

Appendix IV

Groundwater & Surface Water Sampling Analysis Results

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Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date: 17 September 2018
Customer: D_FTIM_DUB
Sample Delivery Group (SDG): 180907-68
Your Reference: P1444
Location: Cartron Big
Report No: 472688

We received 7 samples on Friday September 07, 2018 and 7 of these samples were scheduled for analysis which was completed on Monday September 17, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 180907-68
Location: Cartron Big

Client Reference: P1444
Order Number: Z1162

Report Number: 472688
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18279869	Ballymulvey BH5		0.00 - 0.00	06/09/2018
18279875	Ballymulvey BH6		0.00 - 0.00	06/09/2018
18279808	Ballymulvey - G		0.00 - 0.00	06/09/2018
18279819	Cartron SW1		0.00 - 0.00	06/09/2018
18279837	Cartron SW2		0.00 - 0.00	06/09/2018
18279849	Cartron SW3		0.00 - 0.00	06/09/2018
18279858	Cartron SW4		0.00 - 0.00	06/09/2018

Maximum Sample/Coolbox Temperature (°C) :

13.4

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

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SDG: 180907-68
Location: Cartron Big

Client Reference: P1444
Order Number: Z1162

Report Number: 472688
Superseded Report:

Results Legend		Customer Sample Ref.	Ballymulvey - G	Cartron SW1	Cartron SW2	Cartron SW3	Cartron SW4
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
aq	Aqueous / settled sample.		06/09/2018	06/09/2018	06/09/2018	06/09/2018	06/09/2018
diss.filt	Dissolved / filtered sample.		07/09/2018	07/09/2018	07/09/2018	07/09/2018	07/09/2018
tot.unfilt	Total / unfiltered sample.		180907-68	180907-68	180907-68	180907-68	180907-68
**	Subcontracted test.		18279808	18279819	18279837	18279849	18279858
*	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
Alkalinity, Total as CaCO3	<2 mg/l	TM043	322	293	290	286	302
			#	#	#	#	#
BOD, unfiltered	<1 mg/l	TM045	<1	<1	<1	<1	<1
			◆ #	◆ #	◆ #	◆ #	◆ #
COD, unfiltered	<7 mg/l	TM107	<7	12.8	24.4	<7	16.3
			#	#	#	#	#
Arsenic (diss.filt)	<0.5 µg/l	TM152	1.29	1.1	1.04	1.15	1.24
			#	#	#	#	#
Boron (diss.filt)	<10 µg/l	TM152	12.7	16.6	21.1	18.4	25.8
			#	#	#	#	#
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08
			#	#	#	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	115	113	111	109	109
			#	#	#	#	#
Chloride	<2 mg/l	TM184	20.2	25.1	25.6	25.9	32.8
			#	#	#	#	#
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05

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Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate

NA = not applicable.

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Test Completion Dates

Lab Sample No(s)	18279808	18279819	18279837	18279849	18279858
Customer Sample Ref.	Ballymulvey - G	Cartron SW1	Cartron SW2	Cartron SW3	Cartron SW4
AGS Ref.					
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	14-Sep-2018	14-Sep-2018	14-Sep-2018	13-Sep-2018	13-Sep-2018
Anions by Kone (w)	17-Sep-2018	17-Sep-2018	17-Sep-2018	08-Sep-2018	08-Sep-2018
BOD True Total	17-Sep-2018	17-Sep-2018	17-Sep-2018	17-Sep-2018	17-Sep-2018
COD Unfiltered	17-Sep-2018	16-Sep-2018	17-Sep-2018	17-Sep-2018	17-Sep-2018
Cyanide Comp/Free/Total/Thiocyanate	14-Sep-2018	13-Sep-2018	14-Sep-2018	14-Sep-2018	14-Sep-2018
Dissolved Metals by ICP-MS	14-Sep-2018	14-Sep-2018	14-Sep-2018	14-Sep-2018	14-Sep-2018

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Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
Deviation from method	
	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astestost Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Coisidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



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3rd Floor
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Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date: 16 October 2018
Customer: D_FTIM_DUB
Sample Delivery Group (SDG): 181009-28
Your Reference: P1444
Location: Ballymulvey
Report No: 476976

We received 5 samples on Tuesday October 09, 2018 and 5 of these samples were scheduled for analysis which was completed on Tuesday October 16, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

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Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 181009-28
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 476976
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18487193	BH5		0.00 - 0.00	08/10/2018
18487204	BH6		0.00 - 0.00	08/10/2018
18487168	GW01		0.00 - 0.00	08/10/2018
18487176	GW02		0.00 - 0.00	08/10/2018
18487186	GW03		0.00 - 0.00	08/10/2018

Maximum Sample/Coolbox Temperature (°C) :

10

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

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Validated

SDG: 181009-28
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 476976
Superseded Report:

Results Legend		Customer Sample Ref.	BH5	BH6	GW01	GW02	GW03
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Coliforms, Total*	CFU/100ml	SUB			1640	141000	13400
Alkalinity, Total as CaCO3	<2 mg/l	TM043	3630	984	653	414	521
BOD, unfiltered	<1 mg/l	TM045	14.1	6.15			
Oxygen, dissolved	<0.3 mg/l	TM046	7.01	7.63	8.57	8.86	8.46
Organic Carbon, Total	<3 mg/l	TM090	87.7	12.8	15.1	15.8	28.8
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	469	66.2	3.99	2.56	9.87
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5	<0.5
COD, unfiltered	<7 mg/l	TM107	332	45			
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	8.18	1.84	0.96	0.783	1.2
Antimony (diss.filt)	<1 µg/l	TM152	<1	<1			
Arsenic (diss.filt)	<0.5 µg/l	TM152	3.3	2.1	4.72	52.3	13.4
Barium (diss.filt)	<0.2 µg/l	TM152	382	379			
Beryllium (diss.filt)	<0.1 µg/l	TM152	<0.1	<0.1			
Boron (diss.filt)	<10 µg/l	TM152	1420	399	57.1	32.8	33
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	0.178	<0.08	<0.08
Chromium (diss.filt)	<1 µg/l	TM152	12.7	<1	<1	1.26	<1
Cobalt (diss.filt)	<0.5 µg/l	TM152	3.43	1.57			
Copper (diss.filt)	<0.3 µg/l	TM152	<0.3	<0.3	3.54	1.35	0.967
Lead (diss.filt)	<0.2 µg/l	TM152	0.249	0.233	5.06	2.14	0.325
Manganese (diss.filt)	<3 µg/l	TM152	348	444	1500	1260	617
Molybdenum (diss.filt)	<3 µg/l	TM152	<3	<3			
Nickel (diss.filt)	<0.4 µg/l	TM152	8.52	1.76	8.07	6.34	2.91
Phosphorus (diss.filt)	<10 µg/l	TM152	1890	561	254	69.5	130
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1			
Tellurium (diss.filt)	<2 µg/l	TM152	<2	<2			
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2			
Titanium (diss.filt)	<1 µg/l	TM152	64.9	27.5			
Uranium (diss.filt)	<0.5 µg/l	TM152	<0.5	<0.5			
Vanadium (diss.filt)	<1 µg/l	TM152	2.98	<1			
Zinc (diss.filt)	<1 µg/l	TM152	18.5	4.05	15.1	10.3	4.63
Tin (Diss.Filt)	<1 µg/l	TM152	2.75	<1			
Silver (diss.filt)	<0.5 µg/l	TM152	<0.5	<0.5			
Sodium (Dis.Filt)	<0.076 mg/l	TM152	667	92.8	13.9	13.2	64.2



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Superseded Report:

Results Legend		Customer Sample Ref.	BH5	BH6	GW01	GW02	GW03
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
		Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
		Sample Type	Land Leachate (LE)	Land Leachate (LE)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
		Date Sampled	08/10/2018	08/10/2018	08/10/2018	08/10/2018	08/10/2018
		Sample Time	-	-	-	-	-
		Date Received	09/10/2018	09/10/2018	09/10/2018	09/10/2018	09/10/2018
		SDG Ref	181009-28	181009-28	181009-28	181009-28	181009-28
		Lab Sample No.(s)	18487193	18487204	18487168	18487176	18487186
		AGS Reference					
Component	LOD/Units	Method					
p,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01			
Dieldrin	<0.01 µg/l	TM343	<0.01	<0.01			
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01			
Endrin	<0.01 µg/l	TM343	<0.01	<0.01			
o,p'-DDT	<0.01 µg/l	TM343	<0.01	<0.01			
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01			
Endosulphan II	<0.02 µg/l	TM343	<0.02	<0.02			
p,p'-DDT	<0.01 µg/l	TM343	<0.01	<0.01			
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.01	<0.01			
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.02	<0.02			
Permethrin I	<0.01 µg/l	TM343	<0.01	<0.01			
Permethrin II	<0.01 µg/l	TM343	<0.01	<0.01			
Dichlorvos	<0.01 µg/l	TM344	<0.01	<0.01			
Mevinphos	<0.01 µg/l	TM344	<0.01	<0.01			
Tecnazene	<0.01 µg/l	TM344	<0.01	<0.01			
Hexachlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01			
Diazinon	<0.01 µg/l	TM344	<0.01	<0.01			
Triallate	<0.01 µg/l	TM344	<0.01	<0.01			
Atrazine	<0.01 µg/l	TM344	<0.01	<0.01			
Simazine	<0.01 µg/l	TM344	0.184	<0.01			
Disulfoton	<0.01 µg/l	TM344	<0.01	<0.01			
Propetamphos	<0.01 µg/l	TM344	<0.01	<0.01			
Chlorpyrifos-methyl	<0.01 µg/l	TM344	<0.01	<0.01			
Dimethoate	<0.01 µg/l	TM344	<0.01	<0.01			
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.01	<0.01			
Chlorpyrifos	<0.01 µg/l	TM344	<0.01	<0.01			
Methyl Parathion	<0.01 µg/l	TM344	<0.01	<0.01			
Malathion	<0.01 µg/l	TM344	<0.01	<0.01			
Fenthion	<0.01 µg/l	TM344	<0.01	<0.01			
Fenitrothion	<0.01 µg/l	TM344	<0.01	<0.01			
Triadimefon	<0.01 µg/l	TM344	<0.01	<0.01			
Pendimethalin	<0.01 µg/l	TM344	<0.01	<0.01			

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SDG: 181009-28
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 476976
Superseded Report:

SVOC MS (W) - Aqueous

#	Results Legend	Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
		AGS Reference					
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	<1			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	<1			
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	<1			
2-Methylphenol (aq)	<1 µg/l	TM176	<1	<1			
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1			
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1			
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1			
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	<1			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	<1			
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1			
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	<1			
4-Methylphenol (aq)	<1 µg/l	TM176	<1	<1			
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1			
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1			
Azobenzene (aq)	<1 µg/l	TM176	<1	<1			
Acenaphthylene (aq)	<1 µg/l	TM176	<1	<1			
Acenaphthene (aq)	<1 µg/l	TM176	<1	<1			
Anthracene (aq)	<1 µg/l	TM176	<1	<1			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	<1			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	<1			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	<2			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	<1			

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SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.		Land Leachate (LE)	Land Leachate (LE)			
aq	Aqueous / settled sample.		08/10/2018	08/10/2018			
diss.filt	Dissolved / filtered sample.		.	.			
tot.unfilt	Total / unfiltered sample.		09/10/2018	09/10/2018			
*	Subcontracted test.		181009-28	181009-28			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		18487193	18487204			
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1	<1			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1	<1			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1	<1			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1	<1			
Carbazole (aq)	<1 µg/l	TM176	<1	<1			
Chrysene (aq)	<1 µg/l	TM176	<1	<1			
Dibenzofuran (aq)	<1 µg/l	TM176	<1	<1			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
Diethyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1	<1			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5	<5			
Fluoranthene (aq)	<1 µg/l	TM176	<1	<1			
Fluorene (aq)	<1 µg/l	TM176	<1	<1			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1	<1			
Pentachlorophenol (aq)	<1 µg/l	TM176	<1	<1			
Phenol (aq)	<1 µg/l	TM176	<1	<1			
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1	<1			
Hexachloroethane (aq)	<1 µg/l	TM176	<1	<1			
Nitrobenzene (aq)	<1 µg/l	TM176	<1	<1			
Naphthalene (aq)	<1 µg/l	TM176	<1	<1			
Isophorone (aq)	<1 µg/l	TM176	<1	<1			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1	<1			
Phenanthrene (aq)	<1 µg/l	TM176	<1	<1			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1	<1			
Pyrene (aq)	<1 µg/l	TM176	<1	<1			

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Order Number: Z1162

Report Number: 476976
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	BH5	BH6				
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.	Depth (m)	0.00 - 0.00	0.00 - 0.00				
diss.filt	Dissolved / filtered sample.	Sample Type	Land Leachate (LE)	Land Leachate (LE)				
tot.unfilt	Total / unfiltered sample.	Date Sampled	08/10/2018	08/10/2018				
*	Subcontracted test.	Sample Time						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery	Date Received	09/10/2018	09/10/2018				
(F)	Trigger breach confirmed	SDG Ref	181009-28	181009-28				
1-5&*\$@	Sample deviation (see appendix)	Lab Sample No.(s)	18487193	18487204				
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM208	103	103				
Toluene-d8**	%	TM208	100	101				
4-Bromofluorobenzene**	%	TM208	96.4	95.4				
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	#	#		
Chloromethane	<1 µg/l	TM208	<1	<1	#	#		
Vinyl chloride	<1 µg/l	TM208	<1	186	#	#		
Bromomethane	<1 µg/l	TM208	<1	<1	#	#		
Chloroethane	<1 µg/l	TM208	<1	<1	#	#		
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	#	#		
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	#	#		
Carbon disulphide	<1 µg/l	TM208	<1	<1	#	#		
Dichloromethane	<3 µg/l	TM208	<3	<3	#	#		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	#	#		
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	2.77	#	#		
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	#	#		
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	93.3	#	#		
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	#	#		
Bromochloromethane	<1 µg/l	TM208	<1	<1	#	#		
Chloroform	<1 µg/l	TM208	<1	<1	#	#		
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	#	#		
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	#	#		
Carbontetrachloride	<1 µg/l	TM208	<1	<1	#	#		
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	#	#		
Benzene	<1 µg/l	TM208	1.33	<1	#	#		
Trichloroethene	<1 µg/l	TM208	<1	<1	#	#		
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	#	#		
Dibromomethane	<1 µg/l	TM208	<1	<1	#	#		
Bromodichloromethane	<1 µg/l	TM208	<1	<1	#	#		
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	#	#		
Toluene	<1 µg/l	TM208	1.37	1.48	#	#		
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	#	#		
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	#	#		
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	#	#		

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VOC MS (W)

Results Legend		Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	<1	<1			
Dibromochloromethane	<1 µg/l	TM208	<1	<1			
1,2-Dibromoethane	<1 µg/l	TM208	<1	<1			
Chlorobenzene	<1 µg/l	TM208	2.64	<1			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1			
Ethylbenzene	<1 µg/l	TM208	1.09	<1			
m,p-Xylene	<1 µg/l	TM208	6.06	<1			
o-Xylene	<1 µg/l	TM208	1.95	<1			
Styrene	<1 µg/l	TM208	<1	<1			
Bromoform	<1 µg/l	TM208	<1	<1			
Isopropylbenzene	<1 µg/l	TM208	<1	<1			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	<1			
Bromobenzene	<1 µg/l	TM208	<1	<1			
Propylbenzene	<1 µg/l	TM208	1.07	<1			
2-Chlorotoluene	<1 µg/l	TM208	<1	<1			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	1.94	<1			
4-Chlorotoluene	<1 µg/l	TM208	<1	<1			
tert-Butylbenzene	<1 µg/l	TM208	<1	<1			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	9.68	<1			
sec-Butylbenzene	<1 µg/l	TM208	<1	<1			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	<1			
1,4-Dichlorobenzene	<1 µg/l	TM208	1.86	<1			
n-Butylbenzene	<1 µg/l	TM208	<1	<1			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	<1			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1			
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	<1			
Hexachlorobutadiene	<1 µg/l	TM208	<1	<1			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	<1			
Naphthalene	<1 µg/l	TM208	4.26	<1			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1			

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Table of Results - Appendix

Method No	Reference	Description
SUB		Subcontracted Test
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM284		
TM328		
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS
TM345	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite III) by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



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Test Completion Dates

Lab Sample No(s)	18487193	18487204	18487168	18487176	18487186
Customer Sample Ref.	BH5	BH6	GW01	GW02	GW03
AGS Ref.					
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Land Leachate	Land Leachate	Ground Water	Ground Water	Ground Water

Alkalinity as CaCO3	16-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018
Ammoniacal Nitrogen	15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018
Anions by Kone (w)	15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018	15-Oct-2018
BOD True Total	14-Oct-2018	15-Oct-2018			
COD Unfiltered	12-Oct-2018	11-Oct-2018			
Coliforms (W)			11-Oct-2018	11-Oct-2018	11-Oct-2018
Conductivity (at 20 deg.C)	11-Oct-2018	11-Oct-2018	11-Oct-2018	11-Oct-2018	11-Oct-2018
Cyanide Comp/Free/Total/Thiocyanate	11-Oct-2018	11-Oct-2018	11-Oct-2018	11-Oct-2018	11-Oct-2018
Dissolved Metals by ICP-MS	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018
Dissolved Oxygen by Probe	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
Fluoride	16-Oct-2018	16-Oct-2018	16-Oct-2018	16-Oct-2018	16-Oct-2018
Mercury Dissolved	11-Oct-2018	11-Oct-2018	11-Oct-2018	11-Oct-2018	11-Oct-2018
Mineral Oil C10-40 Aqueous (W)	16-Oct-2018	16-Oct-2018			
Nitrite by Kone (w)	15-Oct-2018	15-Oct-2018			
Organotins in Aqueous Samples	12-Oct-2018	12-Oct-2018			
Pesticides (Suite I) by GCMS	15-Oct-2018	15-Oct-2018			
Pesticides (Suite II) by GCMS	15-Oct-2018	15-Oct-2018			
Pesticides (Suite III) by GCMS	16-Oct-2018	16-Oct-2018			
pH Value	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018	12-Oct-2018
Phosphate by Kone (w)	15-Oct-2018	15-Oct-2018			
Silicon Dissolved by ICP-OES	10-Oct-2018	10-Oct-2018			
SVOC MS (W) - Aqueous	12-Oct-2018	12-Oct-2018			
Total Organic and Inorganic Carbon	10-Oct-2018	11-Oct-2018	10-Oct-2018	10-Oct-2018	10-Oct-2018
VOC MS (W)	11-Oct-2018	11-Oct-2018			

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Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
	Deviation from method
	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astestost Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Coisidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



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Fehily Timoney
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North Park Business Park
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Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date: 08 October 2018
Customer: D_FTIM_DUB
Sample Delivery Group (SDG): 180927-85
Your Reference: P1444
Location: Ballymulvey
Report No: 475704

We received 7 samples on Thursday September 27, 2018 and 7 of these samples were scheduled for analysis which was completed on Monday October 08, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

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Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
18414647	BH1		0.00 - 0.00	26/09/2018
18414656	BH2		0.00 - 0.00	26/09/2018
18414665	BH3		0.00 - 0.00	26/09/2018
18414673	BH5		0.00 - 0.00	26/09/2018
18414681	BH6		0.00 - 0.00	26/09/2018
18414699	SW-C		0.00 - 0.00	26/09/2018
18414691	SW-G		0.00 - 0.00	26/09/2018

Maximum Sample/Coolbox Temperature (°C) :

15.8

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

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CERTIFICATE OF ANALYSIS

Validated

SDG: 180927-85	Client Reference: P1444	Report Number: 475704
Location: Ballymulvey	Order Number: Z1162	Superseded Report:

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type	
	X	Test	N	No Determination Possible								
Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 2									
	Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 2									
	Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 2									
	pH Value	All	NDPs: 0 Tests: 7									
	Phosphate by Kone (w)	All	NDPs: 0 Tests: 2									
	Silicon Dissolved by ICP-OES	All	NDPs: 0 Tests: 2									
	SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 2									
	Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 5									
	VOC MS (W)	All	NDPs: 0 Tests: 2									

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18414691	SW-G	0.00 - 0.00	HNO3 Filtered (ALE204)	SW																			
			H2SO4 (ALE244)	SW																			
			500ml Plastic (ALE208)	SW																			
			250ml BOD (ALE212)	SW																			
			HNO3 Filtered (ALE204)	SW																			
			H2SO4 (ALE244)	SW																			
			500ml Plastic (ALE208)	SW																			
			250ml BOD (ALE212)	SW																			
			Vial (ALE297)	LE																			
			NaOH (ALE245)	LE																			
18414681	BH6	0.00 - 0.00	HNO3 Filtered (ALE204)	LE																			
			H2SO4 (ALE244)	LE																			
			500ml Plastic (ALE208)	LE																			
			250ml BOD (ALE212)	LE																			
			1000ml glass bottle (ALE220)	LE																			
			Vial (ALE297)	LE																			
			NaOH (ALE245)	LE																			
			HNO3 Filtered (ALE204)	LE																			
			H2SO4 (ALE244)	LE																			
			500ml Plastic (ALE208)	LE																			
18414673	BH5	0.00 - 0.00	1000ml glass bottle (ALE220)	LE																			
			Vial (ALE297)	LE																			
			NaOH (ALE245)	LE																			
			HNO3 Filtered (ALE204)	LE																			
			HNO3 Filtered (ALE204)	LE																			
			H2SO4 (ALE244)	LE																			
			500ml Plastic (ALE208)	LE																			
			250ml BOD (ALE212)	LE																			
			1000ml glass bottle (ALE220)	LE																			
			Vial (ALE297)	LE																			

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CERTIFICATE OF ANALYSIS

Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

Results Legend		Customer Sample Ref.	BH1	BH2	BH3	BH5	BH6	SW-C
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Land Leachate (LE)	Land Leachate (LE)	Surface Water (SW)
aq	Aqueous / settled sample.		26/09/2018	26/09/2018	26/09/2018	26/09/2018	26/09/2018	26/09/2018
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
**	Subcontracted test.							
*	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Coliforms, Total*	CFU/100ml	SUB	6050	17200	13000000			
Alkalinity, Total as CaCO3	<2 mg/l	TM043	465	373	695			
BOD, unfiltered	<1 mg/l	TM045				28.2	<2.5	<1
Oxygen, dissolved	<0.3 mg/l	TM046	8.56	8.68	4.92	3.18	6	11.2
Organic Carbon, Total	<3 mg/l	TM090	12.1	14.2	29.1	85.6	13.7	
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	2.75	3.55	11.1	449	58.2	<0.2
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5	<0.5	
COD, unfiltered	<7 mg/l	TM107				677	42.3	
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.9	0.728	1.25	7.84	1.74	2.08
Antimony (diss.filt)	<1 µg/l	TM152				<1	<1	
Arsenic (diss.filt)	<0.5 µg/l	TM152	2.26	18.4	20.4	3.52	1.69	
Barium (diss.filt)	<0.2 µg/l	TM152				287	357	
Beryllium (diss.filt)	<0.1 µg/l	TM152				<0.1	<0.1	
Boron (diss.filt)	<10 µg/l	TM152	53.7	27.5	60.4	1350	348	
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	11.2	<1	
Cobalt (diss.filt)	<0.5 µg/l	TM152				3.33	1.36	
Copper (diss.filt)	<0.3 µg/l	TM152	1.6	0.425	<0.3	<0.3	<0.3	
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	<0.2	<0.2	<0.2	
Manganese (diss.filt)	<3 µg/l	TM152	903	808	591	356	427	
Molybdenum (diss.filt)	<3 µg/l	TM152				<3	<3	
Nickel (diss.filt)	<0.4 µg/l	TM152	4.33	7.56	4.41	7.26	1.31	
Phosphorus (diss.filt)	<10 µg/l	TM152	34.6	22.9	83.1	812	565	
Selenium (diss.filt)	<1 µg/l	TM152				<1	<1	
Tellurium (diss.filt)	<2 µg/l	TM152				<2	<2	
Thallium (diss.filt)	<2 µg/l	TM152				<2	<2	
Titanium (diss.filt)	<1 µg/l	TM152				11.8	11.7	
Uranium (diss.filt)	<0.5 µg/l	TM152				<0.5	<0.5	
Vanadium (diss.filt)	<1 µg/l	TM152				2.02	<1	
Zinc (diss.filt)	<1 µg/l	TM152	4.09	3.45	6.52	2.07	2.33	
Tin (Diss.Filt)	<1 µg/l	TM152				1.3	<1	
Silver (diss.filt)	<0.5 µg/l	TM152				<0.5	<0.5	
Sodium (Dis.Filt)	<0.076 mg/l	TM152	16.4	13.9	76.8	698	85.5	136



CERTIFICATE OF ANALYSIS

Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

Results Legend		Customer Sample Ref.	BH1	BH2	BH3	BH5	BH6	SW-C
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&*&@	Sample deviation (see appendix)							
		Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
		Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Land Leachate (LE)	Land Leachate (LE)	Surface Water (SW)
		Date Sampled	26/09/2018	26/09/2018	26/09/2018	26/09/2018	26/09/2018	26/09/2018
		Sample Time	-	-	-	-	-	-
		Date Received	27/09/2018	27/09/2018	27/09/2018	27/09/2018	27/09/2018	27/09/2018
		SDG Ref	180927-85	180927-85	180927-85	180927-85	180927-85	180927-85
		Lab Sample No.(s)	18414647	18414656	18414665	18414673	18414681	18414699
		AGS Reference						
Component	LOD/Units	Method						
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	14.7	6.71	23.6	220	42	
			#	#	#	#	#	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	7.45	4.06	22.1	160	49.6	14.1
			#	#	#	#	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	167	151	164	231	168	
			#	#	#	#	#	
Iron (Dis.Filt)	<0.019 mg/l	TM152	4.2	1.79	1.06	11.2	10.3	
			#	#	#	#	#	
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172				778	174	
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	<0.01	
			#	#	#	#	#	
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184				<0.05	<0.05	
Sulphate	<2 mg/l	TM184	27.1	23.1	22.6	<2	<2	652
			#	#	#			#
Chloride	<2 mg/l	TM184	25.6	34.7	140	1080	74.1	249
			#	#	#			#
Nitrite as N	<0.0152 mg/l	TM184				<0.0152	<0.0152	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	1.17	<0.1	<0.1	<0.1	<0.1	
			#	#	#			
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	
			#	#	#	#	#	
Cyanide, Free	<0.05 mg/l	TM227				<0.05	<0.05	
						#	#	
pH	<1 pH Units	TM256	7.15	7.11	7.04	7.29	7.13	7.55
			#	#	#	#	#	#
Silicon (diss.filt)	<0.05 mg/l	TM284				10.5	9.5	
Dibutyl tin	<5 ng/l	TM328				11.5	<5	
Tributyl tin	<1 ng/l	TM328				<1	<1	
Tetrabutyl tin	<2 ng/l	TM328				<2	<2	
Triphenyl tin	<1 ng/l	TM328				<1	<1	
Surrogate	%	TM328				59.7	90.9	
Trifluralin	<0.01 µg/l	TM343				<0.02	<0.02	
alpha-HCH	<0.01 µg/l	TM343				<0.02	<0.02	
gamma-HCH (Lindane)	<0.01 µg/l	TM343				<0.02	<0.02	
Heptachlor	<0.01 µg/l	TM343				<0.03	<0.03	
Aldrin	<0.01 µg/l	TM343				<0.03	<0.03	
beta-HCH	<0.01 µg/l	TM343				<0.01	<0.01	
Isodrin	<0.01 µg/l	TM343				<0.02	<0.02	
Heptachlor epoxide	<0.01 µg/l	TM343				<0.02	<0.02	
o,p'-DDE	<0.01 µg/l	TM343				<0.02	<0.02	
Endosulphan I	<0.01 µg/l	TM343				<0.02	<0.02	
trans-Chlordane	<0.01 µg/l	TM343				<0.02	<0.02	
cis-Chlordane	<0.01 µg/l	TM343				<0.02	<0.02	

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CERTIFICATE OF ANALYSIS

Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

Results Legend		Customer Sample Ref.	BH1	BH2	BH3	BH5	BH6	SW-C
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
1-5&*\$@	Sample deviation (see appendix)							
		AGS Reference						
Component	LOD/Units	Method						
p,p'-DDE	<0.01 µg/l	TM343				<0.02	<0.02	
Dieldrin	<0.01 µg/l	TM343				<0.02	<0.02	
o,p'-DDD (TDE)	<0.01 µg/l	TM343				<0.02	<0.02	
Endrin	<0.01 µg/l	TM343				<0.02	<0.02	
o,p'-DDT	<0.01 µg/l	TM343				<0.04	<0.04	
p,p'-DDD (TDE)	<0.01 µg/l	TM343				0.0354	<0.02	
Endosulphan II	<0.02 µg/l	TM343				<0.04	<0.04	
p,p'-DDT	<0.01 µg/l	TM343				<0.04	<0.04	
p,p'-Methoxychlor	<0.01 µg/l	TM343				<0.04	<0.04	
Endosulphan Sulphate	<0.02 µg/l	TM343				<0.02	<0.02	
Permethrin I	<0.01 µg/l	TM343				<0.01	<0.01	
Permethrin II	<0.01 µg/l	TM343				<0.01	<0.01	
Dichlorvos	<0.01 µg/l	TM344				<0.01	<0.01	
Mevinphos	<0.01 µg/l	TM344				<0.01	<0.01	
Tecnazene	<0.01 µg/l	TM344				<0.01	<0.01	
Hexachlorobenzene	<0.01 µg/l	TM344				<0.01	<0.01	
Diazinon	<0.01 µg/l	TM344				<0.01	<0.01	
Triallate	<0.01 µg/l	TM344				<0.01	<0.01	
Atrazine	<0.01 µg/l	TM344				<0.01	<0.01	
Simazine	<0.01 µg/l	TM344				<0.01	<0.01	
Disulfoton	<0.01 µg/l	TM344				<0.01	<0.01	
Propetamphos	<0.01 µg/l	TM344				<0.01	<0.01	
Chlorpyrifos-methyl	<0.01 µg/l	TM344				<0.01	<0.01	
Dimethoate	<0.01 µg/l	TM344				<0.01	<0.01	
Pirimiphos-methyl	<0.01 µg/l	TM344				<0.01	<0.01	
Chlorpyrifos	<0.01 µg/l	TM344				<0.01	<0.01	
Methyl Parathion	<0.01 µg/l	TM344				<0.01	<0.01	
Malathion	<0.01 µg/l	TM344				<0.01	<0.01	
Fenthion	<0.01 µg/l	TM344				<0.01	<0.01	
Fenitrothion	<0.01 µg/l	TM344				<0.01	<0.01	
Triadimefon	<0.01 µg/l	TM344				<0.01	<0.01	
Pendimethalin	<0.01 µg/l	TM344				<0.01	<0.01	

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CERTIFICATE OF ANALYSIS

Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference					
M	mCERTS accredited.		0.00 - 0.00	0.00 - 0.00			
aq	Aqueous / settled sample.		Land Leachate (LE)	Land Leachate (LE)			
diss.filt	Dissolved / filtered sample.		26/09/2018	26/09/2018			
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.		27/09/2018	27/09/2018			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		180927-85	180927-85			
(F)	Trigger breach confirmed		18414673	18414681			
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	<1			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	<1			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	<1			
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	<1			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	<1			
2-Methylphenol (aq)	<1 µg/l	TM176	<1	<1			
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1			
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1			
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1			
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	<1			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	<1			
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1			
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	<1			
4-Methylphenol (aq)	<1 µg/l	TM176	<1	<1			
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	<1			
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1			
Azobenzene (aq)	<1 µg/l	TM176	<1	<1			
Acenaphthylene (aq)	<1 µg/l	TM176	<1	<1			
Acenaphthene (aq)	<1 µg/l	TM176	<1	<1			
Anthracene (aq)	<1 µg/l	TM176	<1	<1			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	<1			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	<1			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	14.2	<2			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1	<1			

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Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00	0.00 - 0.00			
M	mCERTS accredited.		Land Leachate (LE)	Land Leachate (LE)			
aq	Aqueous / settled sample.		26/09/2018	26/09/2018			
diss.filt	Dissolved / filtered sample.		.	.			
tot.unfilt	Total / unfiltered sample.		27/09/2018	27/09/2018			
*	Subcontracted test.		180927-85	180927-85			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		18414673	18414681			
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units		Method				
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1	<1			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1	<1			
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1	<1			
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1	<1			
Carbazole (aq)	<1 µg/l	TM176	<1	<1			
Chrysene (aq)	<1 µg/l	TM176	<1	<1			
Dibenzofuran (aq)	<1 µg/l	TM176	<1	<1			
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
Diethyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1	<1			
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1	<1			
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5	<5			
Fluoranthene (aq)	<1 µg/l	TM176	<1	<1			
Fluorene (aq)	<1 µg/l	TM176	<1	<1			
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1	<1			
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1	<1			
Pentachlorophenol (aq)	<1 µg/l	TM176	<1	<1			
Phenol (aq)	<1 µg/l	TM176	<1	<1			
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1	<1			
Hexachloroethane (aq)	<1 µg/l	TM176	<1	<1			
Nitrobenzene (aq)	<1 µg/l	TM176	<1	<1			
Naphthalene (aq)	<1 µg/l	TM176	<1	<1			
Isophorone (aq)	<1 µg/l	TM176	<1	<1			
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1	<1			
Phenanthrene (aq)	<1 µg/l	TM176	<1	<1			
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1	<1			
Pyrene (aq)	<1 µg/l	TM176	<1	<1			

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CERTIFICATE OF ANALYSIS

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SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.	Depth (m)	0.00 - 0.00	0.00 - 0.00			
diss.filt	Dissolved / filtered sample.	Sample Type	Land Leachate (LE)	Land Leachate (LE)			
tot.unfilt	Total / unfiltered sample.	Date Sampled	26/09/2018	26/09/2018			
*	Subcontracted test.	Sample Time					
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery	Date Received	27/09/2018	27/09/2018			
(F)	Trigger breach confirmed	SDG Ref	180927-85	180927-85			
1-5&*\$@	Sample deviation (see appendix)	Lab Sample No.(s)	18414673	18414681			
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	106	103			
Toluene-d8**	%	TM208	97.7	99.8			
4-Bromofluorobenzene**	%	TM208	95.3	97.3			
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	#	#	
Chloromethane	<1 µg/l	TM208	<1	<1	#	#	
Vinyl chloride	<1 µg/l	TM208	<1	92.1	#	#	
Bromomethane	<1 µg/l	TM208	<1	<1	#	#	
Chloroethane	<1 µg/l	TM208	<1	<1	#	#	
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	#	#	
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	#	#	
Carbon disulphide	<1 µg/l	TM208	<1	<1	#	#	
Dichloromethane	<3 µg/l	TM208	<3	<3	#	#	
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	#	#	
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	#	#	
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	#	#	
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	46.5	#	#	
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	#	#	
Bromochloromethane	<1 µg/l	TM208	<1	<1	#	#	
Chloroform	<1 µg/l	TM208	<1	<1	#	#	
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	#	#	
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	#	#	
Carbontetrachloride	<1 µg/l	TM208	<1	<1	#	#	
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	#	#	
Benzene	<1 µg/l	TM208	1.51	<1	#	#	
Trichloroethene	<1 µg/l	TM208	<1	<1	#	#	
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	#	#	
Dibromomethane	<1 µg/l	TM208	<1	<1	#	#	
Bromodichloromethane	<1 µg/l	TM208	<1	<1	#	#	
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	#	#	
Toluene	<1 µg/l	TM208	1.42	1.02	#	#	
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	#	#	
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	#	#	
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	#	#	

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Validated

SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	BH5	BH6			
#	ISO17025 accredited.						
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	<1	<1			
Dibromochloromethane	<1 µg/l	TM208	<1	<1			
1,2-Dibromoethane	<1 µg/l	TM208	<1	<1			
Chlorobenzene	<1 µg/l	TM208	3.51	<1			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1			
Ethylbenzene	<1 µg/l	TM208	1	<1			
m,p-Xylene	<1 µg/l	TM208	5.51	<1			
o-Xylene	<1 µg/l	TM208	1.52	<1			
Styrene	<1 µg/l	TM208	<1	<1			
Bromoform	<1 µg/l	TM208	<1	<1			
Isopropylbenzene	<1 µg/l	TM208	<1	<1			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	<1			
Bromobenzene	<1 µg/l	TM208	<1	<1			
Propylbenzene	<1 µg/l	TM208	1.07	<1			
2-Chlorotoluene	<1 µg/l	TM208	<1	<1			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	1.79	<1			
4-Chlorotoluene	<1 µg/l	TM208	<1	<1			
tert-Butylbenzene	<1 µg/l	TM208	<1	<1			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	7.13	<1			
sec-Butylbenzene	<1 µg/l	TM208	<1	<1			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	<1			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	<1			
n-Butylbenzene	<1 µg/l	TM208	<1	<1			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	<1			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1			
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	<1			
Hexachlorobutadiene	<1 µg/l	TM208	<1	<1			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	<1			
Naphthalene	<1 µg/l	TM208	<1	<1			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1			

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SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

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Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
SUB		Subcontracted Test
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM284		
TM328		
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS
TM345	EPA 8270D – Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite III) by GCMS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

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SDG: 180927-85
Location: Ballymulvey

Client Reference: P1444
Order Number: Z1162

Report Number: 475704
Superseded Report:

Test Completion Dates

Lab Sample No(s)	18414647	18414656	18414665	18414673	18414681	18414699	18414691
Customer Sample Ref.	BH1	BH2	BH3	BH5	BH6	SW-C	SW-G
AGS Ref.							
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Land Leachate	Land Leachate	Surface Water	Surface Water

Alkalinity as CaCO3	05-Oct-2018	05-Oct-2018	05-Oct-2018				
Ammoniacal Nitrogen	05-Oct-2018	05-Oct-2018	04-Oct-2018	04-Oct-2018	05-Oct-2018	05-Oct-2018	05-Oct-2018
Anions by Kone (w)	05-Oct-2018	05-Oct-2018	05-Oct-2018	05-Oct-2018	05-Oct-2018	03-Oct-2018	03-Oct-2018
BOD True Total				03-Oct-2018	03-Oct-2018	03-Oct-2018	03-Oct-2018
COD Unfiltered				04-Oct-2018	03-Oct-2018		
Coliforms (W)	05-Oct-2018	05-Oct-2018	05-Oct-2018				
Conductivity (at 20 deg.C)	03-Oct-2018	03-Oct-2018	03-Oct-2018	03-Oct-2018	03-Oct-2018	03-Oct-2018	03-Oct-2018
Cyanide Comp/Free/Total/Thiocyanate	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018		
Dissolved Metals by ICP-MS	05-Oct-2018	05-Oct-2018	05-Oct-2018	05-Oct-2018	05-Oct-2018	08-Oct-2018	08-Oct-2018
Dissolved Oxygen by Probe	01-Oct-2018	01-Oct-2018	01-Oct-2018	01-Oct-2018	01-Oct-2018	01-Oct-2018	01-Oct-2018
Fluoride	04-Oct-2018	04-Oct-2018	04-Oct-2018	04-Oct-2018	04-Oct-2018		
Mercury Dissolved	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018		
Mineral Oil C10-40 Aqueous (W)				02-Oct-2018	02-Oct-2018		
Nitrite by Kone (w)				03-Oct-2018	03-Oct-2018		
Organotins in Aqueous Samples				04-Oct-2018	04-Oct-2018		
Pesticides (Suite I) by GCMS				04-Oct-2018	04-Oct-2018		
Pesticides (Suite II) by GCMS				05-Oct-2018	05-Oct-2018		
Pesticides (Suite III) by GCMS				03-Oct-2018	03-Oct-2018		
pH Value	01-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018	02-Oct-2018
Phosphate by Kone (w)				02-Oct-2018	02-Oct-2018		
Silicon Dissolved by ICP-OES				04-Oct-2018	04-Oct-2018		
SVOC MS (W) - Aqueous				05-Oct-2018	03-Oct-2018		
Total Organic and Inorganic Carbon	01-Oct-2018	01-Oct-2018	01-Oct-2018	02-Oct-2018	02-Oct-2018		
VOC MS (W)				03-Oct-2018	03-Oct-2018		

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Customer

Customer Services
ALS Environmental Ltd
Hawarden Business Park
Manor Land
Hawarden, Deeside
UK
CH5 3US

Certificate Of Analysis

Job Number: 18-47445
Issue Number: 2
Report Date: 5 October 2018

Reason for re-issuing report: Edited invoice to split job. SR

Site: 180927-85
PO Number: Not Supplied
Date Samples Received: 27/09/2018

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Please find attached the results for the samples received at our laboratory on 27/09/2018.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By:



Shane Reynolds
Laboratory Manager

Authorised Date: 2 October 2018

Notes:

Results relate only to the items tested.
Information on methods of analysis and performance characteristics is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
This test report shall not be reproduced except in full or with written approval of City Analysts Limited.

Certificate Of Analysis

Customer

Customer Services
ALS Environmental Ltd
Hawarden Business Park
Manor Land
Hawarden, Deeside
UK
CH5 3US

Report Reference: 18-47445

Report Version: 2

Site: 180927-85

Sample Description: Ballymulvey BH1

Date of Sampling: 27/09/2018

Sample Type: Ground

Date Sample Received: 27/09/2018

Lab Reference Number: 412665

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/09/2018	Coliforms	6050.0	MPN/100ml	-

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Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Environmental Ltd
Hawarden Business Park
Manor Land
Hawarden, Deeside
UK
CH5 3US

Report Reference: 18-47445

Report Version: 2

Site: 180927-85

Sample Description: Ballymulvey BH2

Date of Sampling: 27/09/2018

Sample Type: Ground

Date Sample Received: 27/09/2018

Lab Reference Number: 412666

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/09/2018	Coliforms	17220.0	MPN/100ml	-

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Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Certificate Of Analysis

Customer

Customer Services
ALS Environmental Ltd
Hawarden Business Park
Manor Land
Hawarden, Deeside
UK
CH5 3US

Report Reference: 18-47445

Report Version: 2

Site: 180927-85

Sample Description: Ballymulvey BH3

Date of Sampling: 27/09/2018

Sample Type: Ground

Date Sample Received: 27/09/2018

Lab Reference Number: 412667

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	27/09/2018	Coliforms	12997000.0	MPN/100ml	-

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Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon



CERTIFICATE OF ANALYSIS

SDG: 180927-85	Client Reference: P1444	Report Number: 475704
Location: Ballymulvey	Order Number: Z1162	Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
Deviation from method	
	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Astestost Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Coisidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.