



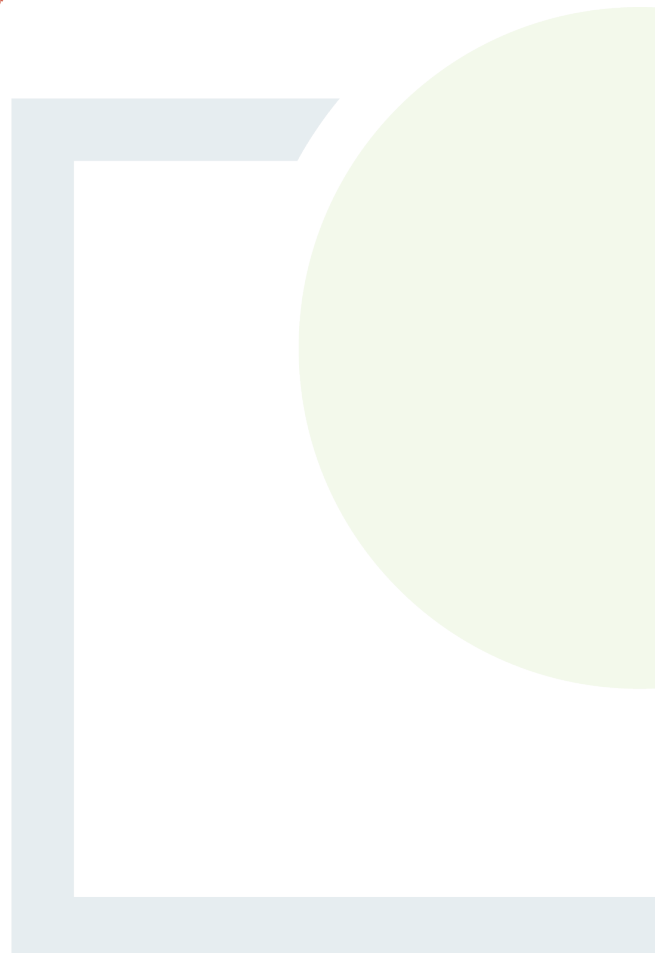
**FEHILY
TIMONEY**

**CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE & PLANNING**

APPENDIX 3

Groundwater and Surface Water Sampling Analysis Results

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Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700
Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Fehily Timoney
3rd Floor
North Park Offices
North Park Business Park
North Road
Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation: 24 September 2019
Customer: Fehily Timoney
Sample Delivery Group (SDG): 190906-109
Your Reference: P1766 North Kerry
Location: North Kerry Landfills
Report No: 522621

We received 6 samples on Friday September 06, 2019 and 6 of these samples were scheduled for analysis which was completed on Tuesday September 24, 2019. 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).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109	Client Reference: P1766 North Kerry	Report Number: 522621
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20668831	SW01 Ahascra		0.00 - 0.00	03/09/2019
20668850	SW02 Ahascra		0.00 - 0.00	03/09/2019
20668862	SW01 Ardfert		0.00 - 0.00	03/09/2019
20668877	SW02 Ardfert		0.00 - 0.00	03/09/2019
20668892	SW01 Listowel		0.00 - 0.00	03/09/2019
20668907	SW02 Listowel		0.00 - 0.00	03/09/2019

Maximum Sample/Coolbox Temperature (°C) :

16.2

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: 190906-109	Client Reference: P1766 North Kerry	Report Number: 522621
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

Results Legend <div style="font-size: small;"> Test No Determination Possible </div> <div style="font-size: x-small;"> 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 </div>	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container	Sample Type	
		20668831	SW01 Ahascra		0.00 - 0.00	NaOH (ALE245) HNO3 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	SW
		20668850	SW02 Ahascra		0.00 - 0.00	NaOH (ALE245) HNO3 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	SW
		20668862	SW01 Ardtert		0.00 - 0.00	NaOH (ALE245) HNO3 Filtered (ALE208) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	SW
		20668877	SW02 Ardtert		0.00 - 0.00	NaOH (ALE245) HNO3 Filtered (ALE204) H2SO4 (ALE244) 500ml Plastic (ALE208) 0.5l glass bottle (ALE227)	SW
Alkalinity as CaCO3	All	NDPs: 0 Tests: 6					
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6					
Anions by Kone (w)	All	NDPs: 0 Tests: 6					
COD Unfiltered	All	NDPs: 0 Tests: 6					
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6					
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 6					
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6					
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 6					
Fluoride	All	NDPs: 0 Tests: 6					
Mercury Dissolved	All	NDPs: 0 Tests: 6					
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 6					
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 6					
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 6					
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 6					
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 6					



Validated

CERTIFICATE OF ANALYSIS

SDG: 190906-109	Client Reference: P1766 North Kerry	Report Number: 522621
Location: North Kerry Landfills	Order Number: Z1658	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		20668831	SW01 Athascra		20668850	SW02 Athascra		20668862	SW01 Ardfert		20668877	SW02 Ardfert	
		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00	
		NaOH (ALE245)	NaOH (ALE245)	NaOH (ALE245)	NaOH (ALE227)	NaOH (ALE245)	NaOH (ALE227)	NaOH (ALE245)	NaOH (ALE227)	NaOH (ALE245)	NaOH (ALE227)	NaOH (ALE245)	NaOH (ALE227)
		SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW

Parameter	Result	NDPs	Tests	Container	Sample Type
pH Value	All	0	6		
Phosphate by Kone (w)	All	0	6		
Suspended Solids	All	0	6		
SVOC MS (W) - Aqueous	All	0	6		
Total Organic and Inorganic Carbon	All	0	6		
VOC MS (W)	All	0	6		

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206688907	SW02 Listowel								
206688992	SW01 Listowel								
		0.00 - 0.00							
	NaOH (ALE245)	SW							
	HNO3 Filtered (ALE204)	SW							
	H2SO4 (ALE244)	SW							
	500ml Plastic (ALE208)	SW	X						
	0.5l glass bottle (ALE227)	SW		X					
	NaOH (ALE245)	SW							
	HNO3 Filtered (ALE204)	SW							
	H2SO4 (ALE244)	SW							
	500ml Plastic (ALE208)	SW	X						
	0.5l glass bottle (ALE227)	SW		X					
						X			
									X

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Validated

SDG:	190906-109	Client Reference:	P1766 North Kerry	Report Number:	522621
Location:	North Kerry Landfills	Order Number:	Z1658	Superseded Report:	

Results Legend			Customer Sample Ref.	SW01 Ahascra	SW02 Ahascra	SW01 Ardert	SW02 Ardert	SW01 Listowel	SW02 Listowel
# ISO17025 accredited. M mCERTS accredited. sq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*#@ Sample deviation (see appendix)	Depth (m)	Sample Type							
	Date Sampled	Sample Time							
	Date Received	SDG Ref							
	Lab Sample No.(s)	AGS Reference							
Component	LOD/Units	Method							
Suspended solids, Total	<2 mg/l	TM022	35.1	46	14.3	15.9	<4	4.47	
			#	#	#	#	#	#	#
Alkalinity, Total as CaCO3	<2 mg/l	TM043	9	12.7	291	292	24.4	18.7	
			#	#	#	#	#	#	#
Oxygen, dissolved	<0.3 mg/l	TM046	9.73	9.04	10.5	10.2	10.8	10.5	
Organic Carbon, Total	<3 mg/l	TM090	63.6	63.5	<3	<3	13	15.8	
			@ #	@ #	#	#	#	#	#
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
			#	#	#	#	#	#	#
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
			#	#	#	#	#	#	#
COD, unfiltered	<7 mg/l	TM107	179	167	<7	<7	41.3	45.3	
			#	#	#	#	#	#	#
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.0973	0.0926	0.655	0.646	0.113	0.119	
			#	#	#	#	#	#	#
Arsenic (diss.filt)	<0.5 µg/l	TM152	<0.5	0.683	0.52	<0.5	<0.5	<0.5	
			#	#	2 #	#	#	#	#
Barium (diss.filt)	<0.2 µg/l	TM152	2.41	2.76	5.62	5.71	2.92	2.86	
			#	#	#	#	#	#	#
Boron (diss.filt)	<10 µg/l	TM152	16.7	16	21.6	22.2	<10	10.5	
			#	#	2 #	#	#	#	#
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	
			#	#	#	#	#	#	#
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1	
			#	#	2 #	#	#	#	#
Copper (diss.filt)	<0.3 µg/l	TM152	3.11	2.41	1.22	2.03	3.13	2.97	
			#	#	2 #	#	#	#	#
Lead (diss.filt)	<0.2 µg/l	TM152	1.26	1.22	<0.2	0.29	0.31	0.349	
			#	#	2 #	#	#	#	#
Manganese (diss.filt)	<3 µg/l	TM152	79.8	85.2	<3	4.78	38.3	38.2	
			#	#	2 #	#	#	#	#
Nickel (diss.filt)	<0.4 µg/l	TM152	0.854	0.915	0.756	0.839	2.18	2.18	
			#	#	2 #	#	#	#	#
Phosphorus (diss.filt)	<10 µg/l	TM152	12.2	12.1	16	28	29	28.4	
			#	#	2 #	#	#	#	#
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	<1	<1	<1	<1	
			#	#	2 #	#	#	#	#
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	<2	<2	
			#	#	2 #	#	#	#	#
Zinc (diss.filt)	<1 µg/l	TM152	41.1	39.6	3.92	7.36	11.3	11.2	
			#	#	2 #	#	#	#	#
Sodium (Dis.Filt)	<0.076 mg/l	TM152	12	11.8	24.3	25.9	10.7	10.8	
			#	#	2 #	#	#	#	#
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	2.63	2.9	8.05	7.48	2.64	2.62	
			#	#	2 #	#	#	#	#
Potassium (Dis.Filt)	<0.2 mg/l	TM152	0.281	0.372	2.99	2.98	1.57	1.55	
			#	#	2 #	#	#	#	#
Calcium (Dis.Filt)	<0.2 mg/l	TM152	6.33	7.48	118	112	7.29	7.19	
			#	#	2 #	#	#	#	#
Iron (Dis.Filt)	<0.019 mg/l	TM152	1.19	1.13	<0.019	<0.019	0.631	0.668	
			#	#	2 #	#	#	#	#
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	<100	<100	<100	<100	<100	<100	
			#	#	#	#	#	#	#
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
			#	#	2	#	#	#	#
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184	<0.05	<0.05	0.08	0.064	<0.05	<0.05	
			#	#	#	#	#	#	#
Chloride	<2 mg/l	TM184	21.2	21.1	48.7	48.8	19.3	19.2	
			#	#	#	#	#	#	#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.5	<0.5	4.94	4.95	0.997	1.15	
			#	#	#	#	#	#	#
Sulphate (soluble) as S	<1 mg/l	TM184	<5	<5	8.1	7.67	<1	1.73	
			#	#	#	#	#	#	#
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	
			#	#	#	#	#	#	#



CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522621
Superseded Report:

Results Legend		Customer Sample Ref.	SW01 Ahasra	SW02 Ahasra	SW01 Ardert	SW02 Ardert	SW01 Listowel	SW02 Listowel
#	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.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
aq	Aqueous / settled sample.		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted - refer to subcontractor report for accreditation status.		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
**	% 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		190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
(F)	Trigger breach confirmed		20668831	20668850	20668862	20668877	20668892	20668907
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.105	<0.105	<0.105	<0.105	<0.105
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	<1 pH Units	TM256	6.14	6.08	8.11	8.23	7.19	7.1
Trifluralin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
alpha-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
beta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Isodrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
delta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor epoxide	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulphan I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
p,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	<0.01 µg/l	TM343	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
o,p'-DDT	<0.01 µg/l	TM343	<0.03	<0.03	<0.01	<0.01	<0.03	<0.03
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulphan II	<0.02 µg/l	TM343	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
p,p'-DDT	<0.01 µg/l	TM343	<0.03	<0.03	<0.02	<0.01	<0.03	<0.03
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.03	<0.03	<0.01	<0.01	<0.03	<0.03
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.04	<0.04	<0.01	<0.01	<0.04	<0.04

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109	Client Reference: P1766 North Kerry	Report Number: 522621
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

Results Legend		Customer Sample Ref.	SW01 Ahascra	SW02 Ahascra	SW01 Ardfert	SW02 Ardfert	SW01 Listowel	SW02 Listowel
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. - Subcontracted - refer to subcontractor report for accreditation status. - % 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 1-3*5@ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Surface Water (SW) 03/09/2019 06/09/2019 190906-109 20668831	0.00 - 0.00 Surface Water (SW) 03/09/2019 06/09/2019 190906-109 20668850	0.00 - 0.00 Surface Water (SW) 03/09/2019 06/09/2019 190906-109 20668862	0.00 - 0.00 Surface Water (SW) 03/09/2019 06/09/2019 190906-109 20668877	0.00 - 0.00 Surface Water (SW) 03/09/2019 06/09/2019 190906-109 20668892	0.00 - 0.00 Surface Water (SW) 03/09/2019 06/09/2019 190906-109 20668907
Component	LOD/Units	Method						
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.06	<0.06	<0.02	<0.06	<0.06	<0.06
Permethrin I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Permethrin II	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Hexachlorobutadiene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dichlorvos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dichlobenil	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mevinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tecnazene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Hexachlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Demeton-S-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phorate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Diazinon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Triallate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Atrazine	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Simazine	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Disulfoton	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Propetamphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dimethoate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methyl Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Malathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fenthion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fenitrothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Triadimefon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pendimethalin	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorfenvinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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CERTIFICATE OF ANALYSIS

Validated

SDG:	190906-109	Client Reference:	P1766 North Kerry	Report Number:	522621
Location:	North Kerry Landfills	Order Number:	Z1658	Superseded Report:	

Results Legend		Customer Sample Ref.	SW01 Ahascra	SW02 Ahascra	SW01 Ardfert	SW02 Ardfert	SW01 Listowel	SW02 Listowel
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted - refer to subcontractor report for accreditation status.							
**	% 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							
1-3*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	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
		Date Sampled	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
		Sample Time	-	-	-	-	-	-
		Date Received	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
		SDG Ref	190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
		Lab Sample No.(s)	20668831	20668850	20668862	20668877	20668892	20668907
		AGS Reference						
Component	LOD/Units	Method						
trans-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
cis-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Carbophenothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Triazophos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosalone	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Azinphos methyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Azinphos ethyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Etridiazole	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pentachlorobenzene	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Propachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Omethoate	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Propazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Propyzamide	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Alachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Prometryn	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Telodrin	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Terbutryn	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chlorothalonil	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Etrimphos	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Metazachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Trietazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Coumaphos	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphamidon I	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphamidon II	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522621
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	SW01 Ahasra	SW02 Ahasra	SW01 Ardert	SW02 Ardert	SW01 Listowel	SW02 Listowel
#	ISO17025 accredited.								
M	mCERTS accredited.								
aq	Aqueous / settled sample.	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	0.00 - 0.00
dis.filt	Dissolved / filtered sample.	Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
tot.unfilt	Total / unfiltered sample.	Date Sampled	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
*	Subcontracted - refer to subcontractor report for accreditation status.	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	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
(F)	Trigger breach confirmed	SDG Ref	190906-109	190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
1-3*#@	Sample deviation (see appendix)	Lab Sample No.(s)	20668831	20668850	20668862	20668877	20668892	20668907	20668907
		AGS Reference							
Component	LOD/Units	Method							
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2-Chlorophenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2-Methylphenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2-Nitroaniline (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
2-Nitrophenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
3-Nitroaniline (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Chloroaniline (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Methylphenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Nitroaniline (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
4-Nitrophenol (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
Azobenzene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
Acenaphthylene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
Acenaphthene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
Anthracene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<40	<16	<4	<2	<8	<2	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<20	<8	<2	<1	<4	<1	



CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522621
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	SW01 Ahascra	SW02 Ahascra	SW01 Ardert	SW02 Ardert	SW01 Listowel	SW02 Listowel
#	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.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
aq	Aqueous / settled sample.		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
diss.filt	Dissolved / filtered sample.		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
tot.unfilt	Total / unfiltered sample.		190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
..	Subcontracted - refer to subcontractor report for accreditation status.		20668831	20668850	20668862	20668877	20668892	20668907
-	% 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							
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Carbazole (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Chrysene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Dibenzofuran (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Diethyl phthalate (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Dimethyl phthalate (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<100 @ #	<40 @ #	<10 @ #	<5 @ #	<20 @ #	<5 @ #
Fluoranthene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Fluorene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Hexachlorobenzene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Pentachlorophenol (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Phenol (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Hexachloroethane (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Nitrobenzene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Naphthalene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Isophorone (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Phenanthrene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #
Pyrene (aq)	<1 µg/l	TM176	<20 @ #	<8 @ #	<2 @ #	<1 @ #	<4 @ #	<1 @ #



CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522621
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	SW01 Ahascra	SW02 Ahascra	SW01 Ardert	SW02 Ardert	SW01 Listowel	SW02 Listowel
#	ISO17025 accredited.			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.			Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
sq	Aqueous / settled sample.	Depth (m)		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
dis.filt	Dissolved / filtered sample.	Sample Type		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
tot.unfilt	Total / unfiltered sample.	Date Sampled		190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
*	Subcontracted - refer to subcontractor report for accreditation status.	Sample Time		20668831	20668850	20668862	20668877	20668892	20668907
**	% 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							
(F)	Trigger breach confirmed	SDG Ref							
1-3*#@	Sample deviation (see appendix)	Lab Sample No.(s)							
		AGS Reference							
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208	112	108	104	107	110	104	
			1	1	1	1	1	1	1
Toluene-d8**	%	TM208	101	100	99.9	99.6	100	101	
			1	1	1	1	1	1	1
4-Bromofluorobenzene**	%	TM208	99.6	99.6	99.7	100	100	101	
			1	1	1	1	1	1	1
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1	1	1	1	1	1	1
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Dichloromethane	<3 µg/l	TM208	<3	<3	<3	<3	<3	<3	<3
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1	1	1	1	1	1	1
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1	<1
			1 #	1 #	1 #	1 #	1 #	1 #	1 #



CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109	Client Reference: P1766 North Kerry	Report Number: 522621
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.		SW01 Ahasra	SW02 Ahasra	SW01 Ardferd	SW02 Ardferd	SW01 Listowel	SW02 Listowel
# ISO17025 accredited.	Customer Sample Ref.		Depth (m)	Sample Type	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.	Date Sampled		Date Sampled	Date Received	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
aq Aqueous / settled sample.	Date Received		Date Received	SDG Ref	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
diss.filt Dissolved / filtered sample.	Lab Sample No.(s)		Lab Sample No.(s)	AGS Reference	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
tot.unfilt Total / unfiltered sample.	AGS Reference		AGS Reference		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
Subcontracted - refer to subcontractor report for accreditation status.					190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
% 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					20668831	20668850	20668862	20668877	20668892	20668907
(F) Trigger breach confirmed										
1-3*5@ Sample deviation (see appendix)										
Component	LOD/Units	Method								
Tetrachloroethene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Dibromochloromethane	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,2-Dibromoethane	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Chlorobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Ethylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
m,p-Xylene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
o-Xylene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Styrene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Bromoform	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Isopropylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Bromobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Propylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
2-Chlorotoluene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
4-Chlorotoluene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
tert-Butylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
sec-Butylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
4-iso-Propyltoluene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
n-Butylbenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	1	<1	1	<1	1	<1	1
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Hexachlorobutadiene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
Naphthalene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	1 #	<1	1 #	<1	1 #	<1	1 #

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-109 Client Reference: P1766 North Kerry Report Number: 522621
Location: North Kerry Landfills Order Number: Z1658 Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	SW01 Ahascra	SW02 Ahascra	SW01 Ardfert	SW02 Ardfert	SW01 Listowel	SW02 Listowel
#	ISO17025 accredited.		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.		Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
aq	Aqueous / settled sample.	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
diss.filt	Dissolved / filtered sample.	Sample Type	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)	Surface Water (SW)
tot.unfilt	Total / unfiltered sample.	Date Sampled	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
	Subcontracted - refer to subcontractor report for accreditation status.	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	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
(F)	Trigger breach confirmed	SDG Ref	190906-109	190906-109	190906-109	190906-109	190906-109	190906-109
1-3*5@	Sample deviation (see appendix)	Lab Sample No.(s)	20668831	20668850	20668862	20668877	20668892	20668907
		AGS Reference						
Component	LOD/Units	Method						
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	<1
			1	1	1	1	1	1

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SDG: 190906-109 Client Reference: P1766 North Kerry Report Number: 522621
 Location: North Kerry Landfills Order Number: Z1658 Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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
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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CERTIFICATE OF ANALYSIS

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SDG: 190906-109
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522621
Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.
Depth
Type

	20668831	20668850	20668862	20668877	20668892	20668907
	SW01 Ahascra	SW02 Ahascra	SW01 Ardferf	SW02 Ardferf	SW01 Listowel	SW02 Listowel
	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Alkalinity as CaCO3	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019
Ammoniacal Nitrogen	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019
Anions by Kone (w)	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019
COD Unfiltered	11-Sep-2019	11-Sep-2019	11-Sep-2019	10-Sep-2019	11-Sep-2019	11-Sep-2019
Conductivity (at 20 deg.C)	11-Sep-2019	11-Sep-2019	11-Sep-2019	11-Sep-2019	11-Sep-2019	11-Sep-2019
Cyanide Comp/Free/Total/Thiocyanate	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019
Dissolved Metals by ICP-MS	18-Sep-2019	17-Sep-2019	18-Sep-2019	18-Sep-2019	18-Sep-2019	18-Sep-2019
Dissolved Oxygen by Probe	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019
Fluoride	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019
Mercury Dissolved	11-Sep-2019	11-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019
Mineral Oil C10-40 Aqueous (W)	16-Sep-2019	18-Sep-2019	16-Sep-2019	10-Sep-2019	18-Sep-2019	10-Sep-2019
PCB Congeners - Aqueous (W)	16-Sep-2019	16-Sep-2019	16-Sep-2019	11-Sep-2019	16-Sep-2019	11-Sep-2019
Pesticides (Suite I) by GCMS	11-Sep-2019	11-Sep-2019	12-Sep-2019	11-Sep-2019	11-Sep-2019	11-Sep-2019
Pesticides (Suite II) by GCMS	12-Sep-2019	11-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	11-Sep-2019
Pesticides (Suite III) by GCMS	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019
pH Value	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	13-Sep-2019	13-Sep-2019
Phosphate by Kone (w)	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019
Suspended Solids	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019
SVOC MS (W) - Aqueous	19-Sep-2019	20-Sep-2019	24-Sep-2019	19-Sep-2019	19-Sep-2019	19-Sep-2019
Total Organic and Inorganic Carbon	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019
VOC MS (W)	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019

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CERTIFICATE OF ANALYSIS

SDG: 190906-109 Client Reference: P1766 North Kerry Report Number: 522621
 Location: North Kerry Landfills Order Number: Z1658 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. 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.

3. 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.

4. 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.

5. 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.

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

7. Results relate only to the items tested.

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

9. **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.

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

11. 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.

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

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

14. 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.

15. 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.

16. 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.

17. **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.

18. 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
3	Deviation from method
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

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).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2107)*.

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.

Certificate of Analysis

Customer:	Fehily Timoney & Co	Project:	Listowel
Address:	Core House Pouladuff Rd Cork	Date Received:	04/09/2019
Report to:	Emily Archer	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/09/2019 - 13/09/2019
Quote No.		Issue Date:	13/09/2019
		BATCH NUMBER:	19-03586

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinc Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

(registered office)

4 park business centre | farranfore | county kerry | ireland | telephone +353 66 976 3588 | fax +353 66 976 3589
dunrinc | killarney | county kerry | ireland | telephone +353 64 66 33922 | fax +353 64 66 39022

web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Customer Sample Ref:	BH 01	Customer Sample Code:	
Project:	Listowel	Sampled By:	Emily Archer
Our Reference:	11187 (19-03586)	Sample Matrix:	Ground Water
Date Sampled:	03/09/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
<u>Microbiological Analysis: (D)</u>				
SMP 019	Coliforms	MPN/100mL	<10	8164
SMP 124	Faecal coliforms	MPN/100mL	<10	602

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 dunrine | **killarney** | county kerry | ireland | telephone +353 64 66 33922 | fax +353 64 66 39022

web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
 registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	BH 02	Customer Sample Code:	
Project:	Listowel	Sampled By:	Emily Archer
Our Reference:	11188 (19-03586)	Sample Matrix:	Ground Water
Date Sampled:	03/09/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
<u>Microbiological Analysis: (D)</u>				
SMP 019	Coliforms	MPN/100mL	<10	> 24196
SMP 124	Faecal coliforms	MPN/100mL	<10	177

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web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	SW 01	Customer Sample Code:	
Project:	Listowel	Sampled By:	Emily Archer
Our Reference:	11189 (19-03586)	Sample Matrix:	Surface Water
Date Sampled:	03/09/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0

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Customer Sample Ref:	SW 02	Customer Sample Code:	
Project:	Listowel	Sampled By:	Emily Archer
Our Reference:	11190 (19-03586)	Sample Matrix:	Surface Water
Date Sampled:	03/09/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.4

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dunrine | **killarney** | county kerry | ireland | telephone +353 64 66 33922 | fax +353 64 66 39022

web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Fehily Timoney
3rd Floor
North Park Offices
North Park Business Park
North Road
Dublin
Dublin 11

Attention: Daniel Hayden

CERTIFICATE OF ANALYSIS

Date of report Generation: 20 September 2019
Customer: Fehily Timoney
Sample Delivery Group (SDG): 190906-103
Your Reference: P1766 North Kerry
Location: North Kerry Landfills
Report No: 522224

We received 5 samples on Friday September 06, 2019 and 5 of these samples were scheduled for analysis which was completed on Friday September 20, 2019. 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).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103	Client Reference: P1766 North Kerry	Report Number: 522224
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
20668536	BH01 Ahascra		0.00 - 0.00	03/09/2019
20668587	BH02 Ahascra		0.00 - 0.00	03/09/2019
20668626	BH01 Ardfert		0.00 - 0.00	03/09/2019
20668654	BH01 Listowel		0.00 - 0.00	03/09/2019
20668689	BH02 Listowel		0.00 - 0.00	03/09/2019

Maximum Sample/Coolbox Temperature (°C) :

16.2

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: 190906-103
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522224
Superseded Report:

Results Legend

- 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

	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container											Sample Type	
					0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)		Vial (ALE297)
	20668654	BH01 Listowel		0.00 - 0.00	0.5l glass bottle (ALE227)												GW
	20668626	BH01 Ardert		0.00 - 0.00	Vial (ALE297)												GW
	20668536	BH01 Ahascra		0.00 - 0.00	Vial (ALE297)												GW
	20668587	BH02 Ahascra		0.00 - 0.00	Vial (ALE297)												GW
Acid Herbicides by GCMS	All	NDPs: 0 Tests: 5				X											
Alkalinity as CaCO3	All	NDPs: 0 Tests: 5					X										
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 5															
Anions by Kone (w)	All	NDPs: 0 Tests: 5															
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 5															
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 5															
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5															
Dissolved Oxygen by Probe	All	NDPs: 0 Tests: 5															
Fluoride	All	NDPs: 0 Tests: 5															
Mercury Dissolved	All	NDPs: 1 Tests: 4															
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 5															
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 5															
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 5															
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 5															
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 5															

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CERTIFICATE OF ANALYSIS

SDG: 190906-103 Client Reference: P1766 North Kerry Report Number: 522224
 Location: North Kerry Landfills Order Number: Z1658 Superseded Report:

Results Legend	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		Sample Type		
	X	Test	BH01	Ahascra	BH02	Ahascra	0.00 - 0.00	0.00 - 0.00	Vial (ALE227)	0.5l glass bottle (ALE227)	GW	GW	
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													
pH Value	All	NDPs: 0 Tests: 5											
Phosphate by Kone (w)	All	NDPs: 0 Tests: 5											
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 5											
Total Dissolved Solids	All	NDPs: 0 Tests: 5											
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 5											
VOC MS (W)	All	NDPs: 0 Tests: 5											

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206686899							BH02 Listowel							0.00 - 0.00						
206686899							BH01 Listowel							0.00 - 0.00						

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103	Client Reference: P1766 North Kerry	Report Number: 522224
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

Results Legend			Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferd	BH01 Listowel	BH02 Listowel	
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % 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 1-3*#@ Sample deviation (see appendix)	Depth (m)	Sample Type							
	Date Sampled	Sample Time							
	Date Received	SDG Ref							
	Lab Sample No.(s)	AGS Reference							
Component	LOD/Units	Method							
Alkalinity, Total as CaCO3	<2 mg/l	TM043	309	348	346	660	320		
Oxygen, dissolved	<0.3 mg/l	TM046	7.1	9.08	9	3.31	8.63		
Organic Carbon, Total	<3 mg/l	TM090	4.04	3.29	3.78	24.5	9.49		
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	2.38	2.38	0.296	26.1	0.313		
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5	<0.5		
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.552	0.634	0.834	1.49	0.424		
Dissolved solids, Total (meter)	<5 mg/l	TM123	434	484	605	1170	343		
Arsenic (diss.filt)	<0.5 µg/l	TM152	65.6	19.2	2.65	12.4	0.934		
Barium (diss.filt)	<0.2 µg/l	TM152	24.8	42.8	32.4	164	8.61		
Boron (diss.filt)	<10 µg/l	TM152	18.2	16.6	68.4	189	197		
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	<1	<1		
Copper (diss.filt)	<0.3 µg/l	TM152	<0.3	0.464	1.07	<0.3	2.46		
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2	<0.2	3.84	0.261	0.473		
Manganese (diss.filt)	<3 µg/l	TM152	376	250	119	1310	1250		
Nickel (diss.filt)	<0.4 µg/l	TM152	0.972	1.32	2.27	3.79	1.72		
Phosphorus (diss.filt)	<10 µg/l	TM152	<10	19.6	38.3	20.1	32.1		
Selenium (diss.filt)	<1 µg/l	TM152	<1	<1	3.24	<1	<1		
Thallium (diss.filt)	<2 µg/l	TM152	<2	<2	<2	<2	<2		
Zinc (diss.filt)	<1 µg/l	TM152	2.19	3.3	2.8	8.6	8.03		
Sodium (Dis.Filt)	<0.076 mg/l	TM152	31.4	29.6	36.5	119	22.8		
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	8.25	10.3	9.74	48.2	6.66		
Potassium (Dis.Filt)	<0.2 mg/l	TM152	1.78	2.28	14	29.7	1.42		
Calcium (Dis.Filt)	<0.2 mg/l	TM152	80.2	102	135	156	64.5		
Iron (Dis.Filt)	<0.019 mg/l	TM152	2.79	4.13	0.355	12.3	0.171		
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	<100	<100	<100	<100	3340		
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	<0.05	<0.05	<0.05		
Chloride	<2 mg/l	TM184	37.4	37.4	73.2	214	22.5		
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	<0.1	<0.1	5.82	<0.1	<0.1		
Sulphate (soluble) as S	<1 mg/l	TM184	<1	<1	11.2	<1	1.9		
PCB congener 28	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03		
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03		

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CERTIFICATE OF ANALYSIS

Validated

SDG:	190906-103	Client Reference:	P1766 North Kerry	Report Number:	522224
Location:	North Kerry Landfills	Order Number:	Z1658	Superseded Report:	

Results Legend		Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferd	BH01 Listowel	BH02 Listowel	
#	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.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	
aq	Aqueous / settled sample.		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	
..	Subcontracted - refer to subcontractor report for accreditation status.		190906-103	190906-103	190906-103	190906-103	190906-103	
-	% 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		20668536	20668587	20668626	20668654	20668689	
(F)	Trigger breach confirmed							
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03	
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03	
PCB congener 138	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03	
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03	
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015	<0.015	<0.015	<0.03	
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.105	<0.105	<0.105	<0.105	<0.21	
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	
pH	<1 pH Units	TM256	7.99	7.67	7.64	7.67	7.93	
Trifluralin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
alpha-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Heptachlor	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Aldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
beta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Isodrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
delta-HCH	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Heptachlor epoxide	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
o,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Endosulphan I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
trans-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
cis-Chlordane	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
p,p'-DDE	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Dieldrin	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Endrin	<0.01 µg/l	TM343	<0.02	<0.02	<0.01	<0.02	<0.02	
o,p'-DDT	<0.01 µg/l	TM343	<0.01	<0.03	<0.01	<0.02	<0.01	
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Endosulphan II	<0.02 µg/l	TM343	<0.02	<0.02	<0.02	<0.02	<0.02	
p,p'-DDT	<0.01 µg/l	TM343	<0.01	<0.03	<0.01	<0.02	<0.01	
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.01	<0.03	<0.01	<0.02	<0.01	
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.01	<0.04	<0.01	<0.02	<0.01	
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.06	<0.06	<0.02	<0.04	<0.06	

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CERTIFICATE OF ANALYSIS

Validated

SDG:	190906-103	Client Reference:	P1766 North Kerry	Report Number:	522224
Location:	North Kerry Landfills	Order Number:	Z1658	Superseded Report:	

Results Legend		Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferf	BH01 Listowel	BH02 Listowel	
#	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.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	
aq	Aqueous / settled sample.		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted - refer to subcontractor report for accreditation status.		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	
**	% 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		190906-103	190906-103	190906-103	190906-103	190906-103	
(F)	Trigger breach confirmed		20668536	20668587	20668626	20668654	20668689	
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Permethrin I	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
Permethrin II	<0.01 µg/l	TM343	<0.01	<0.01	<0.01	<0.01	<0.01	
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Hexachlorobutadiene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Dichlorvos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Dichlobenil	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Mevinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Tecnazene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Hexachlorobenzene	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Demeton-S-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Phorate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Diazinon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Triallate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Atrazine	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Simazine	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Disulfoton	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Propetamphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Dimethoate	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Pirimiphos-methyl	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Methyl Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Malathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Fenthion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Fenitrothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Triadimefon	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Pendimethalin	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Parathion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorfenvinphos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
trans-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	

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CERTIFICATE OF ANALYSIS

Validated

SDG:	190906-103	Client Reference:	P1766 North Kerry	Report Number:	522224
Location:	North Kerry Landfills	Order Number:	Z1658	Superseded Report:	

Results Legend		Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferf	BH01 Listowel	BH02 Listowel	
#	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.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	
aq	Aqueous / settled sample.		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted - refer to subcontractor report for accreditation status.		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	
**	% 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		190906-103	190906-103	190906-103	190906-103	190906-103	
(F)	Trigger breach confirmed		20668536	20668587	20668626	20668654	20668689	
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
cis-Chlordane	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Ethion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Carbophenothion	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Triazophos	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Phosalone	<0.01 µg/l	TM344	<0.01	<0.01	<0.01	<0.01	<0.01	
Azinphos methyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02	<0.02	<0.02	
Azinphos ethyl	<0.02 µg/l	TM344	<0.02	<0.02	<0.02	<0.02	<0.02	
Etridiazole	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Pentachlorobenzene	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Propachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Omethoate	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Propazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Propyzamide	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Alachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Prometryn	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Telodrin	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Terbutryn	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorothalonil	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Etrimphos	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Metazachlor	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Cyanazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Trietazine	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Coumaphos	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Phosphamidon I	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Phosphamidon II	<0.01 µg/l	TM345	<0.01	<0.01	<0.01	<0.01	<0.01	
Dinitro-o-cresol	<0.1 µg/l	TM411	<10	0.43	1.07	<0.5	<1	
Clopyralid	<0.04 µg/l	TM411	<4	<0.04	<0.04	<0.2	<0.4	
MCPA	<0.05 µg/l	TM411	<5	<0.05	<0.05	<0.25	<0.5	
Mecoprop	<0.04 µg/l	TM411	<4	<0.04	<0.04	<0.2	<0.4	
Dicamba	<0.04 µg/l	TM411	<4	<0.04	<0.04	<0.2	<0.4	
MCPB	<0.05 µg/l	TM411	<5	<0.05	<0.05	<0.25	<0.5	

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103 Client Reference: P1766 North Kerry Report Number: 522224
Location: North Kerry Landfills Order Number: Z1658 Superseded Report:

Table with columns: Results Legend, Customer Sample Ref., Depth (m), Sample Type, Date Sampled, Sample Time, Date Received, SDG Ref, Lab Sample No.(s), AGS Reference, Component, LOD/Units, Method, and data columns for BH01 Ahascra, BH02 Ahascra, BH01 Ardfert, BH01 Listowel, BH02 Listowel.

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522224
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferd	BH01 Listowel	BH02 Listowel
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted - refer to subcontractor report for accreditation status.							
**	% 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							
1-3*#@	Sample deviation (see appendix)							
Component	LOD/Units	Method	Depth (m)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2-Chloronaphthalene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2-Chlorophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2-Methylnaphthalene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2-Methylphenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2-Nitroaniline (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
2-Nitrophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
3-Nitroaniline (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Chloroaniline (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Methylphenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Nitroaniline (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
4-Nitrophenol (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
Azobenzene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
Acenaphthylene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
Acenaphthene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
Anthracene (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	0.00 - 0.00	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<80 @ #	<40 @ #	<2 @ #	<4 @ #	<40 @ #	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #	
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<40 @ #	<20 @ #	<1 @ #	<2 @ #	<20 @ #	



CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522224
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardfert	BH01 Listowel	BH02 Listowel
#	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.			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.			03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
-	Subcontracted - refer to subcontractor report for accreditation status.			06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019
-	% 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			190906-103	190906-103	190906-103	190906-103	190906-103
(F)	Trigger breach confirmed			20668536	20668587	20668626	20668654	20668689
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Carbazole (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Chrysene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Dibenzofuran (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Diethyl phthalate (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Dimethyl phthalate (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<200	<100	<5	<10	<100	
Fluoranthene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Fluorene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Hexachlorobenzene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Pentachlorophenol (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Phenol (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Hexachloroethane (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Nitrobenzene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Naphthalene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Isophorone (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Phenanthrene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	
Pyrene (aq)	<1 µg/l	TM176	<40	<20	<1	<2	<20	

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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522224
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferd	BH01 Listowel	BH02 Listowel	
#	ISO17025 accredited.		Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	
M	mCERTS accredited.		Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	
sq	Aqueous / settled sample.		Date Sampled	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	
dis.filt	Dissolved / filtered sample.		Sample Time						
tot.unfilt	Total / unfiltered sample.		Date Received	06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	
*	Subcontracted - refer to subcontractor report for accreditation status.		SDG Ref	190906-103	190906-103	190906-103	190906-103	190906-103	
**	% 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		Lab Sample No.(s)	20668536	20668587	20668626	20668654	20668689	
(F)	Trigger breach confirmed		AGS Reference						
1-3*%@	Sample deviation (see appendix)								
Component	LOD/Units	Method							
Dibromofluoromethane**	%	TM208	106	118	103	106	106		
Toluene-d8**	%	TM208	99.6	99.8	99.8	100	99.8		
4-Bromofluorobenzene**	%	TM208	96.8	99.7	98.8	98.2	96.1		
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Dichloromethane	<3 µg/l	TM208	<3	<3	<3	<3	<3		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1		
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1		
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1		



CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103	Client Reference: P1766 North Kerry	Report Number: 522224
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferd	BH01 Listowel	BH02 Listowel	
#	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.		Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	
aq	Aqueous / settled sample.		03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019	
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
	Subcontracted - refer to subcontractor report for accreditation status.		06/09/2019	06/09/2019	06/09/2019	06/09/2019	06/09/2019	
	% 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		190906-103	190906-103	190906-103	190906-103	190906-103	
(F)	Trigger breach confirmed		20668536	20668587	20668626	20668654	20668689	
1-3*5@	Sample deviation (see appendix)							
Component	LOD/Units		Method					
Tetrachloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Dibromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2-Dibromoethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Chlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Ethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
m,p-Xylene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
o-Xylene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Styrene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Bromoform	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Isopropylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Bromobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Propylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
4-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
tert-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
n-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Hexachlorobutadiene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Naphthalene	<1 µg/l	TM208	<1	<1	<1	1.29	<1	
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	

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CERTIFICATE OF ANALYSIS

SDG: 190906-103	Client Reference: P1766 North Kerry	Report Number: 522224
Location: North Kerry Landfills	Order Number: Z1658	Superseded Report:

VOC MS (W)

	Results Legend	Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardfert	BH01 Listowel	BH02 Listowel
# ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. Dissolved / filtered sample. Total / unfiltered sample. tot.unfilt - Subcontracted - refer to subcontractor report for accreditation status. * % 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 1-3*@\$ Sample deviation (see appendix)		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.00 - 0.00 Ground Water (GW) 03/09/2019 - 06/09/2019 190906-103 20668536	0.00 - 0.00 Ground Water (GW) 03/09/2019 - 06/09/2019 190906-103 20668587	0.00 - 0.00 Ground Water (GW) 03/09/2019 - 06/09/2019 190906-103 20668626	0.00 - 0.00 Ground Water (GW) 03/09/2019 - 06/09/2019 190906-103 20668654	0.00 - 0.00 Ground Water (GW) 03/09/2019 - 06/09/2019 190906-103 20668689
Component	LOD/Units	Method					
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1

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SDG: 190906-103 Client Reference: P1766 North Kerry Report Number: 522224
Location: North Kerry Landfills Order Number: Z1658 Superseded Report:

Notification of NDPs (No determination possible)

Date Received : 06/09/2019 14:28:26

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
20668689	BH02 Listowel	0.00 - 0.00	Mercury Dissolved	Insufficient Sample

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SDG: 190906-103 Client Reference: P1766 North Kerry Report Number: 522224
 Location: North Kerry Landfills Order Number: Z1658 Superseded Report:

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
TM046	Method 4500G, AWWA/APHA, 20th Ed., 1999	Measurement of Dissolved Oxygen by Oxygen Meter
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
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
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
TM197	Modified: US EPA Method 8082.EA Method 174 and 5109631	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
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
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
TM411	Acid_Herbs_GCMS	Acid Herbs in Water 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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CERTIFICATE OF ANALYSIS

Validated

SDG: 190906-103
Location: North Kerry Landfills

Client Reference: P1766 North Kerry
Order Number: Z1658

Report Number: 522224
Superseded Report:

Test Completion Dates

Lab Sample No(s)	20668536	20668587	20668626	20668654	20668689
Customer Sample Ref.	BH01 Ahascra	BH02 Ahascra	BH01 Ardferf	BH01 Listowel	BH02 Listowel
AGS Ref.					
Depth	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	Ground Water	Ground Water
Acid Herbicides by GCMS	13-Sep-2019	11-Sep-2019	12-Sep-2019	13-Sep-2019	17-Sep-2019
Alkalinity as CaCO3	13-Sep-2019	13-Sep-2019	13-Sep-2019	15-Sep-2019	15-Sep-2019
Ammoniacal Nitrogen	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019
Anions by Kone (w)	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019	13-Sep-2019
Conductivity (at 20 deg.C)	11-Sep-2019	11-Sep-2019	11-Sep-2019	10-Sep-2019	11-Sep-2019
Cyanide Comp/Free/Total/Thiocyanate	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019
Dissolved Metals by ICP-MS	18-Sep-2019	18-Sep-2019	18-Sep-2019	16-Sep-2019	16-Sep-2019
Dissolved Oxygen by Probe	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019	12-Sep-2019
Fluoride	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019
Mercury Dissolved	10-Sep-2019	09-Sep-2019	10-Sep-2019	09-Sep-2019	
Mineral Oil C10-40 Aqueous (W)	16-Sep-2019	16-Sep-2019	10-Sep-2019	16-Sep-2019	16-Sep-2019
PCB Congeners - Aqueous (W)	16-Sep-2019	16-Sep-2019	11-Sep-2019	16-Sep-2019	16-Sep-2019
Pesticides (Suite I) by GCMS	11-Sep-2019	11-Sep-2019	13-Sep-2019	11-Sep-2019	11-Sep-2019
Pesticides (Suite II) by GCMS	11-Sep-2019	11-Sep-2019	13-Sep-2019	13-Sep-2019	11-Sep-2019
Pesticides (Suite III) by GCMS	10-Sep-2019	10-Sep-2019	12-Sep-2019	10-Sep-2019	10-Sep-2019
pH Value	12-Sep-2019	12-Sep-2019	12-Sep-2019	13-Sep-2019	13-Sep-2019
Phosphate by Kone (w)	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019
SVOC MS (W) - Aqueous	19-Sep-2019	19-Sep-2019	19-Sep-2019	20-Sep-2019	19-Sep-2019
Total Dissolved Solids	11-Sep-2019	10-Sep-2019	11-Sep-2019	11-Sep-2019	11-Sep-2019
Total Organic and Inorganic Carbon	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019	10-Sep-2019
VOC MS (W)	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019	09-Sep-2019

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CERTIFICATE OF ANALYSIS

SDG: 190906-103 Client Reference: P1766 North Kerry Report Number: 522224
 Location: North Kerry Landfills Order Number: Z1658 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. 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.

3. 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.

4. 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.

5. 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.

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

7. Results relate only to the items tested.

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

9. **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.

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

11. 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.

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

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

14. 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.

15. 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.

16. 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.

17. **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.

18. 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
3	Deviation from method
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

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

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).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	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.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2107)*.

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.