Marine Sediment Characterisation
Limerick Docks
Dredging and Disposal Operations

Produced by

AQUAFACT International Services Ltd
On behalf of

Waterways Ireland
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1. Introduction

Waterways Ireland contracted AQUAFACT International Services Ltd. to carry out a sediment characterisation survey at Sarsfield lock along a section of the River Shannon in Limerick City in order to evaluate the sediment for the purposes of Disposal at Sea (DaS) and disposal to landfill (Waste Acceptance Criteria [WAC]).

2. Sampling Methodology

2.1. Sampling Procedure and Processing

On the 20th of July 2022, 10 sediment stations were sampled for physical and chemical analysis to assess the nature of the material to be dredged from the area. Table 2.1 shows the station locations and depths. Conditions on the day were sunny, with high tide occurring at 11:20am. Sampling began at 10:00am and was conducted from a Zodiac inflatable. A 0.025m^2 van Veen grab sampler was used to collect surface sediment samples for DaS and WAC analysis. Appendix 1 contains a photograph of each sediment sample.

Two grab samples for DaS and WAC analysis were taken at each of the 10 stations and samples were divided into the following containers:

1. 2 x Plastic 1l tubs
2. 1 x Plastic 0.5l tub
3. 1 x 120ml amber glass container
4. 1 x 60ml amber glass container

Station L5 was located on hard ground and therefore did not yield sufficient samples for analysis. L1 was located on hard ground and therefore did not have enough material to fill the amber jars.

Table 2.1: Actual coordinates of stations sampled for physical and chemical analysis.

Station	Latitude	Longitude
L1	52.66681	-8.62514
L2	52.66639	-8.62534
L3	52.66671	-8.62554
L4	52.66615	-8.6263
L5	52.66593	-8.62736
L6	52.66551	-8.62811
L7	52.66473	-8.62958
L8	52.66439	-8.62993
L9	52.66415	-8.63047
L10	52.66377	-8.63116

A detailed list of the analysis required including Limits of Detection (LOD) and analysis method can be seen in Table 2.2 for DaS and Table 2.3 for WAC regulations.

Table 2.2: Dumping at sea sediment analysis

Determinant	Limit	Method
Moisture Content	0.2%	Oven drying @105°C
Metals Suite Sieving <2mm: As, Cd, Cr, Cu, Pb, Mn, Mo, Ni, Sb, Se, Zn	0.1-3 mg/kg	HF/Boric extraction & ICPMS
Sieving <2mm:Mercury	0.01mg/kg	Nitric/Peroxide extraction & ICPMS
Metals Suite Sieving <2mm: Al, Ba, Li,	0.5-10 mg/kg	HF/Boric extraction & ICPOES
Total Organic Carbon (TOC)	0.01%	Sulphurous acid/combustion at 800°`C/NDIR
Organotins (DBT, TBT)	1µg/kg	Acid digest and solvent extraction GC-MS
PCBs (ICES 7)	0.1µg/kg	Solvent extraction and clean up followed by GC-MS-MS analysis.
Total Hydrocarbon Content	1µg/kg	Solvent extraction and clean up followed by GC-FID analysis.
PAHs by GCMS	1µg/kg	Solvent extraction and clean up followed by GC-MS analysis.
Particle Size Analysis	%	Distribution by wet & dry sieving and laser detraction
Organochlorine Pesticides	0.1µg/kg	Solvent extraction and clean up followed by GC-MS-MS analysis.
Carbonate	0.04%	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7

Table 2.3: Waste Criteria Acceptance sediment analysis

Determinant	Limit	Method
Moisture content	0.2%	Drying a portion of the sample at 105°C to constant weight.
Total Organic Carbon (TOC)	0.02%	Documented in-house method with carbonate removal and sulphurous acid/combustion at 800°C/NDIR, WSLM59
BTEX (Benzene, toluene, ethylbenzene and xylenes) plus MTBE	0.01 (MTBE & Xylenes 0.02)	Documented in-house method based on USEPA Methods 3810 and 8015. Technique used is headspace gas chromatography with flame ionisation detection, BTEXHSA
PCBs, ICES 7 Congeners (PCB: 28, 52, 101, 118, 138, 153, 180)	0.005	Documented in house method using solvent extraction and determination by GCECD, PCBECD
TPH by GCFID, (C8 to C40) to include TPH Band >C10-C40	10	Documented in-house method based on TNRCC method using gas chromatography with flame ionisation detection, TPHFIDUS
17 PAHs (inc Coronene) by GCMS	0.08	Documented in-house method using ultrasonic extraction with GCMS detection, PAHMSUS
pH	n/a	Documented in-house method using pH electrode, PHSOIL
Acid Neutralisation Capacity	0.1mol/kg	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Leachate preparation	n/a	BS EN12457-3 LS 2-10 Two Stage, WSLM19
Metals Suite dissolved (ICPMS):	Detection Limits in brackets as µg/l	Documented in-house method using ICPMS, ICPMSW
Barium	0.01	Documented in-house method using ICPOES, ICPWATVAR
Chloride	1	Documented in-house method by automated discrete colorimetric analysis, KONENS
Fluoride	0.1	Documented in-house method by Multiple Known Addition using an Automated Ion Selective Electrode based on the Standard Methods for the Examination of Water and Wastewater, ISEF
Sulphate (sulphur expressed as sulphate)	3	Documented in-house method using ICPOES, ICPWATVAR
TDS (Total Dissolved Solids)	2	Documented in-house method based on BS2690 Part 121 (1981), WSLM27
Phenol Index (total)	0.05	Documented in-house method using segmented flow analysis, SFAPI
DOC (Dissolved Organic Carbon)	0.1	Documented in-house method with uvpersulphate oxidation/IR detection, WSLM13



Figure 2.1: Sampling locations above Sarsfield Lock on the River Shannon, Limerick City



Figure 2.2: Sampling locations below Sarsfield Lock on the River Shannon, Limerick City

3. Dumping at Sea (DaS) Results

Appendix 2 contains the laboratory report showing the full set of results from SOCOTEC.

3.1. Parameter Code 1

Table 3.1 shows the visual inspection information, which includes colour and sediment type.

Table 3.1: Visual Inspection

Station	Description
L1	Grey slightly sandy gravelly CLAY
L2	Grey organic slightly sandy SILT
L3	Grey silty CLAY
L4	Grey Weeds & Rootlets
L6	Grey organic SILT
L7	Grey organic SILT
L8	Grey organic SILT
L9	Grey organic SILT
L10	Grey organic SILT

3.2. Parameter Code 2

The moisture results can be seen in Table 3.2. Moisture values ranged from 56 (L1) to 69.6% (L4).

Table 3.2: Density results for 9 stations surveyed at Limerick docks

Station	Moisture (%)
L1	56.0
L2	58.8
L3	65.5
L4	69.6
L6	67.5
L7	55.9
L8	68.3
L9	60.6
L10	59.3

3.3. Parameter Code 3

Table 3.3 shows the sediment grain size results obtained from SOCOTEC, results are broken down into % gravel (>2mm), sand (<2mm >63µm) and mud (<63µm). Gravel ranged from 0% (L8/L9) to 22.86% at L1. Sand ranged from 3.86% (L4) to 40.80% (L2) and silt-clay ranged from 67.48% (L1) to 95.95% (L4).

Table 3.3: Granulometry results

Station	% Gravel (>2mm)	% Sand (<2mm - > 63µm)	% Silt-Clay (<63µm)
L1	22.86	9.66	67.48
L2	3.30	40.80	55.90
L3	3.86	14.28	81.86
L4	0.19	3.86	95.95
L6	0.13	17.11	82.76
L7	0.06	10.29	89.65
L8	0.00	12.80	87.20
L9	0.00	13.02	86.98
L10	0.49	7.92	91.59

3.4. Parameter Code 4

3.4.1. Code 4a

Table 3.4 shows the total organic carbon results. Values ranged from 1.16% (L1) to 2.80% (L8).

Table 3.4: Total organic carbon results

Station	TOC %
L1	1.16
L2	3.94
L3	2.03
L4	2.68
L6	2.71
L7	2.72
L8	2.80
L9	2.17
L10	1.64

3.4.2. Code 4b

Table 3.5 shows the carbonate results. Values ranged from 9.8 (L2) to 17.3 (L1).

Table 3.5: Carbonate results

Station	Carbonate %
L1	17.3
L2	9.8
L3	15.6
L4	14.4
L6	12.5
L7	13.9
L8	13.2
L9	14.2
L10	14.4

3.4.3. Code 4c

Table 3.6 shows the metal results, along with the upper and lower guidance values for metals (Cronin *et al.,* 2006). Arsenic, Cadmium, Chromium, Copper, Zinc, Mercury, Aluminium and Lithium were all below the lower level guidance value. Lead (1160mg/kg) was above the upper action limit at one station, L1 (upper limit Pb 218mg/kg). Due to the high concentration of Lead recorded, SOCOTEC re-analysed the sample. The second analysis confirmed the initial finding.

Table 3.6: Metal results and guidance values (mg/kg)

Determinant (mg/kg)	As	Cd	Cr	Cu	Pb	Ni	Zn	Hg	Al	Li
Lower Action Limit	20~	0.7	120	40	60	40~	160	0.2	N/A	N/A
Upper Action Limit	70	4.2	370	110^	218	60	410	0.7	N/A	N/A
Station	As	Cd	Cr	Cu	Pb	Ni	Zn	Hg	Al	Li
L1	12.6	0.3	54.2	13.4	1160	29.5	71.6	0.05	46900	31.9
L2	8.0	0.4	62.0	13.1	59.1	30.8	133	0.08	41800	31.7
L3	10.0	0.3	66.2	12.4	34.4	32.1	116	0.07	47000	37.5
L4	12.5	0.4	70.3	12.5	36.7	36.4	135	0.07	54800	42.5
L6	11.3	0.4	68.7	14.1	37.5	35.0	142	0.08	50900	39.1
L7	10.9	0.4	67.9	12.5	33.8	33.3	130	0.08	50000	38.4
L8	10.6	0.5	63.7	13.3	36.0	39.9	138	0.09	47900	37.1
L9	11.1	0.3	60.8	11.6	30.8	32.2	114	0.07	53100	39.1
L10	10.8	0.3	67.2	10.7	30.1	31.9	107	0.06	49200	40.1

Exceeds Lower Limit | Exceeds Upper Limit

* ERL (rounded up) – No background Irish data ^ PEL as ERM considered high.

In some locations natural levels of arsenic will exceed this value and in such instances, this guidance value will not be appropriate.

3.4.4. Code 4d

Tables 3.7 and 3.8 show the organochlorines including ɣ-HCH (Lindane) and PCB results, along with the upper and lower guidance values (Cronin *et al.,* 2006). All stations were below the lower action limit for all determinants.

Table 3.7: Organochlorine results (ug/kg)

Determinant (µg/kg)	p,p'-DDE	p,p'-DDT	p,p'-DDD	Dieldrin	alpha-HCH	beta-HCH	gamma-HCH	HCB
Lower Action Limit	N/A	N/A	N/A	N/A	N/A	N/A	0.3	0.3
Upper Action Limit	N/A	N/A	N/A	N/A	N/A	N/A	1	1
L1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
L3	<0.1	<0.1	<0.1	0.20	<0.1	<0.1	<0.1	<0.1
L4	0.11	0.32	0.05	0.14	<0.1	<0.1	<0.1	<0.1
L6	<0.1	<0.1	0.10	0.25	<0.1	<0.1	<0.1	<0.1
L7	<0.1	0.13	<0.1	0.18	<0.1	<0.1	<0.1	<0.1
L8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
L9	<0.1	0.39	0.13	0.17	<0.1	<0.1	<0.1	<0.1
L10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.15	0.13

Exceeds Lower Limit | Exceeds Upper Limit

Table 3.8: PCB Results (ug/kg)

Determinant (µg /kg)	PCB 028	PCB 052	PCB 101	PCB 118	PCB 138	PCB 153	PCB 180	PCB (Σ ICES 7)*
Lower Action Limit	1	1	1	1	1	1	1	7
Upper Action Limit	180	180	180	180	180	180	180	1260
L1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L2	<0.08	<0.08	0.11	0.16	0.20	0.21	0.13	0.97
L3	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.56
L4	<0.08	<0.08	<0.08	0.11	0.12	0.10	<0.08	<0.65
L6	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08	<0.56
L7	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08	<0.57
L8	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.56
L9	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.56
L10	<0.08	<0.08	<0.08	0.09	<0.08	0.09	<0.08	<0.57

Exceeds Lower Limit | Exceeds Upper Limit

3.4.5. Code 4e

Table 3.9 shows the total extractable hydrocarbon results, along with the lower guidance values for hydrocarbons (Cronin *et al.,* 2006). Values ranged from 0.0959g/kg (L10) to 0.653g/kg (L1). All were below the lower guidance level.

Table 3.9: Total extractable hydrocarbon results (ug/kg)

Determinant (g/kg)	THC (g/kg)
Lower Action Limit	1
Upper Action Limit	-
L1	N/A
L2	0.653
L3	0.329
L4	0.210
L6	0.177
L7	0.178
L8	0.171
L9	0.112
L10	0.0959

3.4.6. Code 4f

Table 3.10 shows the dibutyl and tributyl tin results, along with the upper and lower guidance values (Cronin *et al.,* 2006). The sum of DBT and TBT was below the lower action limit for all stations.

Table 3.10: Dibutyl and tributyl tin results (ug/kg)

Determinant (mg/kg)	Dibutyltin (DBT)	Tributyltin (TBT)	Σ TBT & DBT
Lower Action Limit	-	-	100
Upper Action Limit	-	-	500
L1	N/A	N/A	N/A
L2	<5	<5	0.010
L3	<5	<5	0.010
L4	<5	<5	0.010
L6	<5	<5	0.010
L7	<5	<5	0.010
L8	<5	<5	0.010
L9	<5	<5	0.010
L10	<5	<5	0.010
Exceeds Lower Limit	Exceeds Upper Limit		

3.4.7. Code 4g

Table 3.11 shows the PAH results and lower guidance values for the sum of 16 PAH's. The sum of the 16 PAH's was below the lower action limit for all stations.

Table 3.11: PAH results (ug/kg)

Determinant (µg/kg)	PAH Acena-phthene	PAH Acena-phthylene	PAH Anthr-acene	PAH Benzo (a) anthracene	PAH Benzo (a) pyrene	PAH Benzo (b) fluor-anthene	PAH Benzo (ghi) perylene	PAH Benzo (k) fluor-anthene	PAH Chryse ne	PAH Dibenz (a,h) anthracene	PAH Floure ne	PAH Fluor-anthene	PAH Indeno (1,2,3–cd) pyrene	PAH Naphthal ene	PAH Phenant hrene	PAH Pyrene	Σ PAH
Lower Action Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4000
Upper Action Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L2	6.98	12.9	17.2	72.7	138	144	132	66.5	83.6	28.8	6.64	154	149	20.2	35.7	160	1228.22
L3	9.26	19.8	28.8	107	189	201	170	101	124	32.3	13.6	205	191	12.9	64.7	206	1675.36
L4	3.25	4.50	7.33	27.7	35.2	38.5	28.7	22.2	35.4	6.21	5.52	56.1	31.1	9.30	27.5	50.2	388.71
L6	8.65	7.48	11.0	42.4	54.9	61.7	46.1	33.4	49.9	11.9	10.0	89.0	46.2	11.5	54.9	76.5	615.53
L7	5.64	4.71	10.2	39.3	45.9	48.7	34.5	25.6	42.3	8.36	8.66	64.5	37.9	9.52	31.2	55.3	472.29
L8	4.00	3.02	7.85	31.8	38.3	41.3	33.0	22.9	37.4	7.12	6.77	58.5	32.3	9.86	28.1	49.4	411.62
L9	7.35	5.25	12.3	31.0	35.7	35.4	30.6	18.7	36.4	6.79	10.0	69.3	32.7	9.81	46.3	58.3	445.9
L10	13.8	4.45	6.15	23.1	34.2	35.4	30.6	14.9	29.1	7.01	6.12	45.1	33.3	7.77	22.6	38.7	352.3

Exceeds Lower Limit | Exceeds Upper Limit

4. Waste Acceptance Criteria (WAC) Results

Appendix 3 contains the laboratory report showing the full set of results from SOCOTEC.

4.1. Sediments

4.1.1. Total organic carbon

Table 4.1 shows the total organic carbon results. Values ranged from 2.2% (L10) to 4.91% (L2). L2, L4, L6, and L8 exceed the limit for inert waste landfill, but below the limit for stable non-reactive hazardous waste in non-hazardous landfill.

Table 4.1: Total Organic Carbon results

	Landfill Waste Acceptance Criteria Limit Values										
Determinant	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Total Organic Carbon % M/M	3	5	6	4.91	2.62	3.4	3.2	2.78	3.15	2.82	2.2

4.1.2. BTEX (Benzene, toluene, ethylbenzene and xylenes)

Table 4.2 shows BTEX, all values were below the below the Inert criteria limit value.

Table 4.2: BTEX (Benzene, toluene, ethylbenzene and xylenes) (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values									
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Benzene				<0.028	<0.026	<0.029	<0.028	<0.025	<0.024	<0.024	<0.023
Toluene				<0.028	<0.026	<0.029	<0.028	<0.025	<0.024	<0.024	<0.023

Determinant (mg/kg)	Landfill Waste Acceptance Criteria Limit Values			L2	L3	L4	L6	L7	L8	L9	L10
	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill								
Ethyl Benzene				<0.028	<0.026	<0.029	<0.028	<0.025	<0.024	<0.024	<0.023
m/p-Xylene				<0.056	<0.053	<0.057	<0.057	<0.051	<0.049	<0.049	<0.045
o-Xylene				<0.028	<0.026	<0.029	<0.028	<0.025	<0.024	<0.024	<0.023
Σ of BTEX	6			<0.167	<0.157	<0.172	<0.170	<0.152	<0.146	<0.146	<0.135

4.1.3. PCBs, ICES Congeners (PCB: 28, 52, 101, 118, 138, 153, 180)

Table 4.3 shows PCBs, ICES Congeners (PCB: 28, 52, 101, 118, 138, 153, 180) and the sum of PCBs for the 7 Congeners, of which all results were below the Inert criteria limit value for each station.

Table 4.3: PCBs, ICES Congeners (PCB: 28, 52, 101, 118, 138, 153, 180) results (mg/kg)

Determinant (mg/kg)	Landfill Waste Acceptance Criteria Limit Values			L2	L3	L4	L6	L7	L8	L9	L10
	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill								
PCB 28				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
PCB 52				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
PCB 101				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
PCB 118				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
PCB 138				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
PCB 153				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
PCB 180				<0.014	<0.013	<0.014	<0.014	<0.013	<0.012	<0.012	<0.011
Σ 7 PCBs	1			<0.098	<0.092	<0.100	<0.099	<0.088	<0.085	<0.085	<0.079

4.1.4. TPH by GCFID, (C8 to C40) (mg/kg)

Table 4.4 shows the TPH results, all stations were below the inert criteria limit value for mineral oils.

Table 4.4: TPH by GCFID, (C8 to C40) results

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
TPH Band (>C10-C40) Mineral Oil	500			80.3	61.4	70.5	77.4	81.8	77.9	87.9	45.5

4.1.5. PAHs

Table 4.5 shows the results for the 17 PAHs, the sum of the 17 PAHs were below results were below the inert criteria limit value at all stations.

Table 4.5: 17 PAHs including Coronene by GCMS results (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Acenaphthene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Acenaphthylene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Anthracene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Benzo (a) anthracene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Benzo (a) pyrene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Benzo (b) fluoranthene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Benzo (ghi) perylene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Benzo (k) fluoranthene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Chrysene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Coronene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Dibenzo (ah) anthracene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Fluoranthene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Fluorene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Indeno (123-cd) pyrene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Naphthalene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Phenanthrene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Pyrene				<0.22	<0.21	<0.23	<0.23	<0.20	<0.20	<0.20	<0.18
Σ of 17 PAHs	100			<3.79	<3.57	<3.90	<3.85	<3.43	<3.31	<3.32	<3.06

4.2. Leachate

4.2.1. Metals

Table 4.6 shows the metal results. All stations were below the inert criteria limit values for each of the metals outlined in the table.

Table 4.6: Metals results (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Land-fill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Arsenic	0.5	2	25	0.1	0.1	0.3	0.15	0.14	0.07	0.15	0.08
Cadmium	0.04	1	5	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	0.5	10	70	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	2	50	100	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	0.5	10	50	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	0.01	0.2	2	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Molybdenum	0.5	10	30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	0.4	10	40	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Antimony	0.06	0.7	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	0.1	0.5	7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	4	50	200	0.03	<0.02	<0.02	<0.02	0.04	<0.02	0.03	<0.02
Barium	20	100	300	1	0.8	0.8	1	0.8	1.2	0.6	0.4

4.2.2. Anions

The results for Chloride, Fluoride and Sulphate anions can be seen in Table 4.7. All stations were below the inert criteria limit values for all parameters. Chloride ranged from 46 mg/kg (L3) to 80 mg/kg (L4). Fluoride was <1 mg/kg for all stations. Sulphate ranged from <30 mg/kg (ST4) to 73 mg/kg (ST6).

Table 4.7: Anion results (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Chloride	800	15000	25000	53	46	80	54	64	63	56	56
Fluoride	10	150	500	<1	<1	<1	<1	<1	<1	<1	<1
Sulphate SO4	1000	20000	50000	53	46	<30	73	37	72	37	38

4.2.3. TDS (Total Dissolved Solids)

Total Dissolved Solids results can be seen in Table 4.8. All stations were below the inert criteria limit values. TDS ranged from 1690mg/kg (L10) to 2210 (L8) mg/kg.

Table 4.8: Total dissolved solids results (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
TDS	4000	60000	100000	2070	1860	2160	1960	1920	2210	1830	1690

4.2.4. Phenol Index

Phenol Index results can be seen in Table 4.9. All stations were below the inert criteria limit values. Phenol index was <0.5mg/kg at all stations

Table 4.9: Phenol Index results (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
Phenol Index	1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

4.2.1. Ph

Table 4.10 shows the Ph results from all stations. All stations met the criteria limit value for Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill. pH ranged from 8.3 (L9 & L10) to 8 (ST2, L6 & L7) pH units.

Table 4.10: pH results

	Landfill Waste Acceptance Criteria Limit Values										
Determinant	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
pH units		>6		8	8.1	8.2	8	8	8.1	8.3	8.3

4.2.2. DOC (Dissolved Organic Carbon)

DOC results can be seen in Table 4.11. All stations were below the inert criteria limit values.

Table 4.11: Dissolved Organic Carbon results (mg/kg)

	Landfill Waste Acceptance Criteria Limit Values										
Determinant (mg/kg)	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**	**L2**	**L3**	**L4**	**L6**	**L7**	**L8**	**L9**	**L10**
DOC	500	800	1000	76.1	84.9	158	81.7	106	60.7	109	80.2

5. Discussion

The sediments analysed for disposal at sea were below the upper action limit for the majority of parameters at all stations. However, Lead was above the upper action level at station L1. A determination as to whether this material is suitable for disposal at sea will be made by the Marine Institute.

The sediment analysed for Waste Acceptance Criteria was classified as inert at stations L3, L7, L9, and L10 and non-hazardous with regards to total organic carbon for stations L2, L4, L6, and L8. All other sediment analysed for WAC was classified as inert. All stations were classified as non-hazardous with regards to pH.

6. References

Cronin, M., McGovern, E., McMahon, T. & R. Boelens. 2006. Guidelines for the assessment of dredge material for disposal in Irish waters. Marine Environmental and Health Series, No. 24, 2006.

Marine Institute. 2019 Addendum to 2006 Guidelines for the Assessment of Dredged material in Irish Waters (Cronin *et al.*).

Appendix 1
Sediment Sample Photographs


AQUAFACT
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L1


AQUAFACT
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L2


AQUAFACT
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L3


OK04
AQUAFACT
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L4


AQUAFACT
APEM Group
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L5


AQUAFACT
APEM Group
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L6


AQUAFACT
APEM Group
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L7


AQUAFACT
APEM Group
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L8


AQUAFACT
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L9


AQUAFACT
Survey: JN1720
Location: Limerick
Date: 20/07/2022
Station:
L10

Appendix 2
Dumping at Sea SOCOTEC Laboratory Certs

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID	**MAR01486**
Issue Version	1
Customer	Aquafact International Services Ltd, 12 Kilkerrin Park, Liosbaun Industrial Estate, Tuam Rd, Galway, Ireland
Customer Reference	JN1720 Limerick DaS Sediment Analysis
Date Sampled	20-Jul-22
Date Received	25-Jul-22
Date Reported	02-Sep-22
Condition of samples	Ambient Satisfactory



Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

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Test Report ID	MAR01486
Issue Version	1
Customer Reference	JN1720 Limerick DaS Sediment Analysis

		Method No	SOCOTEC Doncaster*
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Visual Description**
L1	MAR01486.001	Sediment	Grey slightly sandy gravelly CLAY
L2	MAR01486.002	Sediment	Grey organic slightly sandy SILT
L3	MAR01486.003	Sediment	Grey silty CLAY
L4	MAR01486.004	Sediment	Grey Weeds & Rootlets
L6	MAR01486.005	Sediment	Grey organic SILT
L7	MAR01486.006	Sediment	Grey organic SILT
L8	MAR01486.007	Sediment	Grey organic SILT
L9	MAR01486.008	Sediment	Grey organic SILT
L10	MAR01486.009	Sediment	Grey organic SILT

* See Report Notes

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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	%	%	%	%	%	Mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SUB_02*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
L1	MAR01486.001	Sediment	56.0	44.0	22.86	9.66	67.48	2.53
L2	MAR01486.002	Sediment	58.8	41.2	3.30	40.80	55.90	2.60
L3	MAR01486.003	Sediment	65.5	34.5	3.86	14.28	81.86	2.67
L4	MAR01486.004	Sediment	69.6	30.4	0.19	3.86	95.95	Not Amenable
L6	MAR01486.005	Sediment	67.5	32.5	0.13	17.11	82.76	2.53
L7	MAR01486.006	Sediment	55.9	44.1	0.06	10.29	89.65	2.59
L8	MAR01486.007	Sediment	68.3	31.7	0.00	12.80	87.20	2.55
L9	MAR01486.008	Sediment	60.6	39.4	0.00	13.02	86.98	2.55
L10	MAR01486.009	Sediment	59.3	40.7	0.49	7.92	91.59	2.69
		Reference Material (% Recovery)	NA	NA	NA	NA	NA	NA
		QC Blank	NA	NA	NA	NA	NA	NA

* See Report Notes

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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	% m/m	%m/m
		Method No	WSLM59*	ANC*
		Limit of Detection	0.02	0.12
		Accreditation	UKAS	No
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**TOC**	**Carbonate Equivalent (%CO3)**
L1	MAR01486.001	Sediment	1.16	17.3
L2	MAR01486.002	Sediment	3.94	9.8
L3	MAR01486.003	Sediment	2.03	15.6
L4	MAR01486.004	Sediment	2.68	14.4
L6	MAR01486.005	Sediment	2.71	12.5
L7	MAR01486.006	Sediment	2.72	13.9
L8	MAR01486.007	Sediment	2.80	13.2
L9	MAR01486.008	Sediment	2.17	14.2
L10	MAR01486.009	Sediment	1.64	14.4
		Reference Material (% Recovery)	93	98
		QC Blank	<0.02	<0.12

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Test Report ID	MAR01486
Issue Version	1
Customer Reference	JN1720 Limerick DaS Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SEDMS*	SEDMS*	SEDMS*	SEDMS*	SEDMS*	SEDMS*	SEDMS*
		Limit of Detection	0.5	0.2	2	2	1.2	2	3
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic as As**	**Cadmium as Cd**	**Chromium as Cr**	**Copper as Cu**	**Lead as Pb**	**Nickel as Ni**	**Zinc as Zn**
L1	MAR01486.001	Sediment	12.6	0.3	54.2	13.4	1160	29.5	71.6
L2	MAR01486.002	Sediment	8.0	0.4	62.0	13.1	59.1	30.8	133
L3	MAR01486.003	Sediment	10.0	0.3	66.2	12.4	34.4	32.1	116
L4	MAR01486.004	Sediment	12.5	0.4	70.3	12.5	36.7	36.4	135
L6	MAR01486.005	Sediment	11.3	0.4	68.7	14.1	37.5	35.0	142
L7	MAR01486.006	Sediment	10.9	0.4	67.9	12.5	33.8	33.3	130
L8	MAR01486.007	Sediment	10.6	0.5	63.7	13.3	36.0	39.9	138
L9	MAR01486.008	Sediment	11.1	0.3	60.8	11.6	30.8	32.2	114
L10	MAR01486.009	Sediment	10.8	0.3	67.2	10.7	30.1	31.9	107
Certified Reference Material 2702 (Measured Value)			43.1	0.6	309	99.9	122	64.6	423
Certified Reference Material 2702 (Certified Value)			45.3	0.817	352	117.7	132.8	75.4	485.3
Certified Reference Material 2702 (% Recovery)			97	88	102	96	98	99	99
QC Blank			<0.5	<0.2	<2	<2	<1.2	<2	<3

* See Report Notes

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	TMMS1*	SEDOES*	SEDOES*
		Limit of Detection	0.01	10	2
		Accreditation	N	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Mercury as Hg**	**Aluminium as Al**	**Lithium as Li**
L1	MAR01486.001	Sediment	0.05	46900	31.9
L2	MAR01486.002	Sediment	0.08	41800	31.7
L3	MAR01486.003	Sediment	0.07	47000	37.5
L4	MAR01486.004	Sediment	0.07	54800	42.5
L6	MAR01486.005	Sediment	0.08	50900	39.1
L7	MAR01486.006	Sediment	0.08	50000	38.4
L8	MAR01486.007	Sediment	0.09	47900	37.1
L9	MAR01486.008	Sediment	0.07	53100	39.1
L10	MAR01486.009	Sediment	0.06	49200	40.1
Certified Reference Material 2702 (Measured Value)			0.42	74157	82.7
Certified Reference Material 2702 (Certified Value)			0.04	84000	78.2
Certified Reference Material 2702 (% Recovery)			100	97	92
QC Blank			<0.01	<10	<2

* See Report Notes
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Test Report ID	MAR01486
Issue Version	1
Customer Reference	JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
L2	MAR01486.002	Sediment	<5	<5
L3	MAR01486.003	Sediment	<5	<5
L4	MAR01486.004	Sediment	<5	<5
L6	MAR01486.005	Sediment	<5	<5
L7	MAR01486.006	Sediment	<5	<5
L8	MAR01486.007	Sediment	<5	<5
L9	MAR01486.008	Sediment	<5	<5
L10	MAR01486.009	Sediment	<5	<5
Certified Reference Material QSP078MS(Measured Value)			17.5	41.1
Certified Reference Material QSP078MS(Certified Value)			17.5	31.5
Certified Reference Material QSP078MS (% Recovery)			100	131
QC Blank			<1	<1

* See Report Notes

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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
L2	MAR01486.002	Sediment	6.98	12.9	17.2	72.7	138	144
L3	MAR01486.003	Sediment	9.26	19.8	28.8	107	189	201
L4	MAR01486.004	Sediment	3.25	4.50	7.33	27.7	35.2	38.5
Certified Reference Material QPH106MS (Measured Value)			32.7	40.2	116	256	222	419
Certified Reference Material QPH106MS (Certified Value)			35.5	34.2	127	256	210	419
Certified Reference Material QPH106MS (% Recovery)			92	118	91	100	106	100
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
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Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
L2	MAR01486.002	Sediment	132	66.5	83.6	28.8	154	6.64
L3	MAR01486.003	Sediment	170	101	124	32.3	205	13.6
L4	MAR01486.004	Sediment	28.7	22.2	35.4	6.21	56.1	5.52
Certified Reference Material QPH106MS (Measured Value)			255	197	385	63.0	537	52.3
Certified Reference Material QPH106MS (Certified Value)			239	174	388	60.2	555	56.6
Certified Reference Material QPH106MS (% Recovery)			107	113	99	105	97	92
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
L2	MAR01486.002	Sediment	149	20.2	35.7	160	653000
L3	MAR01486.003	Sediment	191	12.9	64.7	206	329000
L4	MAR01486.004	Sediment	31.1	9.30	27.5	50.2	210000
Certified Reference Material QPH106MS (Measured Value)			286	194	327	445	1436~
Certified Reference Material QPH106MS (Certified Value)			267	208	366	438	1400~
Certified Reference Material QPH106MS (% Recovery)			107	93	89	102	103~
QC Blank			<1	<1	<1	<1	<1

For full analyte name see method summaries
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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
L6	MAR01486.005	Sediment	8.65	7.48	11.0	42.4	54.9	61.7
L7	MAR01486.006	Sediment	5.64	4.71	10.2	39.3	45.9	48.7
L8	MAR01486.007	Sediment	4.00	3.02	7.85	31.8	38.3	41.3
L9	MAR01486.008	Sediment	7.35	5.25	12.3	31.0	35.7	35.4
L10	MAR01486.009	Sediment	13.8	4.45	6.15	23.1	34.2	35.4
Certified Reference Material QPH106MS (Measured Value)			33.7	39.0	116	237	216	362
Certified Reference Material QPH106MS (Certified Value)			35.5	34.2	127	256	210	419
Certified Reference Material QPH106MS (% Recovery)			95	114	91	93	103	86
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
L6	MAR01486.005	Sediment	46.1	33.4	49.9	11.9	89.0	10.0
L7	MAR01486.006	Sediment	34.5	25.6	42.3	8.36	64.5	8.66
L8	MAR01486.007	Sediment	33.0	22.9	37.4	7.12	58.5	6.77
L9	MAR01486.008	Sediment	30.6	18.7	36.4	6.79	69.3	10.0
L10	MAR01486.009	Sediment	30.6	14.9	29.1	7.01	45.1	6.12
Certified Reference Material QPH106MS (Measured Value)			254	165	355	57.9	527	52.8
Certified Reference Material QPH106MS (Certified Value)			239	174	388	60.2	555	56.6
Certified Reference Material QPH106MS (% Recovery)			106	95	92	96	95	93
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
L6	MAR01486.005	Sediment	46.2	11.5	54.9	76.5	177000
L7	MAR01486.006	Sediment	37.9	9.52	31.2	55.3	178000
L8	MAR01486.007	Sediment	32.3	9.86	28.1	49.4	171000
L9	MAR01486.008	Sediment	32.7	9.81	46.3	58.3	113000
L10	MAR01486.009	Sediment	33.3	7.77	22.6	38.7	95900
Certified Reference Material QPH106MS (Measured Value)			265	182	324	432	1317~
Certified Reference Material QPH106MS (Certified Value)			267	208	366	438	1400~
Certified Reference Material QPH106MS (% Recovery)			99	87	88	99	94~
QC Blank			<1	<1	<1	<1	<1

For full analyte name see method summaries
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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
L2	MAR01486.002	Sediment	<0.08	<0.08	0.11	0.16	0.20	0.21	0.13
L3	MAR01486.003	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
L4	MAR01486.004	Sediment	<0.08	<0.08	<0.08	0.11	0.12	0.10	<0.08
L6	MAR01486.005	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08
L7	MAR01486.006	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	0.09	<0.08
L8	MAR01486.007	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
L9	MAR01486.008	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
L10	MAR01486.009	Sediment	<0.08	<0.08	<0.08	0.09	<0.08	0.09	<0.08
Certified Reference Material QOR149 MS (Measured Value)			5.30	6.44	8.72	6.56	9.49	15.3	5.87
Certified Reference Material QOR149 MS (Certified Value)			7.09	7.51	10.5	6.73	9.32	14.3	7.23
Certified Reference Material QOR149 MS (% Recovery)			75	86	83	98	102	107	81
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries
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Certificate of Analysis

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Test Report ID	MAR01486
Issue Version	1
Customer Reference	JN1720 Limerick DaS Sediment Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
L2	MAR01486.002	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1	0.11
L3	MAR01486.003	Sediment	<0.1	<0.1	<0.1	0.20	<0.1	<0.1	<0.1	<0.1
L4	MAR01486.004	Sediment	<0.1	<0.1	<0.1	0.14	<0.1	<0.1	<0.1	<0.1
L6	MAR01486.005	Sediment	<0.1	<0.1	<0.1	0.25	<0.1	0.11	0.32	0.05
L7	MAR01486.006	Sediment	<0.1	<0.1	<0.1	0.18	<0.1	<0.1	<0.1	0.10
L8	MAR01486.007	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	<0.1
L9	MAR01486.008	Sediment	<0.1	<0.1	<0.1	0.17	<0.1	<0.1	<0.1	<0.1
L10	MAR01486.009	Sediment	<0.1	<0.1	0.15	<0.1	0.13	<0.1	0.39	0.13
Certified Reference Material QOR149 MS (Measured Value)			0.12	0.40	0.16	0.26	3.90	2.69	0.79	1.64
Certified Reference Material QOR149 MS (Certified Value)			0.18	0.40	0.12	0.36	4.03	2.18	0.84	1.45
Certified Reference Material QOR149 MS (% Recovery)			63	100	134	73	97	124	94	113
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For full analyte name see method summaries

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Test Report ID MAR01486
Issue Version 1
Customer Reference JN1720 Limerick DaS Sediment Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
WSLM59*	MAR01486.001-009	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
ANC*	MAR01486.001-009	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SEDMS*	MAR01486.001-009	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SEDOES*	MAR01486.001-009	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
TMMS1*	MAR01486.001-009	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SUB_01*	MAR01486.001-009	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR01486.001-009	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR01486.004	Sample Unsuitable For Test - Sample is Grey Weeds & Rootlets
ASC/SOP/301	MAR01486.001-009	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/303/304	MAR01486.001-009	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene).This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Sample Contaminated through Damaged Packaging	N/A	N/A
D3	Sample Contaminated through Sampling	N/A	N/A
D4	Inappropriate Container/Packaging	N/A	N/A
D5	Damaged in Transit	N/A	N/A
D6	Insufficient Quantity of Sample	N/A	N/A
D7	Inappropriate Headspace	N/A	N/A
D8	Retained at Incorrect Temperature	N/A	N/A
D9	Lack of Date & Time of Sampling	N/A	N/A
D10	Insufficient Sample Details	N/A	N/A
D11	Sample integrity compromised or not suitable for analysis	N/A	N/A

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Test Report ID	MAR01486
Issue Version	1
Customer Reference	JN1720 Limerick DaS Sediment Analysis

Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and seived to <2mm	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Carbonate	Air dried and seived to <2mm	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Metals	Air dried and seived to <2mm	HF/Boric extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions					
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorcyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorcyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorcyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichlorodiphenyldichloroethane
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	DDE	p,p'-Dichlorodiphenyldichloroethylene
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	DDT	p,p'-Dichlorodiphenyltrichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

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Appendix 3
WASTE Acceptance Criteria SOCOTEC Laboratory Certs

SOCOTEC

Environmental
Chemistry

Certificate of Analysis

Client: AQUAFACT International Services Ltd

Project: 22080055

Quote: BEC220726084 V3.1

Project Ref: JN1720

Site: Limerick WAC Analysis

Contact: Eddie McCormack

Address: 12 Kilkerrin Park
Liosbaun Industrial Estate
Tuam Road
Galway
Co. Galway

E-Mail: eddie@aquafact.ie

Phone: 091-756812

No. Samples Received: 8

Date Received: 01/08/2022

Analysis Date: 19/08/2022

Date Issued: 19/08/2022

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

Reported by Account Manager
Martin Elliott-Palmer
01283 554137

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

Samples Analysed

Text ID	Sample Reference	Sampling Date	Sample Type	Sample Description
22080055-001	ST2	20/07/2022 00:00:00	LPL	Soil Sample
22080055-002	ST3	20/07/2022 00:00:00	LPL	Soil Sample
22080055-003	ST4	20/07/2022 00:00:00	LPL	Soil Sample
22080055-004	ST6	20/07/2022 00:00:00	LPL	Soil Sample
22080055-005	ST7	20/07/2022 00:00:00	LPL	Soil Sample
22080055-006	ST8	20/07/2022 00:00:00	LPL	Soil Sample
22080055-007	ST9	20/07/2022 00:00:00	LPL	Soil Sample
22080055-008	ST10	20/07/2022 00:00:00	SOLID	Soil Sample

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

UKAS TESTING 1252

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002		003		004
					Customer ID	ST2		ST3		ST4		ST6
					Sample Type	LPL	SOLID	LPL	SOLID	LPL	SOLID	LPL
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Antimony as Sb	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Arsenic as As	ICPMSW (Dissolved)	0.01	mg/kg^	N		0.10		0.10		0.30		0.15
Barium as Ba	ICPWATVAR (Dissolved)	0.1	mg/kg^	N		1.0		0.8		0.8		1.0
Cadmium as Cd	ICPMSW (Dissolved)	0.0002	mg/kg^	N		<0.0002		<0.0002		<0.0002		<0.0002
Chloride as Cl	KONENS	10	mg/kg^	N		53		46		80		54
Total Chromium as Cr	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Copper as Cu	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Lead as Pb	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Mercury as Hg	ICPMSW (Dissolved)	0.0003	mg/kg^	N		<0.0003		<0.0003		<0.0003		<0.0003
Molybdenum as Mo	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Nickel as Ni	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Phenol Index	SFAPI	0.5	mg/kg^	N		<0.5		<0.5		<0.5		<0.5
Selenium as Se	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01		<0.01		<0.01		<0.01
Total Sulphur as SO4	ICPWATVAR (Dissolved)	30	mg/kg^	N		53		46		<30		73
TDS as mg/kg	PHCONDW	700	mg/kg^	N		2070		1860		2160		1960
Leached Organic Carbon	WSLM13	2	mg/kg^	N		76.1		84.9		158		81.7
Fluoride as F	ISEF	1	mg/kg^	N		<1		<1		<1		<1
Zinc as Zn	ICPMSW (Dissolved)	0.02	mg/kg^	N		0.03		<0.02		<0.02		<0.02
Conductivity at 25°C	PHCONDW	100	µS/cm	U		343		299		359		317

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	004	005		006		007	
					Customer ID	ST6	ST7		ST8		ST9	
					Sample Type	SOLID	LPL	SOLID	LPL	SOLID	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Antimony as Sb	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Arsenic as As	ICPMSW (Dissolved)	0.01	mg/kg^	N			0.14		0.07		0.15	
Barium as Ba	ICPWATVAR (Dissolved)	0.1	mg/kg^	N			0.8		1.2		0.6	
Cadmium as Cd	ICPMSW (Dissolved)	0.0002	mg/kg^	N			<0.0002		<0.0002		<0.0002	
Chloride as Cl	KONENS	10	mg/kg^	N			64		63		56	
Total Chromium as Cr	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Copper as Cu	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Lead as Pb	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Mercury as Hg	ICPMSW (Dissolved)	0.0003	mg/kg^	N			<0.0003		<0.0003		<0.0003	
Molybdenum as Mo	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Nickel as Ni	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Phenol Index	SFAPI	0.5	mg/kg^	N			<0.5		<0.5		<0.5	
Selenium as Se	ICPMSW (Dissolved)	0.01	mg/kg^	N			<0.01		<0.01		<0.01	
Total Sulphur as SO4	ICPWATVAR (Dissolved)	30	mg/kg^	N			37		72		37	
TDS as mg/kg	PHCONDW	700	mg/kg^	N			1920		2210		1830	
Leached Organic Carbon	WSLM13	2	mg/kg^	N			106		60.7		109	
Fluoride as F	ISEF	1	mg/kg^	N			<1		<1		<1	
Zinc as Zn	ICPMSW (Dissolved)	0.02	mg/kg^	N			0.04		<0.02		0.03	
Conductivity at 25°C	PHCONDW	100	µS/cm	U			307		359		290	

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	008	
					Customer ID	ST10	
					Sample Type	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022
Antimony as Sb	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Arsenic as As	ICPMSW (Dissolved)	0.01	mg/kg^	N		0.08	
Barium as Ba	ICPWATVAR (Dissolved)	0.1	mg/kg^	N		0.4	
Cadmium as Cd	ICPMSW (Dissolved)	0.0002	mg/kg^	N		<0.0002	
Chloride as Cl	KONENS	10	mg/kg^	N		56	
Total Chromium as Cr	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Copper as Cu	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Lead as Pb	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Mercury as Hg	ICPMSW (Dissolved)	0.0003	mg/kg^	N		<0.0003	
Molybdenum as Mo	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Nickel as Ni	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Phenol Index	SFAPI	0.5	mg/kg^	N		<0.5	
Selenium as Se	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01	
Total Sulphur as SO4	ICPWATVAR (Dissolved)	30	mg/kg^	N		38	
TDS as mg/kg	PHCONDW	700	mg/kg^	N		1690	
Leached Organic Carbon	WSLM13	2	mg/kg^	N		80.2	
Fluoride as F	ISEF	1	mg/kg^	N		<1	
Zinc as Zn	ICPMSW (Dissolved)	0.02	mg/kg^	N		<0.02	
Conductivity at 25°C	PHCONDW	100	µS/cm	U		264	

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002		003		004
					Customer ID	ST2	ST3		ST4		ST6
					Sample Type	LPL	SOLID	LPL	SOLID	LPL	SOLID	LPL
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
pH	PHCONDW	1	pH units	U		8.0		8.1		8.2		8.0
TDS as mg/l	PHCONDW	70	mg/l	N		233		203		244		216
Chloride as Cl	KONENS	1	mg/l	U		6		5		9		6
Phenol Index	SFAPI	0.05	mg/l	U		<0.05		<0.05		<0.05		<0.05
Fluoride as F	ISEF	0.1	mg/l	U		0.1		0.1		0.1		0.1
Total Organic Carbon	WSLM59	0.02	% m/m^	U			4.91*		2.62*		3.40*	
Leached Organic Carbon	TOCW	0.4	mg/l	U		8.56*		9.25*		17.9*		9.01*
Antimony as Sb	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001		<0.001		<0.001		<0.001
Arsenic as As	ICPMSW (Dissolved)	0.001	mg/l	U		0.011		0.011		0.034		0.016
Cadmium as Cd	ICPMSW (Dissolved)	0.00002	mg/l	U		<0.00002		<0.00002		<0.00002		<0.00002
Total Chromium as Cr	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001		<0.001		<0.001		<0.001
Copper as Cu	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001		<0.001		<0.001		<0.001
Lead as Pb	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001		<0.001		<0.001		<0.001
Mercury as Hg	ICPMSW (Dissolved)	0.00003	mg/l	U		<0.00003		<0.00003		<0.00003		<0.00003
Molybdenum as Mo	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001		<0.001		<0.001		<0.001
Nickel as Ni	ICPMSW (Dissolved)	0.001	mg/l	U		0.001		0.001		0.001		0.001
Selenium as Se	ICPMSW (Dissolved)	0.001	mg/l	U		0.001		0.001		0.001		0.001
Zinc as Zn	ICPMSW (Dissolved)	0.002	mg/l	U		0.003		<0.002		0.002		<0.002
Barium as Ba	ICPWATVAR (Dissolved)	0.01	mg/l	U		0.11		0.09		0.09		0.11

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	004	005		006		007	
					Customer ID	ST6	ST7		ST8		ST9	
					Sample Type	SOLID	LPL	SOLID	LPL	SOLID	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
pH	PHCONDW	1	pH units	U			8.0		8.1		8.3	
TDS as mg/l	PHCONDW	70	mg/l	N			209		244		197	
Chloride as Cl	KONENS	1	mg/l	U			7		7		6	
Phenol Index	SFAPI	0.05	mg/l	U			<0.05		<0.05		<0.05	
Fluoride as F	ISEF	0.1	mg/l	U			0.1		0.1		0.1	
Total Organic Carbon	WSLM59	0.02	% m/m^	U		3.20*		2.78*		3.15*		2.82*
Leached Organic Carbon	TOCW	0.4	mg/l	U			11.5*		6.71*		11.7*	
Antimony as Sb	ICPMSW (Dissolved)	0.001	mg/l	U			<0.001		<0.001		<0.001	
Arsenic as As	ICPMSW (Dissolved)	0.001	mg/l	U			0.015		0.008		0.016	
Cadmium as Cd	ICPMSW (Dissolved)	0.00002	mg/l	U			<0.00002		<0.00002		<0.00002	
Total Chromium as Cr	ICPMSW (Dissolved)	0.001	mg/l	U			<0.001		<0.001		<0.001	
Copper as Cu	ICPMSW (Dissolved)	0.001	mg/l	U			<0.001		<0.001		<0.001	
Lead as Pb	ICPMSW (Dissolved)	0.001	mg/l	U			<0.001		<0.001		<0.001	
Mercury as Hg	ICPMSW (Dissolved)	0.00003	mg/l	U			<0.00003		<0.00003		<0.00003	
Molybdenum as Mo	ICPMSW (Dissolved)	0.001	mg/l	U			<0.001		<0.001		0.001	
Nickel as Ni	ICPMSW (Dissolved)	0.001	mg/l	U			0.001		<0.001		0.001	
Selenium as Se	ICPMSW (Dissolved)	0.001	mg/l	U			0.001		0.001		0.001	
Zinc as Zn	ICPMSW (Dissolved)	0.002	mg/l	U			0.004		0.002		0.003	
Barium as Ba	ICPWATVAR (Dissolved)	0.01	mg/l	U			0.09		0.13		0.06	

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID: 008	
					Customer ID: ST10	
					Sample Type: LPL	SOLID
					Sampling Date: 20/07/2022	20/07/2022
pH	PHCONDW	1	pH units	U	8.3	
TDS as mg/l	PHCONDW	70	mg/l	N	180	
Chloride as Cl	KONENS	1	mg/l	U	6	
Phenol Index	SFAPI	0.05	mg/l	U	<0.05	
Fluoride as F	ISEF	0.1	mg/l	U	0.1	
Total Organic Carbon	WSLM59	0.02	% m/m^	U		2.20*
Leached Organic Carbon	TOCW	0.4	mg/l	U	8.52*	
Antimony as Sb	ICPMSW (Dissolved)	0.001	mg/l	U	<0.001	
Arsenic as As	ICPMSW (Dissolved)	0.001	mg/l	U	0.009	
Cadmium as Cd	ICPMSW (Dissolved)	0.00002	mg/l	U	<0.00002	
Total Chromium as Cr	ICPMSW (Dissolved)	0.001	mg/l	U	<0.001	
Copper as Cu	ICPMSW (Dissolved)	0.001	mg/l	U	<0.001	
Lead as Pb	ICPMSW (Dissolved)	0.001	mg/l	U	<0.001	
Mercury as Hg	ICPMSW (Dissolved)	0.00003	mg/l	U	<0.00003	
Molybdenum as Mo	ICPMSW (Dissolved)	0.001	mg/l	U	0.001	
Nickel as Ni	ICPMSW (Dissolved)	0.001	mg/l	U	0.001	
Selenium as Se	ICPMSW (Dissolved)	0.001	mg/l	U	0.001	
Zinc as Zn	ICPMSW (Dissolved)	0.002	mg/l	U	<0.002	
Barium as Ba	ICPWATVAR (Dissolved)	0.01	mg/l	U	0.04	

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002		003		004
					Customer ID	ST2		ST3		ST4		ST6
					Sample Type	LPL	SOLID	LPL	SOLID	LPL	SOLID	LPL
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Total Sulphur as SO4	ICPWATVAR (Dissolved)	3	mg/l	U		6		5		<3		8
Benzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.028* B		<0.026* B		<0.029* B	
Ethylbenzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.028*		<0.026*		<0.029*	
m/p-Xylene HS_1D_AR	BTEXHSA	0.02	mg/kg^	UM			<0.056*		<0.053*		<0.057*	
o-Xylene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.028*		<0.026*		<0.029*	
Toluene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.028*		<0.026*		<0.029*	
Total BTEX HS_1D_AR	BTEXHSA	0.06	mg/kg^	UM			<0.167*		<0.157*		<0.172*	
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U			<0.22*		<0.21*		<0.23*	
Anthracene	PAHMSUS	0.08	mg/kg^	U			<0.22*		<0.21*		<0.23*	
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Chrysene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Coronene	PAHMSUS	0.08	mg/kg^	N			<0.22		<0.21		<0.23	
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	004	005		006		007	
					Customer ID	ST6	ST7		ST8		ST9	
					Sample Type	SOLID	LPL	SOLID	LPL	SOLID	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Total Sulphur as SO4	ICPWATVAR (Dissolved)	3	mg/l	U			4		8		4	
Benzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.028* B		<0.025* B		<0.024* B		<0.024* B
Ethylbenzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.028*		<0.025*		<0.024*		<0.024*
m/p-Xylene HS_1D_AR	BTEXHSA	0.02	mg/kg^	UM		<0.057*		<0.051*		<0.049*		<0.049*
o-Xylene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.028*		<0.025*		<0.024*		<0.024*
Toluene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.028*		<0.025*		<0.024*		<0.024*
Total BTEX HS_1D_AR	BTEXHSA	0.06	mg/kg^	UM		<0.170*		<0.152*		<0.146*		<0.146*
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U		<0.23*		<0.20*		<0.20*		<0.20*
Anthracene	PAHMSUS	0.08	mg/kg^	U		<0.23*		<0.20*		<0.20*		<0.20*
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Chrysene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Coronene	PAHMSUS	0.08	mg/kg^	N		<0.23		<0.20		<0.20		<0.20
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID: 008	
					Customer ID: ST10	
					Sample Type: LPL	SOLID
					Sampling Date: 20/07/2022	20/07/2022
Total Sulphur as SO4	ICPWATVAR (Dissolved)	3	mg/l	U	4	
Benzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.023* B
Ethylbenzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.023*
m/p-Xylene HS_1D_AR	BTEXHSA	0.02	mg/kg^	UM		<0.045*
o-Xylene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.023*
Toluene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM		<0.023*
Total BTEX HS_1D_AR	BTEXHSA	0.06	mg/kg^	UM		<0.135*
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U		<0.18*
Anthracene	PAHMSUS	0.08	mg/kg^	U		<0.18*
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Chrysene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Coronene	PAHMSUS	0.08	mg/kg^	N		<0.18
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM		<0.18*

Client: AQUAFACT International Services Ltd
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Project No: 22080055
Date Issued: 19/08/2022

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002		003		004
					Customer ID	ST2		ST3		ST4		ST6
					Sample Type	LPL	SOLID	LPL	SOLID	LPL	SOLID	LPL
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Fluorene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Naphthalene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Pyrene	PAHMSUS	0.08	mg/kg^	UM			<0.22*		<0.21*		<0.23*	
Total PAH 16	PAHMSUS	1.28	mg/kg^	U			<3.57*		<3.36*		<3.67*	
Total PAH 17	PAHMSUS	1.36	mg/kg^	N			<3.79		<3.57		<3.90	
PCB 101	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
PCB 118	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
PCB 138	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
PCB 153	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
PCB 180	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
PCB 28	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
PCB 52	PCBECD	0.005	mg/kg^	UM			<0.014*		<0.013*		<0.014*	
Total PCB 7 Congeners	PCBECD	0.035	mg/kg^	UM			<0.098*		<0.092*		<0.100*	
>C10-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U			80.3*		61.4*		70.5*	
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	UM			80.3*		61.4*		70.5*	
Total Moisture at 35°C	CLANDPREP	0.1	%	N			64.1		61.9		65.1	
Description of Solid Material	CLANDPREP		-	N			SLUDGE		SLUDGE		SLUDGE	

Client: AQUAFACT International Services Ltd
Project Name:
Project No: 22080055
Date Issued: 19/08/2022

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	004	005		006		007	
					Customer ID	ST6	ST7		ST8		ST9	
					Sample Type	SOLID	LPL	SOLID	LPL	SOLID	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Fluorene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Naphthalene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.23*		<0.20*		<0.20*		<0.20*
Total PAH 16	PAHMSUS	1.28	mg/kg^	U		<3.63*		<3.23*		<3.11*		<3.12*
Total PAH 17	PAHMSUS	1.36	mg/kg^	N		<3.85		<3.43		<3.31		<3.32
PCB 101	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
PCB 118	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
PCB 138	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
PCB 153	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
PCB 180	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
PCB 28	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
PCB 52	PCBECD	0.005	mg/kg^	UM		<0.014*		<0.013*		<0.012*		<0.012*
Total PCB 7 Congeners	PCBECD	0.035	mg/kg^	UM		<0.099*		<0.088*		<0.085*		<0.085*
>C10-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U		77.4*		81.8*		77.9*		87.9*
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	UM		77.5*		81.8*		77.9*		87.9*
Total Moisture at 35°C	CLANDPREP	0.1	%	N		64.7		60.4		58.9		59.0
Description of Solid Material	CLANDPREP		-	N		SLUDGE		SLUDGE		SLUDGE		SLUDGE

Client: AQUAFACT International Services Ltd
Project Name:
Project No: 22080055
Date Issued: 19/08/2022

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	008
					Customer ID	ST10
					Sample Type	LPL / SOLID
					Sampling Date	20/07/2022 / 20/07/2022
Fluorene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Naphthalene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Pyrene	PAHMSUS	0.08	mg/kg^	UM		<0.18*
Total PAH 16	PAHMSUS	1.28	mg/kg^	U		<2.88*
Total PAH 17	PAHMSUS	1.36	mg/kg^	N		<3.06
PCB 101	PCBECD	0.005	mg/kg^	UM		<0.011*
PCB 118	PCBECD	0.005	mg/kg^	UM		<0.011*
PCB 138	PCBECD	0.005	mg/kg^	UM		<0.011*
PCB 153	PCBECD	0.005	mg/kg^	UM		<0.011*
PCB 180	PCBECD	0.005	mg/kg^	UM		<0.011*
PCB 28	PCBECD	0.005	mg/kg^	UM		<0.011*
PCB 52	PCBECD	0.005	mg/kg^	UM		<0.011*
Total PCB 7 Congeners	PCBECD	0.035	mg/kg^	UM		<0.079*
>C10-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U		45.5*
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	UM		45.5*
Total Moisture at 35°C	CLANDPREP	0.1	%	N		55.5
Description of Solid Material	CLANDPREP		-	N		SLUDGE

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002		003		004
					Customer ID	ST2		ST3		ST4		ST6
					Sample Type	LPL	SOLID	LPL	SOLID	LPL	SOLID	LPL
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Equivalent Weight of Dry Material (kg)	Leachate Prep CEN 10:1		kg	N		0.090		0.090		0.090		
Fraction above 4mm (%)	Leachate Prep CEN 10:1		%	N		0		0		0		
Fraction of non-crushable material (%)	Leachate Prep CEN 10:1		%	N		0		0		0		
Volume of Water for 10:1 Leach (ltr)	Leachate Prep CEN 10:1		l	N		0.743		0.773		0.737		
Weight of Sample Leached (kg)	Leachate Prep CEN 10:1		kg	N		0.247		0.217		0.253		
WAC Report	WAC		-	N		See Attached		See Attached		See Attached		

Client: AQUAFACT International Services Ltd
Project Name:
Project No: 22080055
Date Issued: 19/08/2022

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	004	005		006		007	
					Customer ID	ST6	ST7		ST8		ST9	
					Sample Type	SOLID	LPL	SOLID	LPL	SOLID	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022	20/07/2022
Equivalent Weight of Dry Material (kg)	Leachate Prep CEN 10:1		kg	N		0.090		0.090		0.090		0.090
Fraction above 4mm (%)	Leachate Prep CEN 10:1		%	N		0		0		0		0
Fraction of non-crushable material (%)	Leachate Prep CEN 10:1		%	N		0		0		0		0
Volume of Water for 10:1 Leach (ltr)	Leachate Prep CEN 10:1		l	N		0.762		0.776		0.759		0.786
Weight of Sample Leached (kg)	Leachate Prep CEN 10:1		kg	N		0.228		0.214		0.231		0.204
WAC Report	WAC		-	N		See Attached		See Attached		See Attached		See Attached

Client: AQUAFACT International Services Ltd
Project Name:
Project No: 22080055
Date Issued: 19/08/2022

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	008
					Customer ID	ST10
					Sample Type	LPL	SOLID
					Sampling Date	20/07/2022	20/07/2022
Equivalent Weight of Dry Material (kg)	Leachate Prep CEN 10:1		kg	N		0.090
Fraction above 4mm (%)	Leachate Prep CEN 10:1		%	N		0
Fraction of non-crushable material (%)	Leachate Prep CEN 10:1		%	N		0
Volume of Water for 10:1 Leach (ltr)	Leachate Prep CEN 10:1		l	N		0.799
Weight of Sample Leached (kg)	Leachate Prep CEN 10:1		kg	N		0.191
WAC Report	WAC		-	N		See Attached

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-001	ST2	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.247
Moisture content @ 105°C (% Wet Weight)	63.5
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.743
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	4.91	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.167	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.098	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	80.3	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.79	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.0				
U	WSLM2**	Conductivity (µS/cm)	343				
U	ICPMSW	Arsenic	0.011	0.10	0.5	2	25
U	ICPWATVAR	Barium	0.11	1.0	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.003	0.03	4	50	200
U	KONENS	Chloride	6	53	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	6	53	1000	20000	50000
N	WSLM27	Total Dissolved Solids	233	2070	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	8.56	76.1	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-002	ST3	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.217
Moisture content @ 105°C (% Wet Weight)	58.6
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.773
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.62	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.157	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.092	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	61.4	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.57	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.1				
U	WSLM2**	Conductivity (µS/cm)	299				
U	ICPMSW	Arsenic	0.011	0.10	0.5	2	25
U	ICPWATVAR	Barium	0.09	0.8	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	<0.002	<0.02	4	50	200
U	KONENS	Chloride	5	46	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	5	46	1000	20000	50000
N	WSLM27	Total Dissolved Solids	203	1860	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	9.25	84.9	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-003	ST4	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.253
Moisture content @ 105°C (% Wet Weight)	64.5
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.737
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	3.40	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.172	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.100	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	70.5	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.90	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.2				
U	WSLM2**	Conductivity (µS/cm)	359				
U	ICPMSW	Arsenic	0.034	0.30	0.5	2	25
U	ICPWATVAR	Barium	0.09	0.8	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.002	<0.02	4	50	200
U	KONENS	Chloride	9	80	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	<3	<30	1000	20000	50000
N	WSLM27	Total Dissolved Solids	244	2160	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	17.9	158	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-004	ST6	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.228
Moisture content @ 105°C (% Wet Weight)	60.6
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.762
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	3.20	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.170	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.099	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	77.4	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.85	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.0				
U	WSLM2**	Conductivity (µS/cm)	317				
U	ICPMSW	Arsenic	0.016	0.15	0.5	2	25
U	ICPWATVAR	Barium	0.11	1.0	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	<0.002	<0.02	4	50	200
U	KONENS	Chloride	6	54	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	8	73	1000	20000	50000
N	WSLM27	Total Dissolved Solids	216	1960	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	9.01	81.7	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-005	ST7	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.214
Moisture content @ 105°C (% Wet Weight)	57.9
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.776
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.78	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.152	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.088	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	81.8	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.43	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.0				
U	WSLM2**	Conductivity (µS/cm)	307				
U	ICPMSW	Arsenic	0.015	0.14	0.5	2	25
U	ICPWATVAR	Barium	0.09	0.8	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.004	0.04	4	50	200
U	KONENS	Chloride	7	64	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	4	37	1000	20000	50000
N	WSLM27	Total Dissolved Solids	209	1920	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	11.5	106	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-006	ST8	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.231
Moisture content @ 105°C (% Wet Weight)	61.1
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.759
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	3.15	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.146	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.085	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	77.9	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.31	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.1				
U	WSLM2**	Conductivity (µS/cm)	359				
U	ICPMSW	Arsenic	0.008	0.07	0.5	2	25
U	ICPWATVAR	Barium	0.13	1.2	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	<0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.002	<0.02	4	50	200
U	KONENS	Chloride	7	63	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	8	72	1000	20000	50000
N	WSLM27	Total Dissolved Solids	244	2210	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	6.71	60.7	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-007	ST9	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.204
Moisture content @ 105°C (% Wet Weight)	55.8
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.786
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.82	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.146	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.085	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	87.9	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.32	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.3				
U	WSLM2**	Conductivity (µS/cm)	290				
U	ICPMSW	Arsenic	0.016	0.15	0.5	2	25
U	ICPWATVAR	Barium	0.06	0.6	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.003	0.03	4	50	200
U	KONENS	Chloride	6	56	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	4	37	1000	20000	50000
N	WSLM27	Total Dissolved Solids	197	1830	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	11.7	109	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	AQUAFACT International Services Ltd	
Site	Limerick WAC Analysis	
Project	22080055	
Sample No	Sample Description	Issue Date
22080055-008	ST10	19/08/2022

Leaching Data	
Weight of Sample (kg)	0.191
Moisture content @ 105°C (% Wet Weight)	53.0
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.799
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	2.20	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.135	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.079	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	45.5	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	<3.06	100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
					Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
			mg/l except **	mg/kg (dry wt)			
U	WSLM3**	pH (pH Units)	8.3				
U	WSLM2**	Conductivity (µS/cm)	264				
U	ICPMSW	Arsenic	0.009	0.08	0.5	2	25
U	ICPWATVAR	Barium	0.04	0.4	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	<0.002	<0.02	4	50	200
U	KONENS	Chloride	6	56	800	15000	25000
U	ISEF	Fluoride	0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	4	38	1000	20000	50000
N	WSLM27	Total Dissolved Solids	180	1690	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	8.52	80.2	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

Deviating Sample Report

Sample Reference	Text ID	Method Code	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
ST2	22080055-001	**PAHMSUS**						✓
ST2	22080055-001	**TPHFIDUS (Aliphatic)**						✓
ST3	22080055-002	**PAHMSUS**						✓
ST3	22080055-002	**TPHFIDUS (Aliphatic)**						✓
ST4	22080055-003	**PAHMSUS**						✓
ST4	22080055-003	**TPHFIDUS (Aliphatic)**						✓
ST6	22080055-004	**PAHMSUS**						✓
ST6	22080055-004	**TPHFIDUS (Aliphatic)**						✓
ST7	22080055-005	**PAHMSUS**						✓
ST7	22080055-005	**TPHFIDUS (Aliphatic)**						✓
ST8	22080055-006	**PAHMSUS**						✓
ST8	22080055-006	**TPHFIDUS (Aliphatic)**						✓
ST9	22080055-007	**PAHMSUS**						✓
ST9	22080055-007	**TPHFIDUS (Aliphatic)**						✓
ST10	22080055-008	**PAHMSUS**						✓
ST10	22080055-008	**TPHFIDUS (Aliphatic)**						✓

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

Analysis Method

Method Code	Method Description	Analysis Method
BTEXHSA	BTEX for WAC by GCFID	As Received
CLANDPREP	Basic Solid Description	As Received
CLANDPREP	DW35 - CLand Prep and Dry Weight Correction to 35°C	As Received
ICPMSW (Dissolved)	Antimony (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Antimony in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Arsenic (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Arsenic in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Cadmium (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Cadmium in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Chromium (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Chromium in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Copper (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Copper in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Lead (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Lead in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Mercury (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Mercury in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Molybdenum (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Molybdenum in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Nickel (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Nickel in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Selenium (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Selenium in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Zinc (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Zinc in Solids (BSEN 12457-2)	Filtered
ICPWATVAR (Dissolved)	Barium (Diss.) in Lab Leachate by ICPOES	Filtered
ICPWATVAR (Dissolved)	Barium in Solids (BSEN 12457-2)	Filtered
ICPWATVAR (Dissolved)	Total Sulphur as SO4 (Diss.) in Lab Leachate	Filtered
ICPWATVAR (Dissolved)	Total Sulphur as SO4 in Solids (BSEN 12457-2)	Filtered
ISEF	Fluoride by ISE	Filtered
ISEF	Fluoride in Solids (BSEN 12457-2)	Filtered
KONENS	Chloride by Colorimetry	Filtered
KONENS	Chloride in Solids (BSEN 12457-2)	Filtered
Leachate Prep CEN 10:1	WAC Leachate Prep, 1-Stage 10:1 (BSEN 12457-2)	As Received
PAHMSUS	17 PAHs (inc. Coronene) for WAC by GCMS	As Received
PCBECD	PCBs, ICES 7 Congeners inc. Total Calculation	As Received
PHCONDW	Electrical Conductivity @ 25°C	Filtered
PHCONDW	pH	Filtered
PHCONDW	TDS: Total Dissolved Solids (Calc)	Filtered
PHCONDW	Total Dissolved Solids in Solids (BSEN 12457-2)	Filtered
SFAPI	Phenol Index (Total) by SFA	Filtered
SFAPI	Phenol Index in Solids (BSEN 12457-2)	Filtered
TOCW	LOC: Leached Organic Carbon	Filtered
TPHFIDUS (Aliphatic)	TPH (>C8-C40) Aliphatic and Carbon Band (>C10-C40)	As Received
WAC	WAC Report	
WSLM13	Leached Organic Carbon in Solids (BSEN 12457-2)	Filtered
WSLM59	TOC: Total Organic Carbon	Air Dried & Ground

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

Result Report Notes

Letters alongside results signify that the result has associated report notes.
The report notes are a follows:

Letter	Note
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.
F	Based on the sample history, appearance and smell a dilution was applied prior to testing . Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
G	The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.

HWOL Acronym Key

Acronym	Description
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total

Client: AQUAFACT International Services Ltd
Project Name: JN1720-Limerick WAC Analysis
Project No: 22080055
Date Issued: 19/08/2022

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:

U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 35°C.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35°C.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis