

ANNUAL ENVIRONMENTAL REPORT

For

Muckish Landfill Site

(Waste Licence Reference W0126-1)

By
Donegal County Council
For
Environmental Protection Agency

Reporting Period: January 2008 to December 2008

March 2009

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1. INTRODUCTION

- 1.1 This Annual Environmental Report (AER) has been prepared to meet the requirements of Condition 2.3 of Waste Licence W0126-1 for Muckish Landfill and includes the information listed in Schedule A of the Waste Licence.
- 1.2 Muckish Landfill Site is located in a rural setting on the lower slopes of Muckish Mountain, approximately 5km south east of the village of Falcarragh. The site is within the upper catchment of the Ray River and is situated on an extensive area of blanket bog.
- 1.3 Donegal County Council submitted an application to the Environmental Protection Agency for the continued operation of the landfill site, as required by the Waste Management (Licensing) Regulations 1997. On the 29th of May 2001 the Environmental Protection Agency granted the Council a Waste Licence (registration number W0126-1) for the facility, in accordance with the Third Schedule of the Waste Management Act, 1996.
- 1.4 The Licence granted was for the orderly closure, capping and restoration of the landfill and allows only for the acceptance of inert waste to be used for the purpose of site restoration. The facility ceased to accept waste on the 6th of November 2001 and the site was closed.
- 1.5 The facility had been developed and operated on the 'dilute and disperse' principle, whereby rainfall infiltrated the landfill and generated leachate, the leachate was in turn allowed to disperse into the surrounding environment.
- 1.6 The site was fully restored during 2005/6 in accordance with the approved Restoration and Aftercare Plan.

2. REPORTING PERIOD

2.1 This report refers to the period from 1st January, 2008 to 31st December 2008.

3. WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

3.1 Type of Waste

The licensed disposal activities, in accordance with the Third Schedule of the Waste Management Act, 1996 are restricted to those listed as follows

- Class 1 Deposit on, in or under land (including landfill): This activity is limited to the disposal of inert waste only and leachate treatment at the facility.
- Class 13 Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced: This activity is limited to leachate collection and storage prior to treatment.

4. QUANTITIES OF WASTE

4.1 In accordance with Condition 1 of the waste licence only inert waste shall be accepted for the purposes of remediation, rehabilitation, enhancement and restoration of the facility. The maximum total of inert waste to be disposed of at the site is 40,000 tonnes. The quantities of waste received during each year at the facility are presented in Table 1. 2,500 tonnes of inert waste (for use in restoration works) was accepted onto the site during 2004. The balance of restoration materials were imported during this reporting period and the quantity is shown under 2005 in the table.

Table 1: Waste Quantities Accepted (tonnes)

Waste Type	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Domestic Refuse*	4418	5639	7008	5729	0	0	0	0	0	0	0
Inert Waste	0	0	0	0	0	0	2,500	34,667	0	0	0

^{*}Figures based on estimates

5. SUMMARY REPORT ON EMISSIONS

5.1 Groundwater

- 5.1.1 Groundwater flow is typically in a north-easterly direction ultimately providing base flow to the Ray River. Groundwater monitoring is carried out at three locations (GW1, GW2 and GW3) as shown on Drawing No 5234.20/102 Monitoring Locations. These groundwater monitoring boreholes were installed at the landfill early in 2000 as per licence requirements. Results of this year's monitoring are presented in Appendix A in tabular and graphical format. Monitoring location GW1 is representative of water quality upstream and monitoring locations GW2 and GW3 are immediately downstream of the waste body.
- 5.1.2 Groundwater results show that levels of parameters indicative of groundwater contamination with leachate, such as ammonia and electrical conductivity, are slightly lower than those in the last reporting period. Again this period, the only well showing any significant presence of parameters indicative of leachate is GW3, which is situated immediately downstream of the waste body.

5.2 Surface Water

5.2.1 Muckish landfill site is situated in the upper catchment of the Ray (Duvowen) River. The landfill site is based on an area of extensive blanket bog. This river forms the northeast boundary of the landfill and Council ownership boundary. Surface water monitoring is carried out at four monitoring locations as shown on Drawing No 5234.20/04 Monitoring Locations. Monitoring points S1 and S2 are upstream of the waste body. Results continue to show that previous low levels of leachate contamination of the Ray River have been virtually eliminated since the capping of the site.

5.3 Leachate Composition

5.3.1 Leachate monitoring is carried out at one monitoring location point on the site as shown on Drawing No 5234.20/04 Monitoring Locations. All parameters are consistent with typical leachate composition ranges (as presented in EPA Manual 'Landfill Operational Practices'), but leachate is stronger in composition yet again when compared results from the previous reporting period. Again this is consistent with the continuing effects of the capping.

5.4 Landfill gas

5.4.1 Landfill gas monitoring is undertaken at three locations as shown on Drawing No 5234.20/102 Monitoring Locations, which are located within the site boundary in waste. Gas monitoring on the mature waste body is indicative of methanogenic gas processes that would be occurring under anaerobic conditions.

6. SUMMARY OF RESULTS AND INTERPRETATIONS OF ENVIRONMENTAL MONITORING.

6.1 Summary of Results

All monitoring data for the period is contained in Appendix A. This data is summarised in Graphs also contained in this Appendix.

6.2 Update of Monitoring Locations

Monitoring locations for the site are as given in Table 6.1. These locations are shown on Drawing No 5234.20/04 Monitoring Locations and grid coordinates for the points are included on this drawing. A post restoration topographical survey was undertaken in July 2006. This was submitted to the Agency under separate cover. There have not been any new monitoring locations installed during this reporting period.

Table 6.1: Monitoring Points

	Monitoring Locations
Landfill Gas	P1, P2, P3
Groundwater	GW1, GW2, GW3
Leachate	L1
Surface Water	SW1, SW2, SW3, SW4

6.3 Interpretation of Environmental Monitoring

6.3.1 Groundwater

Condition 9 and Schedule D of the Licence requires the Licensee to monitor groundwater water quality at various locations on and outside the site on a monthly, quarterly and annual basis for those parameters as listed in Table D3 of the Waste Licence. These results have been compared to EC (Quality of Water Intended For Human Consumption) Regulations, 1988, the European communities (Drinking Water) Regulations, 2000 and the EPA Interim Report, Towards Setting Guidelines Values for the Protection of Groundwater in Ireland.

The majority of the parameters measured are below the recommended limits. Those exceeding the limits are discussed below. Parameters indicative of possible leachate contamination include Ammoniacal-N, Conductivity, Iron, Chloride and heavy metals.

Upstream

Levels of suspended solids, iron, boron phenols & nutirents are slightly raised at GW1 relative to MAC.

Downstream

Monitoring at GW2 and GW3 detected elevated levels of Ammoniacal Nitrogen (max 17.23mg/l - GW3), SS (max 7162mg/l), iron (max 73mg/l), iron (max 5602ug/l), manganese

(max 962ug/l), potassium (max 16mg/l), boron (max 150ug/l), phenols (max 0.1mg/l) and nutrients during the reporting period.

These results generally indicate that leachate was being released from the waste body into the immediate groundwater environment. The downstream wells however are very close to the waste body.

6.3.2 Surface Water

Condition 9 and Schedule D of the licence requires the licensee to monitor surface water at four locations in the vicinity of the site on a quarterly and annual basis for those parameters as listed in Table D3 of the waste licence.

These results have been compared to EC (Quality of Surface Water Intended For The Abstraction of Drinking Water) Regulations, 1989. The majority of the parameters have been below the recommended limits for A1 category surface water. Those exceeding the limits are discussed below.

Upstream

Upstream only nutrient levels are slightly raised.

Downstream

Chemical analysis of samples indicates ammonia levels below MAC in SW3 and SW4 throughout the period. Leachate contamination of surface water appears to have been eliminated. Iron (max 226ug/l) and manganese (51ug/l) slightly over MAC and nutrient levels are slightly raised.

6.3.3 Leachate

Leachate quality can vary during the lifetime of landfill site depending on the phase of decomposition of the waste. Leachate results for the reporting period are presented in Appendix A and some of the characteristic parameters of the leachate are listed in Table 6.2 below.

Table 6.2: Leachate Concentrations

	THE RESERVE AND THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NEVER THE PERSON NAMED IN THE PERSON NAMED I	andfill Site	landfills acco	amples from Ul epting domesti sults in mg/l	
PARAMETER	Min.Conc	Max.Conc	Min.Conc	Max.Conc	Mean
Ammonia (mg/N)	319.6	448	<0.2	1700	491
BOD	5.7	34.7	4.5	>4800	>834
COD	476	1402	<10	33,700	3078
Chloride (mg/l)	289.9	443.86	27	3410	1256
iron (ug/l)	-	3983	0.4	664	54.4
Potassium(ug/l)	-	223.3	2.7	1480	491
TON (mg/l N)		0	1	1	1
Conductivity (mS/cm)	5040	5551	503	19,200	7789
pН	7.14	7.42	6.4	8	7.2

Leachate results have been compared to "Typical Leachate Composition of 30 Samples from UK/Irish Landfills accepting mainly Domestic Waste" (Landfill Operational Practices). All parameters are consistent with typical leachate composition ranges. The data for this period shows leachate concentrations continuing to increase, this being consistent with the on-going effects of the site now being capped.

6.3.4 Landfill Gas

Gas monitoring on the mature waste body is indicative of methanogenic gas processes that would be occurring under anaerobic conditions. Methane concentrations range from 18% to 63.7%. Carbon Dioxide levels range from 6.8% to 33.1%. There are no monitoring locations outside of the waste body.

7. VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE DISCHARGED

- 7.1 Leachate is been tankered on a weekly basis from the collection sump on site. Records show that during this period 338m³ of leachate was removed from the site and tankered to Donegal County Council's Wastewater Treatment Plant in Letterkenny.
- 7.2 A water balance calculation has been produced for this period and is shown in Appendix B. This indicates that the estimated volume of leachate being produced at the site for the reporting period is 2547m³. The water balance calculation is attached in Appendix B.

8. CAPPING AND RESTORATION OF COMPLETED CELLS / PHASES

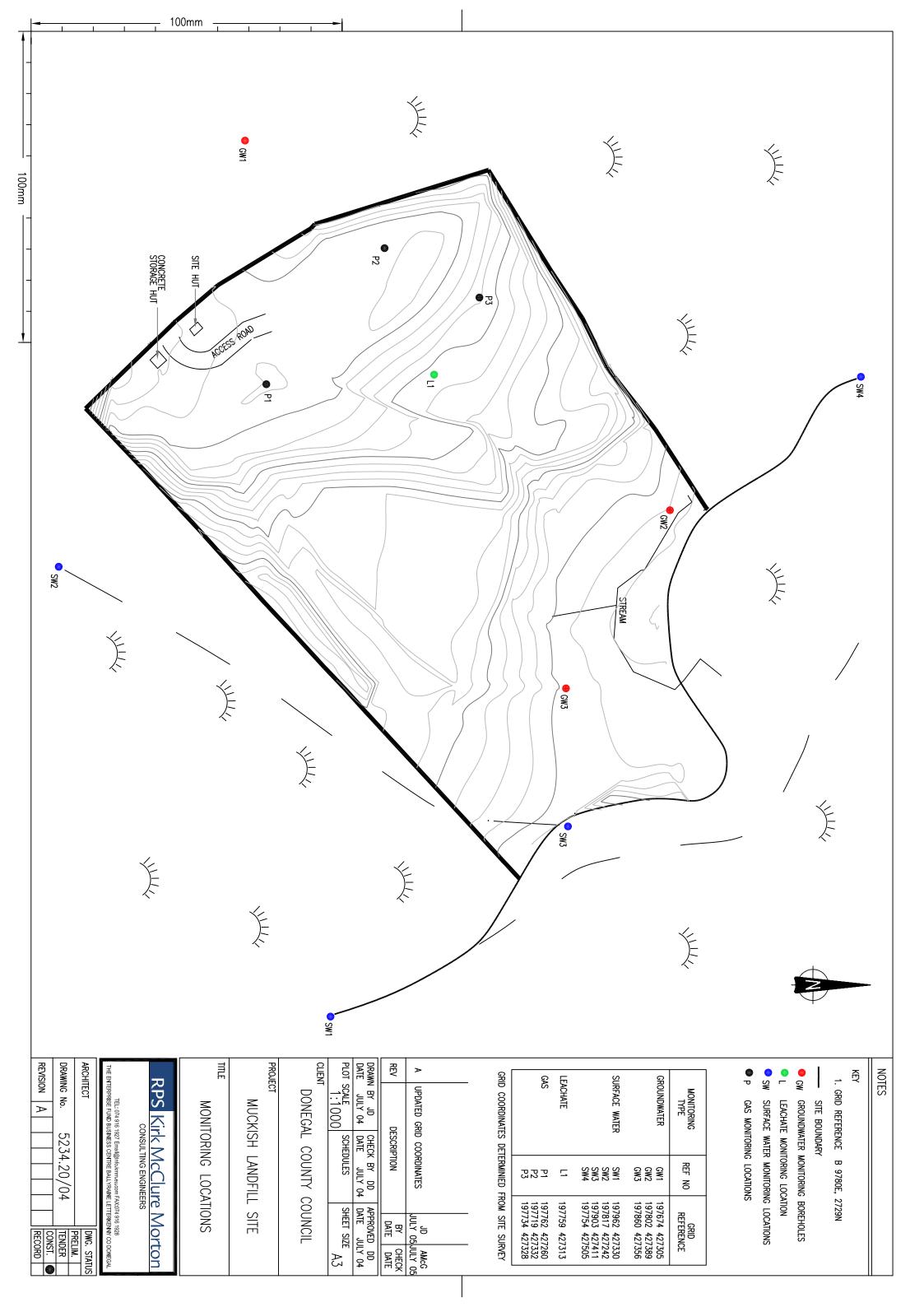
8.1 The site is fully restored.

9. REPORTED INCIDENTS AND COMPLAINTS SUMMARIES

- 9.1 Donegal County Council reports to the EPA emissions exceedances on an on-going basis. In the case of Muckish, there are no perimeter gas wells, but levels of ammonia in excess of 0.2mg/l in either surface water or groundwater monitoring locations are reported as incidents with each bi-annual report.
- 9.2 Other than the on-going exceedance incident reporting described above, no further incidents occurred during this reporting period, and therefore none were reported to the EPA.
- 9.3 No complaints were received during the reporting period.

10. REVIEW OF NUISANCE CONTROLS

10.1 The site is inspected regularly for all types of nuisances (flies, pests, dust, litter and illegal dumping, birds and odours) and where any action is deemed necessary the appropriate steps are taken in accordance with the EMS.



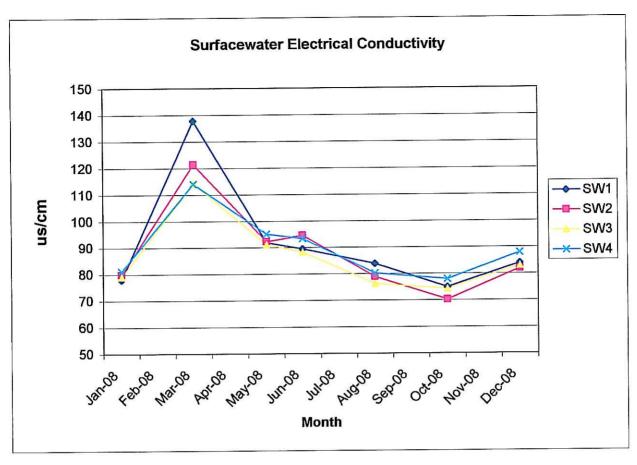
APPENDIX A MONITORING DATA

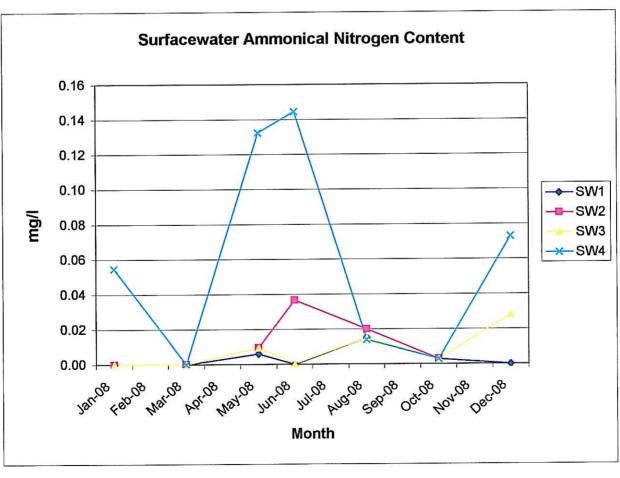
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Sample Type							surfac	surface water					
Site No							S	SW1					
Date of Sample		Jan	Feb	Mar	Apr	May	Jun	Inc	Aug	Sept	Oct	Nov	Dec
Lab No		1300	1	2223	1	3172	3837	****	4998	1	6695	1	7629
		6.73	I	6.49	I	7.34	6.52	***	7.05	ı	7.96	I	6.46
Temp	C	7.81	-	13.30	I	12.49	13.19	-	13.61	1	8.88	1	9.77
Electrical Conductivity	mS/cm	78	1	138	I	92	90	1	84	I	75	ŀ	84
Ammonical Nitrogen	mg/l	0.00	I	0.00	ı	0.01	0.00	1	0.02	1	0.00	I	0.00
COD	mg/l	0	1	0	l	2	0	ı	7	1	22	1	0
BOD	mg/l	1.02	l	1.55	1	0.82	1.96		0.35		1.20	-	0.61
Dissolved Oxygen	mg/l	11.76	1	9.08	1	10.84	10.61	1	10.40	****	11.44		8.87
55	mg/l	0.8	-	0.7	1	4	0.4	ı	4.0	-	9.0	ı	2.4
Residue on Evaporator	l/bm		-	ı	I		1	1	ı	1	ı	ı	ı
Calcium	l/bn		1	-			2983	ı	-	1	1	ı	1
Cadmlum	l/bn		-	I	****	-	<0.4	ı		1	1	1	1
Chromlum	l/bn	1	1	-	1	1	<0.05	ı	1	ı	1	ı	ŀ
Chloride	l/bw	ı	ı	1	1	1	23	ı	17	ı	22	1	ŀ
Chlorine	l/bm	-					1	ı	1	1	ı	ı	ı
Copper	l/bn	1	ı	1	1	1		1		1		ı	
Cyanide	l/bm	1	ı	ı	ı		ı	ı	1		1	1	
Dissolved Iron	l/bn	1	1	1	1		198						1
Lead	l/bn	1	1	i	1	1	Ļ	1	1	1			1
Magnesium	l/bn	1	1	ı		ı	2968	1	1	Î		ı	1
Manganese	l/bn	ı	ı	l	l		۲	ı	ı	1	ı	ı	1
Mercury	l/bn	ı	ı	ı	1	1	<0.05	I	ı	ı	ı	1	ı
Nickel	l/bm	1	l	1	1	I	ŀ	I	1	1	1	ı	1
Potassium	l/bm		-		1	1	ļ	1	1	1	ı	ı	1
Sodium	l/bm	1	1	-	1	-	13	ł	-	1	ı	1	1
Sulphate	l/bm	-	-		1	1	9	-		1	ı	1	ı
Zinc	ug/l			ı	1	-	19	-	-	L	-		
Total Alkalinity as CaCO3	mg/l	-	-	-	I	-	16	I	-	-	ı	1	1
Total Organic Carbon	mg/l	1	1		-		1	-		-			1
Total Oxidised Nitrogen	mg/l	0.15	1	0.17	1	0.28	0.23	-	0.12		0.29	-	0.16
Arsenic	mg/l	I	1	I	1	1	1	1	-	1	1	-	I
Barlum	mg/l	1	1	1	I	1	-	-	-		1	-	I
Boron	ng/l	1	ı	I	1	-	1	1		-	-		-
Flouride	mg/l	I	1	1	1	1	I	1	1	1	ı		I
Total Phenois	l/gm	I	ı	1	-	1	1	I	1	1	ı		1
Phosphorous	Mg/l	1	I	1	1	-	1	-					1
Selenium	l/gm	I	1	Ì	ı	1	1	1	-	-			I
Silver	mg/l	1	1		-		-		-		-		ı
Mircrotox	Toxic Units		-	ı		-	I	-		1	ı	-	1
Microtox	Toxic Units]	1	l	ı	1	ı	-	1	1	I	1	1
Nitrite	I/bm	0.005	1	0.009	1	0.008	0.007	-	0.014	i	0	1	0.00
Nitrate	I/bm	0.1421	I	0.1636		0.2772	0.2275	1	0.100	1	0.280	ı	0.16
Phosphate - ORTHO	l/bm	0.013	1	0.164	1	0.017	00.00	1	0.000	1	0.001	1	0.00
Phosphate - TOTAL	l/bm	1		0.0000		:	00.0	-	1	***	1	1	I
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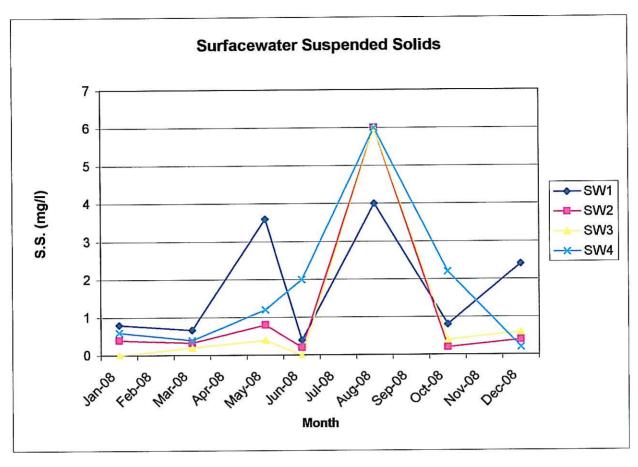
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Miscration Mis	lemp	ט	7.92	1	10.20	I	12.16	13.59	1	13.98	I	8.45	ľ	9.61
Marie 200	Electrical Conductivity	uS/cm	80	1	121	1	92	95	I	79	1	70	1	82
Miles Mile	Ammonical Nitrogen	l/gm	0.00	1	0.00		0.01	0.04	-	0.02	ı	0.00	i	0.01
mgil 0.53	COD	mg/l	20	1	10	ı	26	2	ı	30	1	21	I	2
	BOD	mg/l	0.53		1.04	1	0.28	1.09	1	0.39	-	1.08	1	02'0
magil 0.4 0.3 0.8 0.2 0.6 0.0 0.0 uuyi 0.8 0.2 0.6 0.0 0.0 uuyi 0.6 0.6 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.0 uuyi 0.0 0.0 0.0 0.	Dissolved Oxygen	mg/l	10.72		10.35	1	10.16	9.63	-	9.02		9:38	•	8.42
until	SS	mg/l	0.4	-	0.3	1	0.8	0.2	-	0.9	-	0.2	1	0.4
Unif Color Color	Residue on Evaporator	mg/l		-		1	-	1		-	-	1	1	1
United 1.1.	Calclum	∏gn	1	-		1	1	3186	1	1	-			i
Mail	Cadmlum	ug/l	1			****	ł	<0.4	1	-	-	1	ı	I
mg/l	Chromlum	//Bn	-		-	-		<0.05	!	ı			-	1
mg/l —	Chloride	l/gm					-	23		19		24	ı	1
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mg/l —	Copper	l/bn	ı	1	1	ı	Ī	٧	I	I	1	1	ı	1
ugil <th< td=""><td>Cyanide</td><td>l/bm</td><td>]</td><td>1</td><td>1</td><td>l</td><td>ı</td><td></td><td></td><td>ı</td><td></td><td> </td><td>1</td><td>1</td></th<>	Cyanide	l/bm]	1	1	l	ı			ı			1	1
ug/l	Dissolved Iron	l/bn	1	1	1	ŀ		87.0	1	1	1	ı		
ug/I	Cad San Lead	l/bn	i	1	1		1	1.0	1	ı	1	1		l
Ugil	Magnesium	l/bn	i	1	1	1	I	3425.0	ı			1	1	1
Mail	Manganese	l/bn	ı	1	1	ı	ı	1.0	ı	1	1	1	ı	:
mg/l —	Mercury	l/bn	-	1	1	1	1	<0.05	I	ı	1	1	l	1
mg/l — — — 0.8 — <td>Nickel</td> <td>l/bu</td> <td>1</td> <td></td> <td></td> <td>1</td> <td>ı</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>I</td> <td>1</td>	Nickel	l/bu	1			1	ı	1	1	1	1	1	I	1
mg/l —	Potassium	mg/l	ı	1	1		1	0.8	1	I	1			-
mg/l 9.0 <td>Sodlum</td> <td>mg/l</td> <td>-</td> <td>-</td> <td></td> <td>-</td> <td></td> <td>13.3</td> <td></td> <td>ı</td> <td>1</td> <td></td> <td>1</td> <td>1</td>	Sodlum	mg/l	-	-		-		13.3		ı	1		1	1
ug/l —	Sulphate	mg/l		-	-			9.0	****	-	-			i
mg/l <td>Zinc</td> <td>ug/l</td> <td>-</td> <td></td> <td>-</td> <td>1</td> <td>1</td> <td>16.0</td> <td></td> <td>1</td> <td>-</td> <td>-</td> <td>-</td> <td>ł</td>	Zinc	ug/l	-		-	1	1	16.0		1	-	-	-	ł
mg/l <td>otal Alkalinity as CaCO3</td> <td>mg/l</td> <td>-</td> <td></td> <td></td> <td>-</td> <td></td> <td>10.0</td> <td></td> <td></td> <td>1</td> <td>-</td> <td>-</td> <td>1</td>	otal Alkalinity as CaCO3	mg/l	-			-		10.0			1	-	-	1
mg/l 0.05 0.16 0.12 0.03 0.06 mg/l	Total Organic Carbon	mg/l	1	-	-		-	****						1
mg/l <td>Total Oxidised Nitrogen</td> <td>mg/l</td> <td>0.05</td> <td>*****</td> <td>0.09</td> <td></td> <td>0.16</td> <td>0.12</td> <td></td> <td>0.03</td> <td>ı</td> <td>90.0</td> <td>-</td> <td>0.09</td>	Total Oxidised Nitrogen	mg/l	0.05	*****	0.09		0.16	0.12		0.03	ı	90.0	-	0.09
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ug/l <td>Barlum</td> <td>mg/l</td> <td>1</td> <td>-</td> <td></td> <td></td> <td>ŀ</td> <td></td> <td></td> <td>1</td> <td>I</td> <td>-</td> <td>i</td> <td>i</td>	Barlum	mg/l	1	-			ŀ			1	I	-	i	i
mg/l —	Boron	l/bn		1		1	1		-		1	1	1	1
mg/l —	Flouride	l/bm	1	I	-	-	-	1	-	1	I	I	ı	1
mg/l —	Total Phenois	l/bm	****	*****			1	-		1	1	I	ı	1
mg/l	Phosphorous	l mg/l		***					1	1	1	1	ı	1
mg/l <td>Selenium</td> <td>l/bm</td> <td>1</td> <td>ı</td> <td>****</td> <td>-</td> <td></td> <td>-</td> <td>1</td> <td>1</td> <td>ı</td> <td>1</td> <td>1</td> <td>1</td>	Selenium	l/bm	1	ı	****	-		-	1	1	ı	1	1	1
Toxic Units — <th< td=""><td>Silver</td><td>l/bm</td><td>-</td><td>ı</td><td>-</td><td></td><td>-</td><td>-</td><td> </td><td> </td><td>1</td><td></td><td>1</td><td> :</td></th<>	Silver	l/bm	-	ı	-		-	-			1		1	:
Toxic Units — <th< td=""><td>Mircrotox</td><td>Toxic Units</td><td>1</td><td>ı</td><td>ı</td><td>1</td><td>1</td><td>I</td><td>ı</td><td></td><td>Ī</td><td></td><td></td><td>ı</td></th<>	Mircrotox	Toxic Units	1	ı	ı	1	1	I	ı		Ī			ı
mg/l 0.003 — 0.023 — 0.007 0.006 — 0.018 — 0.005 — D mg/l 0.0451 — 0.0634 — 0.1525 0.1152 — 0.0200 — 0.0500 D mg/l — 0.063 — 0.000 — 0.000 — 0.004 L mg/l — — — — — — — mg/l — — — — — — — — mg/l — — — — — — — mg/l — — — — — — — — mg/l — — — — — — — —	Microtox	Toxic Units	1	1	ı	1	1	1	ı	1	1	1	1	1
mg/l 0.0451 0.0634 0.1525 0.1152 0.0200 0.0500 0.0500 0.0500 0.0500 0.0500 0.004 0.004 0.004 0.004 0.004	Nitrite	l/bm	0.003	1	0.023	1	0.007	900'0	ı	0.018	1	0.005	1	0.008
Date of the control	Nitrate	l/bm	0.0451		0.0634	1	0.1525	0.1152	ı	0.0200	I	0.0500	1	0.0839
	Phosphate - ORTHO	mg/l	0.000	1	0.063	1	0.000	0.000		0		0.004		0.000
	Phosphate - TOTAL	l/gm	-	1	0.0000	1	I	0.0000	-	I	I	ı	1	-
	Total Collforms		1	1	1	I	1	1	1	1				I
	Facel Coliforms	AND DESCRIPTION OF STREET	ı	1			0.000	200	20000000	5000000	20000000	Contract of the Contract of th	The second secon	

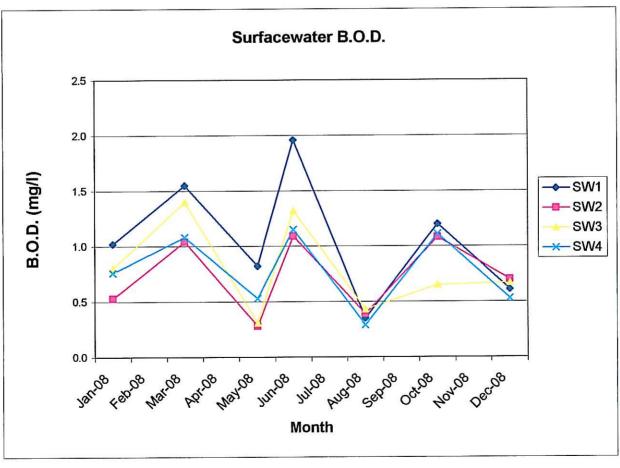
Cocanon						Muck	sh, Falcar	Muckish, Falcarragh, Co Donegal	Jonegal				
Sample Type							surfac	surface water					
Site No							S	SW3					語が経過
Date of Sample		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lab No	TOTAL PROPERTY BETTER	1302	i	2225	ı	3174	3839	1	2000	1	2699	i	7631
The state of the s		6.35	I	6.39	i	6.85	7.02	-	6.49	1	5.87	1	6.23
Temp	ن ا	7.82	1	9.45	I	11.53	13.15	1	13.42	1	9.16		9.38
Electrical Conductivity	ms/cm	6/	1	114	1	91	88	ı	9/	1	74		83
Ammonical Nitrogen	mg/l	0.00	1	0.0		0.01	0.00	1	0.02	!	0.00	1	0.03
מממ	I/BH	CL		٩	1	٥		1	12	1	19	1	-
BOD	mg/i	08.0	1	1.40	ı	0.31	1.32	I	0.43		0.65	1	0.67
Dissolved Oxygen	1/6H	11.65	1	11.47	1	10.70	10.58	1	10.37	ı	10.66	1	9.24
. 88	l/gm	0.0	ı	0.2	1	0.4	0.0	1	9.0	١	0.4	1	9.0
Residue on Evaporator	l/gm	J	-	1	1	1	I	I	I	1	1	I	I
Calcium	/bn	i	1		-	1	2969	1	I	I	1	1	1
Cadmium	l/6n	i	I	1	1	1	<0.4	1	1	I	-	1	1
Chromium	l/6n	I	I	!	1	I	<0.05	I	1	I	-	1	-
Chloride	l/gm	1	ı	ı	1	I	23	1	21	I	21	1	-
Chlorine	l/gm	i	1	1							-		-
Copper	l/bn	1	1	1	1	1	7	1	1				-
Cyanide	mg/l	1	-	-	ı	1	1	1	1	ı	Î	1	ı
Dissolved Iron	ug/l	-		***	-		172.0	1	1	1	1	1	ı
Lead	ug/I	1		-	-	I	1.0		1	1	1	1	1
Magnesium	ug/l	1	ı		i	I	2937.0	-	ı	1	1	1	ı
Manganese	ug/l	-		-	-		2.0	-	1	ı	ı	1	1
Mercury	ug/l	1	-	ŀ	1	-	<0.05	I	1	I	1	1	1
Nickel	mg/l	1	1	1	I	ı	1	1	-	1	-		1
Potassium	l/gm	1	1	*****	I	1	1.1	I	I	1	1	1	
Sodium	mg/l		1	١	1	!	12.6	1	l	-	-		I
Sulphate	l/bm	1		1	1	I	6.0	1	1	-	-		1
Zinc	l/gu	1	1	ı	ı	1	22.0	1	1		Î		-
Total Alkalinity as CaCO3	l/gm	-	1	ı	1	1	12.0	1	1	1			
Total Organic Carbon	l/bm	1	1	ı	1	l	1	1	1	1	1		-
Total Oxidised Nitrogen	mg/l	0.13	ı	0.15	I	0.25	0.26	1	0.12		0.12		0.18
Arsenic	mg/l	I	1	l	I	i	1	1	1		1		****
Barlum	mg/l	I	!	1	-	-	1	1	1	-		-	1
Вогоп	Marie ug/l	1	I	1	i	1	1	ı	I	1			1
Flouride	mg/l	i	1	1	l	ı	1	1	I	I	1		1
Total Phenois	mg/l	I	1	I	1	I	1		-	ı	1	_	1
Phosphorous	mg/l	I	1	1	I	1	1	1	1				-
Selenium	mg/l	1	1		-	1	-	****		-	1	ı	1
Silver	mg/l		1					1			ı	1	ı
Mircrotox	Toxic Units	-	ı	-	1	-	1	1		1	ı		ı
Microtox	Toxic Units	1	1	1	1		1	ı	1	1		1	1
Nitrite	l/gm	0.003	-	2000		0.004	0.008	1	0.018	-	0.004	ı	0.00
Nitrate	l/bm	0.1262	l	0.1385	1	0.2488	0.2492	1	0.100		0.120	-	0.17
Phosphate - ORTHO	/bm	0.000	1	0.139	-	0.000	0.000	i	0	1	0.000	1	0.00
Phosphate - IOIAL	l/gm	ı	:	0.0000	I	I	0.0883	-	-	!	1	ı	ì
Total Coliforms		I	1	1	1	i	-	1		1	I	ı	I
Facel Collforms		1	1	1	i	ı	1	1	1	1	-	1	
Depth	新作品的 E 经可能允许	ı	1	1	J	ı	1	1	1	I	ļ	ı	I

Single by Patrice Sing	Location						Market	machini maningni oo ponegar	and Indian	mann	A COLUMN TO SECURE A COLUMN TO S			
1875 1875	Sample Iype							surfac	e water					
1	Site No							S	W4					
1.00 1.00	Date of Sample		Jan	Feb	Mar	Apr	May	unr	IDC	Aug	Sept	Oct	Nov	Dec
C C C C C C C C C C	Lab No		1303	1	2226	-	3175	3840	I	5001	ı	8699	i	7632
No. C C C C C C C C C C	Hd		6.39	-	6.39	1	6.81	6.62		6.56	1	6.07	-	6.45
USING MINING 0.05 1.14 1.14 1.14 1.15	Temp	ပ	8.03		9.46	1	11.38	12.49	ı	13.42	ı	7.60	I	69.6
mgl/mgl 6.05 — 0.00 — 0.13 0.14 — 0.01 — 0.00 — 0.00 mgl/mgl 6.05 — 1.08 — 0.53 1.14 — 0.29 — 1.11 — 0.00 mgl/mgl 1.06 — 1.08 — 0.53 1.165 — 0.29 — 1.11 — 0.00 mgl/mgl — 1.06 — 1.06 — 1.05 — 1.06 — 0.23 — 1.05 — 0.29 — 1.11 — 0.00 mgl/mgl — 1.06 — 1.06 — 1.06 — 1.06 — 0.00 — 0.00 — 0.00 mgl/mgl — 1.06 — 1.06 — 1.06 — 0.00	Electrical Conductivity	uS/cm	81		114	1	95	93	I	80	I	78	I	88
mg/l 6 — 0 — 13 — 13 — 14	Ammonical Nitrogen	mg/l	0.05	1	0.00	1	0.13	0.14	1	0.01	ı	0.00	1	0.07
Maria 0.76 1.08 0.75 1.15 0.29 1.141 Maria 0.6 1.08 1.075 1.085 1.059 1.169 1.169 Maria 0.6 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 Maria 0.6 0.6 0.7 0.7 0.2 0.2 0.2 0.2 1.0 1.0 Maria 0.6 0.7 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 Maria 0.6 0.7 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 Maria 0.6 0.7 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 Maria 0.6 0.7 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 Maria 0.7 0.7 0.7 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 Maria 0.7 0.7 0.7 0.7 0.2 0.	COD	mg/l	9	1	0		2	11		13	1	26	ı	1
Margil 11.00 11.56 10.75 10.85 10.59 11.69 10.75 10.85 10	BOD	l/bm	92.0	-	1.08	ı	0.53	1.15	I	0.29	1	1.11	ı	0.53
Maria 0.6 0.0 1.1 2. 6.0 6.0 2.2	Dissolved Oxygen	l/bm	11.00	1	11.56	ı	10.75	10.85	1	10.59	ı	11.69	1	9.34
Might	SS	I/bm	9.0		0	1	-	2	1	6.0		2.2	ı	0.2
ugil — — — — 2763 — </td <td>Residue on Evaporator</td> <td>I/bu</td> <td>I</td> <td>1</td> <td>1</td> <td>ı</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>-</td> <td>1</td>	Residue on Evaporator	I/bu	I	1	1	ı	1	1	1	1	1	1	-	1
Unit	Calcium	I/an	1	1	I	****	-	2763	!	!	1	1	1	1
ugil <td>Cadmium</td> <td>l/on</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>ı</td> <td><0.4</td> <td>1</td> <td>1</td> <td>ı</td> <td>ŀ</td> <td>1</td> <td>I</td>	Cadmium	l/on	1	1	1	1	ı	<0.4	1	1	ı	ŀ	1	I
mg/l <td>Chromium</td> <td>100/</td> <td>ı</td> <td> </td> <td> </td> <td> </td> <td></td> <td><0.05</td> <td>l</td> <td>1</td> <td>l</td> <td> </td> <td>l</td> <td>I</td>	Chromium	100/	ı					<0.05	l	1	l		l	I
Mail	Chloride	l/um		l				23	ŀ	23		26	I	l
Ugilia	Chlorine	l/om	ļ		1				l		ı		l	1
mg/l	Copper	// // // // // // // // // // // // //			1	ı		⊽]		l	l	l	I
ugil 226.0 <	Cvanide	ma/l			1	ļ	I	ı	ı		ı	!	ı	ı
Ugil	Dissolved Iron	l/DI1			1	l		226.0	1		l			
ugil <td>Lead</td> <td>l/on</td> <td>ı</td> <td> </td> <td>ı</td> <td>ı</td> <td>!</td> <td>٧</td> <td>ı</td> <td>ı</td> <td>ı</td> <td>ı</td> <td>ı</td> <td>I</td>	Lead	l/on	ı		ı	ı	!	٧	ı	ı	ı	ı	ı	I
ugil 51.0 </td <td>Magnesium</td> <td>l/on</td> <td>l</td> <td>1</td> <td>1</td> <td>l</td> <td></td> <td>3030.0</td> <td>1</td> <td>I</td> <td>I</td> <td>ı</td> <td>1</td> <td>I</td>	Magnesium	l/on	l	1	1	l		3030.0	1	I	I	ı	1	I
Description Columbia Columb	Manganese	l/on	i	1	1	-	1	51.0	1	ı	ı	ı	1	I
mg/l	Mercury	I manufactural	1		ı	-	1	<0.05	1	!	1	1	1	1
mg/l 1.1 <td>Nickel</td> <td>ma/l</td> <td>1</td> <td>-</td> <td>1</td> <td>1</td> <td>1</td> <td>I</td> <td>-</td> <td>ı</td> <td>ŀ</td> <td>i</td> <td>ł</td> <td>I</td>	Nickel	ma/l	1	-	1	1	1	I	-	ı	ŀ	i	ł	I
mg/l 12.9 </td <td>Potassium</td> <td>mg/l</td> <td></td> <td>-</td> <td>-</td> <td></td> <td>1</td> <td>1.1</td> <td>-</td> <td>1</td> <td>ı</td> <td>1</td> <td>1</td> <td>I</td>	Potassium	mg/l		-	-		1	1.1	-	1	ı	1	1	I
mg/l — — — 7.0 — <td>Sodium</td> <td> mg/l</td> <td></td> <td>-</td> <td></td> <td>****</td> <td>-</td> <td>12.9</td> <td>I</td> <td>1</td> <td>1</td> <td></td> <td>1000</td> <td>ı</td>	Sodium	mg/l		-		****	-	12.9	I	1	1		1000	ı
ug/l 18.0 </td <td>Sulphate</td> <td>mg/l</td> <td>-</td> <td></td> <td>-</td> <td></td> <td>1</td> <td>7.0</td> <td>1</td> <td>-</td> <td>1</td> <td></td> <td></td> <td>-</td>	Sulphate	mg/l	-		-		1	7.0	1	-	1			-
mg/l <td>Zinc</td> <td>ug/I</td> <td></td> <td></td> <td>2000</td> <td>-</td> <td></td> <td>18.0</td> <td></td> <td>ı</td> <td>-</td> <td>1</td> <td>***</td> <td></td>	Zinc	ug/I			2000	-		18.0		ı	-	1	***	
mg/l <td>otal Alkalinity as CaCO3</td> <td>mg/l</td> <td>-</td> <td>-</td> <td>1</td> <td>1</td> <td>1</td> <td>12.0</td> <td>-</td> <td>-</td> <td>1</td> <td>-</td> <td></td> <td>***</td>	otal Alkalinity as CaCO3	mg/l	-	-	1	1	1	12.0	-	-	1	-		***
mg/l 0.21 0.15 0.15 0.15 0.15 0.15 0.15 0.15 <t< td=""><td>Total Organic Carbon</td><td>mg/l</td><td>1</td><td></td><td>1</td><td>-</td><td>-</td><td>ı</td><td>-</td><td>1</td><td>-</td><td>1</td><td>-</td><td>-</td></t<>	Total Organic Carbon	mg/l	1		1	-	-	ı	-	1	-	1	-	-
mg/l	Total Oxidised Nitrogen	l/BⅢ	0.21	1	0.19	1	0.25	0.21	-	0.11	1	0.15		0.23
mg/l —	Arsenic	∏/B/II	1	i	1	I	1	1	1	1	1	-	-	
ugil —	Barium	I/bm	l	1	I	I	1	1	1	1	I	1	I	i
mg/l <td>Boron</td> <td>l/bn</td> <td>1</td> <td>1</td> <td>1</td> <td>I</td> <td>1</td> <td>I</td> <td>I</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>I</td>	Boron	l/bn	1	1	1	I	1	I	I	1	1	1	1	I
mg/l —	Flouride	l/Bm	I	1	I	1	1	1	1	1	1	-		ı
mg/l <td>Total Phenois</td> <td>l/gm</td> <td>1</td> <td></td> <td>1</td> <td>l</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>-</td> <td>1</td>	Total Phenois	l/gm	1		1	l	1	1	1	1	1	1	-	1
mg/l <td>Phosphorous</td> <td>l/gm</td> <td>1</td> <td></td> <td>1</td> <td></td> <td>I</td> <td>I</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>() () () () () ()</td> <td></td>	Phosphorous	l/gm	1		1		I	I	1	1	1	1	() () () () () ()	
Toxic Units — <th< td=""><td>Selenlum</td><td>l/gm</td><td>ı</td><td>1</td><td>1</td><td>ı</td><td>1</td><td>1</td><td>1</td><td>1</td><td>ı</td><td>1</td><td>-</td><td>-</td></th<>	Selenlum	l/gm	ı	1	1	ı	1	1	1	1	ı	1	-	-
Toxic Units	Silver	mg/l	I	1		ı		1	ı	1	1	I	-	I
Toxic Units <th< td=""><td>Mircrotox</td><td>Toxic Units</td><td>ı</td><td>1</td><td> </td><td>1</td><td>1</td><td>ı</td><td>1</td><td>ı</td><td>1</td><td>ı</td><td></td><td>1</td></th<>	Mircrotox	Toxic Units	ı	1		1	1	ı	1	ı	1	ı		1
mg/l 0.010 0.004 0.006 0.005 0.006 0.005 0.005 0.005 0.005 0.005 0.005 0.150 0.150 -	Microtox	Toxic Units	1	1	1	1	1	1	1	1		-		-
mg/l 0.1987 — 0.1876 — 0.245 0.204 — 0.100 — 0.150 — mg/l — 0.016 — 0 — 0 — 0.000 — mg/l — — — — — — — — mg/l — — — — — — — — mg/l — — — — — — —	Nitrite	∏gm	0.010	ı	0.004	I	900.0	0.005	1	900'0	1	0.005		0.0
mg/l 0.016 0.188 0 0 0 0 0 000 0 000	Nitrate	l/bm	0.1987	ĺ	0.1876		0.245	0.204	1	0.100	1	0.150	I	0.5
L mg/l 0.00 0.00	Phosphate - ORTHO	I/6m	0.016	1	0.188	1	0	0	1	0	I	0.000	-	0.0
	Phosphate - TOTAL	l/6m	I	1	0.00	1	1	0.00	I	I	l	1	I	I
	Total Coliforms		1	1	1	1		-	-	1	1	1	1	I
	Facel Coliforms		1	1	1	I	I	1	-	i	1	1		The second second





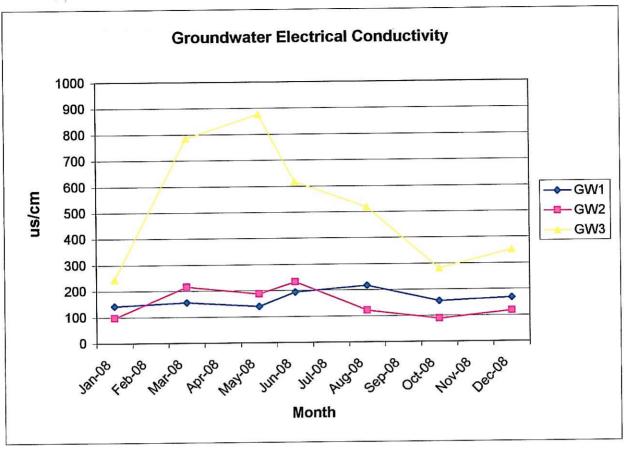


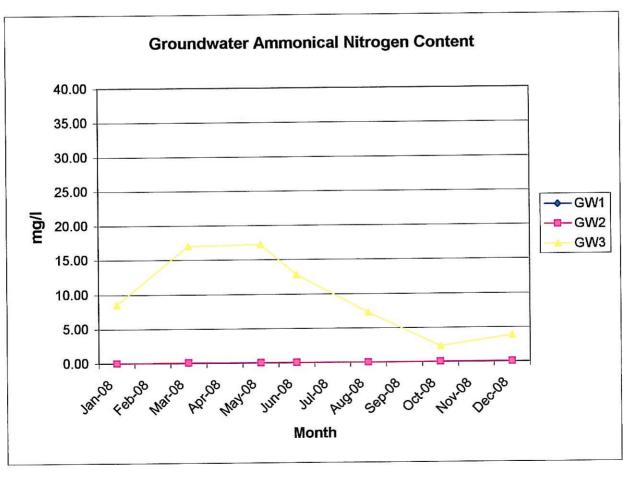


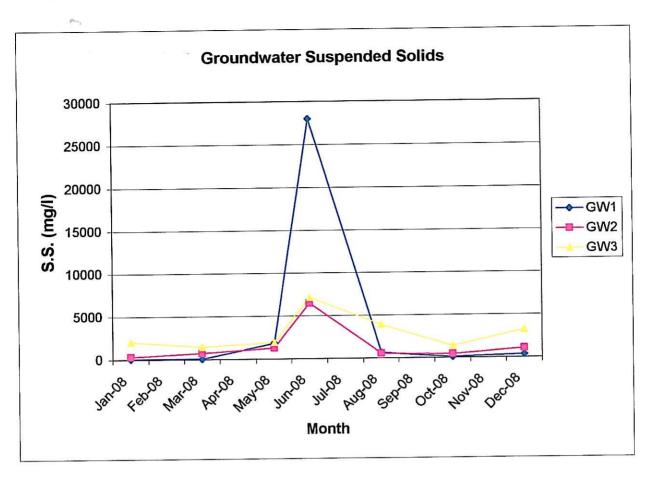
Location													
Sample Type							groun	groundwater					
Site No							5	GW1					
Date of Sample		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lab No		1304	ı	2227	l	3176	3841	1	5002	1	6699		7633
Hd		6.04	1	5.67	*****	6.53	6.33		09.9	1	6.19	-	6.62
Temp Temp	ပ	9.64	1	10.18	1	12.85	11.94	1	13.56	1	8.93	1	11.45
Electrical Conductivity	uS/cm	142	i	156	I	140	194	1	218	1	157	-	168
Ammonical Nitrogen	mg/l	0.07	1	0.00	1	0.01	0.02	ı	0	1	0.01		0.00
COD	mg/l	1	1	1	1	1	l	I	1	I	I	1	1
BOD	mg/l	l	ı	ı	1		1	-	1	1	-		1
Dissolved Oxygen	l/bm	10.29	i	9.21	****	6.38	3.62		8.33		8.23		8.51
SS	l/bm	75	I	09	1	1828	28016	1	678	1	66	1	386
Residue on Evaporator	l/bm	1	ı	1	1	1	7892	1	1	1	ı	-	I
Calcium	l/an	1	1	1	1	1	11780	ı	ı	ı	1	ı	1
Cadmium	l/on	1	1	1	1		<0.4	ı	1	I	ı	1	1
Chromium	l/an	1	ı	I	ı	1	0.130	I	i	I	1		1
Chloride	l/am	ŀ	I	i	ı	1	24		20	1	28	1	1
Chlorine	l/om	1	1	l	ı	1	I	ı	1	ı	!	ı	
Conner	1/211		1		١	L	3.00						
Cvanida	l) Jun				ŀ		<0.05						
Dissolved Iron	1/2/1						326.0				70		
Dissolved II on	/b1.						250.0				2		1
Magneelim	1/211						2166.0						:
Magnesium	1/2:						150.0						
Marginese	l/Bn						20.07						
Merculy	liko u						20.57						
Dotorelina	1/6111	-		I		ľ	1 2 5				1 80		
rotassium	1/611	1	1	1			3.0		!	1	20.0		
mnipos	I/Bm	-	l	İ	ı	1	43.7	1			9.40		
Sulphate	I/BW	1	1	1	1	1	27.0		!	1		1	i
Zinc	ng/l	1	ı	I	I	I	15.0	1	1	1	I	1	1
rotal Alkalinity as CaCO3	l/bm	-	I	I	ı	I	68.0	1	1	I	l	ı	I
Total Organic Carbon	l/gm	:	1	:		-	15	-	I	1	18.0	1	I
Total Oxidised Nitrogen	l/gm	0.17	I	0.18	1	0.80	69.0	1	0.43	1	0.07	1	0.16
Arsenic	mg/l	1	ı	1	1	****	1	ı	1	I	I	I	1
Barium	mg/l	-	I	1	1	Ì	1	I	ı	I	1	ì	1
Boron	l/gu	1	I	I	1	I	29.0	1	1	1	1	1	I
Flouride	mg/l	1	ı	ı	l	1	<0.1	I	1	1	1	1	ı
Total Phenois	l/bm				*****	****	0.02	ı	-	I	<0.01	-	ı
Phosphorous	l/bm				-	1	-	I	-	1		ı	ı
Selenium	l/bm			1	1	***	-	1	1				1
Silver	l/bm			1				-		****	ı	-	1
Mircrotox	Toxic Units	1	-	1	ı	ı	1	1	1		1	1	ı
Microtox	Toxic Units	ı	i	ı	ı	I	ı	l	ı	1	1	l	1
Nitrite	l/bm	0.005		0.010	-	0.007	0.007	-	0.016		0		0.0
Nitrafe	I/bm	0.1626		0.1672		0.795	0.678		0.410	-	090.0	-	0.2
Phosphate - ORTHO	l/bm	0.009	-	0.167	-	0.000	0.000	-	0	-	0.026		0.0
Phosphate - TOTAL	l mg/l	-		0			0.927	-	-		1	*****	
Total Coliforms		-	1	0.0	ı	ı	0	ı	0	ı	0	1	1
Facel Coliforms				0			_				-		
				5	!	!	>	!	>	I	>	1	ŀ

Location					SPECIAL PROPERTY OF THE PERSON NAMED IN COLUMN	Mach	machini, I alcairagii, oo Doilegai		manin	SECTION AND ADDRESS OF THE PERSON.	THE RESERVE AND ASSESSED.		STREET, STREET
Sample Type					The state of the s		groun	groundwater					
Site No							19	GW2					
Date of Sample		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lab No		1305	:	2228	1	3177	3842		5003	ı	6700	ı	7634
THE RESIDENCE HE SECRETARIES		5.85		6.58		5.84	6.33		5.46	-	6.18	1	5.51
Temp	ပ	10.30	1	10.68		11.50	12.40	1	14.68	1	8.16	I	90.6
Electrical Conductivity	mS/cm	26	1	216	1	188	233	1	121	ı	88	1	118
Ammonical Nitrogen	l/bu	00'0		0.08		0.03	0.03	1	0.00	I	0.05	1	90.0
000	l/bw			1	1		-		1	I	1	ı	-
BOD	I/bm	1	l	ı	I	1	-	ı	ı	1	1	-	-
Dissolved Oxygen	I/bm	6.32		6.48	ı	4.12	2.14	1	3.55	-	2.87	-	4.88
SS	ma/I	334	1	730	I	1300	6494	1	566	1	438	ı	1066
Residue on Evaporator	I/om	1	1	ı	1	1	3567	-	Ī	1	1	1	I
Calcium	l/on	ı	1	1	1	1	10390	l	1	ı	ı	1	ı
Cadmin	1/011	I		1	I	1	<0.4	1	!	I	1	-	-
Chromitim	[] []	I	1	ı		1	<0.05	1	1	ı	ı	1	ı
Chloride	l/om		ŀ	I	1	ı	36	1	37	ı	36	I	ı
Chlorine	l/bu				l			1			1	1	I
Conner	1/6/1			I	l	l	5.0	1		1	1	ı	I
Cvanide	ma/l	ŀ		1	ı	ŀ	<0.05	1	l		I	1	1
Dissolved Iron	1/0/1	I	l	ı	ŀ	ı	5602.0	1		I	459	l	1
Lead	l/DI	ı	1	1		I	3.0		1	1	1	I	I
Magnesium	l/bn	ı	ı	I	1	1	7389.0	1	1	ı	-	-	i
Manganese	l/an	I		1	1	1	116.0	1	ı	1	1		
Mercury	l/bn	l	1	1	1	1	<0.05		-	1	-	-	-
Nickel	l/bm	ı				1		*****		1		1	I
Potassium	mg/l	1		1	-	1	5.0	1		1	1.60	1	1
Sodium	I/bu				ı	ı	23.8	1	1	1	11.00	I	I
Sulphate	mg/l	1	1	1	1	1	65.0	1	1	1	I	-	1
Zinc	l/bn	-				1	40.0	1	1	ı	1	ı	I
Total Alkalinity as CaCO3	mg/l	1	1	1	1	1	20.0	ı	1	1	1		I
Total Organic Carbon	mg/l	1	l	l	1	ı	27.0	I	1	i	16.0	l	I
Total Oxidised Nitrogen	mg/l	00.00	1	0.07	1	0.00	0.4	I	0.00	:	0.00	I	0.00
Arsenic	mg/l	-	-	1	ı	1	1	I		I	1	ŀ	I
Barlum	/bm	-	-	ı	1	I	1	I	1	1	ı	ı	1
Boron	l/gn	-	1	-	1	1	146.0	1	1	1	ı	1	1
Flouride	mg/l	I	1		-	I	<0.1	1	ı	I	I	1	1
Total Phenois	less l/bus	-		1	1	1	0.1	1	1	1	<0.01	ı	ĺ
Phosphorous	/bm	-		-	-	1	1	I	1	1	ı	I	1
Selenium	I/6m	-	-		-	I	1	1	1	1	1	ı	i
Silver		1	1	1	ì	1	1		1	1		ı	1
Mircrotox	Toxic Units	1	1	1	1	ı	-	1	1	i	ı	I	1
Microtox	Toxic Units	I	1	1	1	I	1	-	ı	-	l	-	ı
Nitrite	mg/l	0.000	1	0.000	-	0.000	0.000	i	0	I	0	I	0.00
Nitrate	mg/l	0.0000	I	0.0660	Î	0.000	0.413	-	0	1	0.000	-	0.00
Phosphate - ORTHO	l/gm	0.040		0.066		0.029	0.062	1	0	I	0.050	I	90.0
Phosphate - TOTAL	l Mg/l	1		0	-	I	0.3638	I	I	1	1	1	l
Total Coliforms		1	ı	0	1	ı	0.0	I	1	1	0	I	1
Facel Coliforms		1		0		1	0.0	****	1		0	I	-

Location			STATES OF STREET		THE RESIDENCE AND ADDRESS OF THE PARTY OF TH	Annual Contract Contr	The second secon	Andreas Committee and Market and American State of Management State of Stat					
Sample Type							groundwater	iwater					
Site No							S)	GW3					
Date of Sample		Jan	Feb	Mar	Apr	May	unr	Jul	Aug	Sept	Oct	Nov	Dec
Lab No		1306	1	2229	1	3178	3843	1	5004	1	6701	1	7635
		6.83	ı	7.05	I	6.54	6.15	1	6.81	ı	6.22	1	6.70
Temp	Comments of the last of the la	8.34	1	10.32		11.99	11.86]	14.44	1	8.14	I	9.10
Electrical Conductivity	m2/sn	244		785	1	877	618	ı	518	1	281	1	323
Ammonical Nitrogen		8.51	-	17.03	1	17.23	12.84		7.26	I	2.35	ı	3.89
COD	mg/l	-	1	I	I	1	١		-	1	ı	1	1
GOB	l/bw	-	****				1	1	l	i	1	1	ı
Dissolved Oxygen	l/bm	4.60		4.65	1	2.83	1.11	1	2.53	1	3.54	l	3.28
SS	l/bm	2042	-	1450	-	1930	7162	1	3924	I	1400	1	3252
Residue on Evaporator	l/bm	1	ı				2899	-	1	1	I	-	1
Calcium	l/bn	ı	1	1			48460	-	I	1	i	1	1
Cadmium	I/an	I	1	I	-	-	<0.4			1	I	ı	I
Chromium	I/bn	I	ı	1		-	<0.05	-	1	1	1	1	1
Chloride	ma/l	-		I	1	I	73	-	43	1	43		1
Chlorine	ma/l	1	ı	ı	1	-	-		1	1	1	I	1
Copper	I/an	ı					3.0	1		1		-	1
Cvanide	ma/l/m			ı		1	<0.05	-		1	1	-	l
Dissolved Iron	I/an	-		1		1	5533.0	l	1	-	526.00		1
Lead	l/an	Ĩ	1	1			2.0			1	I	1	1
Magnesium	I/bn		ı	1	-	****	19660.0	-	1	1	I	1	1
Manganese	l/bn	1	1	1	-	1	962.0		1	ı	1	1	1
Mercury	l/bn	1				1	<0.05	-	1	1	1		-
Nickel	l/bm	1		-	1	1	-	1	1	l	I	-	1
Potassium	I/bu			ı	1	1	16.0		1	1	9.20	1	i
Sodium	l/gm	ı	-	-	I	1	48.0	1	ı	1	21.90		1
Sulphate	mg/l	ı	1	ı	1	!	63.0				١	1	1
Zinc	lan lag/	-		ł	ı	1	18.0		1		1	ı	1
Total Alkalinity as CaCO3	l/bm	1	1	1	ı	1	184.0		ı	I			1
Total Organic Carbon	mg/l	1	1	l	1	1	19.0	-		1	9.0	1	1
Total Oxidised Nitrogen	mg/l	0.34	1	0.75	1	4.28	0.14		0.00	I	0.01	I	0
Arsenic	l/bm	I	I	1	I	1		1	1	1	1	1	1
Barium	l/bm	****	I	1	1	I	l	1	1	1	I	1	1
Boron	l/gn	-	1	l	1	1	150	I	1	1	1	1	1
Flouride	l/bm mg/l	ŀ	Ì	1	I	1	0.1	1	I	1	ı	Î	:
Total Phenois	mg/l		1	1	1	I	0.04	I			<0.01	1	i
Phosphorous	mg/l	1	l	1	1	1	i	ı	١	ı		1	1
Selenium	mg/l			1	1	ı	l	-	1			1	:
Silver	l/gm			1	1	I	ı	1	-		1	-	i
Mircrotox	Toxic Units	-	1	1	ı	1	ı	-	1	-	1	-	1
Microtox	Toxic Units		2	1	1	1	I	1	!	l	1	-	1
Nitrite	l/bm	0.00		0.00	1	0.003	0.000	1	0.00	1	0		0.00
Nitrate	l/bm	0.3400		0.7500	1	4.275	0.135	1	0.00	I	0.010	-	0.13
Phosphate - ORTHO	mg/l	0.040		0.750	-	0.070	0.062	1	0.040	I	5.000	-	90.0
Phosphate - TOTAL	# mg/l	-		0	1	1	0.2698	1	i	1	1		1
Total Coliforms		1	1	0	1		0	-			0	1	i
Facel Coliforms	The second secon	1	1	_	i	1	_	I	_	-	_	-	1
	The state of the s			,			,				ì	100000000000000000000000000000000000000	





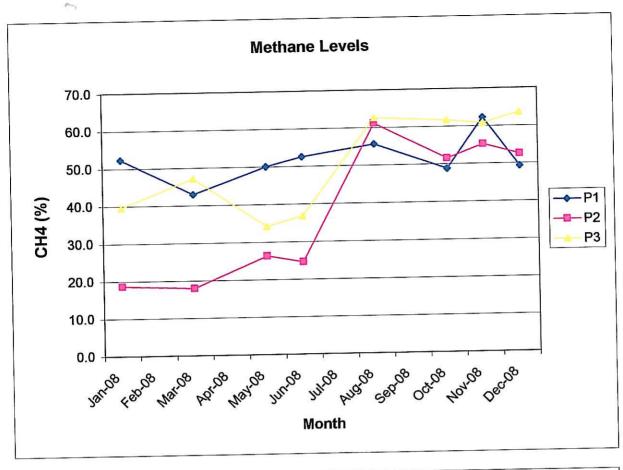


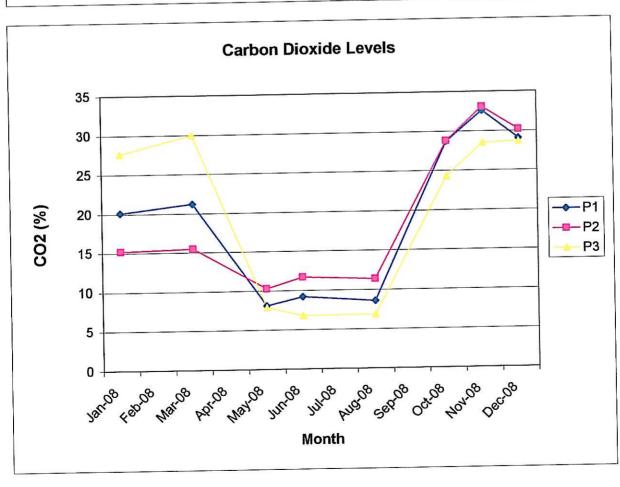
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			VoV	1		l	1	1	I		-		-	-	I	1		1	1	ı	I	I	1	1	-	1	•	I	I	1	ı	1		1	ı	1	ı		-	1	I	1	1	1	I	I	!	I
			Oct	6702	7.42	9.21	5040	371.00	1402	34.7	0.91	638			-		290	-	1	1	1	-	I	1	1	1	1	1	ı	1	1	100	2: 1		ı		1			1	-	-	0.0	0.0	0.230	1	-	i
		THE REAL	Sept	-		****	ı		1	ı	1	1		1	-	-	1		ı	1	1	-	1	1	1	I	ı	1	1	1		1			1	-	1	ı	-	1	1	1	ı		I	I	1	1
negal			Aug	5005	7.30	14.46	5420	357.00	870	24.75	2.62	998	-			1	357	-	1	I	I	1	1	I	1	!	1	ı		1	ı	1 6	2.1]	;	ı	ı		1		1	0.0	0.0	0.220	1	1	1
igh, Co Da	late		Jul	1			I	ı	-	1	1		1	-		1	1		ı	ı	ı	ı	I	1	1	1	ı	١	1	1		ı			I	1	ı	1		ı	-	1	****		1	-	1	-
Muckish, Falcarragh, Co Donegal	leachate	IΠ	nnp	3844	7.17	14.26	5320	398.00	542	30.80	0.76	1738	1	96200	<0.4	<0.05	444	-	4.00	<0.05	3983	7	116700	474	<0.05	ı	223.3	367.5	88.0	44.0	2100.0	1 6	0.0		1792 0	0.4		1	****	1		l	0.0	0.0	0.062	1.3358	ı	-
Muckis			May	3179	7.28	13.46	5150	346.11	863	5.70	1.64	1704	ı				-			1	1	1		1	1	I	ı	1	ı	1	1	1 6	0.0		I	ı	1		-			I	0.0	0.0	1.190	I	I	
	Apr	ı	-	1	1	ı	l	ı	ı	1	ı		****	I	-		1	I	I	1	I	1	1	I	1	1	-	1	1	1			ı	1	1	ı	1	-	-	I	1	ı	l	-	1	1		
	Mar	2230	7.23	10.01	5170	319.60	637	24.0	2.40	1365	1	ı	-	*****	ı	1	1	1	-	1	1	ı	1	ı	1		1		ı	1 2	0.00			1	ı	1	-	I	-	ı	0.00	0.56	0.560	0.0	1	-		
	Feb		1	ı	1	1	-	ı	1	ı	1	ı	1		-	1	-	-	-		1	1		1	-		ı			ı	ı			1	ı	1	ı		-	-	1	l	1	1	1	8500000		
			Jan	1307	7.14	10.12	5460	448.00	476	24.00	3.60	1256	1	1			1	-	-				1	1	-	1	1	-	I	1		100	0.00			ı	1	1	1	-	-		0.00	0.00	0.050	1	1	-
				STREET, STREET		C	uS/cm	mg/l	l/bm	ma/l	l/am	l/bm	l/bm	l/bn	l/bn	l/bn	l/bm	l/bm	l/gn		l/bn	l/bn	l/bn	l/bn	ng/l	l/gm	l/bm	//gm	l/gm	l/6n	l/bm	l/gm	I/BIII	100	1/611	ma/l	ma/l	l/bm	l/bm	I/bm	Toxic Units	Toxic Units	l/6m	mg/l	mg/i	l/gm		WITH COLUMN TO SERVICE STATE OF THE PERSON STA
Location	Sample Type	Site No	Date of Sample	Lab No	日 日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日	Temp	Electrical Conductivity	Ammonical Nitrogen	COD	800	Dissolved Oxygen	SS	Residue on Evaporator	Calcium	Cadmium	Chromium	Chloride	Chlorine	Copper	Cyanide	Dissolved Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Sodlum	Sulphate	Zinc	Total Alkalinity as CaCO3	Total Organic Carbon	I otal Oxidised Nitrogen	Alsellic	Boron	Flouride	Total Phenois	Phosphorous	Selenium		X		Nitrite	Nitrate	Phosphate - ORTHO	Phosphate - IOIAL	Total Coliforms	Facel Coliforms

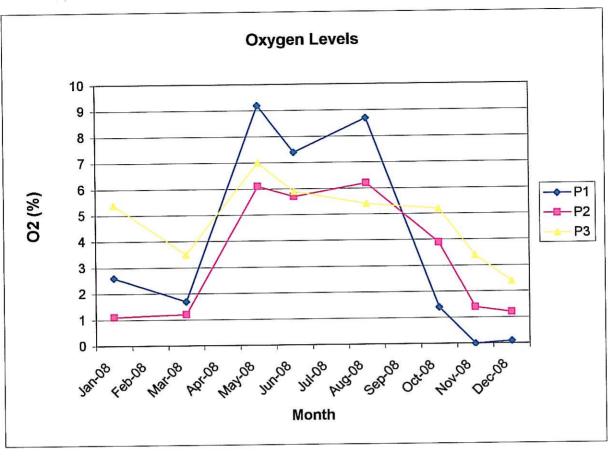
Location						Muckish	Muckish Landfill, Muckish, Co Donegal	kish, Co L	Jonegal				计时间
Sample Type							Landfill Gas levels	levels					
Site No							P1						
Date of Sample													
Parameters	Units	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
		30-Jan-08	1	27-Mar-08	1	21-May-08 24-Jun-08	24-Jun-08		07-Aug-08		07-Oct-08	07-Oct-08 05-Nov-08	10-Dec-08
Methane	%	52.3	!	43.0	1	50.1	52.6		22.7	-	48.8	62.3	49.3
Carbon Dioxide	%	20.1	1	21.2	1	8.1	9.2		8.6	****	28.7	32.6	29.1
Oxygen	%	2.6	1	1.7	1	9.2	7.4		8.7	1	1.4	0.0	0.1
Atmos. Pressure	mBar	1006	1	866	1	686	986	-	666		1010	1002	866

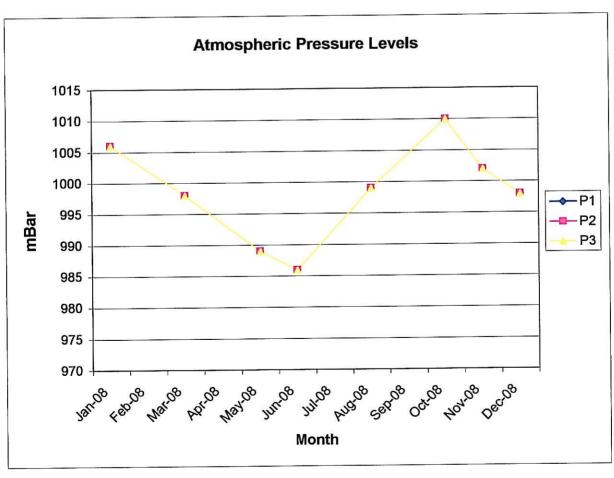
				The state of the s		MARIOLIC	Mr. nelich I and Wil Mirelish Co Donegal	rick CoD	oneda/				
l ocafion						MUSTIN							
	THE PROPERTY AND PERSONS			Management of the second secon	STREET, STREET		I andfill Gas levels	s levels					THE REAL PROPERTY AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO PERSONS ASSESSED.
Samula Tyna						THE PERSON NAMED IN	Prince Despendent transfer of the second	AND DESCRIPTION OF PERSONS ASSESSED.			THE REAL PROPERTY AND PERSONS IN		新聞 株式 株式 株式 株式 株式 株式 株式 株
adf. admin	The state of the s			THE REAL PROPERTY AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO PERSONS AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO PERSON NAMED			P2						
Site No										TOTAL STREET,	THE PERSON NAMED IN		
THE REAL PROPERTY AND PERSONS ASSESSED.	AND RESIDENCE OF THE PARTY OF T	S CONTRACTOR OF THE PERSON NAMED IN COLUMN NAM	The second secon									TOTAL PROPERTY AND PROPERTY OF	SHAME THE PROPERTY OF THE PARTY
Date of Sample	6			The American	Charles of the Party of the Par				-	0,00	Date	Date	Date
	ш		1	Doto	Date	Date	Date	Date	Date	Date	חמום	2000	
Parameters	Units	Date	Date	Dale	Date	2			80 21.7 20		07-Oct-08	05-Nov-08 10-Dec-08	10-Dec-08
		30 Jan 08	ì	27-Mar-08	l	21-May-08	21-May-08 24-Jun-08		on-Snw-10				0 0
· · · · · · · · · · · · · · · · · · ·		30-0all-00				. 00	1770		610	1	51.6	22.5	97.0
	/0	197		180	l	26.4	7.47		2.10				000
Methane	P.	1.0.		200		199	777		117	1	28.8	33.1	30.7
Orivoid and	%	15.2	ļ	15.5	l	10.3	7:1	!	-			7 7	7.0
Carpoil Dioxide	The same of the same	110				4	7 2	;	6.2	1	y. 2.	4.1	7:1
Охупеп	%	Ξ	i	1.2			5		000		4040	1002	866
	1	ľ		800	1	686	986	!	666		200	1002	222
Atmos. Pressure	mbar	1000	-	200		A CONTRACTOR OF THE PROPERTY O							
STATE AND PROPERTY OF THE PROP													

Location			SPECIAL PROPERTY.			Muckie	Muckish Landfill, Muckish, Co Donegal	ckish, Co De	onegal				
Sample Type							Landfill Gas levels	s levels					
Site No							P3						
Date of Sample	a			S TO THE SECOND SECOND									
Doromotere	Ilnite	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
רמומוותנפוט	2	30 Jan-08	1	27-Mar-08		21-May-08 24-Jun-08	24-Jun-08	l	07-Aug-08	1	07-Oct-08	07-Oct-08 05-Nov-08 10-Dec-08	10-Dec-08
Mothons	8	30 6		47.2	1	34.2	36.9		62.7	I	61.7	6.09	63.7
Carbon Diovido	8 %	27.6		30.0	1	7.9	6.8	ı	6.9	l	24.3	28.5	28.7
Oxygen	%	5.4	1	3.5	1	7.0	5.9	1	5.4		5.2	3.4	2.4
Atmos. Pressure	mBar	1006	-	866		986	986		666		1010	1002	966









APPENDIX B WATER BALANCE CALCULATION

	produced (Lo(m3)	2547	2547
		2547	
	Restored Restored are area infliration RCA(m3)	2547	
		20,500	
	Temp Restored infiltration IRCA(m3)		
		۰	
	Active Area Liquid Wests Tump Infiltration Restored R(A)(m ²) LW(m ²) Area	0	
	Author Area inflibration R(A)(m²)	0	
	Rainfail	1242.0	1247
z	Wash Sput Smooth	0	
LCULATIO	A See	٥	
ALANCE CAL	Status Status	Closed	
MUCKISH WATER BALANCE CALCULATION	YEAR	2008	1

Assumptions			
IRCA=	Fully Capped/Restored area infiltration of rainfall estimated (2-10%),EPA Manual	10%	*
Restored area	Area capped is 20,500.	20,500	H ₂
Rainfall Data	Data taken from Met Eireann Station Maiin Head, Total Rainfall used.	1242.6	E

APPENDIX C E-PRTR Regulations (AER Electronic Reporting System)

At the time of reporting passwords for 2009 for the EPA's web-based database have not been issued. A hard copy of the return will be forwarded to the Agency under separate cover when passwords are issued.