Comhairle Contae Dhún na nGall
Donegal County Council

ANNUAL ENVIRONMENTAL REPORT

For

Muckish Landfill Site

(Waste Licence Reference W0126-1)

By
Donegal County Council
For
Environmental Protection Agency

Reporting Period: January 2013 to December 2013

May 2014

TABLE OF CONTENTS

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 material 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, 2012 to 31st December 2013.

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 material shall be accepted for the purposes of remediation, rehabilitation, enhancement and restoration of the facility. The maximum amount 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 material; (for use in restoration works) was accepted onto the site during 2004. The balance of restoration materials were imported during 2005 as shown in the table. No material has been imported since this time.

Table 1: Waste Quantities Accepted (tonnes)

Waste Type	1998	1999	2000	2001	2002	2003	2004	2005
Domestic Refuse*	4418	5639	7008	5729	0	0	0	0
Inert Waste	0	0	0	0	0	0	2,500	34,667
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
All mterial	0	0	0	0	0	0	0	0

*Figures based on estimates

5. SUMMARY REPORT ON EMISSIONS

5.1 Summary of Results

All monitoring data for the period is contained in Appendix A.

5.2 Update of Monitoring Locations

Monitoring locations for the site are as given in Table 5.1. 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 5.1: Monitoring Points

	Monitoring Locations
Landfill Gas	P1, P2, P3
Groundwater	GW1, GW2, GW3
Leachate	L1 (now inaccessible and replaced with collection sump)
Surface Water	SW1, SW2, SW3, SW4

5.3 Groundwater

5.3.1 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 BL523421/406 Monitoring Locations. These groundwater monitoring boreholes were installed at the landfill early in 2000 as per licence requirements. Monitoring location GW1 is representative of water quality up-gradient conditions and monitoring locations GW2 and GW3 are immediately down-gradient of the waste body.

5.3.2 Groundwater results show that levels of parameters indicative of groundwater contamination with leachate, such as ammonia and electrical conductivity, are similar than those detected in the last reporting period. GW1 is clear and wells GW2 & GW3 show low levels of contamination. Levels in GW2 are at MAC or below for ammonia. In GW3 ammonia is present (max. ammonia = 4.04mg/l), however it should be noted that both wells are situated immediately downstream of the unlined 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 north-eastern boundary of the landfill. Surface water monitoring is carried out at four monitoring locations as shown on Drawing no 5234.20/04 Monitoring Locations. Monitoring points SW1 and SW2 are upstream of the waste body. Results continue to show that previous low levels of leachate

contamination of the Ray River have been eliminated since the capping of the site. All samples tested contained ammonia levels below MAC.

5.3 Leachate Composition

5.3.1 Leachate monitoring was previously carried out at one monitoring location on the site (L1) as shown on drawing No BL523421/406 Monitoring Locations. This well became inaccessible at during 2011 and leachate is now sampled from the leachate collection sump. Results show all parameters are consistent with typical leachate composition ranges (as presented in EPA Manual 'Landfill Operational Practices'). The range in ammonia levels detected in the leachate is consistent with the previous period. The leachate is generally weak.

5.4 Landfill gas

5.4.1 Landfill gas monitoring is undertaken at three locations P1, P2 & P3 (as shown on drawing no 5234.20/04 Monitoring Locations), all of which are within the site boundary in waste. Reasonable levels of gas are being produced from each well with methane levels ranging from 49% - 59.7%. Carbon dioxide levels range from 20.5% - 32.6%. These results are consistent with levels detected in previous periods.

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 2786.1m^3 of leachate was removed from the site and tankered to Donegal County Council's Wastewater Treatment Plant in Letterkenny. Table 7.1 below shows the monthly breakdown of tankering volumes relative to rainfall data.

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 2344m^3. The water balance calculation is attached in Appendix B.

Table 7.1 Breakdown of leachate volumes by month in 2013 relative to rainfall at Malin Head

Month	Leachate Volume (m^3)	Rainfall at Main Head (mm)
January	267.04	140.9
February	182.95	74.1
March	242.33	61.7
April	268.27	61.6
May	249.15	102.5
June	212.86	85.5
July	220.96	56.5
August	266,70	92.6
September	267.46	69.7
October	158.16	103.8
November	264.96	116
December	185.26	178.6
Totals	**2786.1m^3**	**1143.5mm**

8. CAPPING AND RESTORATION OF COMPLETED CELLS / PHASES

8.1 The site is fully restored.

9. REPORTED INCIDENTS AND COMPLAINTS SUMMARIES

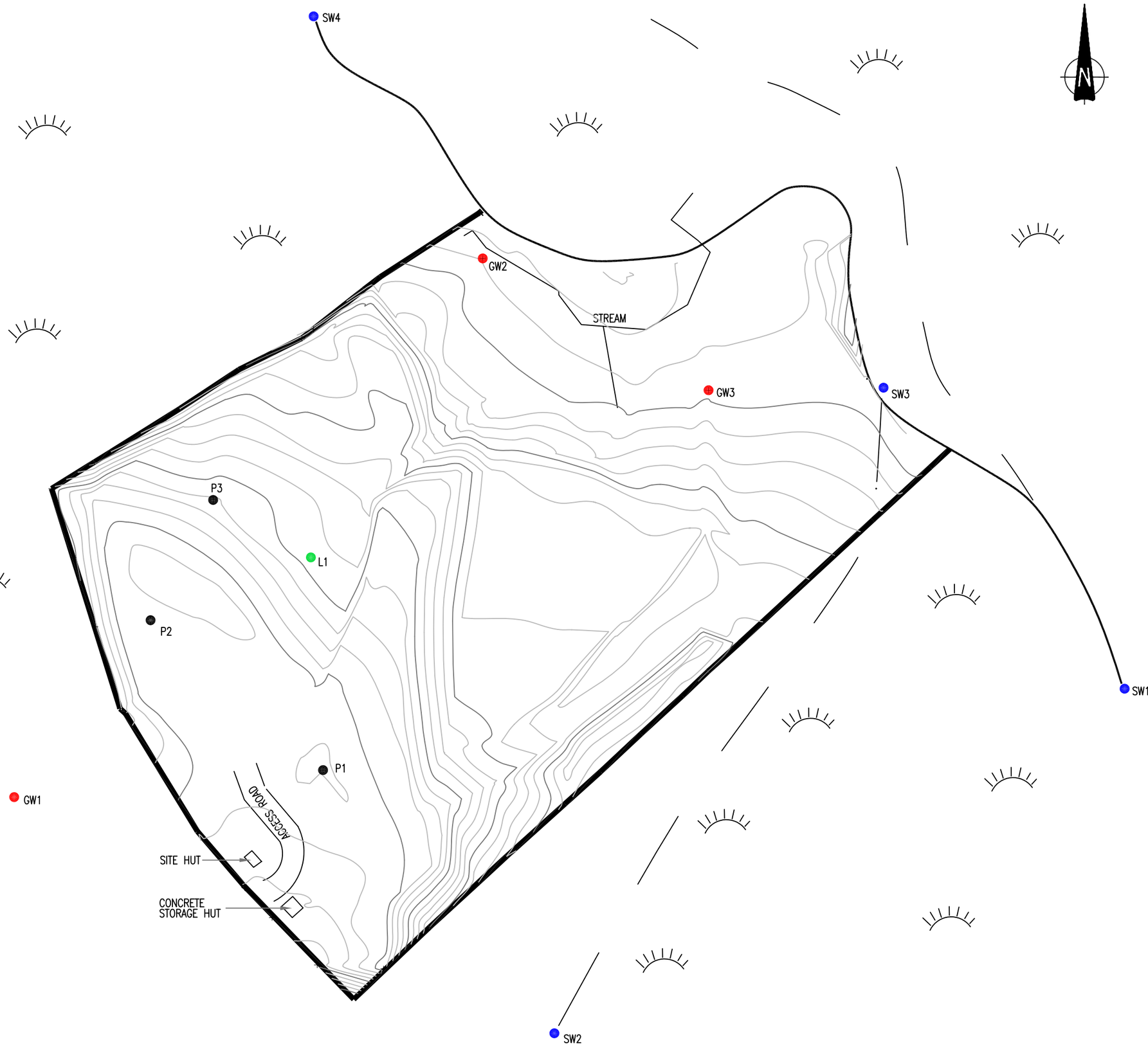
9.1 Donegal County Council reports to the EPA emissions exceedances on an on-going basis. In the case of Muckish, there are no perimeter gas wells, but levels of ammonia in excess of 0.2mg/l in either surface water or groundwater monitoring locations are reported in each bi-annual report.

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.



NOTES

KEY

1. GRID REFERENCE B 9780E, 2729N

- SITE BOUNDARY
- GW GROUNDWATER MONITORING BOREHOLES
- L LEACHATE MONITORING LOCATION
- SW SURFACE WATER MONITORING LOCATIONS
- P GAS MONITORING LOCATIONS

MONITORING TYPE	REF NO	GRID REFERENCE
GROUNDWATER	GW1	197674 427305
	GW2	197802 427389
	GW3	197860 427356
SURFACE WATER	SW1	197962 427330
	SW2	197817 427242
	SW3	197903 427411
	SW4	197754 427505
LEACHATE	L1	197759 427313
GAS	P1	197762 427260
	P2	197719 427332
	P3	197734 427328

GRID COORDINATES DETERMINIED FROM SITE SURVEY

REV	DESCRIPTION	BY DATE	CHECK DATE
A	UPDATED GRID COORDINATES	JD JULY 05	AMcG JULY 05

DRAWN BY JD DATE JULY 04	CHECK BY DD DATE JULY 04	APPROVED DD DATE JULY 04
PLOT SCALE 1:1000	SCHEDULES	SHEET SIZE A3

CLIENT
DONEGAL COUNTY COUNCIL

PROJECT
MUCKISH LANDFILL SITE

TITLE
MONITORING LOCATIONS

RPS Kirk McClure Morton
CONSULTING ENGINEERS
TEL: 074 916 1927 Email@Info.kmm.eu.com FAX:074 916 1928
THE ENTERPRISE FUND BUSINESS CENTRE BALLYRAINE LETTERKENNY CO DONEGAL

ARCHITECT	
DRAWING No.	5234.20/04
REVISION	A

DWG. STATUS	
PRELIM.	
TENDER	
CONST.	●
RECORD	

100mm

100mm

APPENDIX A
MONITORING DATA

Station Name	Sample Date	Ammonia (as N)	BOD	COD	Chloride	Conduct'y @ 20℃	DO (Measure't)	pH	SS	Temp
Muckish SW 1	26/02/2013	<0.040	0.02	8	24	60	12.83	6.96	0.8	5.8
Muckish SW 2	26/02/2013	<0.040	0.02	4	25	65	12.22	6.26	0.6	6.4
Muckish SW 3	26/02/2013	<0.040	0	10	25	63	12.77	6.53	0.6	6.1
Muckish SW 4	26/02/2013	0.158	0.18	18	25	66	12.75	6.6	0.6	6
Muckish SW 1	06/12/2013	0.014	0.05	20	20	71	12.51	6.63	0.6	6.6
Muckish SW 2	06/12/2013	0.023	0.01	26	20	76	11.48	5.85	0.6	6.6
Muckish SW 3	06/12/2013	0.027	0.02	23	23	73	12.23	6.69	0.8	6.7
Muckish SW 4	06/12/2013	0.06	0.73	24	32	76	12.34	6.71	1	6.7

Station Name	Sample Date	Ammonia (as N)	Chloride	Conduct'y @ 20℃	DO (Measure't)	Iron	pH	Phenols	Potassium	Sodium	Temp	Total Coliforms	TOC	TON	Faecal Coliforms (E. coli)
Muckish GW 1	26/02/2013	<0.040	29	139	5.74	0.0373	6.52	<0.016	<2.34	14.2	8.4	NT	9.28	0.168	NT
Muckish GW 2	26/02/2013	0.206	38	102	6.36	0.396	5.65	<0.016	2.83	13.4	6.8	NT	9.84	0.11	NT
Muckish GW 3	26/02/2013	3.99	38	352	2.71	0.432	6.68	<0.016	6.28	20	5	NT	7.23	0.11	NT
Muckish GW 1	06/12/2013	0.025	20	92	8	0.0301	6.69	<0.025	1.29	8.78	8.9	NT	8	0.709	NT
Muckish GW 2	06/12/2013	0	45	316	2.36	0.308	6.76	<0.025	2.81	20	7.4	NT	18	0.16	NT
Muckish GW 3	06/12/2013	4.04	46	113	4.51	0.0327	5.57	<0.025	8.51	21.5	7.1	NT	8	0.12	NT

Station Name	Sample Date	Ammonia (as N)	BOD	COD	Chloride	Conductivity @ 20℃	pH	Temp	TON
Leachate Holding Lagoon	26/02/2013	97.5	5.48	100	104	1270	6.77	5.5	0.224
Muckish Biannual Leachate	06/12/2013	0.85	1.04	94	105	237	6.67	7.8	0.05

Station Name	Sample Date	Atmospheric Pressure	Carbon Dioxide	Methane	Oxygen
Muckish P1	01/03/2013	1006	26.3	54.7	0.1
Muckish P2	01/03/2013	1006	20.5	49	3.1
Muckish P3	01/03/2013	1006	30.3	57.5	0.3
Muckish P1	10/04/2013	978	26.9	53.8	0.2
Muckish P2	10/04/2013	978	21.2	49.5	3.2
Muckish P3	10/04/2013	978	30.9	57.1	0.4
Muckish P1	30/07/2013	986	26.7	50.1	0.1
Muckish P2	30/07/2013	986	27.5	53.6	0.2
Muckish P3	30/07/2013	984	32.6	58.4	0.3
Muckish P1	06/12/2013	997	24.5	59.4	0
Muckish P2	06/12/2013	997	21.5	55.1	1.7
Muckish P3	06/12/2013	997	21.8	59.7	0

APPENDIX B

WATER BALANCE CALCULATION

MUCKISH WATER BALANCE CALCULATION

Year	Status	Rainfall (mm)	Temp Restored area Area	Temp Restored area infiltration IRCA(m3)	Restored area Area	Restored area infiltration IRCA(m3)	Total Water	Leachate produced Lo(m3)	Leachate Volume tahnkered Lo(m3)
2013	Closed	1,144	0		20,500	2,344	2,344	2,344	2,786
Total		1,144						2,344	2,786

Assumptions

IRCA=	Fully Capped/Restored area infiltration of rainfall estimated (2-10%),EPA Manual	10%	%
Restored area	Area capped is 20,500.	20,500	m^2
Rainfall Data	Data taken from Met Eireann Station Malin Head, Total Rainfall used.	1143.5	mm

APPENDIX C

E-PRTR Regulations

(AER Electronic Reporting System)

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2013

1. FACILITY IDENTIFICATION

Parent Company Name	Donegal County Council
Facility Name	Muckish Landfill Site
PRTR Identification Number	W0126
Licence Number	W0126-01

Waste or IPPC Classes of Activity

No.	class_name
3.1	The initial melting or production of iron and steel
3.13	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.

Address 1	Muckish
Address 2	Falcarragh
Address 3	Co Donegal
Address 4	
	Donegal
Country	Ireland
Coordinates of Location	-8.03537 55.0931
River Basin District	GBNIIENW
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Julie McMahon
AER Returns Contact Email Address	julie.mcmahon@donegalcoco.ie
AER Returns Contact Position	Executive Engineer
AER Returns Contact Telephone Number	0749122787
AER Returns Contact Mobile Phone Number	0872861096
AER Returns Contact Fax Number	0749161304
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	1
User Feedback/Comments	Unmanned site. Landgem- no changes made to input parameters
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
50.1	General
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

This question is only applicable if you are an IPPC or Quarry site

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	C	OTH	Landgem	0.0	66320.0	0.0	66320.0
03	Carbon dioxide (CO2)	C	OTH	Landgem	0.0	0.0	0.0	182001.0
02	Carbon monoxide (CO)	C	OTH	Landgem	0.0	0.0	0.0	32.43
07	Non-methane volatile organic compounds (NMVOC)	C	OTH	Landgem	0.0	0.0	0.0	427.67
55	1,1,1-trichloroethane	C	OTH	Landgem	0.0	0.0	0.0	0.53
56	1,1,2,2-tetrachloroethane	C	OTH	Landgem	0.0	0.0	0.0	1.572
34	1,2-dichloroethane (EDC)	C	OTH	Landgem	0.0	0.0	0.0	0.336
62	Benzene	C	OTH	Landgem	0.0	0.0	0.0	1.227
58	Trichloromethane	C	OTH	Landgem	0.0	0.0	0.0	0.03
35	Dichloromethane (DCM)	C	OTH	Landgem	0.0	0.0	0.0	9.835
65	Ethyl benzene	C	OTH	Landgem	0.0	0.0	0.0	4.039
73	Toluene	C	OTH	Landgem	0.0	0.0	0.0	29.71
60	Vinyl chloride	C	OTH	Landgem	0.0	0.0	0.0	3.774
78	Xylenes	C	OTH	Landgem	0.0	0.0	0.0	10.537
57	Trichloroethylene	C	OTH	Landgem	0.0	0.0	0.0	3.043
21	**Mercury and compounds (as Hg)**	C	OTH	Landgem	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
247	Acetone	C	OTH	Landgem	0.0	3.363	0.0	3.363

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Muckish Landfill Site

Please enter summary data on the quantities of methane flared and / or utilised			Method Used			
	T (Total) kg/Year	**M/C/E**	**Method Code**	**Designation or Description**	**Facility Total Capacity m3 per hour**	
Total estimated methane generation (as per site model)					N/A	
Methane flared					0.0	(Total Flaring Capacity)
Methane utilised in engine/s					0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)					N/A	

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	2786.1	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Donegal County Council,D0009-01	Thorn rd,Magheranan,Letterkenny, Co.Donegal,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change
Link to Waste Guidance