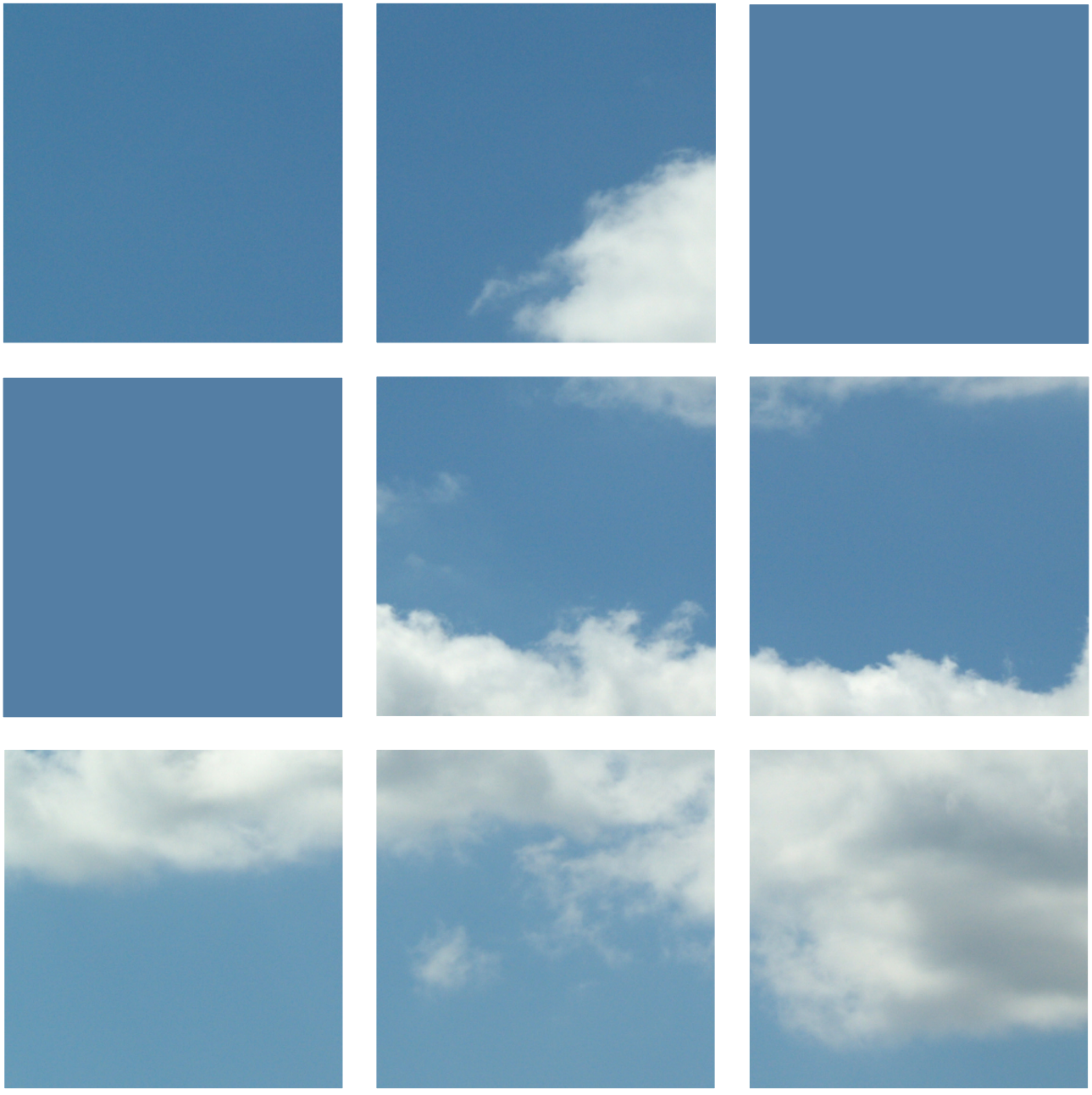
Donegal County Council

Annual Environmental Report 2015
Drumaboden Landfill Site

IBR0859 / April 2016



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Contents

Appendices

1 Introduction

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 2015.

1.1 Waste Licence Requirements

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.

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).

1.2 Nature of the Facility

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, as shown on Drawing IBR0859/005, 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.

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

Table 1.1 Facility Information Summary

AER Reporting Year	2015
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

2.1 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.

3 Quantities and Composition of Waste

3.1 Quantities of Waste for Restoration

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.

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.

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[1]

[1] inert material imported for restoration.

4 Summary Report of Emissions

4.1 Introduction

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 B. It should be noted that monitoring is reduced in frequency to bi-annual except for leachate which remains quarterly and annual parameters are in abeyance as agreed with the Agency.

Details of the monitoring locations are shown on Drawing IBR0859/006 and are given in Table A1 of Appendix A.

4.2 Monitoring Results

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

4.3 Groundwater

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

- EPA Interim Guideline Values[2] (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 (GTV).

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. Monitoring results are highlighted in Table 4.1 below and provided in table and graph format in Appendix B.

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

Groundwater underlying Drumaboden landfill flows towards the river in a northwest and northerly direction reflecting the gently sloping gradient of the area. This is presented in Figure 6 in Appendix A.

Wells labelled GW2, GW3 and GW4 are located within waste and are only used to monitor groundwater / leachate levels. Groundwater monitoring is undertaken bi annually.

4.3.1 Up gradient

The GTV guideline value for ammonia is 0.175 mg/l. Elevated concentrations of ammonia relative to the screening value were recorded in up gradient borehole GW1 throughout the monitoring period when values of 5.44 mg/l N and 6.89 mg/l N were recorded. Trends for ammonia in groundwater are provided in graph format in Appendix B. The source of the up gradient ammonia contamination is unknown.

The IGV EPA Guideline value for iron is 200 ug/l. Elevated concentrations of iron relative to the screening value were recorded up gradient of the site in borehole GW1 during the monitoring period when values of 590 ug/l and 824 ug/l were recorded. 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.

An elevated concentration of potassium above the IGV Guideline value of 5 mg/l was recorded in borehole GW1 in November with a concentration of 6 mg/l.

An elevated level of total coliform was detected in November (42 No/100ml).

No exceedances of the appropriate GTV or IGV values have been recorded for the remaining parameters measured throughout the monitoring period.

4.3.2 Down Gradient

Elevated concentrations of ammonia relative to the screening value were also recorded down gradient of the site in borehole GW7 during the monitoring period. The elevated concentrations ranged from 2.55 mg/l N to 2.77 mg/l N. It should be noted that ammonia concentrations (<0.04 mg/l) were within the relative screening value in GW6 which is located between the waste body and the River Leannan.

Elevated levels of total coliform where also detected in the down gradient boreholes as shown in Table 4.1.

No exceedances of the appropriate GTV or IGV values have been recorded for the remaining parameters measured throughout the monitoring period.

A hydrogeological risk assessment was undertaken in 2015 and submitted to the EPA. The report found that groundwater quality underlying and adjacent to the waste body appears to have been historically impacted by leachate from the unlined waste body. Up gradient monitoring well GW1 appears to be potentially impacted from up gradient septic tanks. The site is located in a heavily agricultural area which may influence groundwater quality.

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).

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Table 4.1 Groundwater Concentrations 2015

	Date	Ammonia (as N)	Chloride	Conductivity @ 20°C	Depth	Dissolved Oxygen (Measure't)	Faecal Coliforms (E. coli)	Iron	pH	Phenols	Potassium	Sodium	Total Coliforms	TOC	TON
GW 1	Jun-15	**6.89**	23.82	484	1	4.2	<1	**824**	6.8	<0.15	1.2	14.4	<1	11.2	<0.1
GW 5	Jun-15	<0.04	31.76	267	0.1	4.3	<1	12	8.39	<0.15	1.3	12.5	<1	1.18	<0.1
GW 6	Jun-15	<0.04	24.82	240	1.2	6.35	1	31	6.75	<0.15	1.5	12.5	**3**	6.79	1.67
GW 7	Jun-15	**2.55**	20.84	606	0.5	4.8	1	36	6.82	<0.15	2.7	10.4	**6**	16	0.11
GW 1	Nov-15	**5.44**	26.8	472	0.2	3.2	<1	**590**	6.63	<0.15	**6**	14.5	**42**	11.29	0.178
GW 5	Nov-15	<0.040	27.8	267	0.1	2.8	<1	0.02	8.09	<0.15	1.9	34.4	**2419.6**	0.56	<0.11
GW 6	Nov-15	<0.040	19.6	210	1.5	4.6	<1	<20	6.66	<0.1	3.1	12.5	**488**	5.81	1.03
GW 7	Nov-15	**2.77**	19.9	647	0.2	2.6	2	<20	6.75	<0.1	3.4	11.7	**78**	17.09	<0.11

4.4 Surface Water

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).

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. The monitoring results are highlighted in Table 4.2 below.

All ammonia results upstream and downstream of the site were <0.04 mg/l during the monitoring period.

The EQS 2009 guideline value for BOD for good status is 2.6 mg/l. Elevated concentrations of BOD relative to the screening value were recorded downstream of the site at surface water monitoring points SW2 and SW4 in October when values of 2.88 mg/l and 3.05 mg/l were recorded.

THE SWQS value for COD is 40 mg/l. Elevated concentrations of COD relative to the screening value were recorded at all monitoring points in October with values ranging from 42 to 57 mg/l.

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

The hydrogeological risk assessment undertaken in 2015 found that there is a potential minor and low impact from the landfill on the river between SW6 and SW2. Occasionally slightly increased levels of Ammoniacal Nitrogen and nitrite were recorded in the vicinity of SW2 with significantly lower levels recorded further down gradient at SW4. It was noted that increasing levels of Ammoniacal Nitrogen were occasionally recorded within SW5 which is located further downstream of SW4. This increase is attributed to downstream agricultural sources of pollution and not from the landfill. Overall, the impact on the river from the landfill is considered to be low.

Table 4.2 Surface Water Concentrations 2015

Location	Date	Ammonia (as N)	BOD	COD	Chloride	Conductivity @ 20°C	Dissolved Oxygen (Measurement)	pH	SS	Temp
SW 1	Jun-15	<0.04	<1	15	27.79	104	10.6	7.29	<6	12.5
SW 2	Jun-15	<0.04	<1	19	24.82	106	10.5	7.2	<6	13.2
SW 4	Jun-15	<0.04	<1	18	20.84	105	10.2	7.16	<6	14
SW 5	Jun-15	<0.04	<1	20	29.78	105	10.05	7.17	<6	13.8
SW 6	Jun-15	<0.04	<1	20	24.82	105	10.3	7.19	<6	14.2
SW 1	Oct-15	<0.04	2.54	**57**	21.84	110.3	10.2	7.02	29.25	11.2
SW 2	Oct-15	<0.04	**3.05**	**42**	19.85	115.8	10.3	6.92	42	11.3
SW 4	Oct-15	<0.04	**2.88**	**45**	23.83	115.7	10.3	6.88	39.5	11.2
SW 5	Oct-15	<0.04	2.44	**44**	19.85	114.7	10.3	6.87	44.25	11.3
SW 6	Oct-15	<0.04	2.57	**47**	15.88	114.2	10.2	6.92	39.75	11.2

4.5 Leachate

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 provided in Table 4.3.

The results for the discharge point (L1) for 2015 show that the parameter's monitored are within the ELV set out in the Waste Licence, Schedule B.

Table 4.3 Groundwater Concentrations 2015

Location	Date	Ammonia (as N)	BOD	COD	Chloride	Conductivity @ 20℃	Depth	pH	TON
Inlet (L2)	Jun-15	38.3	1.45	41	76.43	1,036	1.2	6.86	11.5
Outlet (L1)	Jun-15	12.2	1.58	32	39.7	536	0.9	7.2	1.54
Inlet (L2)	Nov-15	83.7	<1	76	107.2	2,155	n/a	6.83	0.893
Outlet (L1)	Nov-15	0.55	<1	48	104.2	1,415	n/a	7.11	26

4.6 Landfill Gas Monitoring

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). The results are highlighted in Table 4.3 below.

Results continue to show that landfill gas concentration within the wells in waste are very low, with methane levels from waste ranging from 0 to 0.2% v/v and carbon dioxide 0.1to 4.8% v/v.

Carbon dioxide 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 slight exceedance of 1.5 % v/v limit in June.

Table 4.3 Landfill Gas Results 2015

Location	Sample Date	Atmospheric Pressure	Carbon Dioxide %v/v	Methane %v/v	Oxygen %v/v
LG2	Jun-15	1033	0.1	0.1	20.9
LG3	Jun-15	1033	4.5	0.1	15.4
LG5	Jun-15	1033	0.6	0.1	21.1
LG6	Jun-15	NT	NT	NT	NT
LG7	Jun-15	1033	**2.2**	0.2	19.1
LG8	Jun-15	1033	0.2	0.1	20.7
LG2	Oct-15	1005	0.3	0.1	20.2
LG3	Oct-15	1005	4.8	0.2	19.2
LG5	Oct-15	1005	0.5	0.1	19.6
LG6	Oct-15	1005	0.1	0	19.8
LG7	Oct-15	1005	0.2	0.1	19.3
LG8	Oct-15	1005	0	0.2	19.7

5 Volume of Leachate Produced and Volume Discharged

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 6,009 m^3.

6 Reported Incidents and Complaints Summaries

Other than the reporting of on-going emissions exceedances detected in the routine surface water and groundwater monitoring programme (2 in total), no other incidents occurred during the monitoring period and no complaints were received.

Two non compliances were noted in 2015. These were in relation to:

- 01/01/15 the exceedance of the puraflo outlet trigger level (Dec 2014) and,
- 05/08/15 non submission of groundwater risk screening report.

The groundwater risk screening report was submitted to EPA on 02/11/15.

7 Review of Nuisance Controls

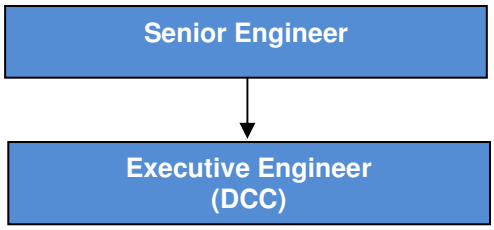
The facility is no longer operational and all areas formerly used for the placement of municipal waste have been fully restored. Accordingly no incidence of nuisance has been recorded during the reporting period. The appropriate control systems (as outlined in the EMS) will be deployed should any sign 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.

8 Management Structure of the Site

8.1 Management Structure

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

Figure 9.1 Management Structure



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.

8.2 Management Responsibility

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.

Executive Engineer: Responsible for overall compliance with EPA Licence.

9 Report on Staff Training

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

10 Resources and Energy Consumption Summary

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.

11 Report on Environmental Management Programme

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.

12 Programme for Public Information

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.

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

13 Capping and Restoration of the Site

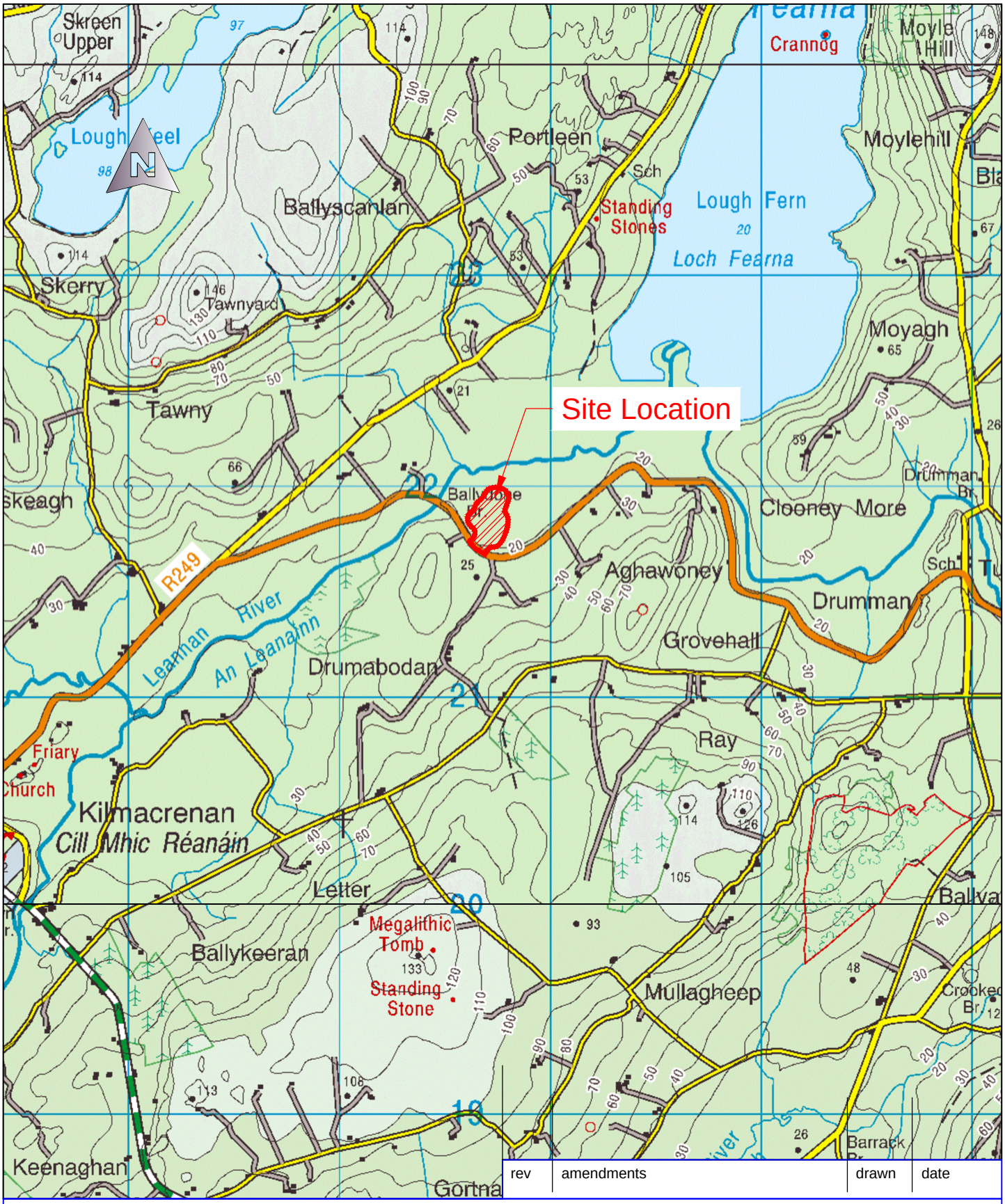
The site was fully restored during 2007-2008 (works commenced April 2007 and works were substantially complete in January 2008).

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

Following a number of years of problematic operation and system overhauls (including complete replacement of the peat media) results for 2015 demonstrate the operating system currently in place is consistently achieving the ELV.

Appendix A

Drawing



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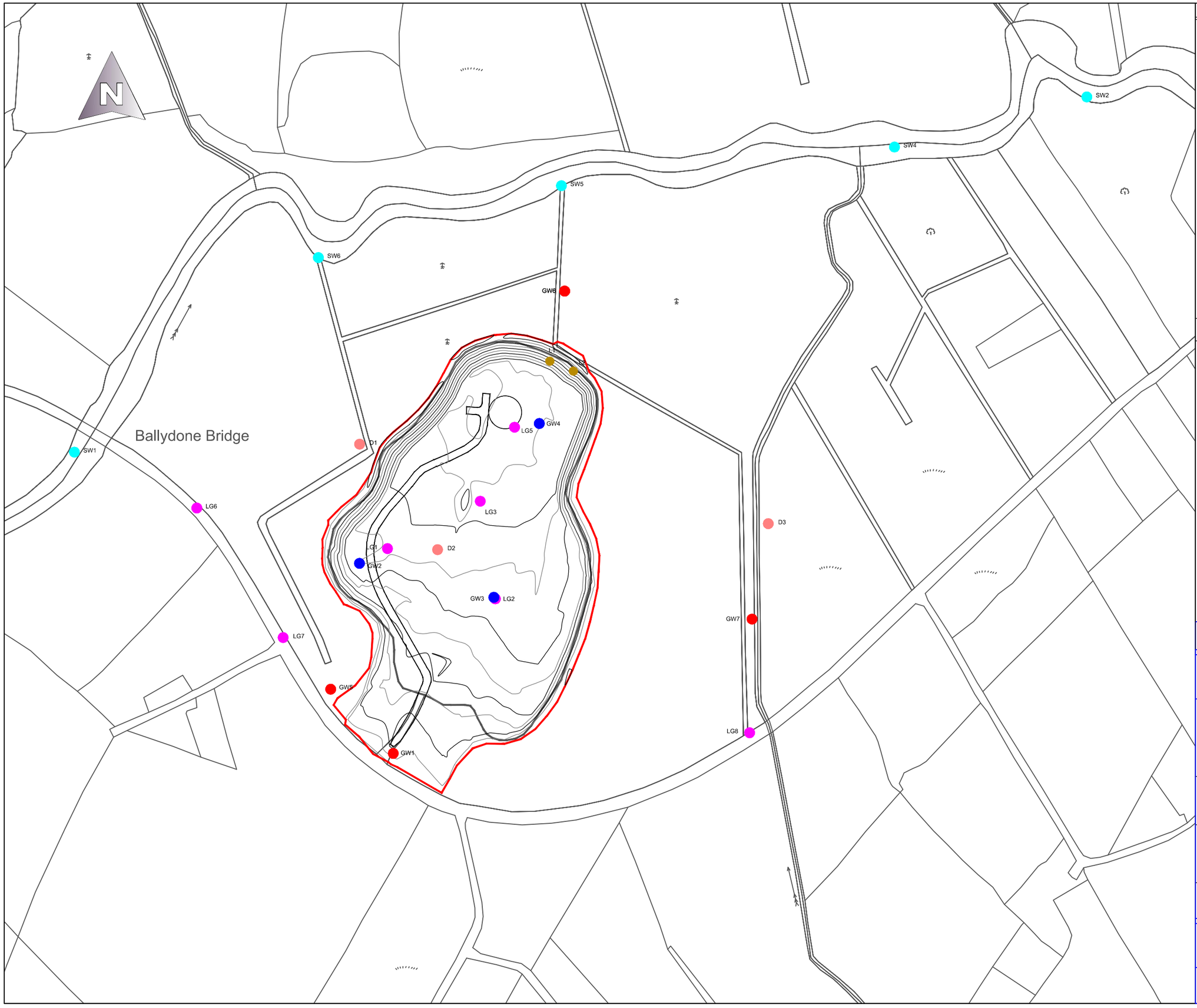
Drawing Number	Rev
IBR0859/005	0

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

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Client
Donegal County Council

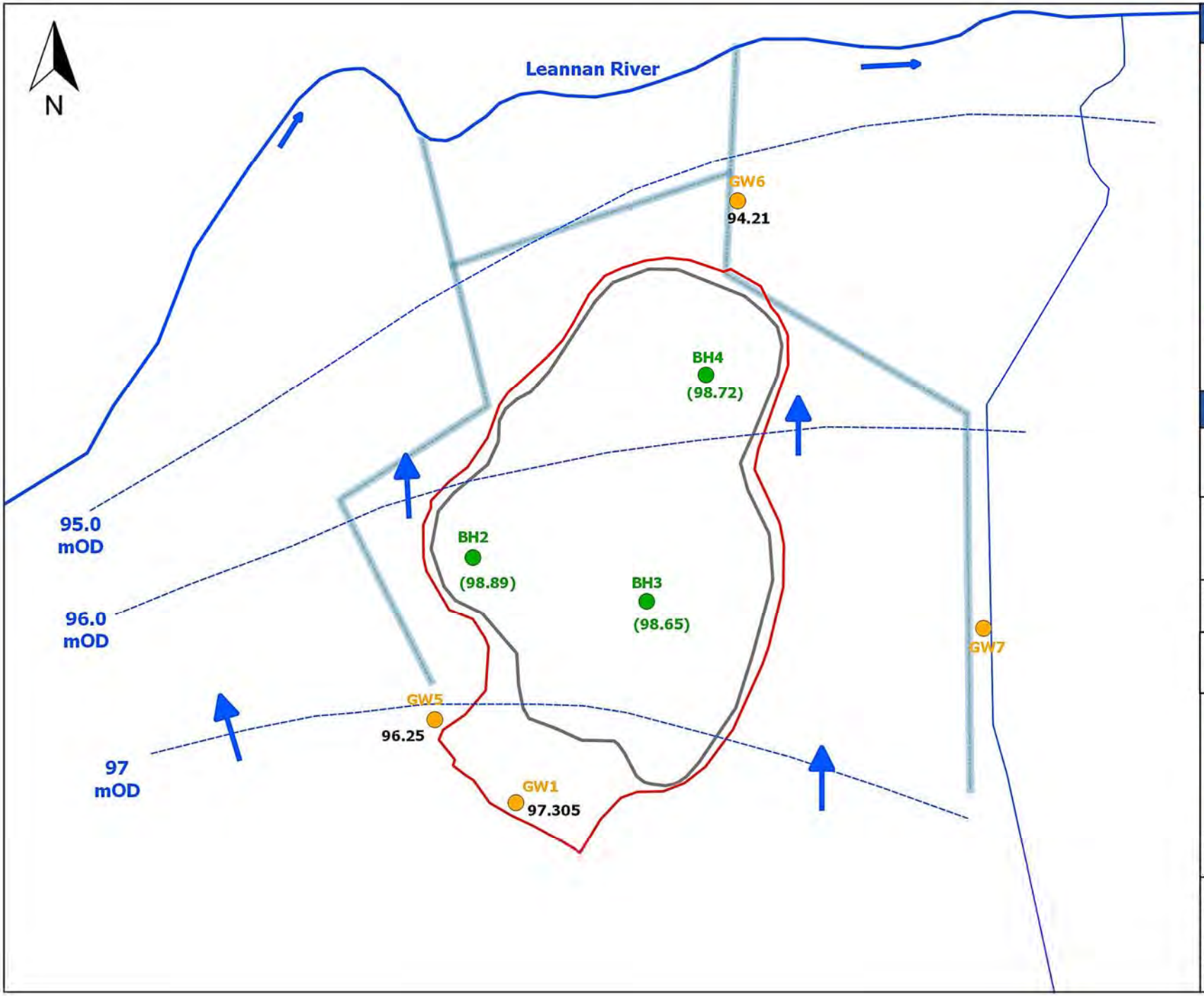
Project
Donegal Landfill Site Reporting 2015

Title
Drumaboden LFS - Monitoring Points

Drawing Status	Sheet Size	Drawing Scale
Preliminary	A3	1:2500

Drawing Number	Rev
IBR0859 /005	0

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



Legend

- Site Border
- Waste Area
- Leachate Monitoring Point
- Groundwater Monitoring Wells
- Groundwater Contours (mOD)
- Groundwater Flow Direction
- (98.89) Leachate level (mOD)
- (97.08) Groudnwater Level (mOD)

Project

Drumaboden Landfill Hydrogeological Risk Assessment

Client: **Donegal County Council**

Drawing: **Figure 6**

Title: **Contours February 2015**

BlueRock Environmental
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File Ref : BRE14020
Drawing Ref : BRE14020DG03
Revision : V01
Date : 06/01/2015
Drawn by: SH
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Scale: NTS

Appendix B

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

Appendix C

Results of Monitoring

	Date	Ammonia (as N)	Chloride	Conductivity @ 20°C	Depth	Dissolved Oxygen (Measure't)	Faecal Coliforms (E. coli)	Iron	pH	Phenols	Potassium	Sodium	Total Coliforms	TOC	TON
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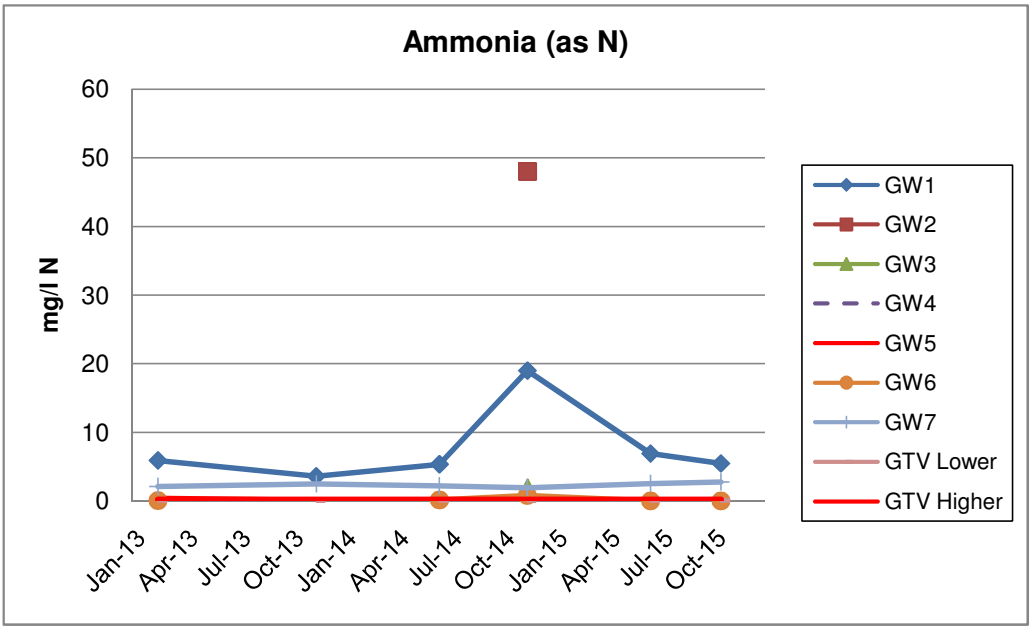
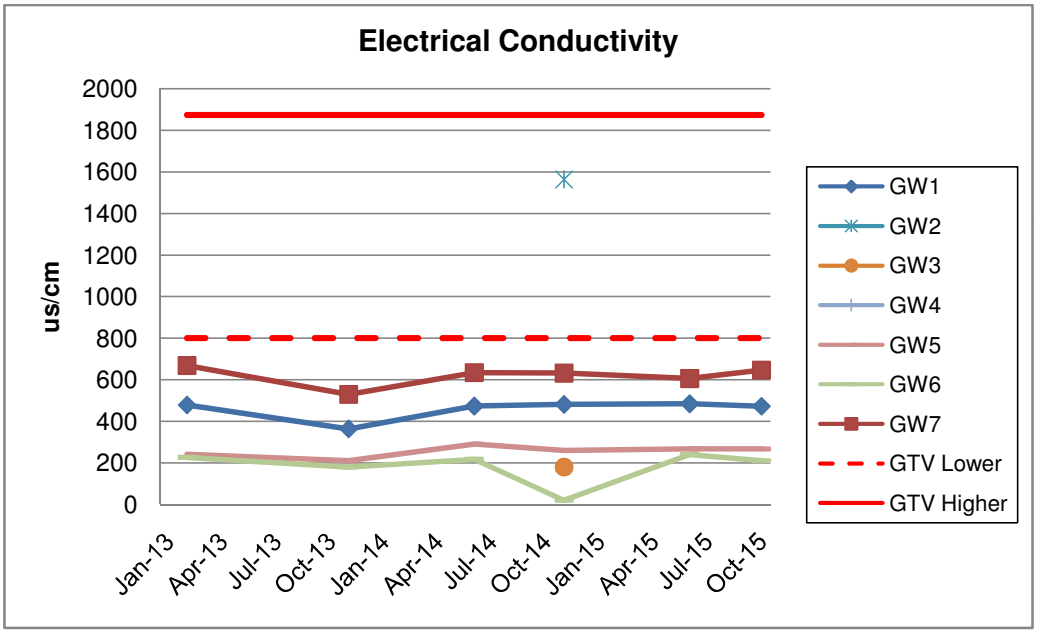
GW 5	Nov-15	<0.040	27.8	267	0.1	2.8	<1	0.02	8.09	<0.15	1.9	34.4	2419.6	0.56	<0.11
GW 6	Nov-15	<0.040	19.6	210	1.5	4.6	<1	<20	6.66	<0.1	3.1	12.5	488	5.81	1.03
GW 7	Nov-15	**2.77**	19.9	647	0.2	2.6	2	<20	6.75	<0.1	3.4	11.7	78	17.09	<0.11

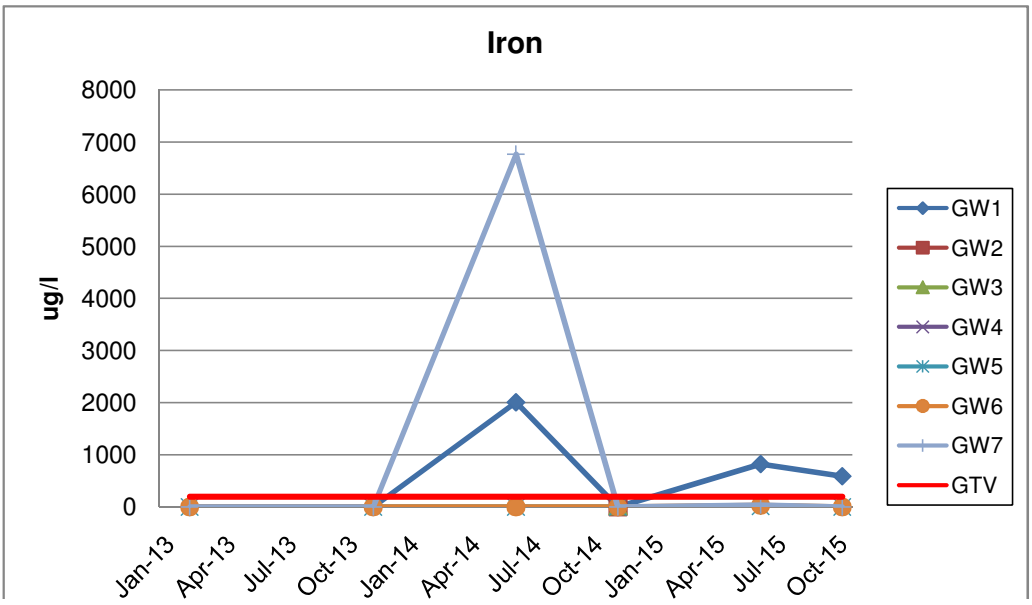
Location	Date	Ammonia (as N)	BOD	COD	Chloride	Conductivity @ 20°C	Dissolved Oxygen (Measurement)	pH	SS	Temp
SW 1	Jun-15	<0.04	<1	15	27.79	104	10.6	7.29	<6	12.5
SW 2	Jun-15	<0.04	<1	19	24.82	106	10.5	7.2	<6	13.2
SW 4	Jun-15	<0.04	<1	18	20.84	105	10.2	7.16	<6	14
SW 5	Jun-15	<0.04	<1	20	29.78	105	10.05	7.17	<6	13.8
SW 6	Jun-15	<0.04	<1	20	24.82	105	10.3	7.19	<6	14.2
SW 1	Oct-15	<0.04	2.54	**57**	21.84	110.3	10.2	7.02	29.25	11.2
SW 2	Oct-15	<0.04	**3.05**	**42**	19.85	115.8	10.3	6.92	42	11.3
SW 4	Oct-15	<0.04	**2.88**	**45**	23.83	115.7	10.3	6.88	39.5	11.2
SW 5	Oct-15	<0.04	2.44	**44**	19.85	114.7	10.3	6.87	44.25	11.3
SW 6	Oct-15	<0.04	2.57	**47**	15.88	114.2	10.2	6.92	39.75	11.2

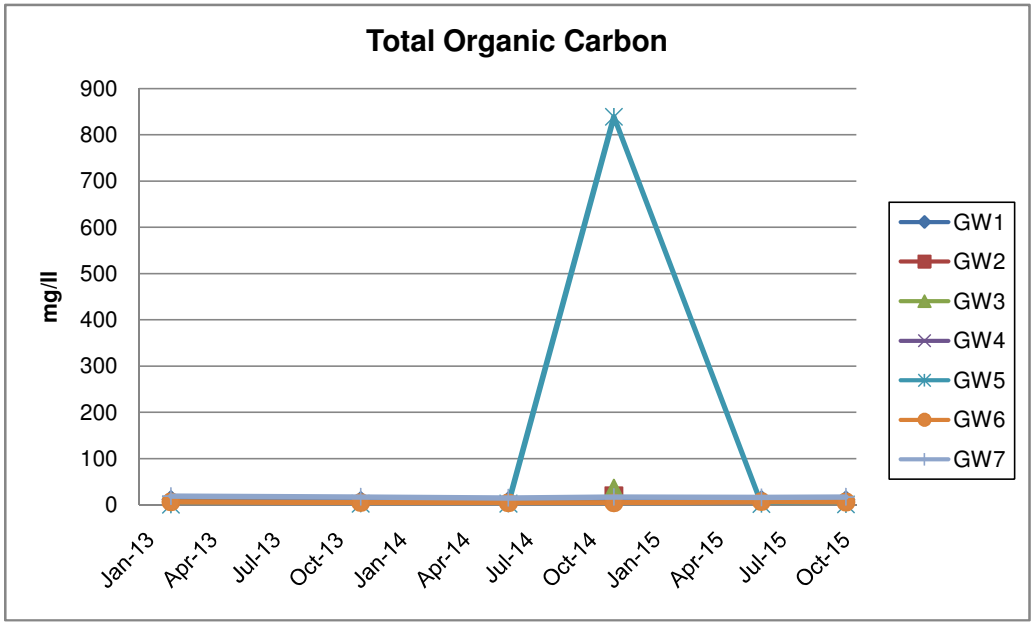
Location	Date	Ammonia (as N)	BOD	COD	Chloride	Conductivity @ 20°C	Depth	pH	TON
Inlet (L2)	Jun-15	38.3	1.45	41	76.43	1036	1.2	6.86	11.5
Outlet (L1)	Jun-15	12.2	1.58	32	39.7	536	0.9	7.2	1.54
Inlet (L2)	Nov-15	83.7	<1	76	107.2	2155	n/a	6.83	0.893
Outlet (L1)	Nov-15	0.55	<1	48	104.2	1415	n/a	7.11	26

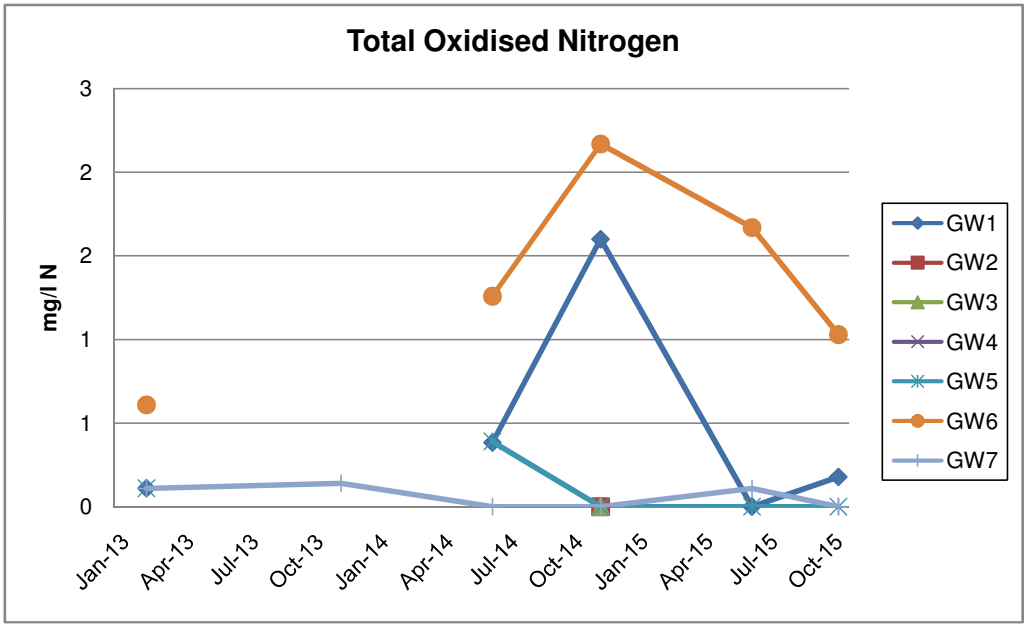
Location	Sample Date	Atmospheric Pressure	Carbon Dioxide	Methane	Oxygen
LG2	Jun-15	1033	0.1	0.1	20.9
LG3	Jun-15	1033	4.5	0.1	15.4
LG5	Jun-15	1033	0.6	0.1	21.1
LG6	Jun-15	NT	NT	NT	NT
LG7	Jun-15	1033	2.2	0.2	19.1
LG8	Jun-15	1033	0.2	0.1	20.7
LG2	Oct-15	1005	0.3	0.1	20.2
LG3	Oct-15	1005	4.8	0.2	19.2
LG5	Oct-15	1005	0.5	0.1	19.6
LG6	Oct-15	1005	0.1	0	19.8
LG7	Oct-15	1005	0.2	0.1	19.3
LG8	Oct-15	1005	0	0.2	19.7

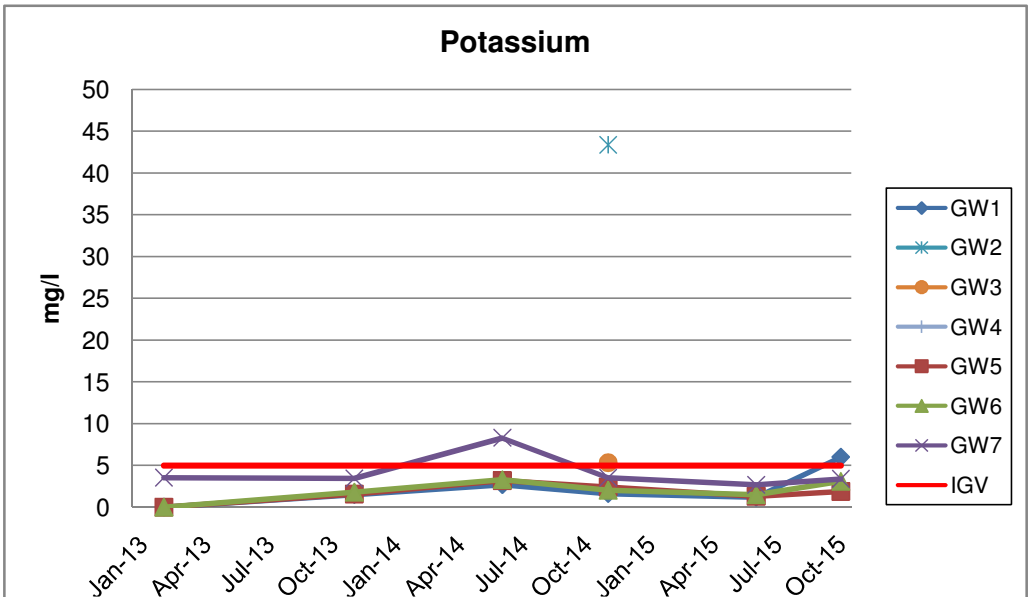

Ammonia (as N)
mg/l N
60
50
40
30
20
10
0
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
GW1
GW2
GW3
GW4
GW5
GW6
GW7
GTV Lower
GTV Higher

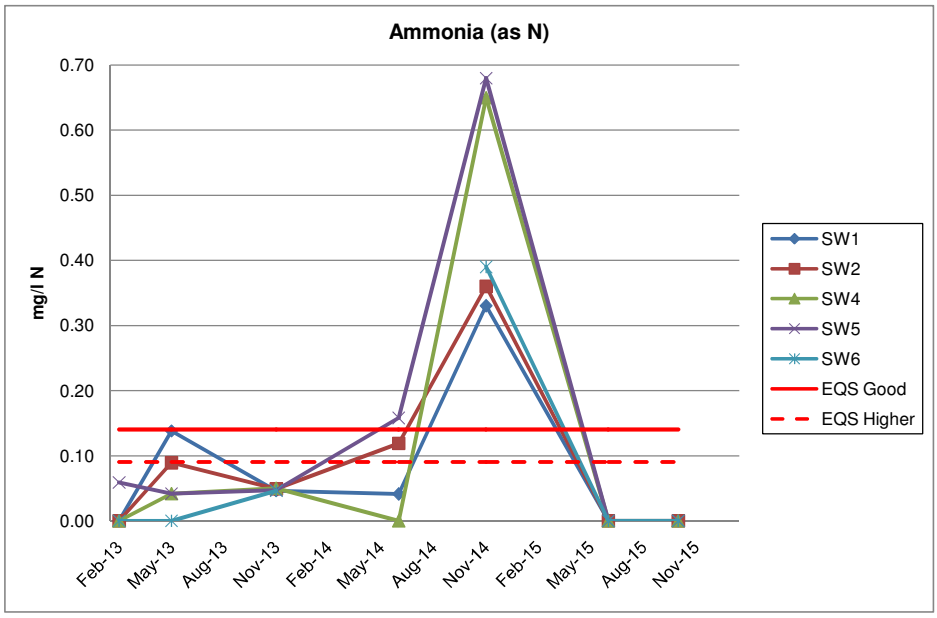

Electrical Conductivity
us/cm
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
GW1
GW2
GW3
GW4
GW5
GW6
GW7
GTV Lower
GTV Higher

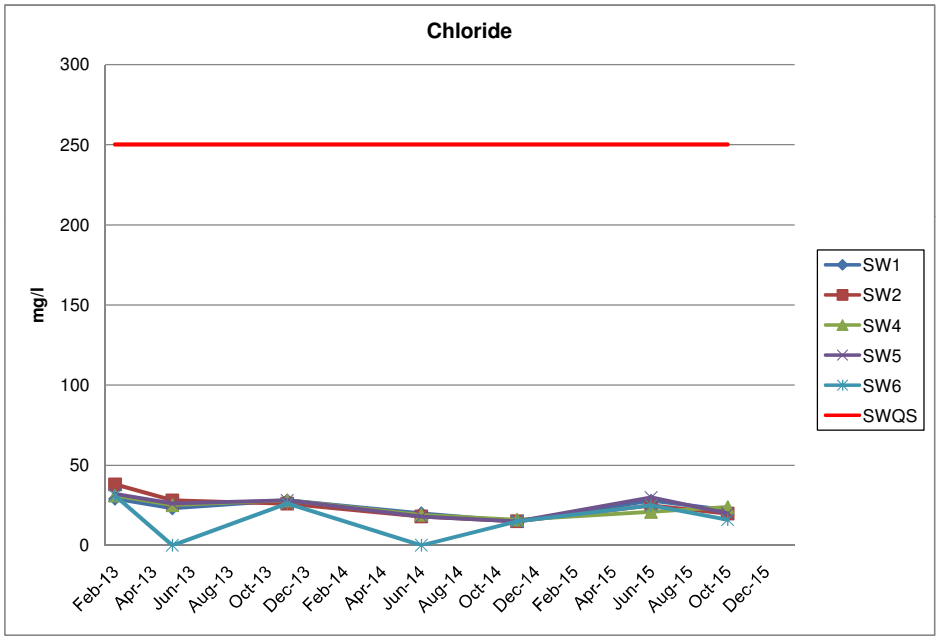

Iron
ug/l
8000
7000
6000
5000
4000
3000
2000
1000
0
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
GW1
GW2
GW3
GW4
GW5
GW6
GW7
GTV

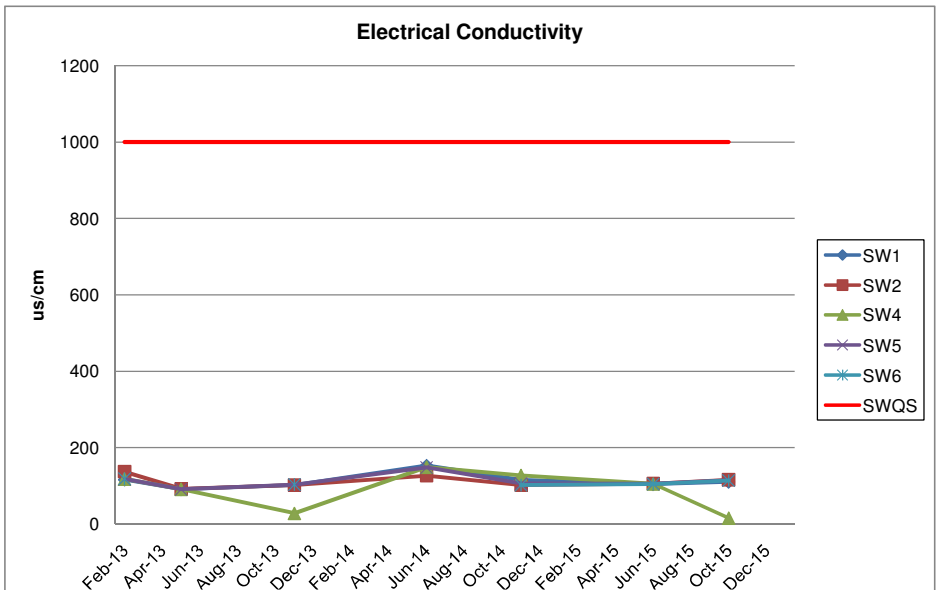

Total Organic Carbon
mg/ll
900
800
700
600
500
400
300
200
100
0
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
GW1
GW2
GW3
GW4
GW5
GW6
GW7

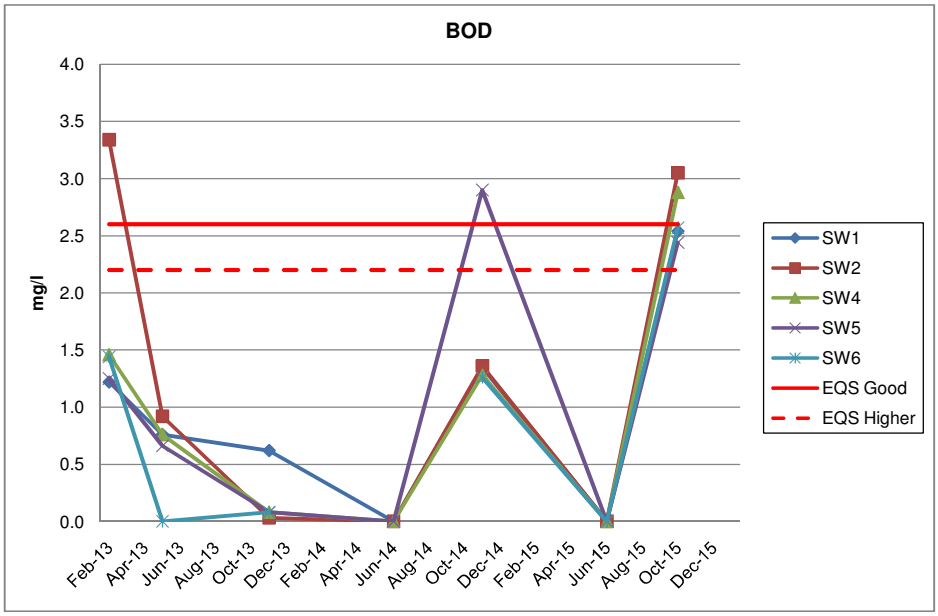

Total Oxidised Nitrogen
mg/l N
3
2
2
1
1
0
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
GW1
GW2
GW3
GW4
GW5
GW6
GW7

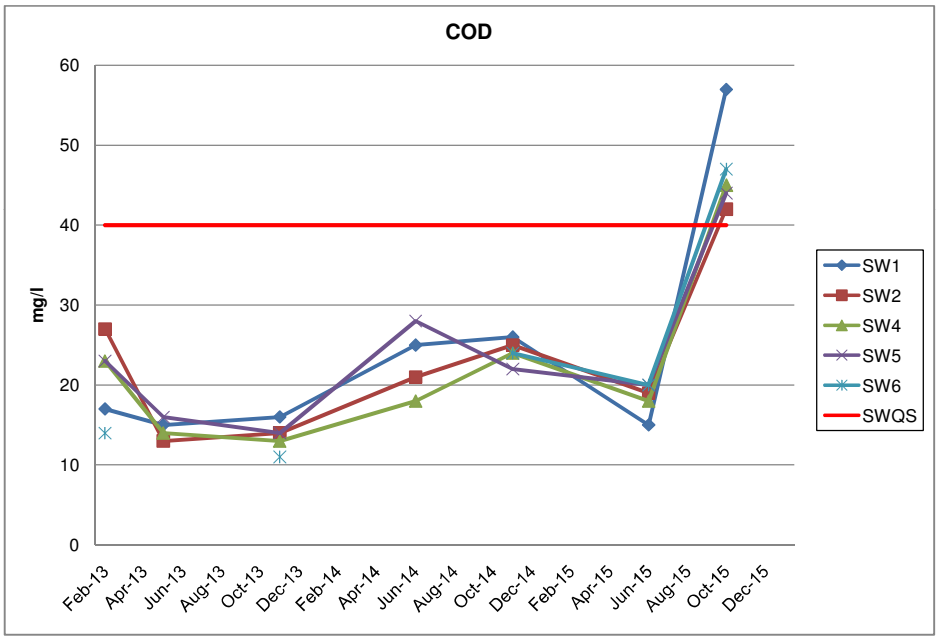

Potassium
mg/l
50
45
40
35
30
25
20
15
10
5
0
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
GW1
GW2
GW3
GW4
GW5
GW6
GW7
IGV


Ammonia (as N)
mg/l N
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Feb-13
May-13
Aug-13
Nov-13
Feb-14
May-14
Aug-14
Nov-14
Feb-15
May-15
Aug-15
Nov-15
SW1
SW2
SW4
SW5
SW6
EQS Good
EQS Higher


Chloride
mg/l
300
250
200
150
100
50
0
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14
Apr-14
Jun-14
Aug-14
Oct-14
Dec-14
Feb-15
Apr-15
Jun-15
Aug-15
Oct-15
Dec-15
SW1
SW2
SW4
SW5
SW6
SWQS


Electrical Conductivity
us/cm
1200
1000
800
600
400
200
0
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14
Apr-14
Jun-14
Aug-14
Oct-14
Dec-14
Feb-15
Apr-15
Jun-15
Aug-15
Oct-15
Dec-15
SW1
SW2
SW4
SW5
SW6
SWQS


BOD
mg/l
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14
Apr-14
Jun-14
Aug-14
Oct-14
Dec-14
Feb-15
Apr-15
Jun-15
Aug-15
Oct-15
Dec-15
SW1
SW2
SW4
SW5
SW6
EQS Good
EQS Higher


COD
mg/l
60
50
40
30
20
10
0
Feb-13
Apr-13
Jun-13
Aug-13
Oct-13
Dec-13
Feb-14
Apr-14
Jun-14
Aug-14
Oct-14
Dec-14
Feb-15
Apr-15
Jun-15
Aug-15
Oct-15
Dec-15
SW1
SW2
SW4
SW5
SW6
SWQS

Appendix D

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)
2015	Closed	1,484	0	0	40,500	6,009	6,009
Total		1,484					6,009

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.	1483.8	mm

Total rainfall in millimetres for Malin_head	Year	2015	2014	2013	2012
	Jan	176	162.2	140.9	134.7
	Feb	85.8	189.9	74.1	68.1
	Mar	123.1	71.6	61.7	29.8
	Apr	64.7	33.4	61.6	46.3
	May	137	86.8	102.5	50.7
	Jun	56.1	48.6	85.5	141.1
	Jul	132.7	86	56.5	91.4
	Aug	111	95.3	92.6	87.3
	Sep	29.7	23	69.7	139.2
	Oct	71.9	131.4	103.8	123.5
	Nov	222.9	134.4	116	87.4
	Dec	272.9	150.5	178.6	149.3
	Annual	1483.8	1213.1	1143.5	1148.8

Appendix E

E-PRTR

(AER Electronic Reporting System)

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2015

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 concentrations - average concentrations for parameters lower in 2015 except for TON.
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) ?	

4.1 RELEASES TO AIR

Link to previous years emissions data

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	134116.6	0.0	134116.6
07	Non-methane volatile organic compounds (NMVOC)	C	OTH	Landgem	0.0	864.7	0.0	864.7
55	1,1,1-trichloroethane	C	OTH	Landgem	0.0	1.07	0.0	1.07
56	1,1,2,2-tetrachloroethane	C	OTH	Landgem	0.0	3.09	0.0	3.09
34	1,2-dichloroethane (EDC)	C	OTH	Landgem	0.0	0.68	0.0	0.68
62	Benzene	C	OTH	Landgem	0.0	2.48	0.0	2.48
02	Carbon monoxide (CO)	C	OTH	Landgem	0.0	65.58	0.0	65.58
58	Trichloromethane	C	OTH	Landgem	0.0	0.06	0.0	0.06
35	Dichloromethane (DCM)	C	OTH	Landgem	0.0	19.89	0.0	19.89
65	Ethyl benzene	C	OTH	Landgem	0.0	8.17	0.0	8.17
73	Toluene	C	OTH	Landgem	0.0	60.09	0.0	60.09
57	Trichloroethylene	C	OTH	Landgem	0.0	6.15	0.0	6.15
60	Vinyl chloride	C	OTH	Landgem	0.0	7.63	0.0	7.63
78	Xylenes	C	OTH	Landgem	0.0	21.3	0.0	21.3
03	**Carbon dioxide (CO2)**	C	OTH	Landgem	0.0	367984.5	0.0	367984.5

* 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

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 onl

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

* 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	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
79	Chlorides (as Cl)	M	OTH	DCC-SOP average concentration* flow rate	636.96	0.0	636.96	0.0	0.0
13	Total phosphorus	M	OTH	DCC-SOP average concentration* flow rate	0.09	0.0	0.09	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	45.03	45.03	0.0	0.0
303	BOD	M	OTH	DCC-SOP average concentration* flow rate	11.28	11.28	0.0	0.0
306	COD	M	OTH	DCC-SOP average concentration* flow rate	433.44	433.44	0.0	0.0
379	**Total Oxidised Nitrogen (TON)**	M	OTH	DCC-SOP average concentration* flow rate	127.69	127.69	0.0	0.0

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