/Kg d.w		114.0		84.8		48.8		94.2		157.4
Ethylbenzene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	
Fluoride	mg/Kg d.w		2.8		2.5		2.1		2.0		2.1
Lead	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mercury	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mineral Oil (C10-C40)	mg/Kg d.w	186		91		104		79		< 20	
Molybdenum (Mo)	mg/Kg d.w		0.05		0.02		0.01		0.02		0.07
Nickel	mg/Kg d.w		0.02		< 0.01		< 0.01		0.01		0.02
PCB BZ #101	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #118	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #138	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #153	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #180	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #28	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #52	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
Phenol Index	mg/Kg d.w		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0
Selenium	mg/Kg d.w		0.02		< 0.01		< 0.01		< 0.01		0.02
Sulphate	mg/Kg d.w		117.7		100.7		2441.0		243.6		189.4
Total BTEX	mg/Kg d.w	< 0.13		< 0.13		< 0.13		< 0.13		< 0.13	

	Job Number	22-16786									
	Sample ID	53382	53383	53384	53385	53386	53387	53388	53389	53390	53391
	Client Sample Reference	TRH 1.1 - 0.1m	TRH 1.1 - 0.1m	TRH 1.2 - 1-2m	TRH 1.2 - 1-2m	TRH 1.3 - 2-3m	TRH 1.3 - 2-3m	TRH 1.4 - 3.4m	TRH 1.4 - 3.4m	TRH 1.5 - 4-5m	TRH 1.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Total Dissolved Solids (TDS)	mg/Kg d.w		800.0		630.0		2820.0		730.0		950.0
Total Organic Carbon (TOC)	% w/w	4.48		2.47		1.27		1.91		4.66	
Total PAH's	mg/Kg d.w	0.66		0.99		< 0.48		< 0.48		< 0.48	
Zinc	mg/Kg d.w		0.22		< 0.01		0.05		0.09		0.11
o-Xylene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

Table 4. Test Parameters for Trial Hole 2

	Job Number	22-16786									
	Sample ID	53392	53393	53394	53395	53396	53397	53398	53399	53400	53401
	Client Sample Reference	TRH 2.1 - 0-1m	TRH 2.1 - 0-1m	TRH 2.2 - 1-2m	TRH 2.2 - 1-2m	TRH 2.3 - 2-3m	TRH 2.3 - 2-3m	TRH 2.4 - 3-4m	TRH 2.4 - 3-4m	TRH 2.5 - 4-5m	TRH 2.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Antimony	mg/Kg d.w		0.02		< 0.01		< 0.01		0.01		0.01
Arsenic	mg/Kg d.w		0.02		0.03		0.02		0.02		0.02
Barium (Ba)	mg/Kg d.w		0.21		0.19		0.15		0.17		0.13
Benzene	mg/Kg d.w	< 0.02		< 0.02		< 0.02		< 0.02		< 0.02	
Cadmium	mg/Kg d.w		< 0.005		< 0.005		< 0.005		< 0.005		< 0.005
Chloride	mg/Kg d.w		20.3		22.8		22.5		17.1		91.2
Chromium	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		0.01
Copper	mg/Kg d.w		0.07		0.08		0.08		0.06		0.18
Dissolved Organic Carbon (DOC)	mg/Kg d.w		62.7		89.2		98.1		57.8		327.0
Ethylbenzene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

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	Job Number	22-16786									
	Sample ID	53392	53393	53394	53395	53396	53397	53398	53399	53400	53401
	Client Sample Reference	TRH 2.1 - 0-1m	TRH 2.1 - 0-1m	TRH 2.2 - 1-2m	TRH 2.2 - 1-2m	TRH 2.3 - 2-3m	TRH 2.3 - 2-3m	TRH 2.4 - 3-4m	TRH 2.4 - 3-4m	TRH 2.5 - 4-5m	TRH 2.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Fluoride	mg/Kg d.w		2.2		2.1		2.3		2.1		3.9
Lead	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mercury	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mineral Oil (C10-C40)	mg/Kg d.w	< 20		139		46		38		< 20	
Molybdenum (Mo)	mg/Kg d.w		0.06		0.03		0.02		0.02		0.05
Nickel	mg/Kg d.w		0.01		0.01		0.01		0.01		0.03
PCB BZ #101	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #118	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #138	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #153	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #180	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #28	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #52	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
Phenol Index	mg/Kg d.w		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0
Selenium	mg/Kg d.w		< 0.01		< 0.01		< 0.01		0.03		0.02
Sulphate	mg/Kg d.w		100.4		118.8		96.6		479.5		185.7
Total BTEX	mg/Kg d.w	< 0.13		< 0.13		< 0.13		< 0.13		< 0.13	
Total Dissolved Solids (TDS)	mg/Kg d.w		760.0		680.0		710.0		710.0		1100.0
Total Organic Carbon (TOC)	% w/w	4.00		4.97		2.10		4.62		9.15	
Total PAH's	mg/Kg d.w	< 0.48		< 0.48		< 0.48		< 0.48		< 0.48	
Zinc	mg/Kg d.w		0.18		0.06		0.06		0.11		0.20
o-Xylene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

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Table 5. Test Parameters for Trial Hole 3

	Job Number										
	Sample ID	53402	53403	53404	53405	53406	53407	53408	53409	53410	53411
	Client Sample Reference	TRH 3.1 - 0-1m	TRH 3.1 - 0-1m	TRH 3.2 - 1-2m	TRH 3.2 - 1-2m	TRH 3.3 - 2-3m	TRH 3.3 - 2-3m	TRH 3.4 - 3-4m	TRH 3.4 - 3-4m	TRH 3.5 - 4-5m	TRH 3.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Antimony	mg/Kg d.w		< 0.01		< 0.01		0.02		0.02		0.01
Arsenic	mg/Kg d.w		0.02		0.02		0.02		0.02		0.02
Barium (Ba)	mg/Kg d.w		0.49		0.13		0.26		0.07		0.33
Benzene	mg/Kg d.w	< 0.02		< 0.02		< 0.02		< 0.02		< 0.02	
Cadmium	mg/Kg d.w		< 0.005		< 0.005		< 0.005		< 0.005		< 0.005
Chloride	mg/Kg d.w		15.8		21.6		23.0		15.8		24.1
Chromium	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Copper	mg/Kg d.w		0.14		0.11		0.08		0.06		0.17
Dissolved Organic Carbon (DOC)	mg/Kg d.w		69.8		92.4		91.4		68.2		101.9
Ethylbenzene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	
Fluoride	mg/Kg d.w		2.1		2.2		2.1		1.8		2.4
Lead	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mercury	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mineral Oil (C10-C40)	mg/Kg d.w	37		< 20		< 20		< 20		< 20	
Molybdenum (Mo)	mg/Kg d.w		0.02		0.01		0.02		0.01		0.20
Nickel	mg/Kg d.w		< 0.01		< 0.01		0.02		0.02		0.03
PCB BZ #101	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #118	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #138	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #153	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #180	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #28	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #52	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
Phenol Index	mg/Kg d.w		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0
Selenium	mg/Kg d.w		0.08		0.01		< 0.01		< 0.01		0.01
Sulphate	mg/Kg d.w		977.5		519.1		269.9		54.9		486.5
Total BTEX	mg/Kg d.w	< 0.13		< 0.13		< 0.13		< 0.13		< 0.13	

	Job Number									
	Sample ID	53402	53403	53404	53405	53406	53407	53408	53409	53410	53411
	Client Sample Reference	TRH 3.1 - 0-1m	TRH 3.1 - 0-1m	TRH 3.2 - 1-2m	TRH 3.2 - 1-2m	TRH 3.3 - 2-3m	TRH 3.3 - 2-3m	TRH 3.4 - 3-4m	TRH 3.4 - 3-4m	TRH 3.5 - 4-5m	TRH 3.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Total Dissolved Solids (TDS)	mg/Kg d.w		1480.0		1100.0		910.0		520.0		1160.0
Total Organic Carbon (TOC)	% w/w	3.15		2.45		4.24		4.32		6.09	
Total PAH's	mg/Kg d.w	0.99		< 0.48		< 0.48		< 0.48		< 0.48	
Zinc	mg/Kg d.w		0.27		0.12		0.10		0.04		0.17
o-Xylene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

Table 6. Test Parameters for Trial Hole 4

	Job Number										
	Sample ID	53412	53413	53414	53415	53416	53417	53418	53419	53420	53421
	Client Sample Reference	TRH 4.1 - 0-1m	TRH 4.1 - 0-1m	TRH 4.2 - 1-2m	TRH 4.2 - 1-2m	TRH 4.3 - 2-3m	TRH 4.3 - 2-3m	TRH 4.4 - 3-4m	TRH 4.4 - 3-4m	TRH 4.5 - 4-5m	TRH 4.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Antimony	mg/Kg d.w		< 0.01		< 0.01		< 0.01		0.01		0.01
Arsenic	mg/Kg d.w		0.01		0.02		0.01		0.02		0.02
Barium (Ba)	mg/Kg d.w		0.23		0.13		0.16		0.52		0.28
Benzene	mg/Kg d.w	< 0.02		< 0.02		< 0.02		< 0.02		< 0.02	
Cadmium	mg/Kg d.w		< 0.005		< 0.005		< 0.005		< 0.005		< 0.005
Chloride	mg/Kg d.w		48.3		49.2		37.1		66.6		81.4
Chromium	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Copper	mg/Kg d.w		0.14		0.09		0.09		0.12		0.15
Dissolved Organic Carbon (DOC)	mg/Kg d.w		138.1		126.3		82.1		223.1		264.6
Ethylbenzene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

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	Job Number										
	Sample ID	53412	53413	53414	53415	53416	53417	53418	53419	53420	53421
	Client Sample Reference	TRH 4.1 - 0-1m	TRH 4.1 - 0-1m	TRH 4.2 - 1-2m	TRH 4.2 - 1-2m	TRH 4.3 - 2-3m	TRH 4.3 - 2-3m	TRH 4.4 - 3-4m	TRH 4.4 - 3-4m	TRH 4.5 - 4-5m	TRH 4.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Fluoride	**mg/Kg d.w**		2.3		2.2		1.7		2.7		2.9
Lead	**mg/Kg d.w**		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mercury	**mg/Kg d.w**		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mineral Oil (C10-C40)	**mg/Kg d.w**	51		44		< 20		< 20		< 20	
Molybdenum (Mo)	**mg/Kg d.w**		0.05		0.03		0.02		0.07		0.10
Nickel	**mg/Kg d.w**		0.01		< 0.01		0.02		0.03		0.02
PCB BZ #101	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #118	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #138	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #153	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #180	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #28	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #52	**mg/Kg d.w**	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
Phenol Index	**mg/Kg d.w**		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0
Selenium	**mg/Kg d.w**		0.01		0.02		< 0.01		0.01		0.01
Sulphate	**mg/Kg d.w**		149.6		148.7		59.3		311.0		354.7
Total BTEX	**mg/Kg d.w**	< 0.13		< 0.13		< 0.13		< 0.13		< 0.13	
Total Dissolved Solids (TDS)	**mg/Kg d.w**		830.0		910.0		710.0		1440.0		1490.0
Total Organic Carbon (TOC)	**% w/w**	4.59		3.85		5.49		9.09		9.43	
Total PAH's	**mg/Kg d.w**	< 0.48		< 0.48		< 0.48		< 0.48		< 0.48	
Zinc	**mg/Kg d.w**		0.25		0.10		0.10		0.48		0.27
o-Xylene	**mg/Kg d.w**	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

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Table 7. Test Parameters for Trial Hole 5

	Job Number										
	Sample ID	53422	53423	53424	53425	53426	53427	53428	53429	53430	53431
	Client Sample Reference	TRH 5.1 - 0-1m	TRH 5.1 - 0-1m	TRH 5.2 - 1-2m	TRH 5.2 - 1-2m	TRH 5.3 - 2-3m	TRH 5.3 - 2-3m	TRH 5.4 - 3-4m	TRH 5.4 - 3-4m	TRH 5.5 - 4-5m	TRH 5.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Antimony	mg/Kg d.w		0.01		0.02		< 0.01		0.01		0.02
Arsenic	mg/Kg d.w		0.01		0.02		0.01		0.03		0.02
Barium (Ba)	mg/Kg d.w		0.08		0.13		0.14		0.25		0.29
Benzene	mg/Kg d.w	< 0.02		< 0.02		< 0.02		< 0.02		< 0.02	
Cadmium	mg/Kg d.w		< 0.005		< 0.005		< 0.005		< 0.005		< 0.005
Chloride	mg/Kg d.w		38.6		42.8		53.7		62.5		110.8
Chromium	mg/Kg d.w		< 0.01		< 0.01		< 0.01		0.02		0.01
Copper	mg/Kg d.w		0.08		0.10		0.11		0.19		0.18
Dissolved Organic Carbon (DOC)	mg/Kg d.w		123.7		115.1		109.2		221.7		582.6
Ethylbenzene	mg/Kg d.w	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	
Fluoride	mg/Kg d.w		2.0		1.9		1.6		2.7		3.3
Lead	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mercury	mg/Kg d.w		< 0.01		< 0.01		< 0.01		< 0.01		< 0.01
Mineral Oil (C10-C40)	mg/Kg d.w	48		58		< 20		< 20		179	
Molybdenum (Mo)	mg/Kg d.w		0.07		0.05		0.02		0.05		0.08
Nickel	mg/Kg d.w		< 0.01		< 0.01		0.02		0.04		0.05
PCB BZ #101	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #118	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #138	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #153	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #180	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #28	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
PCB BZ #52	mg/Kg d.w	< 0.30		< 0.30		< 0.30		< 0.30		< 0.30	
Phenol Index	mg/Kg d.w		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0
Selenium	mg/Kg d.w		0.01		0.01		< 0.01		< 0.01		0.02
Sulphate	mg/Kg d.w		633.3		472.6		151.3		131.3		253.0
Total BTEX	mg/Kg d.w	< 0.13		< 0.13		< 0.13		< 0.13		< 0.13	

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	Job Number									
	Sample ID	53422	53423	53424	53425	53426	53427	53428	53429	53430	53431
	Client Sample Reference	TRH 5.1 - 0-1m	TRH 5.1 - 0-1m	TRH 5.2 - 1-2m	TRH 5.2 - 1-2m	TRH 5.3 - 2-3m	TRH 5.3 - 2-3m	TRH 5.4 - 3-4m	TRH 5.4 - 3-4m	TRH 5.5 - 4-5m	TRH 5.5 - 4-5m
	Matirix	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10	Soil Contaminated Land	Soil Leachate 1:10
Total Dissolved Solids (TDS)	**mg/Kg d.w**		1150.0		1030.0		800.0		980.0		1700.0
Total Organic Carbon (TOC)	**% w/w**	3.68		3.00		5.99		5.46		15.54	
Total PAH's	**mg/Kg d.w**	< 0.48		< 0.48		< 0.48		< 0.48		< 0.48	
Zinc	**mg/Kg d.w**		0.02		0.14		0.09		0.29		0.36
o-Xylene	**mg/Kg d.w**	< 0.04		< 0.04		< 0.04		< 0.04		< 0.04	

As can be seen from the tables above most of the data points for the 25 samples are shaded green and therefore represent inert material and deserve no further comment.

Three related parameters namely dissolved organic carbon, (DOC); Loss on ignition, (LOI) and Total Organic Carbon (TOC), constitute the only sets of parameters that indicate stable non-hazardous or hazardous categorisations. The three parameters are related in that they refer to tests that measure carbon by different techniques. Dissolved organic carbon measures carbon dissolved in water or that can be dissolved in water. Loss on ignition measures carbon in organic matter that is released during incineration of the sample in a furnace at 550^{o} C. Total organic carbon measures the carbon content in the sample. The TOC or Loss on ignition can be used interchangeably or one or other of these tests can be omitted by choice of the analyst. The occurrence of these parameters in this instance is due to either the presence of organic matter from topsoil present in the first 1m of soil which contains carbon from decayed vegetation and accumulated carbon over the last decade or so or the presence of peat and topsoil in the virgin soil at 3-6m BGL. In any case, the DOC result, which represents the soluble organic content, can be selected in preference to the other two tests for carbon and is the guiding parameter in this instance, with a limit value of 500mg/L. All samples bar one TR5.5 are less than 500mg/L (TR 5.5 has 582mg/L which just tips it into the stable non-reactive category. This is understandable as there was quite a large proportion of peat present in this trial hole. It is to be noted that there was no evidence of organic waste of a degradable nature i.e. putrescible waste, paper or cardboard waste observed at any level in any one of the 5 trial holes. Methane was less than 10ppm at all levels in all trial holes. A range of other test parameters e.g. hydrocarbon, pesticides, polyaromatic hydrocarbons, chlorinated solvents, benzene, xylene, toluene, ethyl benzene and other toxic aromatics are safely below the threshold limits for categorisation of the material as inert.

The only other parameter that infers a stable non-reactive categorisation is sulphate in TR 1.3 at 2441.0mg/kg where the limits are 1000mg/kg inert and 20,000 for stable non-reactive. A leaching test may be required to demonstrate inert categorisation. However, TR 1.3 had no evidence of gypsum board present on observation of the excavated material. There was no evidence of sulphate reduction to sulphide in the trial hole. This would be evidenced by discolouration of material to a black colour by reaction with iron. There was no foul odour at this level, demonstrating the absence of production of sulphide by anaerobic biodegradation.

It is safe to accept that the material at this level is stable non-reactive and has no potential to degrade to form harmful sulphides.

Analysis of Ground Water

The water samples taken from each trial hole were analyzed in accordance with the groundwater regulations SI No 9 of 2010 and SI No 366 of 2016. It is to be noted that whilst the Groundwater regulations are used as the barometer of groundwater quality at the site, these regulations are more appropriate for the protection of groundwater as a resource or as a source. The groundwater beneath the site, in an urban environment, cannot be considered as either a resource or a source as it has been the subject of leaching from surface water from a built environment for centuries. Therefore, it cannot be compared strictly to the high standards required to completely satisfy the groundwater regulations.

In all 57 separate tests were carried out on each sample (see Appendix IV for full set of results). The regulations note certain groundwater parameters (see table 8) that can have both natural and anthropogenic origin. If a natural explanation for the source of the exceedance can be ascribed, then the occurrence of the level present is acceptable. As with the WAC analysis above green identifies parameters within the limits of the groundwater regulations SI No 9 of 2010 and SI No 366 of 2016, while red identifies exceedances.

Table 8. Results of Groundwater Analysis.

Parameter		Trial Hole 1	Trial Hole 2	Trial Hole 3	Trial Hole 4	Trial Hole 5	Limits as per Groundwater Regulations
1,2-Dichloroethane	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2.25 µg/l
2,4-D	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/l
Aluminium	µg/L	1221	2526	3310	5568	5038	150 µg/l
Ammonium	mg/L N	9.11	7.63	9.17	3.48	8.24	0.175 mg/L
Arsenic	µg/L	6	13	7	7	10	7.5 µg/L
Atrazine	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L
Bentazone	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L
Benzene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.75 µg/L
Chloride	mg/L	19.5	21.2	16.9	19.9	18.1	187.5 µg/L
Chromium	µg/L	6	9	13	17	16	37.5 µg/L
Conductivity	µS/cm @ 20 °C	1064	1215	1024	733	1040	1875 µS/cm @ 20 °C
Cypermethrin	µg/L	< 0.012	< 0.012	< 0.012	< 0.012	< 0.012	0.075 µg/L
Diuron	µg/L	0.006	< 0.005	0.006	< 0.005	0.019	0.075 µg/L
Glyphosate	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L
Isoproturon	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L
Lead	µg/L	15	36	15	8	17	18.75 µg/L
MCPA	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L
MCPP (Mecoprop)	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L

Parameter		Trial Hole 1	Trial Hole 2	Trial Hole 3	Trial Hole 4	Trial Hole 5	Limits as per Groundwater Regulations
Mercury	µg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.75 µg/L
Mol Reactive Phosphorus (MRP)	mg/L P	< 0.01	0.01	0.06	0.01	0.01	0.035 mg/L P
Nitrate	mg/L N	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	37.5 mg/L N
Nitrite	mg/L N	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.375 mg/L N
Simazine	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.075 µg/L
Sulphate	mg/L	14.6	248.7	140.5	62.1	147.0	187.5 µg/L
Total PAH	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.075 µg/L
Vinyl Chloride	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.375 µg/L

The following 5 parameters show exceedances of the limit values recommended in the groundwater regulations

Aluminum: Aluminum values ranged from 1221-5568 ug/L, the highest value for trial hole 4. The limit value is 150ug/L. Aluminum occur widely on several geological formation, including the rock types observed at the site, predominantly limestone. The levels fond in the samples can be taken as, from natural origin.

Ammonium: Ammonium values range from 3.48 -9.17mg/L, the highest value in trial hole 2. The limit value in the directive is 0.175mg/L. Ammonia is accorded a natural as well as an anthropogenic source in groundwater. The lower strata of the trial holes merged into original ground. This original ground possessed considerable quantities of peat, particularly in trial holes 3, 4 and 5. In any case origin of high ammonia is likely to be of natural origin, most likely from the peaty material or the original native topsoil underlying the made-up ground that is now present throughout the site.

Arsenic: Elevated levels of arsenic were found in trail hole 2 (13ug/L) and trial 5 (10ug/L). The groundwater limit value is 7.5ug/L. Arsenic, also noted in the groundwater regulations as having possible natural origin. The level is thus acceptable.

Lead: Elevated levels of lead occurred in trial hole 2 at 36ug/L. The limit value in the groundwater regulations is 18.75ug/L. Lead does occur naturally in Galena ores. The most likely source of lead in this groundwater in the trial hole is anthropogenic. Most likely caused by leaching into groundwater from the many uses of lead, both modern and traditional (lead pipes, paint, lead flashing, leaded petrol, soldering materials) in an urban setting like Ennis.

Sulphate: Elevated levels of sulphate occurred in trial hole 2, (248.7mg/L). The groundwater limit value is 187.5mg/L. Sulphate is of natural origin found in gypsum and baryte minerals and therefore likely to occur from natural origin. The level is therefore acceptable.

Conclusion

Five separate trial holes representing the site, had excavations made at 1metre levels to a depth of 6 metres. The observations at the trial holes revealed solid made-up ground down to more than 3 metres. A water table was observed across the site at 2.8-3.4metres. The site surface has good drainage to groundwater. Virgin ground occurred at 3m and below. The made-up material consisted predominantly of soil, gravel, stone and boulders, mostly limestone in origin. There was little or no waste of an extraneous nature, no traces of putrescible or degradable waste. Methane was not detected at any level at each trial hole.

A WAC suite of analysis was carried out on 25 separate samples for 57 tests per sample. All tests except for those representing carbon and one sulphate test indicated an inert waste categorisation under the WAC Directive. The presence of carbon as TOC and DOC near ground level and below 3m in the virgin soil indicate sources that are topsoil organic matter and native peat. The low DOC values demonstrate that the material represented at these levels is decidedly inert. A single elevated sulphate test result for the middle of trial hole 3 at the centre of the site infers a categorisation of the material as stable non-reactive, however, the absence of gypsum board, the absence of sulphide indicators confirms that no biodegradation has occurred and there is no potential for its occurrence into the future.

With regard to the groundwater analysis, a wide range of parameters covered by the groundwater regulations were found to be safely below the limit values imposed. These parameters include the more toxic organic and persistent organic pollutants including a range of pesticides, polyaromatic hydrocarbons, chlorinated solvents, benzene, xylene, toluene, ethyl benzene and other toxic aromatics, toxic metals such as hexavalent chromium, mercury and cadmium. Eutrophication inducing parameters phosphate and nitrate are also absent. The test parameters that were found to exceed the groundwater limits with the exception of lead have natural as well as anthropogenic sources and therefore can be considered acceptable in the present context. The occurrence of lead at a value twice the groundwater regulation limit, whilst it is not naturally occurring, is acceptable having regard to the multiple sources of lead in the urban environment.

Appendix I

This appendix contains site photos taken during the excavation of 5off trial holes at the Valley Healthcare Fund site on the Tulla Road Ennis Co Clare. Each trial hole was excavated to a depth of approximately 5 meters. The trail holes were excavated in one-meter sections and segregated into separate piles (as shown below).

Trial Hole No.1

Figure 1: Trial Hole 1, 1m

Figure 2: Trial Hole 1, 2m

Figure 3: Trial Hole 1, 3m

Figure 4: Trial Hole 1, 4m

Figure 5: Trial Hole 1, 5m

Figure 6: Illustrates trial hole 1 & shows the different horizons within the trial hole.

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Trial Hole No.2

Figure 7: Trial Hole 2, 1m

Figure 8: Trial Hole 2, 2m

Figure 9: Trial Hole 2, 3m

Figure 10: Trial Hole 2, 4m

Figure 11: Trial Hole 2, 5m

Figure 12: Illustrates trial hole 1 & shows the different horizons within the trial hole.

Trial Hole No.3

Figure 13: Trial Hole 3, 1m

Figure 14: Trial Hole 3, 2m

Figure 15: Trial Hole 3, 3m

Figure 16: Trial Hole 3, 4m

Figure 17: Trial Hole 3, 5m

Figure 18: Illustrates trial hole 3 & shows the different horizons within the trial hole.

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Trial Hole No.4

Figure 19: Trial Hole 4, 1m

Figure 20: Trial Hole 4, 2m

Figure 21: Trial Hole 4, 3m

Figure 22: Trial Hole 4, 4m

Figure 23: Trial Hole 4, 5m

Figure 24: Illustrates trial hole 4 & shows the different horizons within the trial hole.

Trial Hole No.5

Figure 25: Trial Hole 5, 1m

Figure 26: Trial Hole 5, 2m

Figure 27: Trial Hole 5, 3m

Figure 28: Trial Hole 5, 4m

Figure 29: Trial Hole 5, 5m

Figure 30: Illustrates trial hole 5 & shows the different horizons within the trial hole.

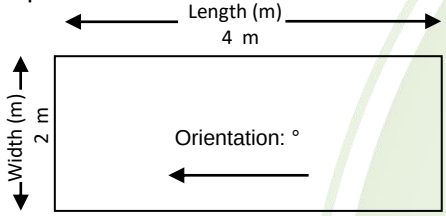
Appendix II – Trial Hole Logs

Southern Scientific Services Consultancy and testing facility	**Contract Name:** Tulla Road		**Client:** HRA Planning Consultants			**Trial Hole ID:** TH01
	Proposal no. 21P-305	Date Started: 14/01/22	Logged by: MM & BOC	Logged by: MM & BOC	Checked by:	
Trial Hole Log	Easting: 134764	Northing: 178577	Ground level: 10m OD	Plant Used: Komatsu SAA4D95LE-7	Date Printed:	Scale:
Weather: Dry, mild, light breeze		Hole Termination: 6m		Stability:		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) Thickness	Legend	Strata Description		
0-1m	1.1					Topsoil. 10-20% Limestone No glass, metal, plastic waste observed. Small quantities of broken pipe <2% Methane results recorded at this level = less than 10ppm[1].		
1-2m	1.2					Stone & gravel, predominately limestone (40-50%). Methane results recorded at this level = less than 10ppm[1]. No Waste		
2-3m	1.3					Stone & gravel (30-40%) Waste observed included extraneous quantities of plastic, wire, cloth <2% Methane results recorded at this level = less than 10ppm[1].	↓ 3.4m BGL	
3-4m	1.4					Topsoil & subsoil. Stone 30%,gravel & limestone Methane results recorded at this level = less than 10ppm[1]. No waste observed		
4-5m	1.5					Stone 30%,gravel & limestone No waste observed Methane results recorded at this level = less than 10ppm[1].		

Dimensions:

Final Depth: 6m



General Remarks:

See Appendix I for relevant site photos (Figures 1-6)
(1) Methane gas monitoring of trial hole: An RSGD38 Methane gas analyser was attached to a telescopic pole and used to monitor methane levels within the trial holes. The objective of the exercise was to detect methane ingress into the open trial arising from open horizontal channels within the profile. The Intake probe of the meter was positioned to the trial hole vertical wall and moved slowly in a horizontal plane around the vertical walls of the trial hole. This is exercise was repeated at each 1 metre level, starting at the top 1-2m level and working downwards.
Methane Trigger value = 10,000ppm.The Lower Exposure Limit for Methane = 50,000ppm.
Miscellaneous waste <1% and include some brick & plastic, also small quantities of timber in degraded state. No glass, electrical goods, Asbestos, or organic waste observed.
Gravel content high in top 3m. No bedrock @ 6m
Trial pit backfilled with arisings on completion.

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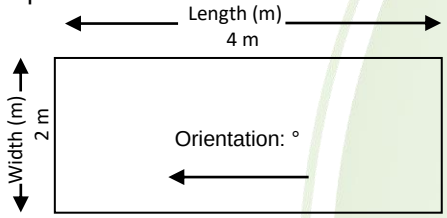
Southern Scientific Services Consultancy and testing facility	**Contract Name:** Tulla Road		**Client:** HRA Planning Consultants		**Trial Hole ID:** TH02
	Proposal no. 21P-305	Date Started: 14/01/22	Logged by: MM & BOC	Logged by: MM & BOC	Checked by:
Trial Hole Log	Easting: 134773	Northing: 178559	Ground level: 10m OD	Plant Used:	Date Printed: / Scale:
Weather: Dry, mild, light breeze	Hole Termination: 5m		Stability:		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) Thickness	Legend	Strata Description		
0-1m	2.1					Stone (30-40%), Gravel & Soil. No waste observed Grey in colour Methane results recorded at this level = less than 10ppm[1].		
1-2m	2.2					Stone & gravel (30%), predominately limestone Waste <1% (sewer pipe) Methane results recorded at this level = less than 10ppm[1].		
2-3m	2.3					Stone & gravel (30-40%) Boulders (size 0.2m-0.3m) Grey in colour Waste: strip of dampcourse (<0.5kgs) Methane results recorded at this level = less than 10ppm[1].	2.9m BGL	
3-4m	2.4					Wet stone (30-40%), gravel & soil Boulders (size 0.1m-0.4m) Predominantly limestone No waste observed Methane results recorded at this level = less than 10ppm[1].		
4-5m	2.5					Soil observed in 3 layers Topsoil above subsoil, with peat observed below these soil layers Large boulder present No waste observed Methane results recorded at this level = less than 10ppm[1].		

Dimensions:

Final Depth: 5m



General Remarks:

See Appendix I for relevant site photos (Figures 7-12)
Miscellaneous waste <1% and include some brick & plastic.
No glass, Asbestos or organic waste observed.
Trial pit backfilled with arisings on completion.

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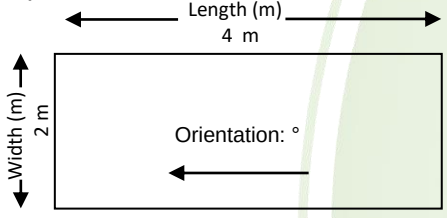
Southern Scientific Services Consultancy and testing facility	**Contract Name:** Tulla Road		**Client:** HRA Planning Consultants		**Trial Hole ID:** TH03
	Proposal no. 21P-305	Date Started: 14/01/22	Logged by: MM & BOC	Logged by: MM & BOC	Checked by:
Trial Hole Log	Easting: 134785	Northing: 178578	Ground level: 10m OD	Plant Used:	Date Printed: / Scale:
Weather: Dry, mild, light breeze	Hole Termination: 5m		Stability:		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) Thickness	Legend	Strata Description		
0-1m	3.1					Boulders, gravel, sand & soil. Boulders (size 0.3m-0.4m) No waste observed Grey in colour, no dark discolouration. Methane results recorded at this level = less than 10ppm[1]		
1-2m	3.2					Boulders (10%), gravel, sand & soil. Boulders (size 0.2m-0.4m) Metal pipe observed (1kg) Soil brown & compact. Methane results recorded at this level = less than 10ppm[1]		
2-3m	3.3					Stone ,gravel (30-40%) & sand (30%) Boulders (size 0.2m-0.4m) Grey in colour Waste: rags, no other waste observed. Methane results recorded at this level = less than 10ppm[1]	2.8m BGL	
3-4m	3.4					Boulders, gravel & sand (30%), wet Boulders (size 0.15m-0.3m) No waste observed Grey in colour Methane results recorded at this level = less than 10ppm[1]		
4-5m	3.5					Boulders (30-40%), gravel & sand, wet Boulders (size 0.2m-0.4m) No waste of any kind observed Grey in colour Methane results recorded at this level = less than 10ppm[1]		

Dimensions:

Final Depth: 5m



General Remarks:

See Appendix I for relevant site photos (Figures 13-18)
Miscellaneous waste <1% and include some brick & plastic.
No glass, domestic appliances, Asbestos or organic waste was observed.
Some ingress of water @ 2.4m.
No bedding plane.
Trial pit backfilled with arisings on completion.

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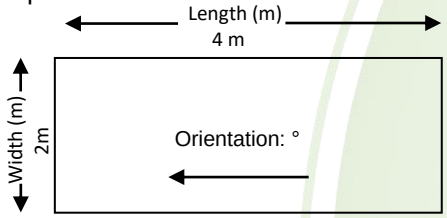
Southern Scientific Services Consultancy and testing facility	**Contract Name:** Tulla Road		**Client:** HRA Planning Consultants		**Trial Hole ID:** TH04
	Proposal no. 21P-305	Date Started: 14/01/22	Logged by: MM & BOC	Logged by: MM & BOC	Checked by:
Trial Hole Log	Easting: 134809	Northing: 178583	Ground level: 10m OD	Plant Used:	Date Printed: / Scale:
Weather: Dry, mild, light breeze	Hole Termination: 5m		Stability:		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) Thickness	Legend	Strata Description		
0-1m	4.1					Boulders(30-40%), (size 0.5m-0.7m). Waste: Plastic % aluminium pieces (<1%) Dark grey in colour. Methane results recorded at this level = less than 10ppm[1]		
1-2m	4.2					Boulders (20-30%), soil and some clay. Boulder (size 0.5m-0.7m) Waste: Metal rebar & broke pipe (<1%) Grey/brown in colour. Methane results recorded at this level = less than 10ppm[1]	↓ 2.9m BGL	
2-3m	4.3					Gravel (75%), boulders, wet. Boulders (size 0.1m-0.3m) Grey in colour No waste observed. Methane results recorded at this level = less than 10ppm[1]		
3-4m	4.4					Boulders (30-40%), peat & gravel Boulders (size >0.75m) No waste observed Methane results recorded at this level = less than 10ppm[1]		
4-5m	4.5					Boulders (30-50%), gravel (30%) No waste observed Methane results recorded at this level = less than 10ppm[1]		

Dimensions:

Final Depth: 5m



General Remarks:

See Appendix I for relevant site photos (Figures 19-24)
Grey topsoil to 0.8m.
0.8-2.0m Grey brown soils with stone.
2.0-3.0 soil & stone, >30% boulders
>30.0m virgin ground
No glass, Asbestos or organic waste observed.
Trial pit backfilled with arisings on completion.

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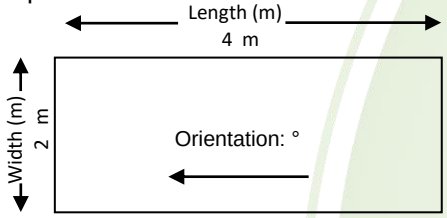
Southern Scientific Services Consultancy and testing facility	**Contract Name:** Tulla Road		**Client:** HRA Planning Consultants		**Trial Hole ID:** TH05
	Proposal no. 21P-305	Date Started: 14/01/22	Logged by: MM & BOC	Logged by: MM & BOC	Checked by:
Trial Hole Log	Easting: 134798	Northing: 178602	Ground level: 10m OD	Plant Used:	Date Printed: / Scale:
Weather: Dry, mild, light breeze	Hole Termination: 5m		Stability:		

Samples & In Situ Testing			Strata Details				Water	Backfill
Depths	Sample ID	Test Result	Reduced Level	Depth (m) Thickness	Legend	Strata Description		
0-1m	5.1					0.3m of red clay. 0.4m of grey clay & some stone. Boulders (30-40%) Boulders (size 0.3m-0.5m) Waste: strips of plastic sheet <1%. Methane results recorded at this level = less than 10ppm[1]		
1-2m	5.2					Stone (30%), soil & some clay. No waste observed Grey in colour Methane results recorded at this level = less than 10ppm[1]	2.0m BGL	
2-3m	5.3					Stone (30-50%) & gravel No waste observed Grey in colour Methane results recorded at this level = less than 10ppm[1]		
3-4m	5.4					Stone (30-50%) & gravel No waste observed Grey in colour Methane results recorded at this level = less than 10ppm[1]		
4-5m	5.5					Peat & soil No waste observed Methane results recorded at this level = less than 10ppm[1]		

Dimensions:

Final Depth: 5m



General Remarks:

See Appendix I for relevant site photos (Figures 25-30)
Tree roots observed @ 1.2m
No large waste, including domestic appliances, no rages, glass, Asbestos or metal observed.
Trial pit backfilled with arisings on completion.

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Appendix III - Complete WAC Results

Analytical Report	
Project	Trial Hole Analysis - Tulla Rd Ennis
Sampler	M Murphy SSS Ltd
Date Sampled	14/01/2022
Sample Type	Soil

Southern Scientific Services Consultancy and testing facility		Acenaphthene	Acenaphthylene	Anthracene	Antimony	Antimony	Arsenic	Arsenic	Barium (Ba)	Barium	Benz(a)anthracene	Benzene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Cadmium	Cadmium	Chloride	Chloride	Chromium	Chromium	Chrysene
Client Sample Reference	**Matirix**	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/L	mg/Kg d.w	mg/L	mg/L	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/L	mg/Kg d.w	mg/L	mg/Kg d.w	mg/L	mg/Kg d.w
TRH 1.1 - 0.1m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							0.04	< 0.02	0.10	0.06	0.06	0.12							0.05
TRH 1.1 - 0.1m	Soil Leachate 1:10				< 0.01	< 0.001	0.02	0.002	0.066	0.66							< 0.005	< 0.0005	28.1	2.8	< 0.01	< 0.001	
TRH 1.2 - 1-2m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							0.07	< 0.02	0.13	0.15	0.07	0.13							0.08
TRH 1.2 - 1-2m	Soil Leachate 1:10				< 0.01	< 0.001	0.01	0.001	0.008	0.08							< 0.005	< 0.0005	25.5	2.6	< 0.01	< 0.001	
TRH 1.3 - 2-3m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							0.03	< 0.02	0.06	0.04	< 0.03	0.07							0.04
TRH 1.3 - 2-3m	Soil Leachate 1:10				0.01	0.001	0.02	0.002	0.026	0.26							< 0.005	< 0.0005	7.8	0.8	< 0.01	< 0.001	
TRH 1.4 - 3.4m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							0.03	< 0.02	0.05	0.06	< 0.03	< 0.03							0.03
TRH 1.4 - 3.4m	Soil Leachate 1:10				0.02	0.002	0.04	0.004	0.020	0.20							< 0.005	< 0.0005	17.6	1.8	< 0.01	< 0.001	
TRH 1.5 - 4-5m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							0.03	< 0.02	0.09	0.10	0.05	0.09							0.04
TRH 1.5 - 4-5m	Soil Leachate 1:10				0.02	0.002	0.03	0.003	0.021	0.21							< 0.005	< 0.0005	30.3	3.0	< 0.01	< 0.001	

Southern Scientific Services Consultancy and testing facility		Acenaphthene	Acenaphthylene	Anthracene	Antimony	Antimony	Arsenic	Arsenic	Barium (Ba)	Barium	Benz(a)anthracene	Benzene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Cadmium	Cadmium	Chloride	Chloride	Chromium	Chromium	Chrysene
TRH 2.1 - 0-1m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 2.1 - 0-1m	Soil Leachate 1:10				0.02	0.002	0.02	0.002	0.021	0.21							< 0.005	< 0.0005	20.3	2.0	< 0.01	< 0.001	
TRH 2.2 - 1-2m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 2.2 - 1-2m	Soil Leachate 1:10				< 0.01	< 0.001	0.03	0.003	0.019	0.19							< 0.005	< 0.0005	22.8	2.3	< 0.01	< 0.001	
TRH 2.3 - 2-3m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 2.3 - 2-3m	Soil Leachate 1:10				< 0.01	< 0.001	0.02	0.002	0.015	0.15							< 0.005	< 0.0005	22.5	2.3	< 0.01	< 0.001	
TRH 2.4 - 3-4m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 2.4 - 3-4m	Soil Leachate 1:10				0.01	0.001	0.02	0.002	0.017	0.17							< 0.005	< 0.0005	17.1	1.7	< 0.01	< 0.001	
TRH 2.5 - 4-5m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 2.5 - 4-5m	Soil Leachate 1:10				0.01	0.001	0.02	0.002	0.013	0.13							< 0.005	< 0.0005	91.2	9.1	0.01	0.001	
TRH 3.1 - 0-1m	Soil Contaminated Land	< 0.03	< 0.03	0.04							0.08	< 0.02	0.11	0.06	0.05	0.07							0.08
TRH 3.1 - 0-1m	Soil Leachate 1:10				< 0.01	< 0.001	0.02	0.002	0.049	0.49							< 0.005	< 0.0005	15.8	1.6	< 0.01	< 0.001	
TRH 3.2 - 1-2m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 3.2 - 1-2m	Soil Leachate 1:10				< 0.01	< 0.001	0.02	0.002	0.013	0.13							< 0.005	< 0.0005	21.6	2.2	< 0.01	< 0.001	
TRH 3.3 - 2-3m	Soil Contaminated Land	0.05	< 0.03	0.08							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 3.3 - 2-3m	Soil Leachate 1:10				0.02	0.002	0.02	0.002	0.026	0.26							< 0.005	< 0.0005	23.0	2.3	< 0.01	< 0.001	
TRH 3.4 - 3-4m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 3.4 - 3-4m	Soil Leachate 1:10				0.02	0.002	0.02	0.002	0.007	0.07							< 0.005	< 0.0005	15.8	1.6	< 0.01	< 0.001	
TRH 3.5 - 4-5m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 3.5 - 4-5m	Soil Leachate 1:10				0.01	0.001	0.02	0.002	0.033	0.33							< 0.005	< 0.0005	24.1	2.4	< 0.01	< 0.001	
TRH 4.1 - 0-1m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 4.1 - 0-1m	Soil Leachate 1:10				< 0.01	< 0.001	0.01	0.001	0.023	0.23							< 0.005	< 0.0005	48.3	4.8	< 0.01	< 0.001	
TRH 4.2 - 1-2m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 4.2 - 1-2m	Soil Leachate 1:10				< 0.01	< 0.001	0.02	0.002	0.013	0.13							< 0.005	< 0.0005	49.2	4.9	< 0.01	< 0.001	
TRH 4.3 - 2-3m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03

Southern Scientific Services Consultancy and testing facility		Acenaphthene	Acenaphthylene	Anthracene	Antimony	Antimony	Arsenic	Arsenic	Barium (Ba)	Barium	Benz(a)anthracene	Benzene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene	Benzo(k)fluoranthene	Cadmium	Cadmium	Chloride	Chloride	Chromium	Chromium	Chrysene
TRH 4.3 - 2-3m	Soil Leachate 1:10				< 0.01	< 0.001	0.01	0.001	0.016	0.16							< 0.005	< 0.0005	37.1	3.7	< 0.01	< 0.001	
TRH 4.4 - 3-4m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 4.4 - 3-4m	Soil Leachate 1:10				0.01	0.001	0.02	0.002	0.052	0.52							< 0.005	< 0.0005	66.6	6.7	< 0.01	< 0.001	
TRH 4.5 - 4-5m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 4.5 - 4-5m	Soil Leachate 1:10				0.01	0.001	0.02	0.002	0.028	0.28							< 0.005	< 0.0005	81.4	8.1	< 0.01	< 0.001	
TRH 5.1 - 0-1m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	0.03	< 0.03	< 0.03							< 0.03
TRH 5.1 - 0-1m	Soil Leachate 1:10				0.01	0.001	0.01	0.001	0.008	0.08							< 0.005	< 0.0005	38.6	3.9	< 0.01	< 0.001	
TRH 5.2 - 1-2m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	0.08	0.08	0.05	< 0.03							< 0.03
TRH 5.2 - 1-2m	Soil Leachate 1:10				0.02	0.002	0.02	0.002	0.013	0.13							< 0.005	< 0.0005	42.8	4.3	< 0.01	< 0.001	
TRH 5.3 - 2-3m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 5.3 - 2-3m	Soil Leachate 1:10				< 0.01	< 0.001	0.01	0.001	0.014	0.14							< 0.005	< 0.0005	53.7	5.4	< 0.01	< 0.001	
TRH 5.4 - 3-4m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 5.4 - 3-4m	Soil Leachate 1:10				0.01	0.001	0.03	0.003	0.025	0.25							< 0.005	< 0.0005	62.5	6.3	0.02	0.002	
TRH 5.5 - 4-5m	Soil Contaminated Land	< 0.03	< 0.03	< 0.03							< 0.03	< 0.02	< 0.03	< 0.03	< 0.03	< 0.03							< 0.03
TRH 5.5 - 4-5m	Soil Leachate 1:10				0.02	0.002	0.02	0.002	0.029	0.29							< 0.005	< 0.0005	110.8	11.1	0.01	0.001	

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Client Sample Reference	Matirix	Copper (Cu)	Copper	Dibenz(a,h)anthracene	Dissolved Organic Carbon (DOC)	Dissolved Organic Carbon (DOC)	Dry Matter	Ethylbenzene	Fluoranthene	Fluorene	Fluoride	Fluoride	Indeno(1,2,3-cd)pyrene	Lead (Pb)	Lead	Loss On Ignition (LOI)	Mercury	Mercury	Mineral Oil (C10-C40)	Molybdenum (Mo)	Molybdenum	Naphthalene	Nickel
		mg/L	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/L	% dw	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/L	mg/Kg d.w	mg/L	mg/Kg d.w	%**	mg/Kg d.w	mg/L	mg/Kg d.w	mg/L	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w
TRH 1.1 - 0.1m	Soil Contaminated Land			0.04			89.4	< 0.04	0.06	< 0.03			0.07			2.7			186			< 0.03	
TRH 1.1 - 0.1m	Soil Leachate 1:10	0.014	0.14		114.0	11.4					2.8	0.3		< 0.001	< 0.01		< 0.01	< 0.001		0.005	0.05		0.02
TRH 1.2 - 1-2m	Soil Contaminated Land			< 0.03			91.5	< 0.04	0.13	< 0.03			0.07			3.1			91			< 0.03	
TRH 1.2 - 1-2m	Soil Leachate 1:10	0.004	0.04		84.8	8.5					2.5	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		< 0.01
TRH 1.3 - 2-3m	Soil Contaminated Land			< 0.03			88.8	< 0.04	0.09	< 0.03			0.04			1.9			104			< 0.03	
TRH 1.3 - 2-3m	Soil Leachate 1:10	0.006	0.06		48.8	4.9					2.1	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.001	0.01		< 0.01
TRH 1.4 - 3.4m	Soil Contaminated Land			< 0.03			90.3	< 0.04	0.09	< 0.03			< 0.03			2.1			79			< 0.03	
TRH 1.4 - 3.4m	Soil Leachate 1:10	0.008	0.08		94.2	9.4					2.0	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		0.01
TRH 1.5 - 4-5m	Soil Contaminated Land			< 0.03			75.3	< 0.04	< 0.03	< 0.03			0.05			5.7			< 20			< 0.03	
TRH 1.5 - 4-5m	Soil Leachate 1:10	0.017	0.17		157.4	15.7					2.1	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.007	0.07		0.02
TRH 2.1 - 0-1m	Soil Contaminated Land			< 0.03			88.8	< 0.04	< 0.03	< 0.03			< 0.03			2.1			< 20			< 0.03	
TRH 2.1 - 0-1m	Soil Leachate 1:10	0.007	0.07		62.7	6.3					2.2	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.006	0.06		0.01
TRH 2.2 - 1-2m	Soil Contaminated Land			< 0.03			90.4	< 0.04	< 0.03	< 0.03			< 0.03			1.9			139			< 0.03	
TRH 2.2 - 1-2m	Soil Leachate 1:10	0.008	0.08		89.2	8.9					2.1	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.003	0.03		0.01
TRH 2.3 - 2-3m	Soil Contaminated Land			< 0.03			92.4	< 0.04	< 0.03	< 0.03			< 0.03			0.9			46			< 0.03	
TRH 2.3 - 2-3m	Soil Leachate 1:10	0.008	0.08		98.1	9.8					2.3	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		0.01
TRH 2.4 - 3-4m	Soil Contaminated Land			< 0.03			88.8	< 0.04	< 0.03	< 0.03			< 0.03			1.1			38			< 0.03	
TRH 2.4 - 3-4m	Soil Leachate 1:10	0.006	0.06		57.8	5.8					2.1	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		0.01
TRH 2.5 - 4-5m	Soil Contaminated Land			< 0.03			61.0	< 0.04	< 0.03	< 0.03			< 0.03			14.1			< 20			< 0.03	
TRH 2.5 - 4-5m	Soil Leachate 1:10	0.018	0.18		327.0	32.7					3.9	0.4		< 0.001	< 0.01		< 0.01	< 0.001		0.005	0.05		0.03
TRH 3.1 - 0-1m	Soil Contaminated Land			< 0.03			89.0	< 0.04	0.19	< 0.03			0.07			2.0			37			< 0.03	

Southern Scientific Services Consultancy and testing facility		Copper (Cu)	Copper	Dibenz(a,h)anthracene	Dissolved Organic Carbon (DOC)	Dissolved Organic Carbon (DOC)	Dry Matter	Ethylbenzene	Fluoranthene	Fluorene	Fluoride	Fluoride	Indeno(1,2,3-cd)pyrene	Lead (Pb)	Lead	Loss On Ignition (LOI)	Mercury	Mercury	Mineral Oil (C10-C40)	Molybdenum (Mo)	Molybdenum	Naphthalene	Nickel
TRH 3.1 - 0-1m	Soil Leachate 1:10	0.014	0.14		69.8	7.0					2.1	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		< 0.01
TRH 3.2 - 1-2m	Soil Contaminated Land			< 0.03			89.9	< 0.04	< 0.03	< 0.03			< 0.03			1.6			< 20			< 0.03	
TRH 3.2 - 1-2m	Soil Leachate 1:10	0.011	0.11		92.4	9.2					2.2	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.001	0.01		< 0.01
TRH 3.3 - 2-3m	Soil Contaminated Land			< 0.03			91.5	< 0.04	0.04	0.03			< 0.03			1.1			< 20			< 0.03	
TRH 3.3 - 2-3m	Soil Leachate 1:10	0.008	0.08		91.4	9.1					2.1	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		0.02
TRH 3.4 - 3-4m	Soil Contaminated Land			< 0.03			90.9	< 0.04	< 0.03	< 0.03			< 0.03			0.8			< 20			< 0.03	
TRH 3.4 - 3-4m	Soil Leachate 1:10	0.006	0.06		68.2	6.8					1.8	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.001	0.01		0.02
TRH 3.5 - 4-5m	Soil Contaminated Land			< 0.03			70.7	< 0.04	< 0.03	< 0.03			< 0.03			9.1			< 20			< 0.03	
TRH 3.5 - 4-5m	Soil Leachate 1:10	0.017	0.17		101.9	10.2					2.4	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.020	0.20		0.03
TRH 4.1 - 0-1m	Soil Contaminated Land			< 0.03			82.1	< 0.04	0.04	< 0.03			< 0.03			4.5			51			< 0.03	
TRH 4.1 - 0-1m	Soil Leachate 1:10	0.014	0.14		138.1	13.8					2.3	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.005	0.05		0.01
TRH 4.2 - 1-2m	Soil Contaminated Land			< 0.03			87.4	< 0.04	< 0.03	< 0.03			< 0.03			2.1			44			< 0.03	
TRH 4.2 - 1-2m	Soil Leachate 1:10	0.009	0.09		126.3	12.6					2.2	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.003	0.03		< 0.01
TRH 4.3 - 2-3m	Soil Contaminated Land			< 0.03			92.3	< 0.04	< 0.03	< 0.03			< 0.03			1.0			< 20			< 0.03	
TRH 4.3 - 2-3m	Soil Leachate 1:10	0.009	0.09		82.1	8.2					1.7	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		0.02
TRH 4.4 - 3-4m	Soil Contaminated Land			< 0.03			54.7	< 0.04	< 0.03	< 0.03			< 0.03			18.7			< 20			< 0.03	
TRH 4.4 - 3-4m	Soil Leachate 1:10	0.012	0.12		223.1	22.3					2.7	0.3		< 0.001	< 0.01		< 0.01	< 0.001		0.007	0.07		0.03
TRH 4.5 - 4-5m	Soil Contaminated Land			< 0.03			58.5	< 0.04	< 0.03	< 0.03			< 0.03			13.0			< 20			< 0.03	
TRH 4.5 - 4-5m	Soil Leachate 1:10	0.015	0.15		264.6	26.5					2.9	0.3		< 0.001	< 0.01		< 0.01	< 0.001		0.010	0.10		0.02
TRH 5.1 - 0-1m	Soil Contaminated Land			< 0.03			89.5	< 0.04	< 0.03	< 0.03			< 0.03			1.8			48			< 0.03	
TRH 5.1 - 0-1m	Soil Leachate 1:10	0.008	0.08		123.7	12.4					2.0	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.007	0.07		< 0.01
TRH 5.2 - 1-2m	Soil Contaminated Land			< 0.03			86.9	< 0.04	0.03	< 0.03			0.05			1.6			58			< 0.03	
TRH 5.2 - 1-2m	Soil Leachate 1:10	0.010	0.10		115.1	11.5					1.9	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.005	0.05		< 0.01
TRH 5.3 - 2-3m	Soil Contaminated Land			< 0.03			92.5	< 0.04	< 0.03	< 0.03			< 0.03			1.0			< 20			< 0.03	
TRH 5.3 - 2-3m	Soil Leachate 1:10	0.011	0.11		109.2	10.9					1.6	0.2		< 0.001	< 0.01		< 0.01	< 0.001		0.002	0.02		0.02

		Copper (Cu)	Copper	Dibenz(a,h)anthracene	Dissolved Organic Carbon (DOC)	Dissolved Organic Carbon (DOC)	Dry Matter	Ethylbenzene	Fluoranthene	Fluorene	Fluoride	Fluoride	Indeno(1,2,3-cd)pyrene	Lead (Pb)	Lead	Loss On Ignition (LOI)	Mercury	Mercury	Mineral Oil (C10-C40)	Molybdenum (Mo)	Molybdenum	Naphthalene	Nickel
TRH 5.4 - 3-4m	Soil Contaminated Land			< 0.03			69.2	< 0.04	< 0.03	< 0.03			< 0.03			9.2			< 20			< 0.03	
TRH 5.4 - 3-4m	Soil Leachate 1:10	0.019	0.19		221.7	22.2					2.7	0.3		< 0.001	< 0.01		< 0.01	< 0.001		0.005	0.05		0.04
TRH 5.5 - 4-5m	Soil Contaminated Land			< 0.03			42.1	< 0.04	< 0.03	< 0.03			< 0.03			35.5			179			< 0.03	
TRH 5.5 - 4-5m	Soil Leachate 1:10	0.018	0.18		582.6	58.3					3.3	0.3		< 0.001	< 0.01		< 0.01	< 0.001		0.008	0.08		0.05

		Nickel	PCB BZ #101	PCB BZ #118	PCB BZ #138	PCB BZ #153	PCB BZ #180	PCB BZ #28	PCB BZ #52	Phenanthrene	Phenol Index	Phenols	Pyrene	Selenium	Selenium	Sulphate	Sulphate	Toluene	Total BTEX	Total Dissolved Solids (TDS)	Total Dissolved Solids (TDS)
Client Sample Reference	**Matirix**	mg/L	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/L	mg/Kg d.w	mg/Kg d.w	mg/L	mg/Kg d.w	mg/L	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w	mg/L
TRH 1.1 - 0.1m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			0.06					< 0.03	< 0.13		
TRH 1.1 - 0.1m	Soil Leachate 1:10	0.002									< 1.0	0.03		0.02	0.002	117.7	11.8			800.0	80
TRH 1.2 - 1-2m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.04			0.13					< 0.03	< 0.13		
TRH 1.2 - 1-2m	Soil Leachate 1:10	< 0.001									< 1.0	0.03		< 0.01	< 0.001	100.7	10.1			630.0	63
TRH 1.3 - 2-3m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			0.08					< 0.03	< 0.13		
TRH 1.3 - 2-3m	Soil Leachate 1:10	< 0.001									< 1.0	0.03		< 0.01	< 0.001	2441.0	244.1			2820.0	282
TRH 1.4 - 3.4m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.04			0.07					< 0.03	< 0.13		
TRH 1.4 - 3.4m	Soil Leachate 1:10	0.001									< 1.0	0.03		< 0.01	< 0.001	243.6	24.4			730.0	73
TRH 1.5 - 4-5m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			0.03					< 0.03	< 0.13		
TRH 1.5 - 4-5m	Soil Leachate 1:10	0.002									< 1.0	0.03		0.02	0.002	189.4	18.9			950.0	95
TRH 2.1 - 0-1m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 2.1 - 0-1m	Soil Leachate 1:10	0.001									< 1.0	0.03		< 0.01	< 0.001	100.4	10.0			760.0	76
TRH 2.2 - 1-2m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		

Southern Scientific Services Consultancy and testing facility		Nickel	PCB BZ #101	PCB BZ #118	PCB BZ #138	PCB BZ #153	PCB BZ #180	PCB BZ #28	PCB BZ #52	Phenanthrene	Phenol Index	Phenols	Pyrene	Selenium	Selenium	Sulphate	Sulphate	Toluene	Total BTEX	Total Dissolved Solids (TDS)	Total Dissolved Solids (TDS)
TRH 2.2 - 1-2m	Soil Leachate 1:10	0.001									< 1.0	0.03		< 0.01	< 0.001	118.8	11.9			680.0	68
TRH 2.3 - 2-3m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 2.3 - 2-3m	Soil Leachate 1:10	0.001									< 1.0	0.03		< 0.01	< 0.001	96.6	9.7			710.0	71
TRH 2.4 - 3-4m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 2.4 - 3-4m	Soil Leachate 1:10	0.001									< 1.0	0.05		0.03	0.003	479.5	47.9			710.0	71
TRH 2.5 - 4-5m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 2.5 - 4-5m	Soil Leachate 1:10	0.003									< 1.0	0.05		0.02	0.002	185.7	18.6			1100.0	110
TRH 3.1 - 0-1m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.09			0.14					< 0.03	< 0.13		
TRH 3.1 - 0-1m	Soil Leachate 1:10	< 0.001									< 1.0	0.03		0.08	0.008	977.5	97.7			1480.0	148
TRH 3.2 - 1-2m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 3.2 - 1-2m	Soil Leachate 1:10	< 0.001									< 1.0	0.03		0.01	0.001	519.1	51.9			1100.0	110
TRH 3.3 - 2-3m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.05			0.04					< 0.03	< 0.13		
TRH 3.3 - 2-3m	Soil Leachate 1:10	0.002									< 1.0	0.02		< 0.01	< 0.001	269.9	27.0			910.0	91
TRH 3.4 - 3-4m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 3.4 - 3-4m	Soil Leachate 1:10	0.002									< 1.0	0.03		< 0.01	< 0.001	54.9	5.5			520.0	52
TRH 3.5 - 4-5m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 3.5 - 4-5m	Soil Leachate 1:10	0.003									< 1.0	0.02		0.01	0.001	486.5	48.6			1160.0	116
TRH 4.1 - 0-1m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			0.03					< 0.03	< 0.13		
TRH 4.1 - 0-1m	Soil Leachate 1:10	0.001									< 1.0	0.06		0.01	0.001	149.6	15.0			830.0	83
TRH 4.2 - 1-2m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 4.2 - 1-2m	Soil Leachate 1:10	< 0.001									< 1.0	0.05		0.02	0.002	148.7	14.9			910.0	91
TRH 4.3 - 2-3m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 4.3 - 2-3m	Soil Leachate 1:10	0.002									< 1.0	0.08		< 0.01	< 0.001	59.3	5.9			710.0	71
TRH 4.4 - 3-4m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 4.4 - 3-4m	Soil Leachate 1:10	0.003									< 1.0	0.06		0.01	0.001	311.0	31.1			1440.0	144
TRH 4.5 - 4-5m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 4.5 - 4-5m	Soil Leachate 1:10	0.002									< 1.0	0.07		0.01	0.001	354.7	35.5			1490.0	149
TRH 5.1 - 0-1m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 5.1 - 0-1m	Soil Leachate 1:10	< 0.001									< 1.0	0.02		0.01	0.001	633.3	63.3			1150.0	115

Southern Scientific Services Consultancy and testing facility		Nickel	PCB BZ #101	PCB BZ #118	PCB BZ #138	PCB BZ #153	PCB BZ #180	PCB BZ #28	PCB BZ #52	Phenanthrene	Phenol Index	Phenols	Pyrene	Selenium	Selenium	Sulphate	Sulphate	Toluene	Total BTEX	Total Dissolved Solids (TDS)	Total Dissolved Solids (TDS)
TRH 5.2 - 1-2m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			0.03					< 0.03	< 0.13		
TRH 5.2 - 1-2m	Soil Leachate 1:10	< 0.001									< 1.0	0.03		0.01	0.001	472.6	47.3			1030.0	103
TRH 5.3 - 2-3m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 5.3 - 2-3m	Soil Leachate 1:10	0.002									< 1.0	0.07		< 0.01	< 0.001	151.3	15.1			800.0	80
TRH 5.4 - 3-4m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 5.4 - 3-4m	Soil Leachate 1:10	0.004									< 1.0	0.08		< 0.01	< 0.001	131.3	13.1			980.0	98
TRH 5.5 - 4-5m	Soil Contaminated Land		< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.03			< 0.03					< 0.03	< 0.13		
TRH 5.5 - 4-5m	Soil Leachate 1:10	0.005									< 1.0	0.07		0.02	0.002	253.0	25.3			1700.0	170

Southern Scientific Services Consultancy and testing facility		Total Organic Carbon (TOC)	Total PAH's	Total PCBs EC7 congeners	Zinc (Zn)	Zinc	m & p-Xylene	o-Xylene
Client Sample Reference	**Matirix**	% w/w	mg/Kg d.w	mg/Kg d.w	mg/L	mg/Kg d.w	mg/Kg d.w	mg/Kg d.w
TRH 1.1 - 0.1m	Soil Contaminated Land	4.48	0.66	2.10			< 0.04	< 0.04
TRH 1.1 - 0.1m	Soil Leachate 1:10				0.022	0.22		
TRH 1.2 - 1-2m	Soil Contaminated Land	2.47	0.99	2.10			< 0.04	< 0.04
TRH 1.2 - 1-2m	Soil Leachate 1:10				< 0.001	< 0.01		
TRH 1.3 - 2-3m	Soil Contaminated Land	1.27	< 0.48	2.10			< 0.04	< 0.04
TRH 1.3 - 2-3m	Soil Leachate 1:10				0.005	0.05		
TRH 1.4 - 3.4m	Soil Contaminated Land	1.91	< 0.48	2.10			< 0.04	< 0.04
TRH 1.4 - 3.4m	Soil Leachate 1:10				0.009	0.09		
TRH 1.5 - 4-5m	Soil Contaminated Land	4.66	< 0.48	2.10			< 0.04	< 0.04

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		Total Organic Carbon (TOC)	Total PAH's	Total PCBs EC7 congeners	Zinc (Zn)	Zinc	m & p-Xylene	o-Xylene
TRH 1.5 - 4-5m	Soil Leachate 1:10				0.011	0.11		
TRH 2.1 - 0-1m	Soil Contaminated Land	4.00	< 0.48	2.10			< 0.04	< 0.04
TRH 2.1 - 0-1m	Soil Leachate 1:10				0.018	0.18		
TRH 2.2 - 1-2m	Soil Contaminated Land	4.97	< 0.48	2.10			< 0.04	< 0.04
TRH 2.2 - 1-2m	Soil Leachate 1:10				0.006	0.06		
TRH 2.3 - 2-3m	Soil Contaminated Land	2.10	< 0.48	2.10			< 0.04	< 0.04
TRH 2.3 - 2-3m	Soil Leachate 1:10				0.006	0.06		
TRH 2.4 - 3-4m	Soil Contaminated Land	4.62	< 0.48	2.10			< 0.04	< 0.04
TRH 2.4 - 3-4m	Soil Leachate 1:10				0.011	0.11		
TRH 2.5 - 4-5m	Soil Contaminated Land	9.15	< 0.48	2.10			< 0.04	< 0.04
TRH 2.5 - 4-5m	Soil Leachate 1:10				0.020	0.20		
TRH 3.1 - 0-1m	Soil Contaminated Land	3.15	0.99	2.10			< 0.04	< 0.04
TRH 3.1 - 0-1m	Soil Leachate 1:10				0.027	0.27		
TRH 3.2 - 1-2m	Soil Contaminated Land	2.45	< 0.48	2.10			< 0.04	< 0.04
TRH 3.2 - 1-2m	Soil Leachate 1:10				0.012	0.12		
TRH 3.3 - 2-3m	Soil Contaminated Land	4.24	< 0.48	2.10			< 0.04	< 0.04
TRH 3.3 - 2-3m	Soil Leachate 1:10				0.010	0.10		
TRH 3.4 - 3-4m	Soil Contaminated Land	4.32	< 0.48	2.10			< 0.04	< 0.04
TRH 3.4 - 3-4m	Soil Leachate 1:10				0.004	0.04		
TRH 3.5 - 4-5m	Soil Contaminated Land	6.09	< 0.48	2.10			< 0.04	< 0.04
TRH 3.5 - 4-5m	Soil Leachate 1:10				0.017	0.17		
TRH 4.1 - 0-1m	Soil Contaminated Land	4.59	< 0.48	2.10			< 0.04	< 0.04
TRH 4.1 - 0-1m	Soil Leachate 1:10				0.025	0.25		
TRH 4.2 - 1-2m	Soil Contaminated Land	3.85	< 0.48	2.10			< 0.04	< 0.04
TRH 4.2 - 1-2m	Soil Leachate 1:10				0.010	0.10		
TRH 4.3 - 2-3m	Soil Contaminated Land	5.49	< 0.48	2.10			< 0.04	< 0.04
TRH 4.3 - 2-3m	Soil Leachate 1:10				0.010	0.10		
TRH 4.4 - 3-4m	Soil Contaminated Land	9.09	< 0.48	2.10			< 0.04	< 0.04
TRH 4.4 - 3-4m	Soil Leachate 1:10				0.048	0.48		

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		Total Organic Carbon (TOC)	Total PAH's	Total PCBs EC7 congeners	Zinc (Zn)	Zinc	m & p-Xylene	o-Xylene
TRH 4.5 - 4-5m	Soil Contaminated Land	9.43	< 0.48	2.10			< 0.04	< 0.04
TRH 4.5 - 4-5m	Soil Leachate 1:10				0.027	0.27		
TRH 5.1 - 0-1m	Soil Contaminated Land	3.68	< 0.48	2.10			< 0.04	< 0.04
TRH 5.1 - 0-1m	Soil Leachate 1:10				0.002	0.02		
TRH 5.2 - 1-2m	Soil Contaminated Land	3.00	< 0.48	2.10			< 0.04	< 0.04
TRH 5.2 - 1-2m	Soil Leachate 1:10				0.014	0.14		
TRH 5.3 - 2-3m	Soil Contaminated Land	5.99	< 0.48	2.10			< 0.04	< 0.04
TRH 5.3 - 2-3m	Soil Leachate 1:10				0.009	0.09		
TRH 5.4 - 3-4m	Soil Contaminated Land	5.46	< 0.48	2.10			< 0.04	< 0.04
TRH 5.4 - 3-4m	Soil Leachate 1:10				0.029	0.29		
TRH 5.5 - 4-5m	Soil Contaminated Land	15.54	< 0.48	2.10			< 0.04	< 0.04
TRH 5.5 - 4-5m	Soil Leachate 1:10				0.036	0.36		

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Appendix IV - Complete Groundwater Results

Southern Scientific Services Consultancy and testing facility	Project	Tullow Rd Ennis				
	Sampler	M Murphy				
	Client Sample Reference	Trial Hole 1	Trial Hole 2	Trial Hole 3	Trial Hole 4	Trial Hole 5
1,2-Dichloroethane	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,4-D	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
2,6 Dichlorobenzamide	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/L	0.591	0.069	0.107	0.016	0.161
Acenaphthylene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Aluminium	µg/L	1221	2526	3310	5568	5038
Ammonium	mg/L N	9.11	7.63	9.17	3.48	8.24
Anthracene	µg/L	0.094	< 0.005	0.027	< 0.005	0.015
Arsenic	µg/L	6	13	7	7	10
Atrazine	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Bentazone	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benz(a)anthracene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	µg/L	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
Benzo(b)fluoranthene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(ghi)perylene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Benzo(k)fluoranthene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Bis(2-ethylhexyl)phthalate	µg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloride	mg/L	19.5	21.2	16.9	19.9	18.1
Chromium VI	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chromium	µg/L	6	9	13	17	16
Chrysene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity	µS/cm @ 20 °C	1064	1215	1024	733	1040
Cypermethrin	µg/L	< 0.012	< 0.012	< 0.012	< 0.012	< 0.012
Dibenz(a,h)anthracene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Dichlobenil	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

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	Project	Tullow Rd Ennis				
	Sampler	M Murphy				
	Client Sample Reference	Trial Hole 1	Trial Hole 2	Trial Hole 3	Trial Hole 4	Trial Hole 5
Dichloromethane	µg/L	< 1	< 1	< 1	< 1	< 1
Diuron	µg/L	0.006	< 0.005	0.006	< 0.005	0.019
Fluoranthene	µg/L	0.100	< 0.005	0.029	0.006	0.032
Fluorene	µg/L	0.190	0.013	0.042	0.005	0.061
Glyphosate	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Indeno(1,2,3-cd)pyrene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Isoproturon	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Lead	µg/L	15	36	15	8	17
MCPA	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
MCPP (Mecoprop)	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury	µg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methyl Tertiary Butyl Esther	µg/L	< 1	< 1	< 1	< 1	< 1
Mol Reactive Phosphorus (MRP)	mg/L P	< 0.01	0.01	0.06	0.01	0.01
Naphthalene	µg/L	0.305	0.005	0.028	< 0.005	0.008
Nitrate	mg/L N	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Nitrite	mg/L N	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Phenanthrene	µg/L	0.357	0.011	0.097	0.007	0.047
Pyrene	µg/L	0.064	< 0.005	0.017	0.006	0.026
Simazine	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Sulphate	mg/L	14.6	248.7	140.5	62.1	147.0
Sum Benzo (b)&(k) fluoranthene	µg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Tetrachloroethene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tetrahydrofuran	µg/L	< 1	< 1	< 1	< 1	< 1
Toluene	µg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH	µg/L	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Total Petroleum Hydrocarbons (C10 - C40)	µg/L	235.9	154.1	114.3	101.0	126.3
Trichloroethene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Vinyl Chloride	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zinc (Zn)	µg/L	25	47	30	26	39
cis-1,2-Dichloroethene	µg/L	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	µg/L	< 1	< 1	< 1	< 1	< 1


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