ANNUAL ENVIRONMENTAL REPORT

For

DRUMABODEN LANDFILL SITE
Co. Donegal

Waste Licence Reference: W0063-02

By
Donegal County Council
For
Environmental Protection Agency

Reporting Period:

January to December 2014

May 2015

Contents

Appendices

1 Introduction

1.1 This Annual Environmental Report (AER) has been prepared to meet the requirements of Condition 11.7 of Waste Licence W0063-02 for Drumaboden Landfill and includes the information listed in Schedule C of the Waste Licence. This report provides an environmental review of the site from January to December 2014.

Waste Licence Requirements

1.2 Donegal County Council ceased operational activity at Drumaboden in April 1999. On the 29th of June 2001 the Environmental Protection Agency granted the Council a Waste Licence (registration number W0063-01) for the orderly closure, capping and restoration of the landfill facility, in accordance with the Third Schedule of the Waste Management Act, 1996. Donegal County Council was only permitted to accept inert waste at the facility for the purpose of restoration and aftercare of the site. The quantity of inert waste to be accepted was limited to 40,000 tonnes. The site was formally restored in 2007. The Licence requires the Council to manage the facility to ensure that activities do not cause environmental pollution and carry out regular environmental monitoring and submit all monitoring results and reports.

1.3 During 2011 the Agency required that the Licence for this site be reviewed under the Environmental Objectives (Surface Water) Regulations 2009 SI No 272. An application for the review of this Licence was submitted to the Agency in September 2011. On 18th April 2013 the Agency granted a revised Licence (W0063-02).

Nature of the Facility

1.4 Drumaboden Landfill is an unlined landfill, historically operated on the 'dilute and disperse' principle, whereby leachate generated by rainfall infiltration and the decomposition of the landfilled wastes is allowed to disperse into the surrounding environment. The landfill is situated on blanket bog and is bounded to the north by the River Leannon and to the south by the R249 (see site layout plan 5234.60/06). A peripheral leachate cut-off drain has been provided to intercept seepage of leachate from the landfill mass. The leachate is then pumped from the cut-off drain into a leachate treatment system (puraflo). The facility was fully restored during 2007.

1.5 A summary of Facility Information is provided in Table 1.1 below.

Table 1.1 Facility Information Summary

AER Reporting Year	2014
Licence Register Number	W0063-02
Name of site	Drumaboden Landfill Site
Site Location	Kilmacrenan, County Donegal
NACE Code	3821
Class/Classes of Activity	Landfill

2 Waste Activities Carried Out at the Facility

Type of Waste

2.1 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.

3 Quantities and Composition of Waste

Quantities of Waste for Restoration

3.1 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 at the facility from 1998-2007 at the facility are presented in Table 3.1 below.

3.2 The total capacity of Drumaboden landfill is 128,000 tonnes and this amount of waste has already been landfilled. The site is closed and no more waste will be accepted.

3.3 Restoration of the landfill was carried out during 2007 and the quantity of inert material imported that year is shown in the following table. No waste has been accepted at the facility since closure in 1999.

Table 3.1 Waste Quantities Accepted (tonnes)

Waste Types	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total (tonnes)	5,596	1,515	0	0	0	0	0	0	0	85,716*

* = inert material imported for restoration.

4 Summary Report of Emissions

Introduction

4.1 There is no continuous air, groundwater, surface water or wastewater (sewer) monitoring at Drumaboden landfill site. Periodic / non-continuous monitoring of groundwater, surface water, leachate and landfill gas is carried out at the site as per the licence schedule, and as agreed with the EPA, as set out in Tables A1, A2 and A3 of Appendix A.

4.2 Details of the monitoring locations are shown on Drawing Nos IBR0697/005 and IBR0697/006 and are given in Table A1 of Appendix A.

Monitoring Results

4.3 Results of monitoring for the period for groundwater, surface water, leachate and gas are contained in tabular and graphical format in Appendix B.

Groundwater

4.4 The groundwater results contained in this report were assessed against the following:

- EPA Interim Guideline Values[1] (IGV);
- SI No 278 of 2007 EC (Drinking Water) Regulations (DWR); and
- SI No 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 as amended (GWR 2010).

4.5 Groundwater is monitored at four locations: GW1, GW5, GW6 and GW7. GW1, GW5 and GW7 are on the inland side of the facility relative to the River Leannan. GW6 is located between the waste body and the River Leannan. It is deemed that wells GW1 and GW5 are representative of up gradient conditions and that GW6 and GW7 are representative of down gradient conditions. It is important to state that all wells are proximate to the unlined waste body.

4.6 Wells labelled GW2, GW3 and GW4 are located within waste and are only used to monitor groundwater / leachate levels.

4.7 Groundwater monitoring is undertaken bi annually.

[1]EPA (2003) Towards setting guideline values for the protection of groundwater in Ireland. Interim Report

Upgradient

4.8 The GWR 2010 guideline value for ammonia is 0.175 mg/l. Elevated concentrations of ammonia relative to the screening value are recorded in up gradient borehole GW1 consistently throughout the monitoring period and in up gradient borehole GW5 in November. These values range from 0.218 mg/l N to 19 mg/l N. Trends for ammonia in groundwater are provided in graph format in Appendix B.

4.9 The IGV EPA Guideline value for iron is 200 ug/l. One incidence of an elevated concentration of iron relative to the screening value was recorded up gradient of the site in borehole GW1 during the monitoring period. This occurred in June 2014 when a value of 2,011.5 ug/l was recorded. Please see paragraph 4.15 below regarding naturally occurring iron.

4.10 No elevated concentrations in exceedance of the appropriate GWR or IGV values have been recorded for the remaining parameters measured throughout the monitoring period.

Down Gradient

4.11 A number of parameters monitored bi annually in the down gradient boreholes exceed the GWR 2010 and / or IGV guideline values. These are summarised in Table 4.1 below and results are provided in table and graph format in Appendix B.

Table 4.1 Groundwater Quality Down Gradient

Parameter	GWR 2010	IGV	Borehole
Ammonia (mg/l N)	0.175		GW6 & GW7
Potassium (mg/l)		5	GW7
Iron (µS/cm)		200	GW7

4.12 Elevated concentrations of ammonia relative to the screening value were also recorded down gradient of the site in boreholes GW6 and GW7. These elevated concentrations ranged from 0.784 mg/l N to 2.21 mg/l N.

4.13 Elevated concentrations of potassium relative to the screening value occurred in borehole GW7 in June and November 2014 with values ranging from 18.0mg/l to 29.0 mg/l.

4.14 The elevated concentration of iron, relative to the screening value, recorded in borehole GW7 in June 2014 showed a value of 6,770.3 ug/l. These significantly higher concentrations of iron occur both up and down gradient of the site in the same month and are therefore likely to be attributed to the same cause. See Section 4.15 below.

4.15 It should be noted that iron occurs naturally in Donegal groundwater as it is associated with naturally occurring conditions such as iron rich bedrock or the presence of reducing conditions, that is, anaerobic environment such as peat. This may therefore contribute to a higher concentration of iron recorded in the monitoring results.

4.16 No elevated concentrations in exceedance of the appropriate GWR or IGV values have been recorded for the remaining parameters measured throughout the monitoring period.

4.17 The identified impacts to groundwater at the site appear to be derived from leachate generated in this unlined landfill. However, as previously stated a spike in concentration of ammonia in November also occurs up gradient of the site on this sampling date indicating possible impact from an up gradient source and levels of ammonia up-gradient are generally higher than those down-gradient.

4.18 It should also be noted that all wells are proximate to the unlined waste body. A low permeability cap has been placed over the site (2007) which will limit the continued excess generation of leachate. A peripheral leachate cut-off drain has also been provided to intercept seepage of leachate from the landfill mass. The leachate is then pumped from the cut-off drain into a leachate treatment system (puraflo). A hydrogeological risk assessment is currently being undertaken for Drumaboden Landfill Site. Please refer to Section 5.

Surface Water

4.19 The surface water results contained in this report were assessed against the following:

- SI No 294 of 1989 European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations (SWQS); and
- SI No 272 of 2009 European Communities Environmental Objectives (Surface Water) Regulations 2009 (EQS).

4.20 Surface water is monitored at locations SW1, SW2, SW4, SW5 & SW6. SW1 is located upstream of the landfill, with SW2, SW4, SW5 & SW6 being mid or downstream.

4.21 The EQS 2009 guideline value for ammonia for good status is 0.140 mg/l N. An elevated concentration of ammonia relative to this screening value was recorded in SW1 up stream of the site when a value of 0.33 mg/l N was recorded in November 2014.

4.22 Elevated concentrations of ammonia relative to the screening value were also recorded downstream of the site at surface water monitoring points SW2, SW4, SW5 and SW6. Elevated concentrations of ammonia at these surface water monitoring points ranged from 0.158 mg/l N to 0.68 mg/l N throughout the monitoring period. It should be noted however

that elevated concentrations of ammonia are also recorded up stream of the site. In addition, these exceedances are small in scale and impact on the River Leannan is generally negligible due to the large assimilative capacity of the river as has been demonstrated by an appropriate assessment (previously submitted to the EPA).

4.23 The EQS 2009 guideline value for BOD for good status is 2.6 mg/l. No instances of elevated concentrations of BOD are recorded upstream of the site throughout the monitoring period. However, one instance of an elevated concentration of BOD relative to the screening value was recorded downstream of the site during the monitoring period. In particular, a value of 2.9 mg/l was recorded at surface water monitoring point SW5 in November 2014.

4.24 No elevated concentrations in exceedance of the appropriate EQS values have been recorded for the remaining parameters measured throughout the monitoring period.

4.25 In summary, there is generally minimal impact on the surface water environment as a result of the site and the results are consistent with results from previous monitoring periods.

Leachate

4.26 Leachate is collected in a toe drain beneath the cap and pumped into a Puraflo treatment system. The Puraflo system (which is marketed in Ireland by Bord na Mona) is a package system containing peat fibre media that filters and biologically treats the leachate. Leachate is monitored at the intake and discharge points and the results are contained in Appendix A.

4.27 The results for the discharge point (L1) show that there are elevated concentrations of ammonia and suspended solids in comparison to the ELV parameter limits during this period (ELVs are as set out in the Waste Licence, Schedule B). These elevated concentrations are recorded in the results for March and November 2014 during the monitoring period. The ELV for ammonia, as set out in the Waste Licence, is 25 mg/l N and an elevated concentration of 51 mg/l N was recorded in March 2014 and 42.7 mg/l N in November 2014. The ELV for suspended solids, as set out in the Waste Licence, is 30 mg/l and an elevated concentration of 100 mg/l was recorded in November 2014. It should be noted however, that the bed was waterlogged in November which may have contributed to the elevated concentrations recorded. In addition, recent works have improved the distribution of leachate over the bed and further operating improvements have been seen, for example, the plant achieved its ELV for ammonia in Quarter 1 of 2015.

Landfill Gas Monitoring

4.28 Passive gas vents allow landfill gas to disperse to the atmosphere at Drumaboden. In addition to the vents, gas monitoring wells have been installed both within waste in the body of the landfill (LG1,2,3&5), and as peripheral wells on the road verge outside the landfill (LG6,7&8).

4.29 Results continue to show that gas production levels from wells within waste are very low, with methane levels from waste ranging from 0% to 0.3% v/v. Perimeter results for methane are also low and range from 0% to 0.1% v/v. CO_2 levels from perimeter wells are within the landfill gas concentration limits set out in the Waste Licence for the site except at well LG7 which shows a regular exceedance throughout the monitoring period with a maximum level of 5.0% v/v in June. However, results recorded are in line with historical ranges.

Dust

4.30 Dust monitoring was not undertaken at the site prior to restoration due to the absence of operational activity. Monitoring plans were in place as required during the restoration contract. Contingency arrangements were not deployed during the project. Since restoration dust levels are inspected during monitoring and a management system can be deployed if required.

5 Hydrogeological Risk Assessment

5.1 A hydrogeological risk assessment is currently being undertaken for Drumaboden Landfill Site. This report is being on foot of a technical amendment to the waste licence by EPA: "Within eighteen months of the date of this technical amendment, the licensee shall carry out a risk screening and where necessary a technical assessment in accordance with the Guidance on the Authorisation of Discharges to Groundwater, published by the Environmental Protection Agency".

5.2 The objectives of this assessment will include the following:

- To consolidate all available geological, hydrogeological and hydrological data relating to the site and its immediate environs;
- To assess and interpret all available water quality data recorded to-date;
- To develop an appropriate Conceptual Site Model (CSM) for the site;
- To assess the level of risk posed to sensitive receptors; and
- To develop an appropriate compliance monitoring programme for the site.

5.3 This assessment will be submitted to EPA under a separate cover.

6 Volume of Leachate Produced and Volume Discharged

6.1 As previously stated a leachate toe drain was constructed as part of the capping system. Leachate from the waste body drains via this route to a sump from where it is pumped into the Puraflo treatment system. The raw leachate is treated through the "Puraflo" peat filtration bed. A water balance calculation has been undertaken and is shown in Appendix B. This estimates that the volume of leachate being generated at the site for the reporting period is 4,913m^3.

7 Reported Incidents and Complaints Summaries

7.1 One live Compliance Investigation was raised by the Agency during the monitoring period for Puraflo operation and groundwater quality. This CI includes a number of elements which are set out below:

- Non-reporting of an exceedance of ammonia at L1 leachate discharge point on 25/03/2014 which was not notified to the Agency as an incident;
- No result was recorded for BOD in the Quarter 1 Leachate Results at L1 on 25/03/2014;
- Quarterly monitoring results for leachate were not submitted to the Agency within 10 days after the end of the reporting period, for example the Quarter 1 monitoring report was not submitted until 28/05/2014;
- Following a site visit by the Agency it was noted that the Puraflo system being used on site was not fully enclosed as required by Condition 3.1.4.1 (vi) which requires 'all structures for the storage and / or treatment of leachate to be fully enclosed except for the inlet and outlet piping'. This is discussed further in Section 14; and
- A number of on-going emissions exceedances were also detected in the routine monitoring programme.

7.2 No complaints were received during the monitoring period.

8 Review of Nuisance Controls

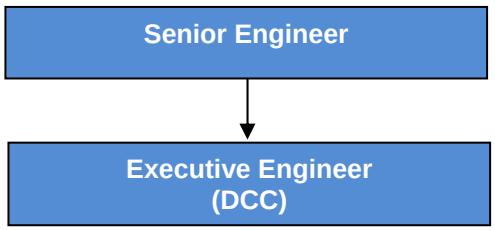
8.1 The facility is no longer operational and all areas formerly used for the placement of municipal waste have been fully restored. Accordingly no incidence of nuisance has been recorded during the reporting period. The appropriate control systems (as outlined in the EMS) will be deployed should any sign of nuisance, in the form of vermin, litter, odour, dust or birds, be detected in the course of the regular site inspections, or should any activity be initiated that requires any such controls.

9 Management Structure of the Site

Management Structure

9.1 The Management Structure at Drumaboden Landfill site is set out in Figure 9.1 below.

Figure 9.1 Management Structure



9.2 An Environmental Liability Risk Assessment has not been carried out at this facility as the landfill site is closed it is not a requirement of the licence.

Management Responsibility

9.3 **Senior Engineer:** Overall responsibility for the management of the site and maintenance of the waste licence. Delegation of authority and responsibility to ensure the effective management of the facility.

9.4 **Executive Engineer**: Responsible for overall compliance with EPA Licence.

10 Report on Staff Training

10.1 No training has been undertaken as the facility is now closed and there are no operational personnel on site.

11 Resources and Energy Consumption Summary

11.1 An energy efficiency audit has not been carried out at this facility as the landfill site is closed it is not a requirement of the licence. Energy was consumed on the site during the reporting period however the energy consumption is unavailable.

12 Report on Environmental Management Programme

12.1 An Environmental Management Programme (EMP) was revised in 2004 to take into consideration the closure of the site and was submitted in to the Agency in December 2004 for its agreement. A public communication programme is included in accordance with Condition 2 of the Waste Licence to ensure that information concerning the environmental performance is available at reasonable times. The public may view environmental records at the Donegal County Council headquarters. Details regarding this are contained in Section 2 of the Environmental Management System Manual.

13 Programme for Public Information

13.1 A public communication programme has been included in the EMS in accordance with Condition 2 of the Waste Licence to ensure that information concerning the environmental performance is available at reasonable times. The public may view environmental records at the Environment Section in Donegal County Council Headquarters in Lifford. Details regarding this are contained in Section 2 of the Environmental Management System Manual.

13.2 A public information / consultation programme was run prior to restoration works commencing.

14 Capping and Restoration of the Site

14.1 The site was fully restored during 2007 - 2008 (works commenced April 2007 and works were substantially complete in January 2008).

15 Report on Development Work Undertaken During the Reporting Period, and a Timescale for those Proposed during the Coming Year

15.1 During 2009, the monitoring programme highlighted the fact that the treatment system was not delivering the reductions in ammonia levels in leachate previously achieved. The situation was investigated in conjunction with the proprietors of the system, Bord na Mona, and some investigations carried out. The peat filtration media was inspected by Bord na Mona and found to be in good enough condition to facilitate treatment. It was concluded that the system was overgrown and pipework clogged. An overhaul of the system was carried

out during the reporting period clearing vegetation. By the end of 2010 the performance of the system had improved but was not yet optimal.

15.2 Further investigations were carried out during 2011 into the lack of performance of the system and by the end of the period it had been decided to replace the pipe distribution network and all the peat fibre media. This work was carried out in 2012.

15.3 Effluent quality from the newly refurbished peat filters bed was monitored following the work but sufficient improvement in quality was not being realised. The reason for this was investigated during 2012 and eventually collapsed underground inlet pipes and blocked outlet drains were discovered. Towards the end of the period works were undertaken to repair the pipes and drains and the system was once again functional hydraulically. This work was undertaken in 2013. The plant then had commercial seed applied and a regular maintenance works programme initiated. When seed was applied during 2013 the plant initially responded. Results continue to show that the plant is reducing ammonia levels but not as low as required by the ELV. Efforts continue in the form of maintenance works and monitoring to improve the performance of the plant and the reductions being achieved. Progress will continue to be reviewed in quarterly and annual reports to the Agency. The recent overhaul upgraded the pump, expanded the pipework and improved distribution across the bed and now good operation is being observed with the ELV being achieved in early 2015.

Appendix A - Monitoring Information

Appendix A - Monitoring Information

Table A1 Groundwater Parameters and Monitoring Frequencies

Bi-Annually
Visual Inspection
Temperature
Groundwater Level
pH
Electrical Conductivity
Ammoniacal Nitrogen
Dissolved Oxygen
Chloride
Iron
Potassium
TOC
TON
Phenols
Sodium
Faecal Coliforms
Total Coliforms

Table A2 Surface Water Parameters and Monitoring Frequencies

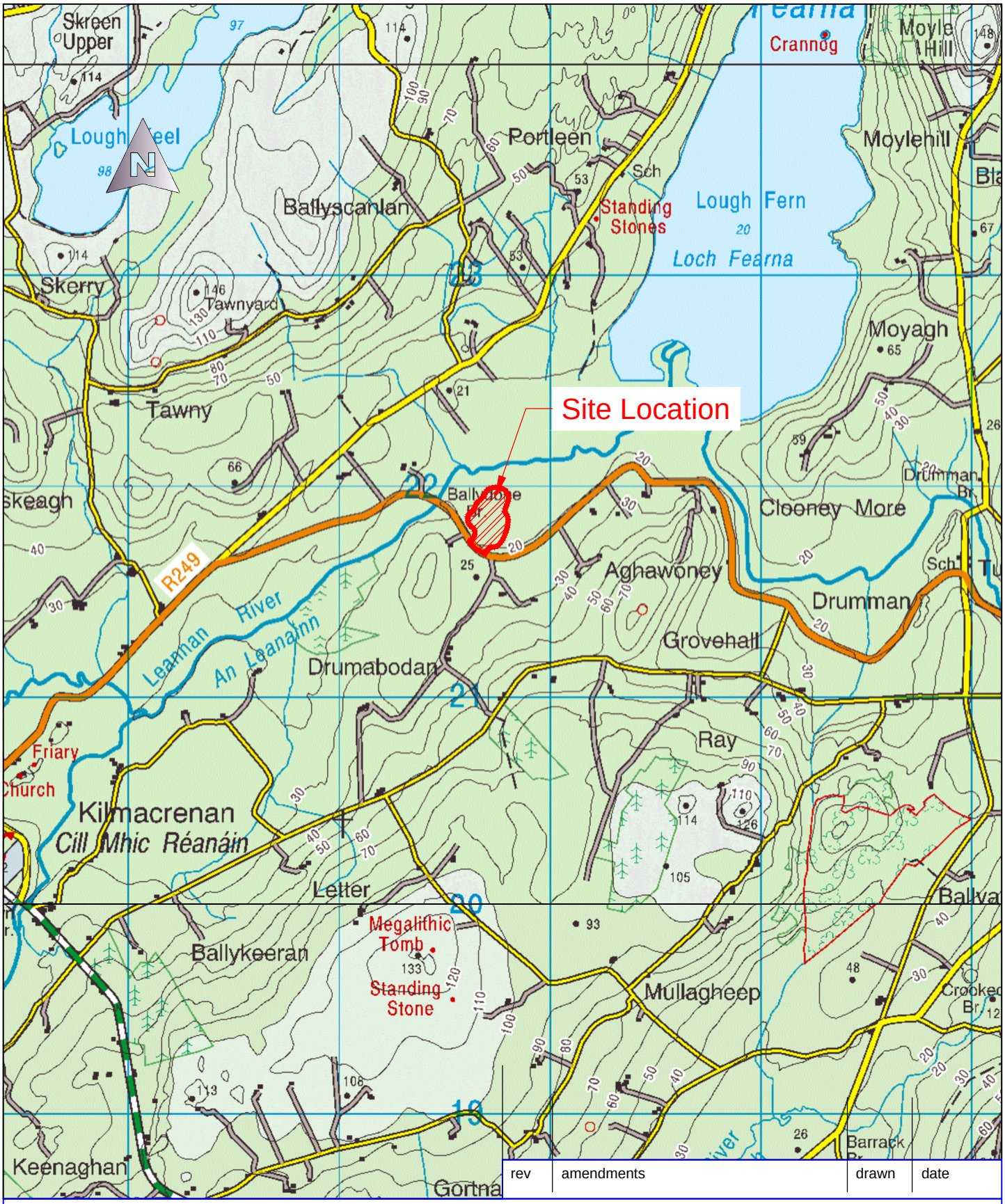
Bi-Annually
Visual Inspection
Temperature
pH
Electrical Conductivity
Ammoniacal Nitrogen
COD
BOD
Dissolved Oxygen
Total Suspended Solids
Chloride

Table A3 Treated Leachate Parameters and Monitoring Frequencies

Quarterly
Flow
Visual Inspection
Temperature
pH
Electrical Conductivity
Ammoniacal Nitrogen
COD
BOD
Chloride
TON

Table A4 Landfill Gas Parameters and Monitoring Frequencies

Bi-Annually
Atmospheric Pressure
Carbon Dioxide
Methane
Oxygen
Temperature



rev	amendments	drawn	date

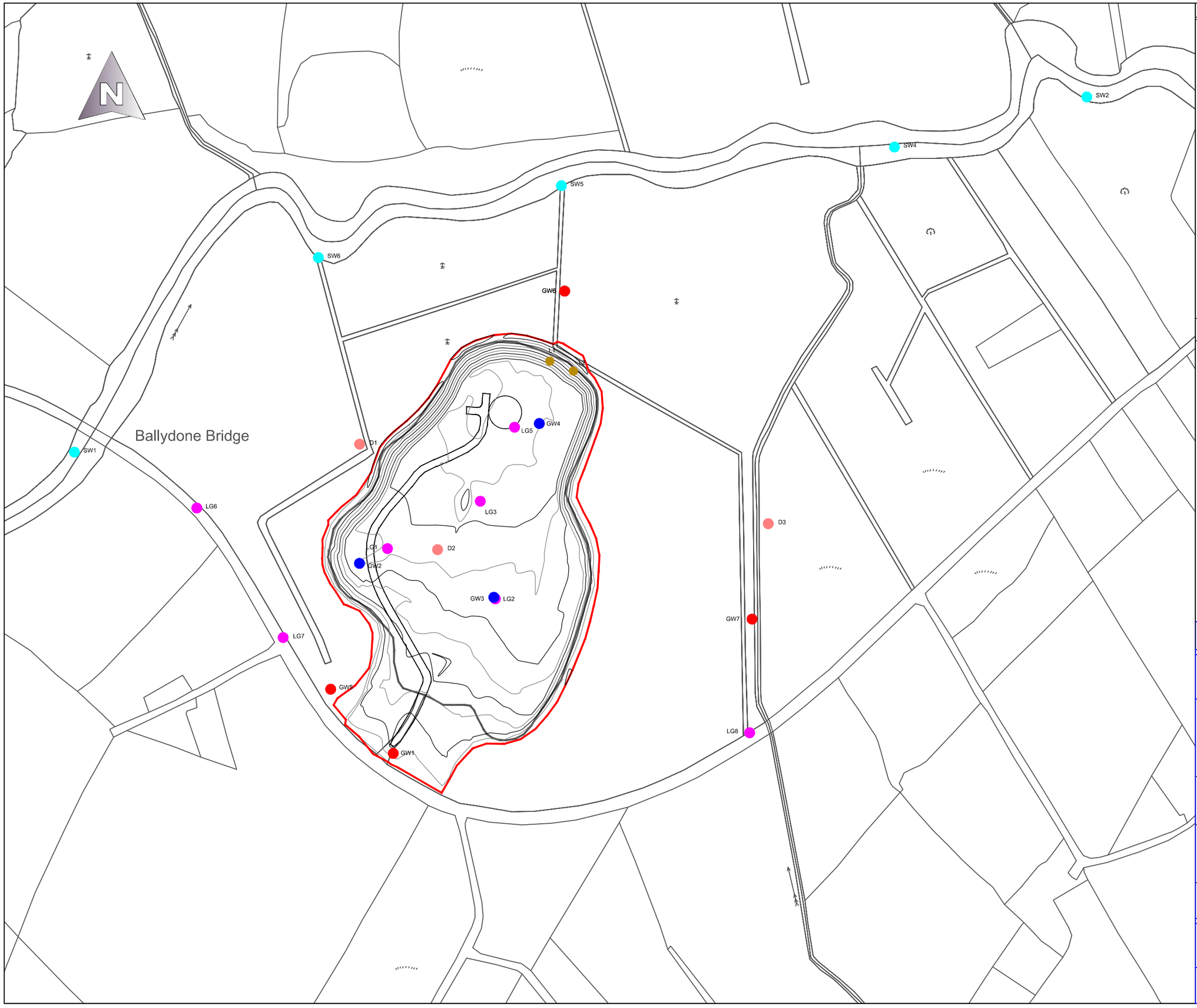
RPS
Enterprise Fund
Business Centre
Ballyraine
Letterkenny
Co. Donegal

T +353 74 9161927
F +353 74 9161928
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Drawing Number	Rev
IBR0697/005	0

Project	Title
Donegal Landfill Site Reporting 2015	DrumabodenLandfill Site Location
Client	**Architect**
Donegal County Council	

Drawing Status	Sheet Size	Drawing Scale	Project Leader	Drawn By	Date	Initial Review
Preliminary	A4	1:25,000	DD	AMB	Apr '15	AMcG



NOTES

1. Verifying Dimensions.
   The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.

2. Existing Services.
   Any information concerning the location of existing services indicated on this drawing is intended for general guidance only. It shall be the responsibility of the contractor to determine and verify the exact horizontal and vertical alignment of all cables, pipes, etc. (both underground and overhead) before work commences.

3. Issue of Drawings.
   Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg, dxf etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors arising from the use of these files, either by human error by the recipient, listing of un-dimensioned measurements, compatibility issues with the recipient's software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

4. Datum:

5. Keys

- Groundwater Monitoring Boreholes
- Leachate Level Locations
- Gas Monitoring Locations
- Gas Vents Locations
- Leachate Sampling Locations
- Dust Sampling Locations
- Surface Water Monitoring Locations

rev	amendments	drawn	date

RPS Consulting Engneers
Enterprise Fund Business Centre
Ballyraine
Letterkenny
Co. Donegal

T +353 (0) 74 91 61927
F +353 (0) 74 91 61928
W www.rpsgroup.com/ireland
E ireland@rpsgroup.com

Client
Donegal County Council

Project
Donegal Landfill Site Reporting 2015

Title
Drumaboden LFS - Monitoring Points

Drawing Status	Sheet Size	Drawing Scale
Preliminary	A3	1:2500

Drawing Number	Rev
IBR0697 /005	0

Project Leader	Drawn By	Date	Initial Review
AMcG	AMB	Apr '15	CG

Appendix B - Results of Monitoring

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Groundwater											
Site No		GW1											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503287						
pH							6.70					6.86	
Temp	C						19.2					10.3	
Electrical Conductivity	uS/cm						473					481	
Ammonical Nitrogen	mg/l						5.32					19.00	
COD	mg/l												
BOD	mg/l												
Dissolved Oxygen	mg/l						3.58					5.64	
SS	mg/l												
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						3					21	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l						2011.500					0.231	
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l						2.70					1.61	
Sodium	mg/l						15.60					15.66	
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l						9.29					10.60	
Total Oxidised Nitrogen	mg/l						0.383					1.600	
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l						<0.15					<0.15	
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms							<1						
Facel Coliforms							<1						
Depth	m						2					1.8	

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Groundwater											
Site No		GW5											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503341						
pH							8.25					7.56	
Temp	C						17.25					10.30	
Electrical Conductivity	uS/cm						290					260	
Ammonical Nitrogen	mg/l						0.041					0.218	
COD	mg/l												
BOD	mg/l												
Dissolved Oxygen	mg/l						3.30					5.81	
SS	mg/l												
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						26					26	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l						<20.000					0.023	
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l						3.20					2.43	
Sodium	mg/l						33.10					34.73	
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l						2.3					838.9	
Total Oxidised Nitrogen	mg/l						0.39					<0.10	
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l						<0.15					<0.15	
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms							2						
Facel Coliforms							1011						
Depth	m						1.5					0.8	

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Groundwater											
Site No		GW6											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503288						
pH							6.90					6.76	
Temp	C						19.4					10.3	
Electrical Conductivity	uS/cm						217					20	
Ammonical Nitrogen	mg/l						0.138					0.784	
COD	mg/l												
BOD	mg/l												
Dissolved Oxygen	mg/l						4.34					7.62	
SS	mg/l												
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						20					28	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l						<20.000					0.001	
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l						3.30					2.04	
Sodium	mg/l						13.50					12.37	
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l						4.31					4.12	
Total Oxidised Nitrogen	mg/l						1.26					2.17	
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l						<0.15					<0.15	
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms							<1						
Facel Coliforms							<1						
Depth	m						2.3					2.1	

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Groundwater											
Site No		GW7											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503289						
pH							6.7					6.5	
Temp	C						17.5					10.1	
Electrical Conductivity	uS/cm						634					632	
Ammonical Nitrogen	mg/l						2.21					1.91	
COD	mg/l												
BOD	mg/l												
Dissolved Oxygen	mg/l						1.62					5.23	
SS	mg/l												
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						18					29	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l						6770.300					0.015	
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l						8.30					3.54	
Sodium	mg/l						12.20					12.16	
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l						14.98					16.70	
Total Oxidised Nitrogen	mg/l						<0.110					<0.100	
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l						<0.15					<0.15	
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms							<1						
Facel Coliforms							<1						
Depth	m						2					1.7	

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Surface Water											
Site No		SW1											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503282						
pH							7.67						
Temp	C						20.6					11.2	
Electrical Conductivity	uS/cm						153					115	
Ammonical Nitrogen	mg/l						0.041					0.330	
COD	mg/l						25					26	
BOD	mg/l						<1.00					1.35	
Dissolved Oxygen	mg/l						8.78					9.60	
SS	mg/l						<6.0					1.2	
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						20					15	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l												
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l												
Sodium	mg/l												
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l												
Total Oxidised Nitrogen	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l												
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms													
Facel Coliforms													
Depth	m												

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Surface Water											
Site No		SW2											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503283						
pH							7.6						
Temp	C						20.5					11.2	
Electrical Conductivity	uS/cm						126.6					102.0	
Ammonical Nitrogen	mg/l						0.119					0.360	
COD	mg/l						21					25	
BOD	mg/l						<1.00					1.36	
Dissolved Oxygen	mg/l						8.72					9.60	
SS	mg/l						<6.0					1.2	
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						18					15	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l												
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l												
Sodium	mg/l												
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l												
Total Oxidised Nitrogen	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l												
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms													
Facel Coliforms													
Depth	m												

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Surface Water											
Site No		SW4											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503284						
pH							7.46						
Temp	C						20.8					11.2	
Electrical Conductivity	uS/cm						149					127	
Ammonical Nitrogen	mg/l						<0.040					0.650	
COD	mg/l						18					24	
BOD	mg/l						<1.00					1.28	
Dissolved Oxygen	mg/l						8.51					9.80	
SS	mg/l						<6.0					0.8	
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						19					16	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l												
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l												
Sodium	mg/l												
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l												
Total Oxidised Nitrogen	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l												
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms													
Facel Coliforms													
Depth	m												

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Surface Water											
Site No		SW5											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No							142503285						
pH							7.41						
Temp	C						20.4					11.2	
Electrical Conductivity	uS/cm						148					106	
Ammonical Nitrogen	mg/l						0.158					0.680	
COD	mg/l						28					22	
BOD	mg/l						<1.0					2.9	
Dissolved Oxygen	mg/l						8.39					9.90	
SS	mg/l						<6					2	
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l						18					15	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l												
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l												
Sodium	mg/l												
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l												
Total Oxidised Nitrogen	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l												
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms													
Facel Coliforms													
Depth	m												

Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		Surface Water											
Site No		SW6											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No													
pH													
Temp	C											11.3	
Electrical Conductivity	uS/cm											102	
Ammonical Nitrogen	mg/l											0.39	
COD	mg/l											24	
BOD	mg/l											1.26	
Dissolved Oxygen	mg/l											10	
SS	mg/l											0.4	
Residue on Evaporator	mg/l												
Calcium	ug/l												
Cadmium	ug/l												
Chromium	ug/l												
Chloride	mg/l											15	
Chlorine	mg/l												
Copper	ug/l												
Cyanide	mg/l												
Total Iron	ug/l												
Lead	ug/l												
Magnesium	ug/l												
Manganese	ug/l												
Mercury	ug/l												
Nickel	mg/l												
Potassium	mg/l												
Sodium	mg/l												
Sulphate as S	mg/l												
Zinc	ug/l												
Total Alkalinity as CaCO3	mg/l												
Total Organic Carbon	mg/l												
Total Oxidised Nitrogen	mg/l												
Arsenic	mg/l												
Barium	mg/l												
Boron	ug/l												
Fluoride	mg/l												
Phenol	mg/l												
Phosphorous	mg/l												
Selenium	mg/l												
Silver	mg/l												
Mircrotox	Toxic Units												
Microtox	Toxic Units												
Nitrite	mg/l												
Nitrate	mg/l												
Phosphate - ORTHO	mg/l												
Phosphate - TOTAL	mg/l												
Total Coliforms													
Facel Coliforms													
Depth	m												

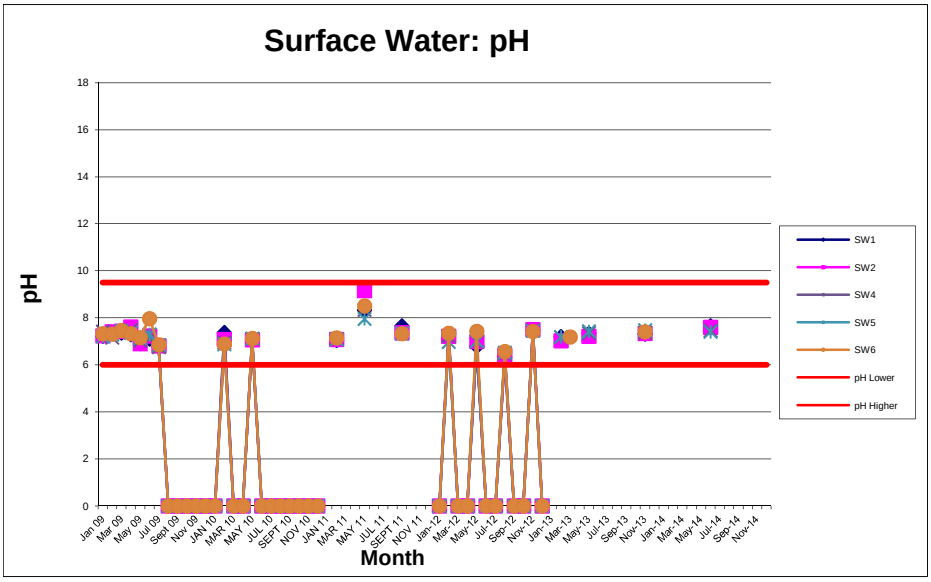
Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		**Leachate**											
Site No		**L1 (Outlet)**											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No													
pH				7.89			7.41		7.34			7.13	
Temp	**C**			20.00			17.00		15.50			10.20	
Electrical Conductivity	**uS/cm**			2066			2130		1356			1816	
Ammonical Nitrogen	**mg/l**			51.0			22.4		19.0			42.7	
COD	**mg/l**			43			102		84			86	
BOD	**mg/l**						<1.00		0.16			4.64	
Dissolved Oxygen	**mg/l**												
SS	**mg/l**						3.8		4.0			100.0	
Residue on Evaporator	**mg/l**												
Calcium	**ug/l**												
Cadmium	**ug/l**												
Chromium	**ug/l**												
Chloride	**mg/l**			120			125		115			140	
Chlorine	**mg/l**												
Copper	**ug/l**												
Cyanide	**mg/l**												
Total Iron	**ug/l**												
Lead	**ug/l**												
Magnesium	**ug/l**												
Manganese	**ug/l**												
Mercury	**ug/l**												
Nickel	**mg/l**												
Potassium	**mg/l**												
Sodium	**mg/l**												
Sulphate as S	**mg/l**												
Zinc	**ug/l**												
Total Alkalinity as CaCO3	**mg/l**												
Total Organic Carbon	**mg/l**												
Total Oxidised Nitrogen	**mg/l**			3.56			6.06		12.60			<0.10	
Arsenic	**mg/l**												
Barium	**mg/l**												
Boron	**ug/l**												
Fluoride	**mg/l**												
Phenol	**mg/l**												
Phosphorous	**mg/l**												
Selenium	**mg/l**												
Silver	**mg/l**												
Mircrotox	**Toxic Units**												
Microtox	**Toxic Units**												
Nitrite	**mg/l**												
Nitrate	**mg/l**												
Phosphate - ORTHO	**mg/l**						0.232						
Phosphate - TOTAL	**mg/l**												
Total Coliforms													
Facel Coliforms													
Depth	**m**						1.5						

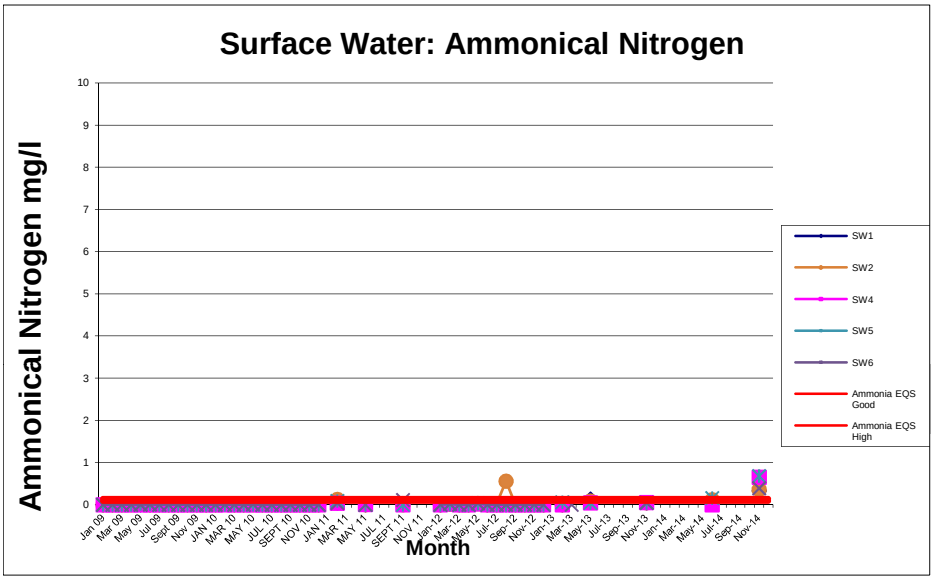
Location		*Drumaboden, Kilmacrennan, Co Donegal*											
Sample Type		**Leachate**											
Site No		**L2 (Outlet)**											
Date of Sample		Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Lab No													
pH				6.85			6.97		6.80			7.49	
Temp	**C**			0.0			17.0		15.0			10.2	
Electrical Conductivity	**uS/cm**			1779			2250		1980			1589	
Ammonical Nitrogen	**mg/l**			77.5			47.7		94.5			56.0	
COD	**mg/l**			70			99		91			57	
BOD	**mg/l**						<1.00		3.76			1.20	
Dissolved Oxygen	**mg/l**												
SS	**mg/l**						48.70		109.00			1.71	
Residue on Evaporator	**mg/l**												
Calcium	**ug/l**												
Cadmium	**ug/l**												
Chromium	**ug/l**												
Chloride	**mg/l**			93			125		119			135	
Chlorine	**mg/l**												
Copper	**ug/l**												
Cyanide	**mg/l**												
Total Iron	**ug/l**												
Lead	**ug/l**												
Magnesium	**ug/l**												
Manganese	**ug/l**												
Mercury	**ug/l**												
Nickel	**mg/l**												
Potassium	**mg/l**												
Sodium	**mg/l**												
Sulphate as S	**mg/l**												
Zinc	**ug/l**												
Total Alkalinity as CaCO3	**mg/l**												
Total Organic Carbon	**mg/l**												
Total Oxidised Nitrogen	**mg/l**			<0.11			<0.11		<0.10			3.65	
Arsenic	**mg/l**												
Barium	**mg/l**												
Boron	**ug/l**												
Fluoride	**mg/l**												
Phenol	**mg/l**												
Phosphorous	**mg/l**												
Selenium	**mg/l**												
Silver	**mg/l**												
Mircrotox	**Toxic Units**												
Microtox	**Toxic Units**												
Nitrite	**mg/l**												
Nitrate	**mg/l**												
Phosphate - ORTHO	**mg/l**						0.233						
Phosphate - TOTAL	**mg/l**												
Total Coliforms													
Facel Coliforms													
Depth	**m**						2						

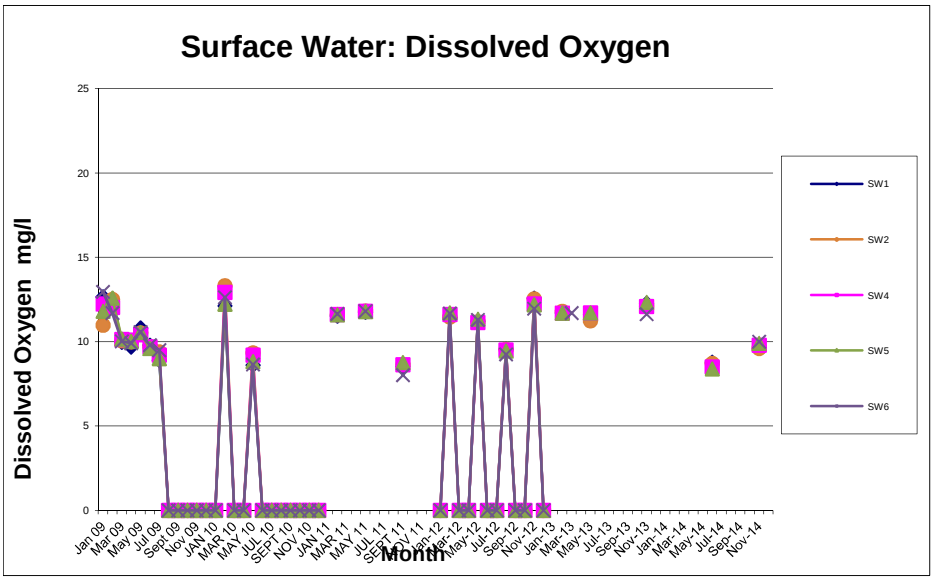
Drumabodan Landfill								
StationName	Sample Lab Code	SampleDate	Northing	Easting	Atmospheric Pressure	Carbon Dioxide	Methane	Oxygen
Drumaboden LG1	142503292	30/06/2014	421845	216668	NT	NT	NT	NT
Drumaboden LG2	142503293	30/06/2014	421811	216742	1011	0.4	0	20.2
Drumaboden LG3	142503294	30/06/2014	421878	216732	1011	5.8	0.3	18.5
Drumaboden LG5	142503295	30/06/2014	421929	216756	1011	0.7	0	20.7
Drumaboden LG6	142503296	30/06/2014	421873	216535	1016	0.01	0.01	19.8
Drumaboden LG7	142503297	30/06/2014	421783	216595	1016	5	0.1	14.6
Drumaboden LG8	142503298	30/06/2014	421717	216916	1016	0.2	0.1	19.5

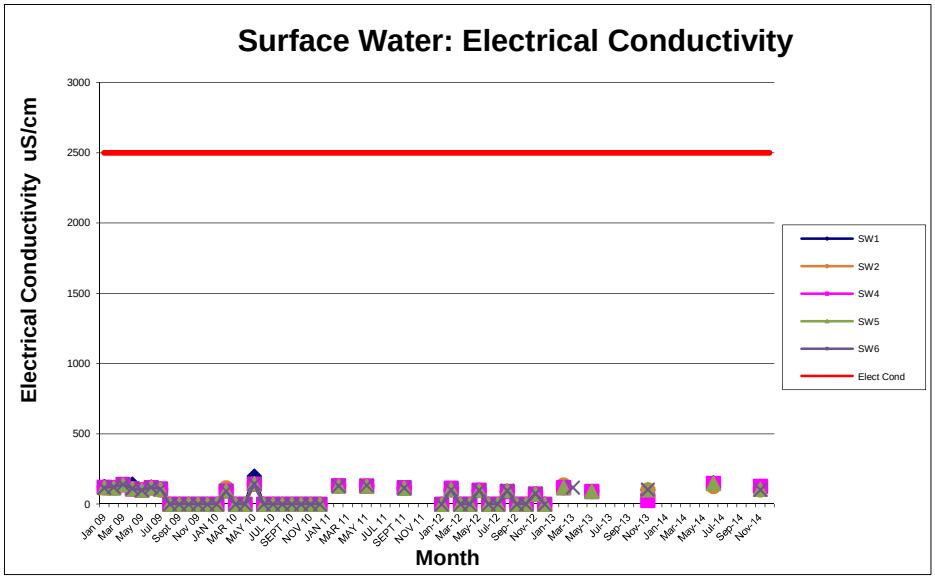
StationName	Sample Lab Code	SampleDate	Atmospheric Pressure	Carbon Dioxide	Methane	Oxygen
Drumaboden LG1*	142505678	20/11/2014	NT	NT	NT	NT
Drumaboden LG2	142505679	20/11/2014	1016	1.2	0	20.8
Drumaboden LG3	142505680	20/11/2014	1016	0.4	0	20.3
Drumaboden LG5	142505681	20/11/2014	1016	0	0	21.5
Drumaboden LG6	142505682	20/11/2014	1014	0	0	21.3
Drumaboden LG7	142505683	20/11/2014	1014	4.4	0	16.6
Drumaboden LG8	142505684	20/11/2014	1014	0.7	0	20.8

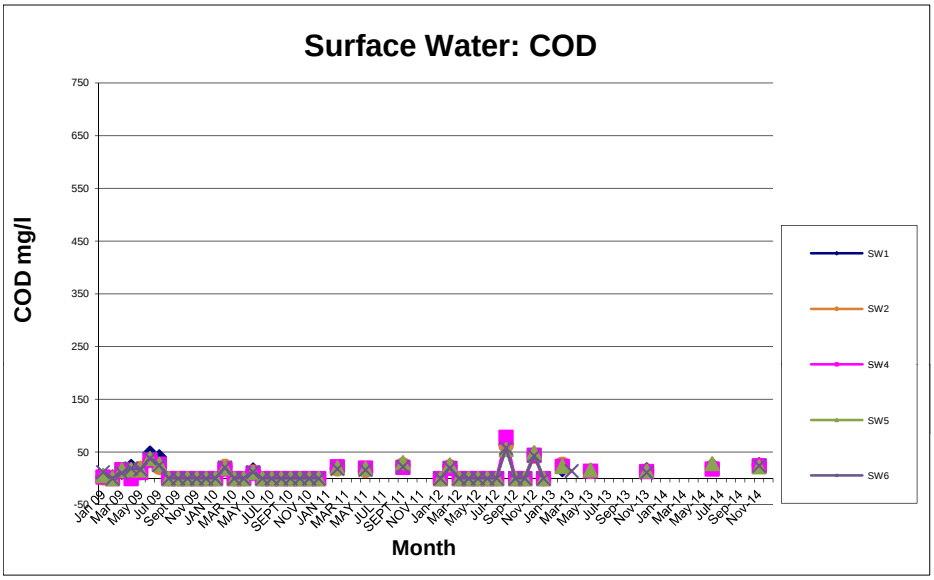
* Sample point inaccessible

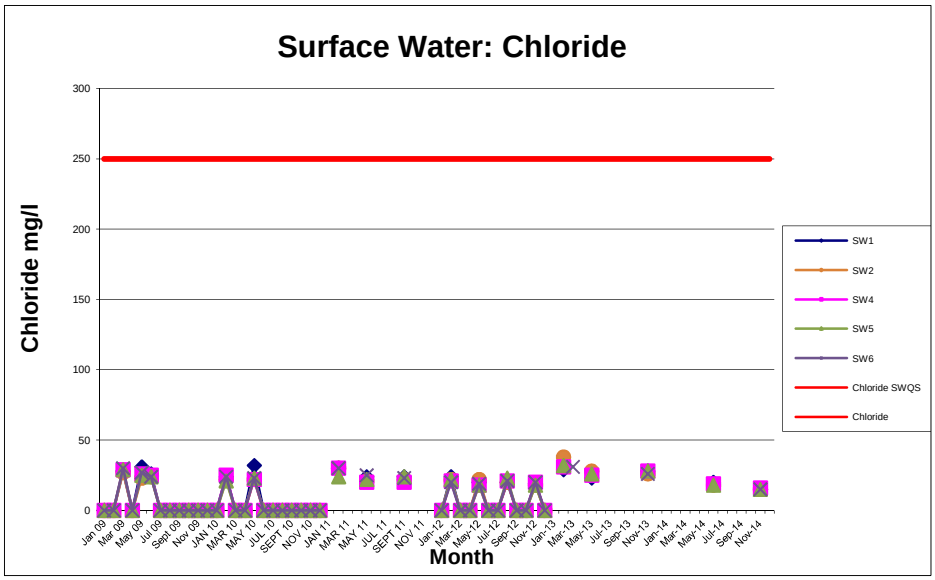

Surface Water: pH
pH
Month
SW1
SW2
SW4
SW5
SW6
pH Lower
pH Higher

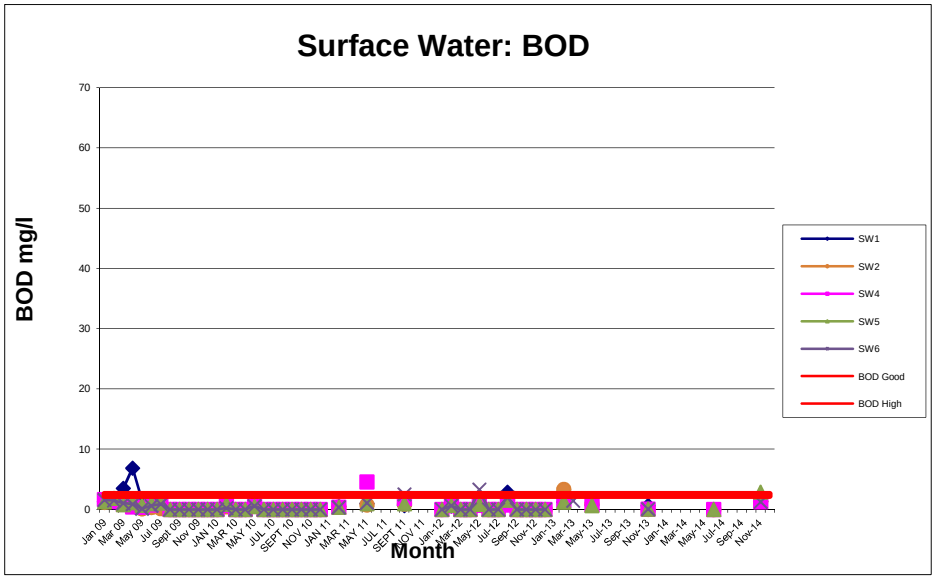

Surface Water: Ammonical Nitrogen
Ammonical Nitrogen mg/l
Month
SW1
SW2
SW4
SW5
SW6
Ammonia EQS Good
Ammonia EQS High

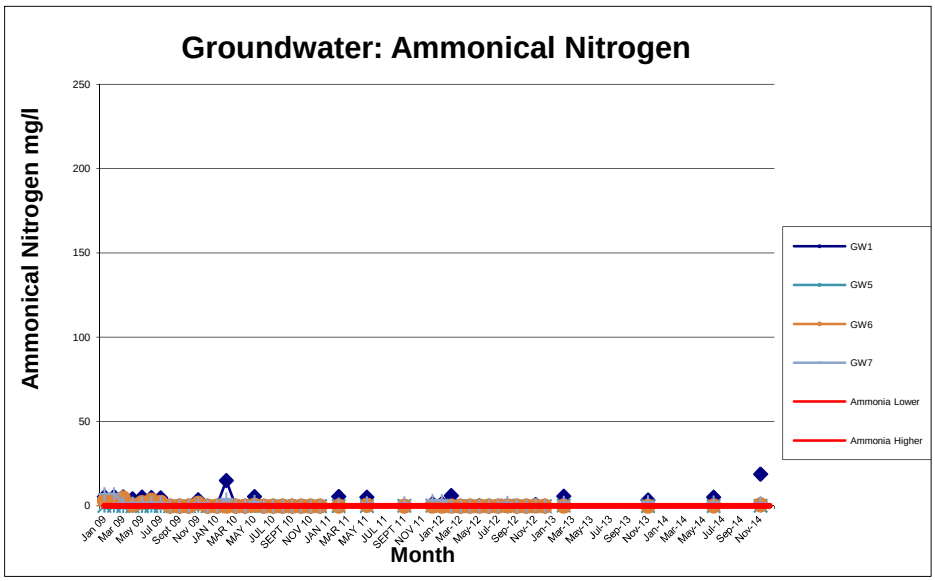

Surface Water: Dissolved Oxygen
Dissolved Oxygen mg/l
Month
SW1
SW2
SW4
SW5
SW6

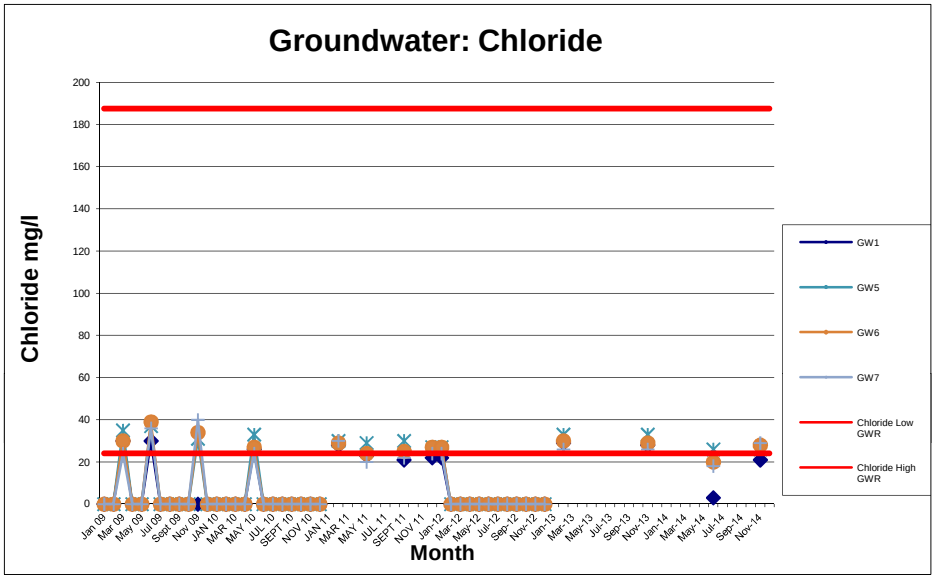

Surface Water: Electrical Conductivity
Electrical Conductivity uS/cm
3000
2500
2000
1500
1000
500
0
SW1
SW2
SW4
SW5
SW6
Elect Cond
Month

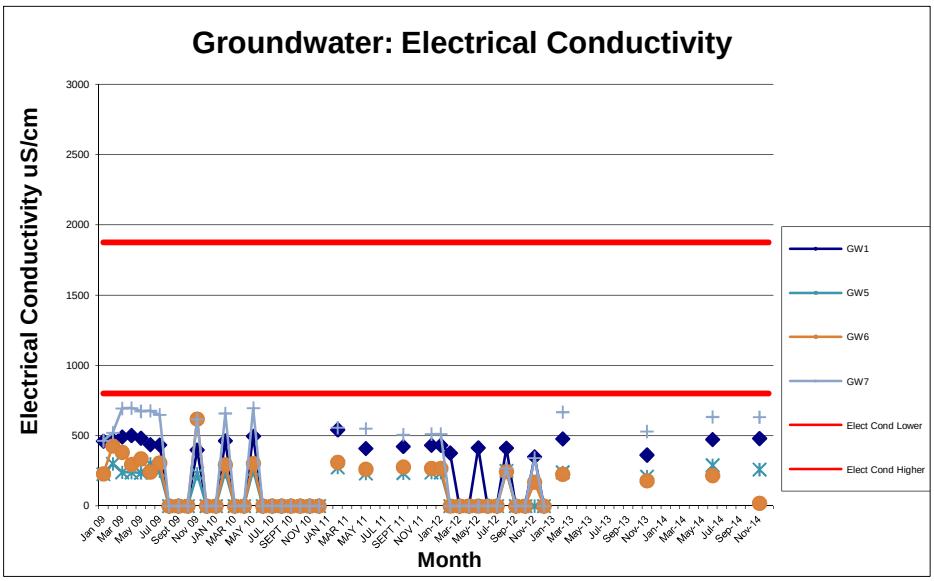

Surface Water: COD
COD mg/l
750
650
550
450
350
250
150
50
SW1
SW2
SW4
SW5
SW6
Month

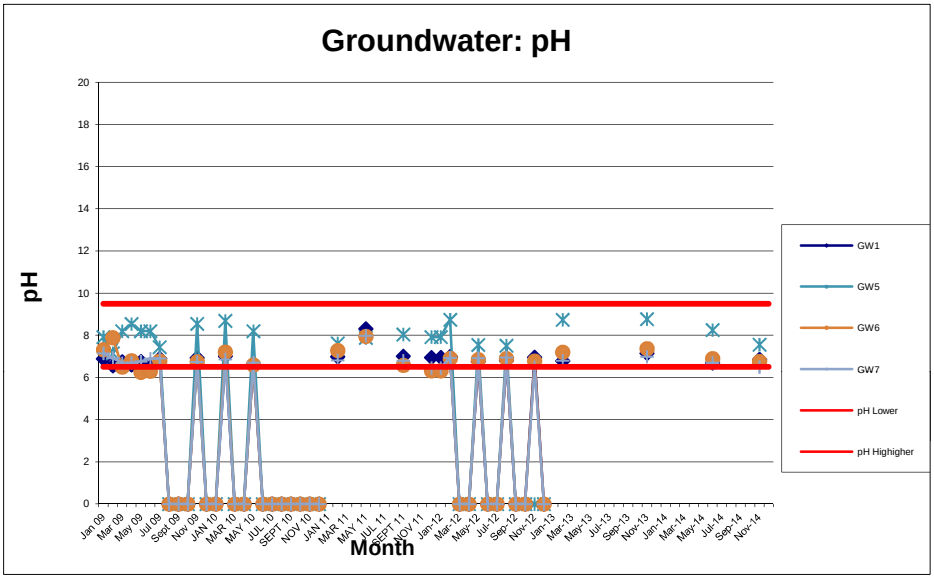

Surface Water: Chloride
Chloride mg/l
300
250
200
150
100
50
0
SW1
SW2
SW4
SW5
SW6
Chloride SWQS
Chloride
Month


Surface Water: BOD
BOD mg/l
70
60
50
40
30
20
10
0
Jan 09
Mar 09
May 09
Jul 09
Sept 09
Nov 09
JAN 10
MAR 10
MAY 10
JUL 10
SEPT 10
NOV 10
JAN 11
MAR 11
MAY 11
JUL 11
SEPT 11
NOV 11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Month
SW1
SW2
SW4
SW5
SW6
BOD Good
BOD High


Groundwater: Ammonical Nitrogen
Ammonical Nitrogen mg/l
250
200
150
100
50
0
Jan 09
Mar 09
May 09
Jul 09
Sept 09
Nov 09
JAN 10
MAR 10
MAY 10
JUL 10
SEPT 10
NOV 10
JAN 11
MAR 11
MAY 11
JUL 11
SEPT 11
NOV 11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Month
GW1
GW5
GW6
GW7
Ammonia Lower
Ammonia Higher


Groundwater: Chloride
Chloride mg/l
200
180
160
140
120
100
80
60
40
20
0
Jan 09
Mar 09
May 09
Jul 09
Sept 09
Nov 09
JAN 10
MAR 10
MAY 10
JUL 10
SEPT 10
NOV 10
JAN 11
MAR 11
MAY 11
JUL 11
SEPT 11
NOV 11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Month
GW1
GW5
GW6
GW7
Chloride Low GWR
Chloride High GWR


Groundwater: Electrical Conductivity
Electrical Conductivity uS/cm
3000
2500
2000
1500
1000
500
0
Jan 09
Mar 09
May 09
Jul 09
Sept 09
Nov 09
JAN 10
MAR 10
MAY 10
JUL 10
SEPT 10
NOV 10
JAN 11
MAR 11
MAY 11
JUL 11
SEPT 11
NOV 11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Month
GW1
GW5
GW6
GW7
Elect Cond Lower
Elect Cond Higher


Groundwater: pH
pH
20
18
16
14
12
10
8
6
4
2
0
Jan 09
Mar 09
May 09
Jul 09
Sept 09
Nov 09
JAN 10
MAR 10
MAY 10
JUL 10
SEPT 10
NOV 10
JAN 11
MAR 11
MAY 11
JUL 11
SEPT 11
NOV 11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Month
GW1
GW5
GW6
GW7
pH Lower
pH Highigher

Appendix C - Water Balance Calculation

DRUMABODEN WATER BALANCE CALCULATION

Year	Active Phase	Rainfall (mm)	Temp Restored area	Temp Restored area infiltration IRCA(m3)	Restored area RCA(m2)	Restored area infiltration IRCA(m3)	Leachate produced Lo(m3)
2014	Closed	1,213	0	0	40,500	4,913	4,913
Total		1,213					4,913

Assumptions

IRCA=	Fully Capped/Restored area infiltration of rainfall estimated (2-10%),EPA Manual	10%	%
Landfill area	Area of landfill site.	40,500	m2
Rainfall Data	Data taken from Met Eireann Station Malin Head, Total Rainfall used.	1213.1	mm

Appendix D - E-PRTR Regulations (AER Electronic Reporting System)

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.18

REFERENCE YEAR	2014

1. FACILITY IDENTIFICATION

Parent Company Name	Donegal County Council
Facility Name	Drumabodan Landfill Site
PRTR Identification Number	W0063
Licence Number	W0063-02

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Kilmacrenan
Address 2	
Address 3	
Address 4	
	Donegal
Country	Ireland
Coordinates of Location	-7.73872 55.0436
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	Flow rate calculated from pump setting and runtime. Unmanned site. Variance in BOD concentration - average BOD concentration higher in 2014
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

4.1 RELEASES TO AIR Link to previous years emissions data | PRTR# : W0063 | Facility Name : Drumabodan Landfill Site | Filename : W0063_2014.xls | Return Year : 2014 | 29/04/2015 17:20

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
					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	139589.0	0.0	139589.0
03	Carbon dioxide (CO2)	C	OTH	Landgem	0.0	383002.0	0.0	383002.0
02	Carbon monoxide (CO)	C	OTH	Landgem	0.0	68.25	0.0	68.25
07	Non-methane volatile organic compounds (NMVOC)	C	OTH	Landgem	0.0	899.0	0.0	899.0
55	1,1,1-trichloroethane	C	OTH	Landgem	0.0	1.11	0.0	1.11
56	1,1,2,2-tetrachloroethane	C	OTH	Landgem	0.0	3.21	0.0	3.21
34	1,2-dichloroethane (EDC)	C	OTH	Landgem	0.0	0.71	0.0	0.71
62	Benzene	C	OTH	Landgem	0.0	2.58	0.0	2.58
58	Trichloromethane	C	OTH	Landgem	0.0	0.06	0.0	0.06
35	Dichloromethane (DCM)	C	OTH	Landgem	0.0	20.7	0.0	20.7
65	Ethyl benzene	C	OTH	Landgem	0.0	8.5	0.0	8.5
73	Toluene	C	OTH	Landgem	0.0	62.54	0.0	62.54
60	Vinyl chloride	C	OTH	Landgem	0.0	7.94	0.0	7.94
78	Xylenes	C	OTH	Landgem	0.0	22.17	0.0	22.17
57	Trichloroethylene	C	OTH	Landgem	0.0	6.4	0.0	6.4

* 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
					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

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: Drumabodan Landfill Site

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

4.2 RELEASES TO WATERS Link to previous years emissions data | PRTR# : W0063 | Facility Name : Drumabodan Landfill Site | Filename : W0063_2014.xls | Return Year : 2014 | 29/4/2015 17:21

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					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
					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 WATERS					Please enter all quantities in this section in KGs					
POLLUTANT								QUANTITY		
			Method Used		Discharge point from leachate treatment system					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
79	Chlorides (as Cl)	M	OTH	DCC-SOP average concentration* flow rate	1140.0	0.0	0.0	1140.0	0.0	0.0
13	Total phosphorus	M	OTH	DCC-SOP average concentration* flow rate	2.12	0.0	0.0	2.12	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 WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used		Discharge point from leachate treatment system			
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
238	Ammonia (as N)	M	OTH	DCC-SOP average concentration* flow rate	308.2	308.2	0.0	0.0
303	BOD	M	OTH	DCC-SOP average concentration* flow rate	21.9	21.9	0.0	0.0
306	COD	M	OTH	DCC-SOP average concentration* flow rate	718.59	718.59	0.0	0.0
379	**Total Oxidised Nitrogen (TON)**	M	OTH	DCC-SOP average concentration* flow rate	67.59	67.59	0.0	0.0

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