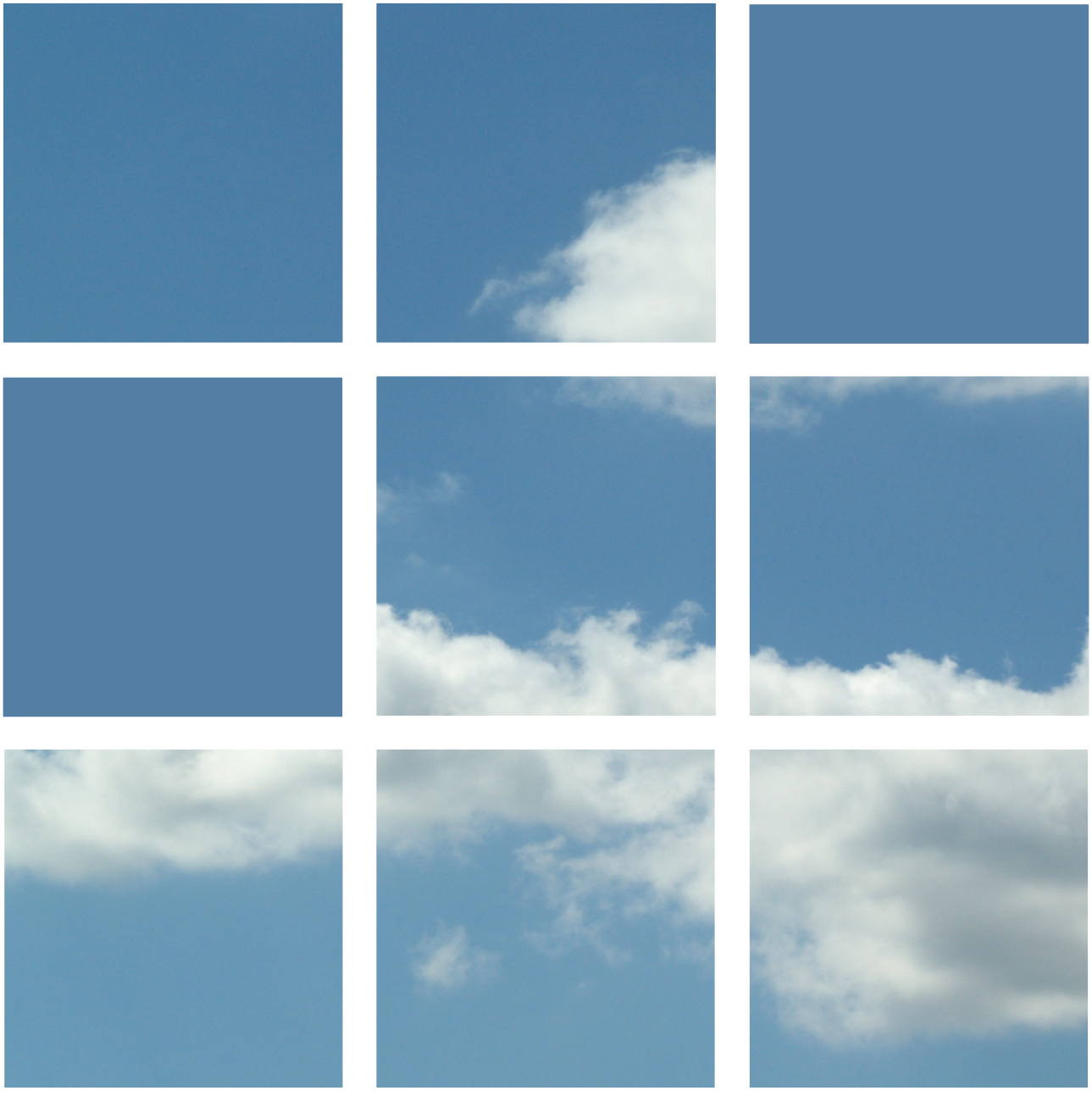
Donegal County Council

Annual Environmental Report 2015
Churchtown Landfill Site

IBR0859 / April 2016



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Contents

1 Introduction 1
2 Reporting Period 2
3 Waste Activities Carried Out at the Facility 3
4 Quantity and Composition of Waste Received and Disposed of during the Reporting Period and each Previous Year 4
5 Calculated Remaining Capacity of the Facility and Year in which Final Capacity is Expected to be Reached 5
6 Methods of Deposition of Waste 6
7 Summary Report on Emissions, Results and Interpretation of Environmental Monitoring . 7
7.1 Environmental Monitoring Requirements 7
7.2 Monitoring Results 7
7.3 Groundwater 7
7.3.1 Upgradient 8
7.3.2 Down Gradient 8
7.4 Surface Water 12
7.4.1 Upstream 12
7.4.2 Downstream 13
7.4.3 Field Drains (SW2 and SW4) 13
7.4.4 Mid and Downstream Locations (SW3, SW5 and SW7) 14
7.5 Leachate 17
7.6 Landfill Gas 17
7.7 Dust and Noise 19
8 Proposed Development of the Site and Timescale of such Development 20
9 Volume of Leachate Produced and Volume of Leachate Transported / Discharged Off Site. 21
10 Report on the Restoration of Completed Cells / Phases 22
11 Site Survey Showing Existing Levels of the Facility at the End of the Reporting Period ... 23
12 Estimated Annual Quantities of Landfill Gas Emitted from the Site 24
13 Estimated Annual Quantity of Indirect Emissions from Groundwater 25
14 Schedule of Environmental Objectives and Targets for the Forthcoming Year 26
15 Report on the Progress Towards Achievement of the Environmental Objectives and Targets Contained in the Previous Years Report 27
16 Full Title and a Written Summary of any Procedures Developed by the Licensee in the Year, which relates to the Facility Operation 28
17 Reported Incidents and Complaints Summaries 29
18 Report on Financial Provisions made under this Licence, Management and Staffing Structure of the Facility and a Programme for Public Information 30

Appendices

Appendix A –Drawings

Appendix B – Monitoring Locations, Frequencies and Parameters

Appendix C – Monitoring Data

Appendix D – Water Balance Calculation

Appendix E - Revised Gas Model Results

Appendix F - E-PRTR

1 Introduction

Donegal County Council holds Waste Licence ref. W0062-1 for Churchtown Landfill Site. The site closed on 31st August 2000. This report provides a review of environmental monitoring data collected for 2015.

The landfill facility at Churchtown occupies an area of approximately 9.7 hectares in the townland of Churchtown, near Lifford, Co. Donegal.

The site is located approximately 3km south west of Lifford and bordered to the northwest by the N15, the main Lifford to Ballybofey Road. The ground to the northeast and southwest of the site is the low lying and gently undulating flood plain of the River Finn both areas being used for grazing. The southeastern boundary is formed by the River Finn. Site Location and Layout are shown on Drawings IBR0859/007 and IBR0859/008.

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	W0062-01
Name of site	Churchtown Landfill Site
Site Location	Lifford, County Donegal
NACE Code	3821
Class/Classes of Activity	Landfill

2 Reporting Period

The reporting period for this Annual Environmental Report (AER) is from January to December 2015.

3 Waste Activities Carried Out at the Facility

In accordance with Condition 5.2 of the waste licence only 11,000 tonnes per annum of inert waste shall be disposed of or recovered at the facility for the purposes of restoration of the site.

The licensed waste 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)1.
- **Class 4:** Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
- **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.

[1] This activity is limited to the disposal of inert waste only at the facility.

4 Quantity and Composition of Waste Received and Disposed of during the Reporting Period and each Previous Year

Only household solid municipal waste, commercial waste of a similar character to solid municipal waste and non-hazardous construction and demolition waste was accepted at the site prior to closure in August 2000. Since closure, the only material to be accepted at the site was a quantity of stone fill, clay (subsoil) and topsoil used for the restoration of the landfill. Table 4.1 shows waste data figures for Churchtown Landfill site from 1998 until 2015.

Table 4.1 Waste quantities accepted (tonnes)

Waste Types	1998	1999	2000	2005	2015
Municipal Waste (20 03 01)	17,900[2]	20,700*	13,800*		
Stone fill, clay (subsoil) and topsoil				4.423[4*]	82,906

Waste data figures where estimated by means of assessment based on the category of vehicle depositing waste at the site.

[2] 1998-2000 figures are estimates
[4] Restoration materials stockpiled on site, this material originated from the development of the Stranorlar Civic Amenity Site and was approved by the EPA.

5 Calculated Remaining Capacity of the Facility and Year in which Final Capacity is Expected to be Reached

The site ceased operation on 31st August 2000.

6 Methods of Deposition of Waste

1,521 m^3 of stone fill, 60,221 m^3 clay (subsoil) and 21,164 m^3 of topsoil were imported for restoration works in 2014/15 (See Table 6.1 below).

The materials were initially stockpiled on the site, before being placed to form the capping system in accordance with the Restoration and Aftercare Plan.

The installation of a 0.5m depth clay cap and topsoil to restore Churchtown Landfill Site and the construction of Integrated Constructed Wetlands (ICWs) and associated works were certified as substantially complete on 17th December 2014 (See Section 8).

Table 6.1 Waste quantities accepted

Waste Types	2014/15 (m^3)
Stone fill	1,521
Clay (Subsoil)	60,221
Topsoil	21,164

7 Summary Report on Emissions, Results and Interpretation of Environmental Monitoring

7.1 Environmental Monitoring Requirements

There is no continuous air, groundwater, surface water or wastewater (sewer) monitoring at Churchtown landfill site. Periodic / non-continuous monitoring of groundwater, surface water, leachate and landfill gas is carried out at the site as per Schedule F of the Waste Licence for the site. These are summarised in the tables contained in Appendix B. Monitoring locations are illustrated in Drawing IBR0859/008.

7.2 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.

7.3 Groundwater

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

- SI No 9 of 2010 European Communities Environmental Objectives (Groundwater) (GTV) and;
- EPA Interim Guideline Values (IGV)[5].

Groundwater flows in a southeasterly direction towards the River Finn. Groundwater quality monitoring was originally carried out at four locations, BH1, BH2, BH3 and BH4 as listed in Table F.4.2 in the waste licence. These original wells were installed in August 1998, however wells BH1, BH2 & BH3 ceased to be used for groundwater monitoring, as they are located within waste. They now serve as leachate wells (L1, L2 & L3).

Three additional boreholes were required by the Waste Licence (Condition 4.11) and the installation work was undertaken in July 2001. BH1 (downstream) and BH3 (upstream) were successfully relocated. Difficulty was encountered in the installation of a second down gradient borehole. Despite four additional pits being started along the length of the landfilled boundary each location encountered waste and therefore were deemed inappropriate to be

[5] Environmental Protection Agency Interim Guideline Values for Groundwater as presented in EPA interim report "Towards Setting Guideline Values for the Protection of Groundwater in Ireland" 2002.

used as a groundwater borehole. It was not possible to move further down gradient due to the fact that the river is in such close proximity to the landfill site. As a result there is only one down gradient groundwater monitoring point (BH1).

Groundwater monitoring is now undertaken at BH1 and BH3 which were installed in July 2001 and BH4 installed in 2014. BH3 and BH4 are representative of up gradient groundwater quality and borehole BH1 is representative of down gradient water quality. Analysis of groundwater List I / II results were undertaken in 2015 and results are provided in Appendix C.

7.3.1 Upgradient

The GWR guideline value for ammonia is 0.175 mg/l. One elevated concentration of ammonia relative to the screening value is recorded in up gradient borehole BH4 in September when a value of 0.21 mg/l N was recorded. Trends for ammonia in groundwater are provided in graph format in Appendix C. It is important to note that elevated levels of ammonia up gradient trigger an emission incident on the site.

No other elevated concentrations, relative to the appropriate screening values, of parameters measured are recorded up gradient of the site during the monitoring period except for:

- Faecal Coliforms in all boreholes, highest 649 no/l in BH3,
- Chromium 128.7 ug/l (BH3)
- Manganese 330 ug/l (BH3)

Volatile Organic Compound (VOC) parameters analysed were all below the lower limit of detection for the methodology used.

7.3.2 Down Gradient

One elevated concentration of ammonia relative to the screening value is recorded in down gradient borehole BH1 in June when a value of 0.97 mg/l N was recorded. No elevated concentrations, relative to the appropriate screening values, of parameters measured are recorded down gradient of the site during the monitoring period.

VOC parameters analysed were all below the lower limit of detection for the methodology used.

Trends for a number of key parameters are provided in graph format in Appendix C.

A hydrogeological risk assessment was undertaken in 2015 and submitted to the EPA. The report found that groundwater quality data does not indicate any upwards trends over time. Both groundwater and surface water contaminant fluxes from the landfill have the potential to impact on the quality of the River Finn. However, available data suggests that groundwater contaminant fluxes to the river are having a negligible effect on the river downstream of the landfill. Groundwater quality is expected to improve after the ICW and willow treatment has been commissioned (See Section 8).

Table 7.1 Groundwater Results 2015

Location	Date	Ammonia (as N)	Chloride	Conduct'y @ 20°C	DO	Iron	Nitrate (as N)	pH	Phenols	Potassium	Sodium	Temp	TOC	TON
BH1	Mar-15	0.05	51.61	324	7.2	<20	0.15	7.6	<0.15	2.7	20.6	6.8	4.1	0.15
BH 3	Mar-15	0	30.77	798	6.9	<20	0.05	7.6	<0.15	1.7	13.8	6.7	1.12	<0.11
BH 4	Mar-15	0	34.74	403	6.3	<20	5.29	6.9	<0.15	3.4	14.7	7	4.11	5.33
BH1	Jun-15	**0.97**	47.64	363	8.31	30	0.193	7.72	<0.15	2.2	17.7	16.1	1.7	0.192
BH 3	Jun-15	<0.04	23.82	494	7.15	<0	<0.1	7.56	<0.15	1.3	13	14.8	0.717	<0.1
BH 4	Jun-15	0.129	32.76	347	8.68	3	5.201	6.43	<0.15	2.3	12.5	15.5	1.21	5.2
BH1	Sep-15	<0.028	28.78	7.54	7.8	<20	0.574	7.54	<0.1	2.6	18.4	11.1	1.77	0.574
BH 3	Sep-15	0.052	24.81	503	7.1	<20	NT	7.51	<0.1	1.5	13	11.5	0.263	0.097
BH 4	Sep-15	**0.209**	29.77	380	6	<20	9.78	6.37	<0.1	2.9	14.1	11.4	1.03	9.78
BH 1	Nov-15	<0.04	40.7	367	8.9	<0.02	0.271	7.68	<100	2.8	19.4	11.1	1.42	0.27
BH3	Nov-15	<0.04	27.8	498	4.7	<0.02	0.053	7.37	<100	1.8	13.8	11.1	3.05	0.06
BH 4	Nov-15	<0.04	30.8	383	6.4	<0.02	4.6	6.34	<100	3.1	15.3	11	0.68	4.65

Location	Date	Alkalinity	Boron	Cadmium	Calcium	Chromium	Copper	Cyanide	Faecal Coliforms (E-coli)	Fluoride	Lead (ug/l)	Magnesium	Manganese	Mercury	Nitrite	Ortho-Phosphate	Sulphate	Zinc
BH1	Nov-15	120	0.02	<0.0001	43	<0.003	<0.003	<0.009	10	<0.1	<0.0003	9.9	0.062	<0.00002	<0.010	0.022	2.6	1.4
BH3	Nov-15	101	<0.02	<0.0001	79	**0.1287**	<0.003	<0.009	**649**	0.13	<0.0003	11	**0.33**	<0.00002	0.007	0.028	5.5	<1
BH4	Nov-15	118	<0.02	<0.0001	54	<0.003	<0.003	<0.009	1	<0.1	<0.0003	5.6	0.0073	<0.00002	0.052	0.0761	10	<0.02

7.4 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).

Churchtown Landfill Site is situated in the lower alluvial flood plain of the River Finn. The River forms the boundary to the south east of the site. Monitoring of surface water quality is carried out at seven locations (SW1 - SW7). SW7 (downstream) was added to surface water monitoring locations as required by Condition 4.13 of the Waste Licence. The land drains to each side of the waste are currently deemed to be surface water systems, however they effectively serve as leachate drains. Restoration works have now been undertaken on site.

Monitoring point SW1 is upstream of the waste body in a field drain that subsequently runs adjacent to the landfill along its north eastern boundary. SW6 is upstream of the facility within the River Finn which forms the south eastern boundary of the site. Mid and downstream locations in the River Finn are SW3, SW5 and SW7. SW2 and SW4 are located at the River Finn end of field drains that run along the two sides of the waste body. The location of surface water monitoring points is provided in Appendix A.

Analysis of List I / II results were undertaken in 2015 and results are provided in Appendix C.

7.4.1 Upstream

The EQS 2009 guideline value for ammonia for good status is 0.140 mg/l N. Elevated concentrations of ammonia relative to this screening value were recorded upstream of the site at SW1 for 3 of the 4 sampling dates during the monitoring period. These elevated concentrations ranged from 0.14 to 2.02 mg/l N and reflect the baseline conditions of surface water upstream of the site. It is important to note that these elevated levels of ammonia upstream trigger an emission incident on the site.

An elevated concentration of iron relative to screening value (200 µg/l) was recorded upstream at SW1 and SW6 with concentrations ranging from 680 to 11,000 µg/l. The upstream concentration of Manganese exceeded the SWQS value (50 µg/l) when a

concentration of 420 µg/l was recorded at SW1. These results indicate iron and manganese occur naturally at elevated levels in the groundwater in this area.

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

VOC parameters analysed were all below the lower limit of detection for the methodology used.

7.4.2 Downstream

A number of parameters monitored downstream of the site exceed the appropriate screening value. These are summarised in Table 7.2 below and results are provided in table and graph format in Appendix C.

Table 7.2 Surface Water Quality Downstream

Parameter	SWQS	EQS	SW Monitoring Point
Ammonia (mg/l N)		0.14 (good status)	SW2,SW4, SW5
BOD (mg/l)		2.6 (good status)	SW4, SW5, SW7
COD (mg/l)	40		SW2, SW4, SW5, SW7
Conductivity (µS/cm)	1,000		SW2, SW4, SW5
Annual Analyses			
Iron (µg/l)	200		SW1 to SW7
Manganese (µg/l)	50		, SW2, SW4

7.4.3 Field Drains (SW2 and SW4)

Elevated concentrations of ammonia relative to the screening value were also recorded downstream of the site at surface water monitoring points SW2 and SW4, these side drains effectively serve as leachate drains. These elevated concentrations ranged from SW2 (range 5.47-58.50 mg/l N) and SW4 (range 20.1-55.0 mg/l N).

Concentrations of manganese above the SWQS guideline value of 50µg/l were recorded at SW2 and SW4 during the monitoring period with a range of 1400 to 1500 µg/l. Elevated concentrations of iron above the SWQS were recorded in field drains (SW2 and SW4) with a range of 5200 to 8800 µg/l.

Elevated concentrations of electricity conductivity, BOD, COD and EC relative to the screening values, as set out in Table 7.1 above, were recorded downstream of the site in the field drains. Results are presented in Table 7.3.

7.4.4 Mid and Downstream Locations (SW3, SW5 and SW7)

Elevated concentrations of ammonia relative to the screening value were also recorded downstream of the site at SW5 and SW7. These elevated concentrations ranged from 0.85 to 53.50 mg/l N. It is important to note surface water monitoring point SW5 is located at the end of one of the leachate toe drains, therefore it is not representative of the river quality.

Iron concentrations exceeded the EQS guideline value of 200 ug/l at mid and downstream surface water monitoring locations with a range of 690 to 710 ug/l. 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 an anaerobic environment such as peat.

Elevated concentrations of electricity conductivity, BOD, COD and EC relative to the screening values, as set out in Table 7.2 above, were recorded downstream of the site in the field drains. Results are presented in Table 7.3.

VOC parameters analysed were all below the lower limit of detection for the methodology used except for Diphenylamine 2.9 ug/l at SW5.

A hydrogeological risk assessment suggests that the landfill is having a limited impact on the quality of the River Finn in the immediate vicinity of the landfill in its current setup. The impact at SW3 is predominantly attributed to the discharges from the site drains at the landfill site.

Leachate was not contained during this reporting period, however, the bio-remediation of the site using willow (see Section 8) and ICW is currently being tested and commissioned. It is anticipated that surface water quality will improve significantly when leachate is being pumped into the willow crop and ICW.

Table 7.3 Surface Water Quality Downstream

	Sample Date	Ammonia (as N)	BOD	Chloride	COD	Conduct'y @ 20°C	Copper	Dissolved Oxygen (Measurement)	Nitrate (as N)	Nitrite (as N)	pH	Phenols	SS	Temp	Zinc
SW 1	Mar-15	0.14	0.88	37.72	5	247	<3	11.9	3	<0.01	6.91	<0.15	<6	7	11.2
SW 2	Mar-15	**5.47**	0.92	39.7	9	378	<3	11.9	2.77	0.02	7.03	<0.15	<6	7	12.1
SW 3	Mar-15	0.03	0.57	32.76	7	185	<3	12.1	0.56	0.01	7.22	<0.15	<6	7.1	11.5
SW 4	Mar-15	**24.4**	1.14	61.54	29	720	<3	11.7	1.89	0.01	6.89	<0.15	19.8	6.8	13.5
SW 5	Mar-15	**15.3**	0.5	51.62	28	552	<3	11.8	1.41	0.02	6.9	<0.15	11.4	7	10.1
SW 6	Mar-15	0.1	0.45	32.76	12	187	<3	12	0.5	0.01	7.3	<0.15	<6	7	6.1
SW 7	Mar-15	0.14	0.1	31.76	**181**	193	<11	12	0.49	0.01	7.28	<0.15	<6	7	11
SW 1	Jun-15	**0.245**	0.85	37.72	20	271	<0.003	10.8	2.508	<0.01	6.84	<0.15	12.6	11.1	0.015
SW 2	Jun-15	**26.8**	2.5	57.57	33	842	<0.003	7.5	0.384	0.023	7.33	<0.15	41.6	11.2	0.025
SW 3	Jun-15	0.132	1.35	22.83	23	111.6	<0.003	11.2	0.128	<0.01	7.15	<0.15	6	11.2	0.029
SW 4	Jun-15	**46.4**	**6.2**	96.28	**64**	**1542**	<0.003	5.7	<0.1	0.022	6.59	<0.15	259.2	11.2	0.035
SW 5	Jun-15	**0.847**	5.67	24.82	24	122.6	<0.003	11.3	0.161	<0.01	7.05	<0.15	6.6	11.2	0.023
SW 6	Jun-15	0.069	1.58	26.8	24	109.1	<0.003	11.3	0.147	0.02	7.07	<0.15	<6	11.3	0.018
SW 7	Jun-15	**0.58**	**5.72**	25.81	26	123	<0.003	11.3	0.15	<0.01	7.05	<0.15	<6	11.3	0.019
SW 1	Sep-15	**2.02**	2.58	22.83	20	649	NT	7.6	1.32	<0.01	6.28	<0.1	74.57	13.8	NT
SW 2	Sep-15	**58.5**	2.45	25.81	**49**	**1200**	NT	7.8	0.511	0.016	7.56	<0.1	57.5	14.7	NT
SW 3	Sep-15	0.057	2.14	21.83	32	84.5	NT	9.3	0.229	<0.01	7.04	<0.1	6	15.8	NT
SW 4	Sep-15	**55**	**8.45**	30.77	**54**	**1153**	NT	5.6	0.973	0.043	7.1	<0.1	93.43	15.7	NT
SW 5	Sep-15	**53.5**	**3.44**	29.77	**54**	**1128**	NT	7.7	0.952	0.043	7.22	<0.1	21	15.1	NT

	Sample Date	Ammonia (as N)	BOD	Chloride	COD	Conduct'y @ 20°C	Copper	Dissolved Oxygen (Measurement)	Nitrate (as N)	Nitrite (as N)	pH	Phenols	SS	Temp	Zinc
SW 6	Sep-15	**0.402**	2.16	20.84	32	91.8	NT	9.4	<0.252	<0.01	7.21	<0.1	6	15.3	NT
SW 7	Sep-15	0.078	2.15	22.83	37	84.1	NT	9.3	0.24	0.01	7.06	<0.1	6.8	15.3	NT
SW 1	Nov-15	<0.04	1.25	28.8	6	273	0.003	8.6	0.809	0.025	6.92	0.1	758	10.8	9.3
SW 2	Nov-15	**48.8**	2.6	70.5	**54**	**1413**	<0.003	6.6	0.238	0.027	7.38	<0.1	43.67	10.8	2.8
SW 3	Nov-15	<0.04	0.67	18.9	26	116	<0.003	9.8	0.124	<0.010	7.05	<0.1	<6	10.7	2.2
SW 4	Nov-15	**20.1**	**2.77**	47.6	**47**	678	<0.003	6.9	0.111	<0.010	6.81	<0.1	35.75	10.7	13.6
SW 5	Nov-15	<0.04	0.71	18.9	30	116	<0.003	9.8	0.127	<0.010	7.01	<0.1	<6	10.8	2.9
SW 6	Nov-15	<0.04	0.73	16.9	26	114	<0.003	9.8	0.13	<0.010	6.97	<0.1	<6	10.6	1.8
SW 7	Nov-15	<0.04	0.69	17.9	34	115	0.017	9.9	0.125	0.003	6.94	<0.1	<6	10.6	12.5

	Date	Alkalinity	Cadmium	Calcium	Chromium	Iron (ug/l)	Lead (ug/l)	Magnesium	Manganese	Mercury	Ortho-phosphate	Potassium	Sulphate	TON
SW 1	Nov-15	81	0.1	35.4	5.3	**11000**	3.1	4.7	**420**	0.04	<0.01	3.9	2.5	0.834
SW 2	Nov-15	36	<0.1	112	<3	**5200**	0.5	37.2	**1500**	0.03	0.032	40.7	6.5	0.265
SW 3	Nov-15	44	<0.1	12.1	<3	**710**	<0.3	2.1	41	0.03	0.0188	1.5	37	0.13
SW 4	Nov-15	45	<0.1	53.7	<3	**8800**	0.5	14	**1400**	0.02	0.031	19.7	9.3	0.12
SW 5	Nov-15	35	<0.1	12.1	<3	**690**	<0.3	2.1	41	0.03	0.02	1.4	7.2	0.135
SW 6	Nov-15	44	<0.1	11.9	3	**680**	<0.3	2.1	37	0.02	<0.01	AR	AR	0.138
SW 7	Nov-15	32	<0.1	11.8	3	**700**	0.9	2.2	46	0.02	<0.01	1.4	6.5	0.128

7.5 Leachate

Churchtown Landfill Site was designed on a dilute and disperse basis. However the boulder clay layer underlying the site functions as an aquitard preventing downward migration of leachate. No formal drainage system was provided on the site however the two land drains that run the length of the north-eastern and south-western sides of the landfill direct surface water, and any leachate emitting from the waste body, into the River Finn.

Monitoring of leachate was carried out at three locations on site at L1 to L3 as shown on Drawing IBR0859/008. Results are presented in Appendix C. Some characteristic parameters have been compared with those of 'typical' raw leachate in Table 7.4 below.

Table 7.4 Raw Leachate Concentrations 2015

	Churchtown Landfill Site		From 30 samples from UK/Irish landfills accepting domestic waste Results in mg/l		
Parameter	**Min.Conc**	**Max.Conc**	**Min.Conc**	**Max.Conc**	**Mean**
Ammonia (mg/ l N)	37.6	165	<0.2	1700	491
BOD	2.7	26.7	4.5	>4800	>834
COD	54.6	287.85	<10	33,700	3078
Chloride (mg/l)	54.6	287.85	27	3410	1256
Iron (ug/l)	1.7	39,000	0.4	664	54.4
Potassium (mg/l)	45.9	182.4	2.7	1480	491
Sodium (mg/l)	44	242.7	12	3000	904
TON (mg/l N)	<0.1	0.553	/	/	/
Conductivity (µS/cm)	6.84	4,310	503	19,200	7789
pH (pH units)	6.58	7.0	6.4	8.0	7.2

Results remain within typical ranges for key leachate parameters (ref. typical parameter ranges for leachate as contained in EPA Manual 'Landfill Operational Practices' 1997).

7.6 Landfill Gas

It was previously discovered that a number of the monitoring wells were covered over and lost when the interim cap was topped up. The remaining wells became inaccessible or lost as a result of the restoration works. All these wells were replaced at the end of this reporting period.

Results for 2015 are available from 9 piezometer wells (LG1 to LG9). These wells are all in waste except LG8A and LG9A. The wells located within the waste show a variation in concentration for methane and carbon dioxide during the monitoring period.

LG8A and LG9A are located on the northern boundary. Monitoring of landfill gas at LG9 has shown raised levels for methane and carbon dioxide. Works are currently being planned to construct a venting trench along the perimeter at this location

Table 7.5 Landfill Gas Results 2015

Location	Date	Atmospheric Pressure	Carbon Dioxide %v/v	Methane %v/v	Oxygen %v/v
LGAa	18/03/2015	1026	0.1	0	21.5
LG2A	18/03/2015	1026	28.3	71.5	0.4
LG3A	18/03/2015	1026	25.1	71.3	0.3
LG5A	18/03/2015	1026	29.5	69.3	0.2
LG6A	18/03/2015	1026	29.6	68.8	1.1
LG7A	18/03/2015	1026	26	70.2	0.1
LG8A	18/03/2015	NT	NT	NT	NT
LG9A	18/03/2015	NT	NT	NT	NT
LG1A	04/06/2015	1023	9.4	0.7	16.1
LG2A	04/06/2015	1022	32.2	66.8	0.6
LG3A	04/06/2015	1022	26.9	70.4	0.2
LG5A	04/06/2015	1022	36.1	63.1	0
LG6A	04/06/2015	1022	35.7	63.2	0
LG7A	04/06/2015	1022	26.6	69.4	0.3
LG8A	04/06/2015	1022	1.8	0.5	17.7
LG9A	04/06/2015	1022	13.6	17.1	1.8
LG1A	23/09/2015	1000	14.1	0.3	11.2
LG2A	23/09/2015	1000	39.7	63.1	0.7
LG3A	23/09/2015	1000	37	65.1	0.1
LG5A	23/09/2015	1000	2.3	38.3	2.3
LG6A	23/09/2015	1000	44.4	57.3	0
LG7A	23/09/2015	1000	35	68.3	0.1
LG8A	23/09/2015	1000	1.7	0.2	17.8
LG9A	23/09/2015	1000	10.3	35.1	0.3

7.7 Dust and Noise

There is currently no activity on site and as such no nuisance monitoring programme. Should any operational activity commence on site requirements for dust and noise control and monitoring will be reviewed in line with the Licence and the Environmental Management System for the site.

8 Proposed Development of the Site and Timescale of such Development

During the 2013 reporting period the Council, with support from the ANSWER Project, proposed to the Agency a bio-technology solution to restoring Churchtown LS involving the use of a willow crop and Integrated Constructed Wetlands (ICW) in combination for the treatment of leachate and a low permeability clay cap together with ancillary works. The SEW for this project was approved in January 2014. Construction works to install a 0.5m depth clay cap and topsoil to restore Churchtown Landfill Site and the construction of a willow crop, ICW and associated works were certified as substantially complete on 17th December 2014. The layout of the willow crop and ICW is provided in Drawing IBR0859/008.

The installation of M&E services and associated civil engineering accommodation works to facilitate distribution of leachate from the collection sumps has been completed and testing and commissioning are ongoing.

9 Volume of Leachate Produced and Volume of Leachate Transported / Discharged Off Site

A water balance calculation has been carried out, see Section 14 and Appendix D. Using this calculation the amount of leachate generated by the landfill has been estimated. The estimate for the year from the calculation is 10,387 m^3. As stated above the bio-remediation of the site using willow (see Section 8) to allow for the collection and storage of leachate prior to the irrigation of the willow crop with leachate and ICW for any residual flow is currently being tested and commissioned.

10 Report on the Restoration of Completed Cells / Phases

See Section 8 for information about restoration works.

11 Site Survey Showing Existing Levels of the Facility at the End of the Reporting Period

The latest site survey following latest works on site was undertaken on the 5th December 2014 and will be submitted to the EPA as part of the CQA report for the works.

12 Estimated Annual Quantities of Landfill Gas Emitted from the Site

Gas emissions from the landfill were remodelled using GasSim in 2005. The revised model results are provided in Appendix E.

The estimated total landfill gas rate for 2015 is 58 m^3/hr.

13 Estimated Annual Quantity of Indirect Emissions from Groundwater

Prior to restoration the site operated on a dilute and disperse basis and as such any leachate generated disperses into the surrounding environment. A water balance calculation is included in Appendix E. This indicates that the estimated volume of leachate being produced at the site for 2015 is approximately 10,387 m^3

14 Schedule of Environmental Objectives and Targets for the Forthcoming Year

Please refer to Section 8.

15 Report on the Progress Towards Achievement of the Environmental Objectives and Targets Contained in the Previous Years Report

Progress towards meeting targets and objectives set down for the reporting period is outlined in Section 8.

16 Full Title and a Written Summary of any Procedures Developed by the Licensee in the Year, which relates to the Facility Operation

Environmental Management Procedures have been developed for the purpose of maintaining and assessing the Environmental Management System. Operational procedures ensure that the routine operational tasks related to the environmental management of the facility are undertaken in a satisfactory manner as required to maintain effective control of the environmental aspects of the facility.

An Environmental Management System (EMS) was submitted to the EPA during 2004 and approved. During 2006 the document was reviewed and there was not deemed to be any need to revision of addition of any procedures. This remains the situation.

17 Reported Incidents and Complaints Summaries

Other than the reporting of on-going emissions exceedances detected in the routine monitoring programme (8 in total), no incidents occurred during the monitoring period and no complaints were received.

One non compliance was noted on 05/08/15. This non-compliance was for the non submission of groundwater risk screening report. The groundwater risk screening report was submitted on 16/12/15.

18 Report on Financial Provisions made under this Licence, Management and Staffing Structure of the Facility and a Programme for Public Information

Management of the landfill site is as follows.

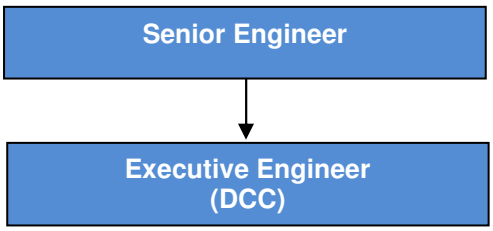


Figure 18.1 Management Structure

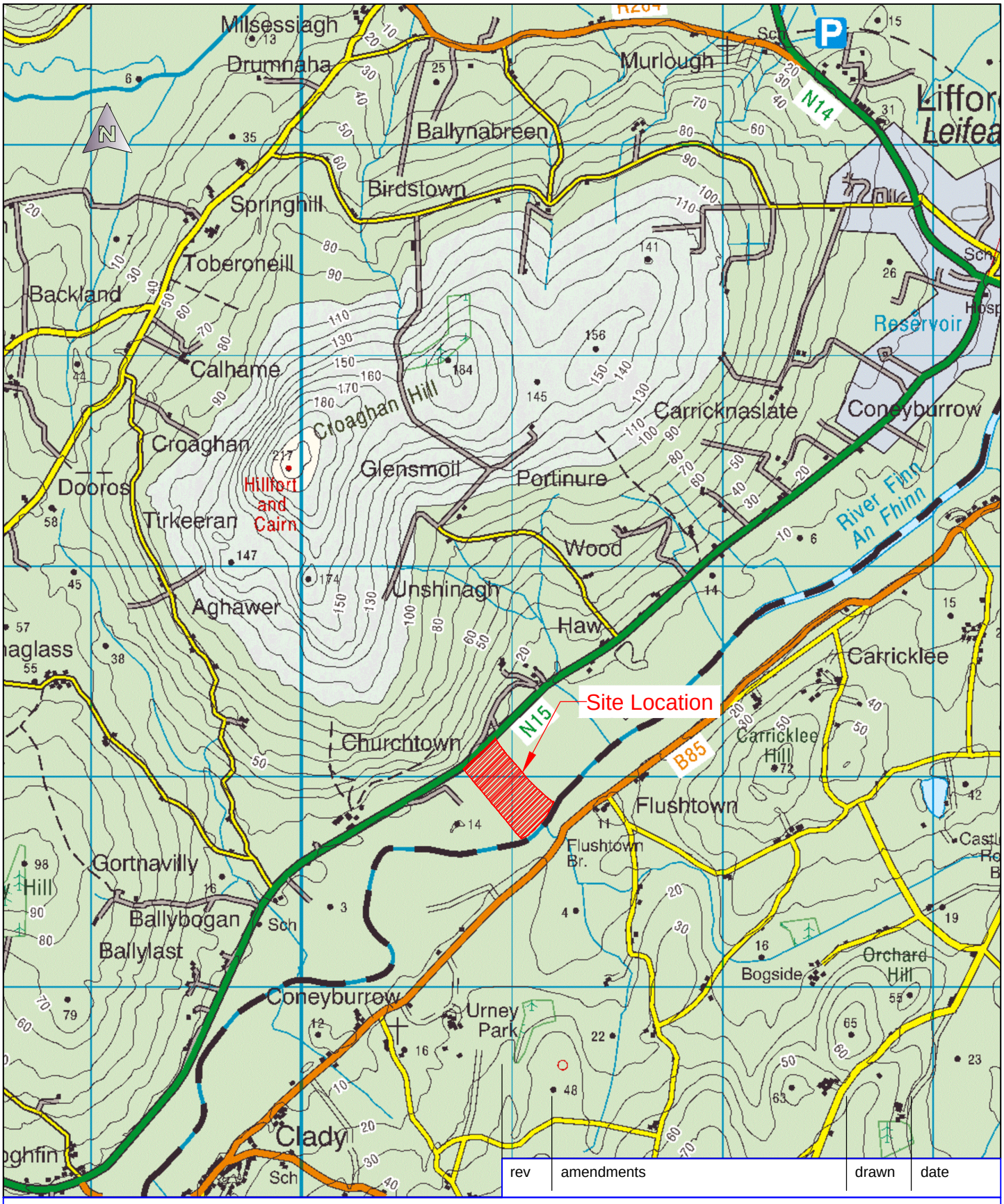
Senior Engineer**:** Overall responsibility for the management of the site and maintenance of the Waste Licence. Delegation of authority and responsibility to ensure the effective management of the facility.

Executive Engineer: Responsible for the operational management of the facility as directed by the Senior Engineer.

A public communication programme has been initiated 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 in Lifford. Details regarding this are contained in Section 2 of the Environmental Management System Manual.

As a Local Authority, Donegal County Council is fully committed to the on-going investment as required by this facility to ensure that it is properly managed environmentally.

Appendix A
Drawing



rev	amendments	drawn	date

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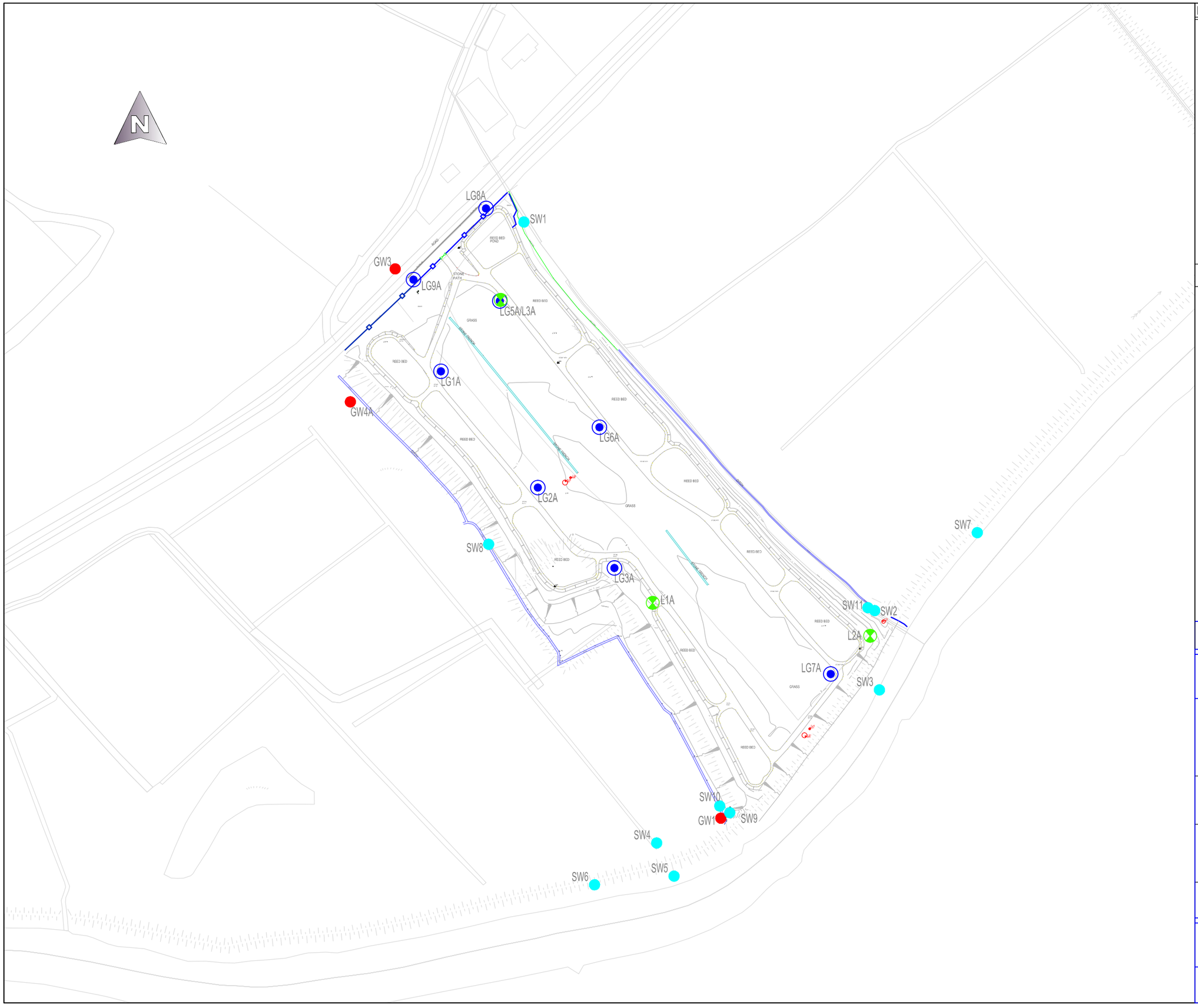
Drawing Number	Rev
IBR0859/007	0

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

Drawing Status	Sheet Size	Drawing Scale	Project Leader	Drawn By	Date	Initial Review
Preiliminary	A4	1:50.000	AMcG	AMB	Apr' 15	CG



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. Date Surveyed 05 December 2014 by LSS Survey Services

5. Keys

- GW1 — Ground Water Monitoring Boreholes
- LG7A — Gas Monitoring Boreholes
- L1A — Leachate Monitoring Boreholes
- SW1 — Surface Water Monitoring Boreholes

rev	amendments	drawn	date

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Client
Donegal County Council

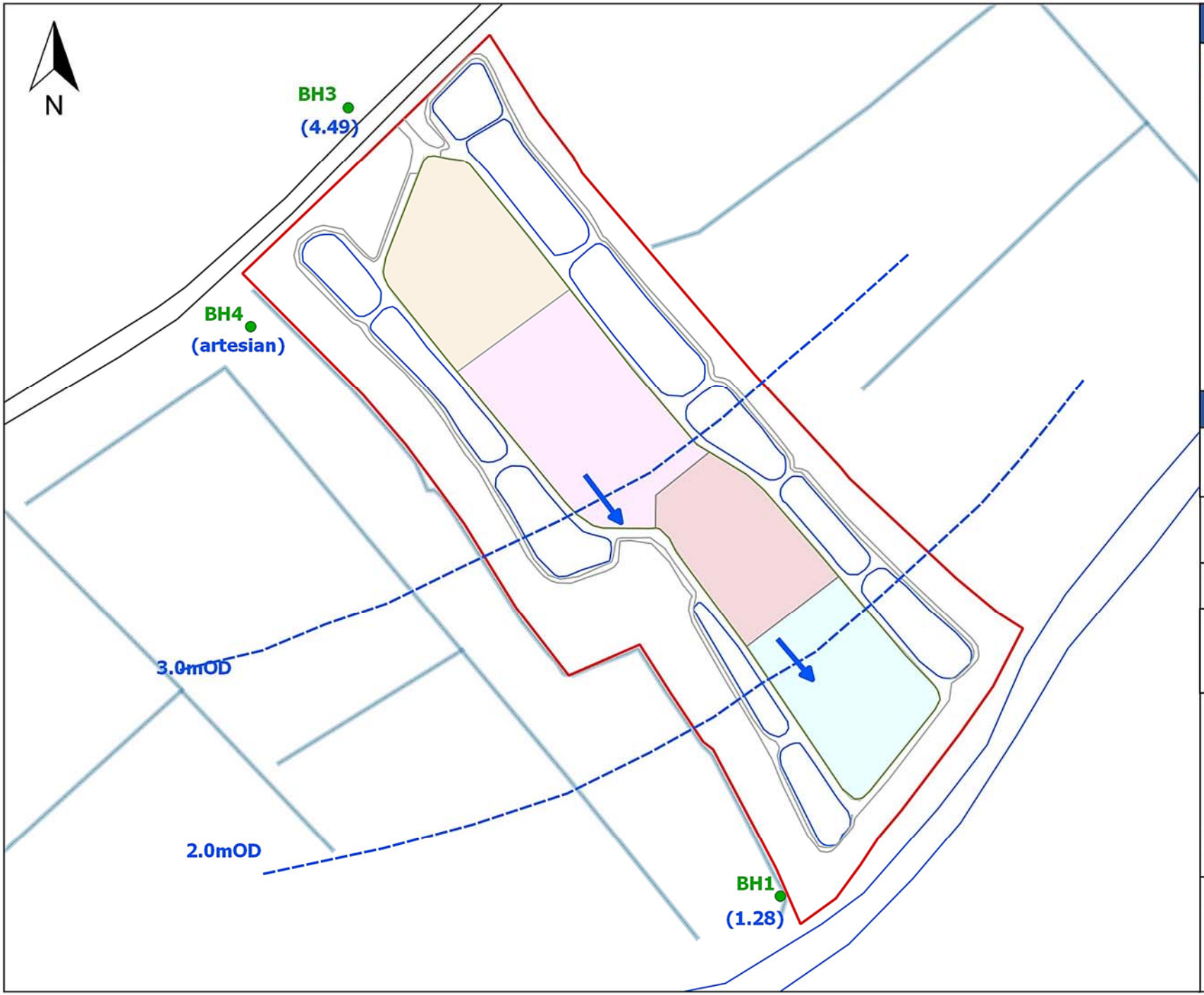
Project
Donegal Landfill Site Reporting 2015

Title
Churchtown LFS - Monitoring Points

Drawing Status	Sheet Size	Drawing Scale
Preliminary	A3	1:2500

Drawing Number	Rev
IBR0859 /008	-

Project Leader	Drawn By	Date	Initial Review
AMcG	AMB	May '15	AMcG



Legend

- Site Boundary
- February 2015 Contours
- Groundwater Monitoring Boreholes
- (1.28) Groundwater Level (metres ordance datum)
- Groundwater Flow Direction

Project

Churchtown Landfill Hydrogeological Risk Assessment

Client: **Donegal County Council**

Drawing: **Figure 4**

Title: **Groundwater Contours February 2015**

BlueRock Environmental
The Hydrogeological and Contaminated Land Consultancy

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File Ref : BRE14023
Drawing Ref : BRE14023DG04
Revision : V01
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Drawn by: SH

Scale: NTS

Appendix B

Monitoring Locations, Frequencies and Parameters

Appendix A - Monitoring Locations, Frequencies and Parameters

Table A1 Groundwater Parameters and Monitoring Frequencies

Quarterly	Annually
Temperature	Boron
Groundwater Level	Cadmium
Chloride	Calcium
Dissolved Oxygen	Chromium
Sodium	Copper
TON	Cyanide
TOC	Fluoride
Phenols	Lead
Ammoniacal Nitrogen	List I/II substances
Electrical Conductivity	Sulphate
pH	Magnesium
Potassium	Manganese
Nitrate	Mercury
Iron	Total Alkalinity
Nitrite	Orthophosphate
	Zinc
	Faecal Coliforms
	Total Coliforms

Table A2 Surface Water Parameters and Monitoring Frequencies

Quarterly	Annually
Temperature	Iron
pH	Cadmium
Ammoniacal Nitrogen	Calcium
BOD	Chromium
Electrical Conductivity	Lead
TSS	List I/II substances
Chloride	Magnesium
Dissolved Oxygen	Manganese
COD	Mercury
Zinc	Orthophosphate
Phenols	Potassium
Nitrite	TON

Nitrate	
Copper	

Table A3 Landfill Gas Parameters and Monitoring Frequencies

Quarterly
Atmospheric Pressure
Carbon Dioxide
Methane
Oxygen

Appendix C
Results of Monitoring

	Date	Ammonia (as N)	Chloride	Conduct'y @ 20°C	Depth	(Measuret) DO	Iron	Nitrate (as N)	pH	Phenols	Potassium	Sodium	Temp	TOC	TON
BH1	Mar-15	0.05	51.61	324	1.5	7.2	<20	0.15	7.6	<0.15	2.7	20.6	6.8	4.1	0.15
BH 3	Mar-15	0	30.77	798	3	6.9	<20	0.05	7.6	<0.15	1.7	13.8	6.7	1.12	<0.11
BH 4	Mar-15	0	34.74	403	0	6.3	<20	5.29	6.9	<0.15	3.4	14.7	7	4.11	5.33
BH1	Jun-15	0.97	47.64	363	1.2	8.31	30	0.193	7.72	<0.15	2.2	17.7	16.1	1.7	0.192
BH 3	Jun-15	<0.04	23.82	494	3.5	7.15	<0	<0.1	7.56	<0.15	1.3	13	14.8	0.717	<0.1
BH 4	Jun-15	0.129	32.76	347	0	8.68	3	5.201	6.43	<0.15	2.3	12.5	15.5	1.21	5.2
BH1	Sep-15	<0.028	28.78	7.54	1.5	7.8	<20	0.574	7.54	<0.1	2.6	18.4	11.1	1.77	0.574
BH 3	Sep-15	0.052	24.81	503	3.9	7.1	<20	NT	7.51	<0.1	1.5	13	11.5	0.263	0.097
BH 4	Sep-15	0.209	29.77	380	0	6	<20	9.78	6.37	<0.1	2.9	14.1	11.4	1.03	9.78
BH1	Nov-15	<0.04	40.7	367	1.2	8.9	<0.02	0.271	7.68	<100	2.8	19.4	11.1	1.42	0.27
BH3	Nov-15	<0.04	27.8	498	3.9	4.7	<0.02	0.053	7.37	<100	1.8	13.8	11.1	3.05	0.06
BH4	Nov-15	<0.04	30.8	383	0.2	6.4	<0.02	4.6	6.34	<100	3.1	15.3	11	0.68	4.65

	Date	Alkalinity	Boron	Cadmium	Calcium	Chromium	Copper	Cyanide	Faecal Coliforms (E-coli)	Fluoride	Lead (ug/l)	Magnesium	Manganese	Mercury	Nitrite	Ortho-Phosphate	Sulphate	Zinc
BH 1	Nov-15	120	0.02	<0.0001	43	<0.003	<0.003	<0.009	10	<0.1	<0.0003	9.9	0.062	<0.00002	<0.010	0.022	2.6	1.4
BH3	Nov-15	101	<0.02	<0.0001	79	0.1287	<0.003	<0.009	649	0.13	<0.0003	11	0.33	<0.00002	0.007	0.028	5.5	<1
BH 4	Nov-15	118	<0.02	<0.0001	54	<0.003	<0.003	<0.009	1	<0.1	<0.0003	5.6	0.0073	<0.00002	0.052	0.0761	10	<0.02

	Sample Date	Ammonia (as N)	BOD	Chloride	COD	Conduct'y @ 20°C	Copper	Dissolved Oxygen (Measurement)	Nitrate (as N)	Nitrite (as N)	pH	Phenols	SS	Temp	Zinc
SW 1	Mar-15	0.14	0.88	37.72	5	247	<3	11.9	3	<0.01	6.91	<0.15	<6	7	11.2
SW 2	Mar-15	5.47	0.92	39.7	9	378	<3	11.9	2.77	0.02	7.03	<0.15	<6	7	12.1
SW 3	Mar-15	0.03	0.57	32.76	7	185	<3	12.1	0.56	0.01	7.22	<0.15	<6	7.1	11.5
SW 4	Mar-15	24.4	1.14	61.54	29	720	<3	11.7	1.89	0.01	6.89	<0.15	19.8	6.8	13.5
SW 5	Mar-15	15.3	0.5	51.62	28	552	<3	11.8	1.41	0.02	**6.9**	<0.15	11.4	7	10.1
SW 6	Mar-15	0.1	0.45	32.76	12	187	<3	12	0.5	0.01	7.3	<0.15	<6	7	6.1
SW 7	Mar-15	0.14	0.1	31.76	**181**	193	<11	12	0.49	0.01	7.28	<0.15	<6	7	11
SW 1	Jun-15	0.245	0.85	37.72	20	271	<0.003	10.8	2.508	<0.01	6.84	<0.15	12.6	11.1	0.015
SW 2	Jun-15	26.8	2.5	57.57	33	842	<0.003	7.5	0.384	0.023	7.33	<0.15	41.6	11.2	0.025
SW 3	Jun-15	0.132	1.35	22.83	23	111.6	<0.003	11.2	0.128	<0.01	7.15	<0.15	6	11.2	0.029
SW 4	Jun-15	46.4	**6.2**	96.28	**64**	**1542**	<0.003	5.7	<0.1	0.022	6.59	<0.15	259.2	11.2	0.035
SW 5	Jun-15	0.847	**5.67**	24.82	24	122.6	<0.003	11.3	0.161	<0.01	7.05	<0.15	6.6	11.2	0.023
SW 6	Jun-15	0.069	1.58	26.8	24	109.1	<0.003	11.3	0.147	0.02	7.07	<0.15	<6	11.3	0.018
SW 7	Jun-15	0.58	**5.72**	25.81	26	123	<0.003	11.3	0.15	<0.01	7.05	<0.15	<6	11.3	0.019
SW 1	Sep-15	2.02	2.58	22.83	20	649	NT	7.6	1.32	<0.01	6.28	<0.1	74.57	13.8	NT
SW 2	Sep-15	58.5	2.45	25.81	**49**	**1200**	NT	7.8	0.511	0.016	7.56	<0.1	57.5	14.7	NT
SW 3	Sep-15	0.057	2.14	21.83	32	84.5	NT	9.3	0.229	<0.01	7.04	<0.1	6	15.8	NT
SW 4	Sep-15	55	**8.45**	30.77	**54**	**1153**	NT	5.6	0.973	0.043	7.1	<0.1	93.43	15.7	NT
SW 5	Sep-15	53.5	**3.44**	29.77	**54**	**1128**	NT	7.7	0.952	0.043	7.22	<0.1	21	15.1	NT
SW 6	Sep-15	0.402	2.16	20.84	32	91.8	NT	9.4	<0.252	<0.01	7.21	<0.1	6	15.3	NT
SW 7	Sep-15	0.078	2.15	22.83	37	84.1	NT	9.3	0.24	0.01	7.06	<0.1	6.8	15.3	NT
SW 1	Nov-15	<0.04	1.25	28.8	6	273	0.003	8.6	0.809	0.025	6.92	0.1	758	10.8	9.3
SW 2	Nov-15	48.8	2.6	70.5	**54**	**1413**	<0.003	6.6	0.238	0.027	7.38	<0.1	43.67	10.8	2.8
SW 3	Nov-15	<0.04	0.67	18.9	26	116	<0.003	9.8	0.124	<0.010	7.05	<0.1	<6	10.7	2.2
SW 4	Nov-15	20.1	**2.77**	47.6	**47**	678	<0.003	6.9	0.111	<0.010	6.81	<0.1	35.75	10.7	13.6
SW 5	Nov-15	<0.04	0.71	18.9	30	116	<0.003	9.8	0.127	<0.010	7.01	<0.1	<6	10.8	2.9
SW 6	Nov-15	<0.04	0.73	16.9	26	114	<0.003	9.8	0.13	<0.010	6.97	<0.1	<6	10.6	1.8
SW 7	Nov-15	<0.04	0.69	17.9	34	115	0.017	9.9	0.125	0.003	6.94	<0.1	<6	10.6	12.5

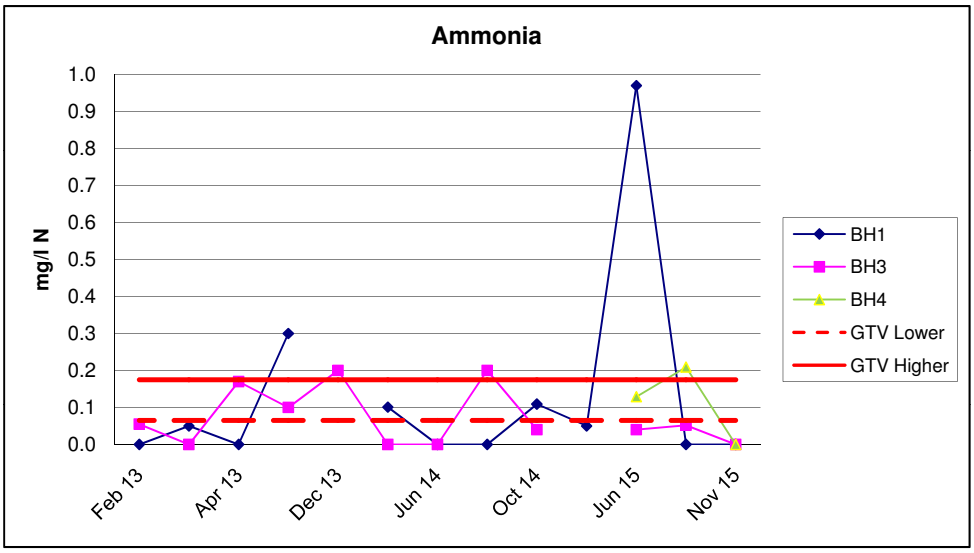
	Date	Tot Alkalinity	Cadmium	Calcium	Chromium	Iron (ug/l)	Lead (ug/l)	Magnesium	Manganese	Mercury	Ortho-phosphate	Potassium	Sulphate	TON
SW 1	Nov-15	81	0.1	35.4	5.3	**11000**	3.1	4.7	**420**	0.04	<0.01	3.9	2.5	0.834
SW 2	Nov-15	36	<0.1	112	<3	**5200**	0.5	37.2	**1500**	0.03	0.032	40.7	6.5	0.265
SW 3	Nov-15	44	<0.1	12.1	<3	**710**	<0.3	2.1	41	0.03	0.0188	1.5	37	0.13
SW 4	Nov-15	45	<0.1	53.7	<3	**8800**	0.5	14	**1400**	0.02	0.031	19.7	9.3	0.12
SW 5	Nov-15	35	<0.1	12.1	<3	**690**	<0.3	2.1	41	0.03	0.02	1.4	7.2	0.135
SW 6	Nov-15	44	<0.1	11.9	3	**680**	<0.3	2.1	37	0.02	<0.01	AR	AR	0.138
SW 7	Nov-15	32	<0.1	11.8	3	**700**	0.9	2.2	46	0.02	<0.01	1.4	6.5	0.128

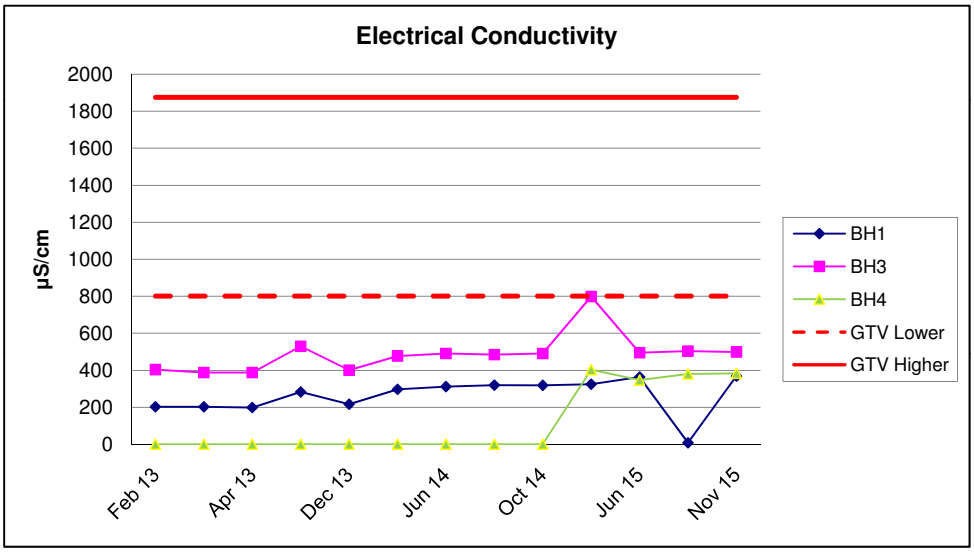
	Date	Atmospheric Pressure	Carbon Dioxide	Methane	Oxygen
LG1	Mar-15	1026	0.1	0	21.5
LG2	Mar-15	1026	28.3	71.5	0.4
LG3	Mar-15	1026	25.1	71.3	0.3
LG5	Mar-15	1026	29.5	69.3	0.2
LG6	Mar-15	1026	29.6	68.8	1.1
LG7	Mar-15	1026	26	70.2	0.1
LG8	Mar-15	NT	NT	NT	NT
LG9	Mar-15	NT	NT	NT	NT
LG1	Jun-15	1023	9.4	0.7	16.1
LG2	Jun-15	1022	32.2	66.8	0.6
LG3	Jun-15	1022	26.9	70.4	0.2
LG5	Jun-15	1022	36.1	63.1	0
LG6	Jun-15	1022	35.7	63.2	0
LG7	Jun-15	1022	26.6	69.4	0.3
LG8	Jun-15	1022	1.8	0.5	17.7
LG9	Jun-15	1022	13.6	17.1	1.8
LG1	Sep-15	1000	14.1	0.3	11.2
LG2	Sep-15	1000	39.7	63.1	0.7
LG3	Sep-15	1000	37	65.1	0.1
LG5	Sep-15	1000	2.3	38.3	2.3
LG6	Sep-15	1000	44.4	57.3	0
LG7	Sep-15	1000	35	68.3	0.1
LG8	Sep-15	1000	1.7	0.2	17.8
LG9	Sep-15	1000	10.3	35.1	0.3

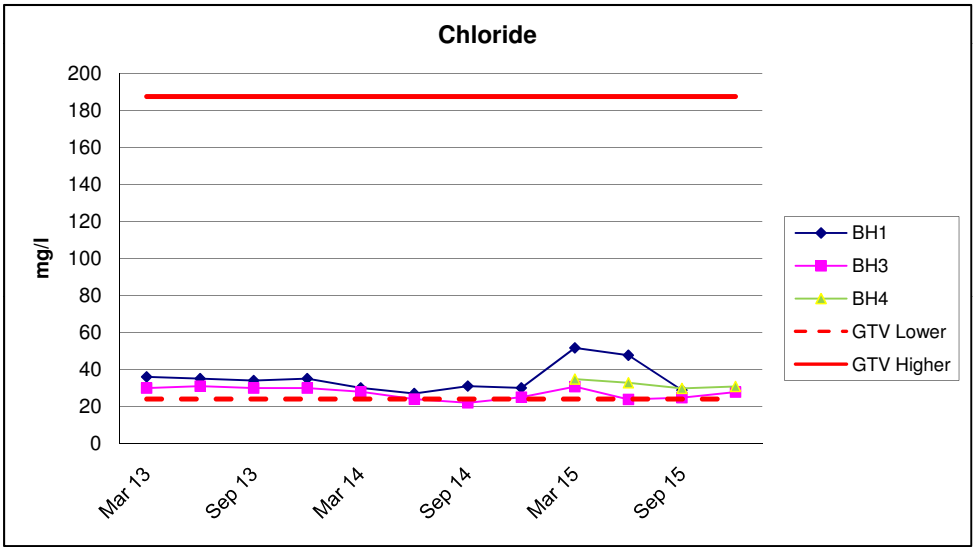
	Date	Ammonia (as N)	BOD	Chloride	COD	Conductivity @ 20°C	Depth	Iron	pH	Potassium	Sodium	Temp	TON	Vis Inspn
L1	Jun-15	88.6	2.7	287.85	194	4310	3.2	1.765	7	182.4	242.7	16.1	<0.1	0
L2	Jun-15	48.6	26.7	114.15	143	1931	3	16.15	6.66	53.2	61.6	16.4	<0.1	0
L1	Sep-15	165	11.45	155.83	126	6.84	2	93	6.84	116.2	148.7	13.6	0.553	0
L2	Sep-15	80.4	8.55	75.44	100	6.59	1.5	46	6.59	45.9	44	13.5	0.1	0
L3	Sep-15	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
L1	Nov-15	43.5	5.1	100.3	107	2600	3.2	3100	6.61	77.4	111.5	11.2	0.003	0
L2	Nov-15	37.6	3.74	54.6	118	1858	1.9	39000	6.58	47.5	45.5	11.3	0.009	0
L3	Nov-15	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

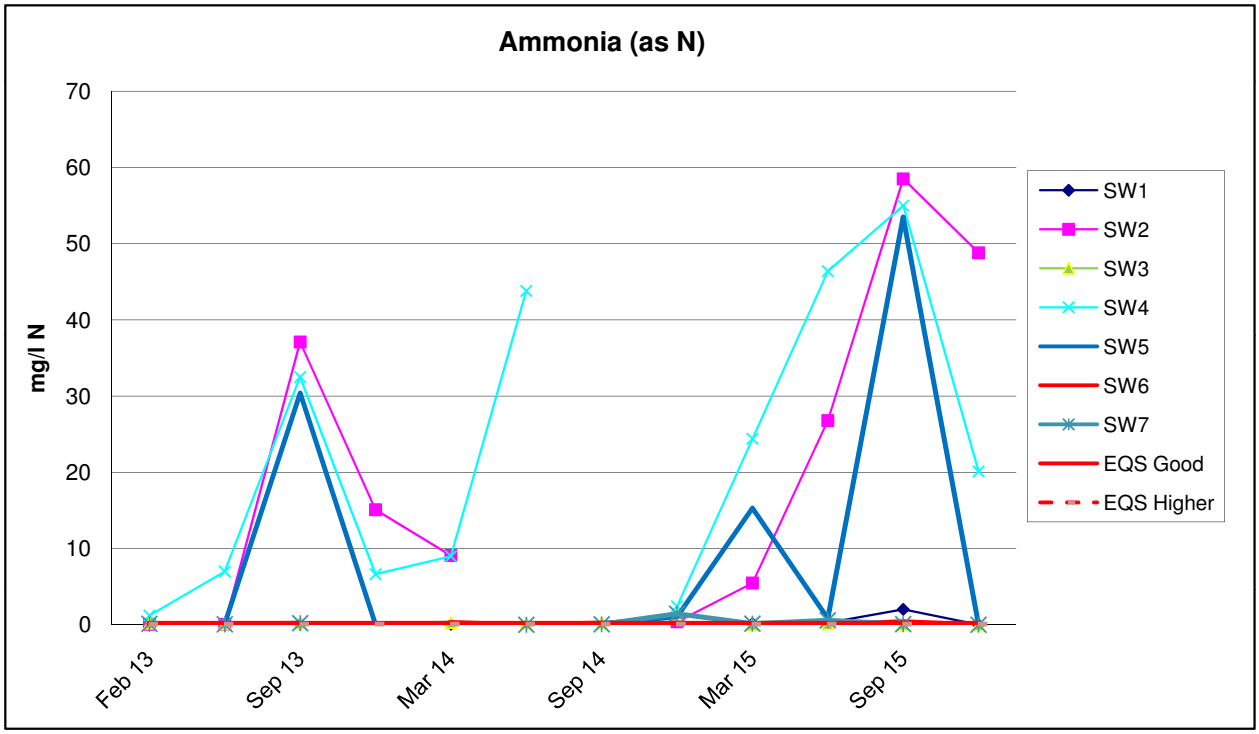
n/s = not sampled, well dry

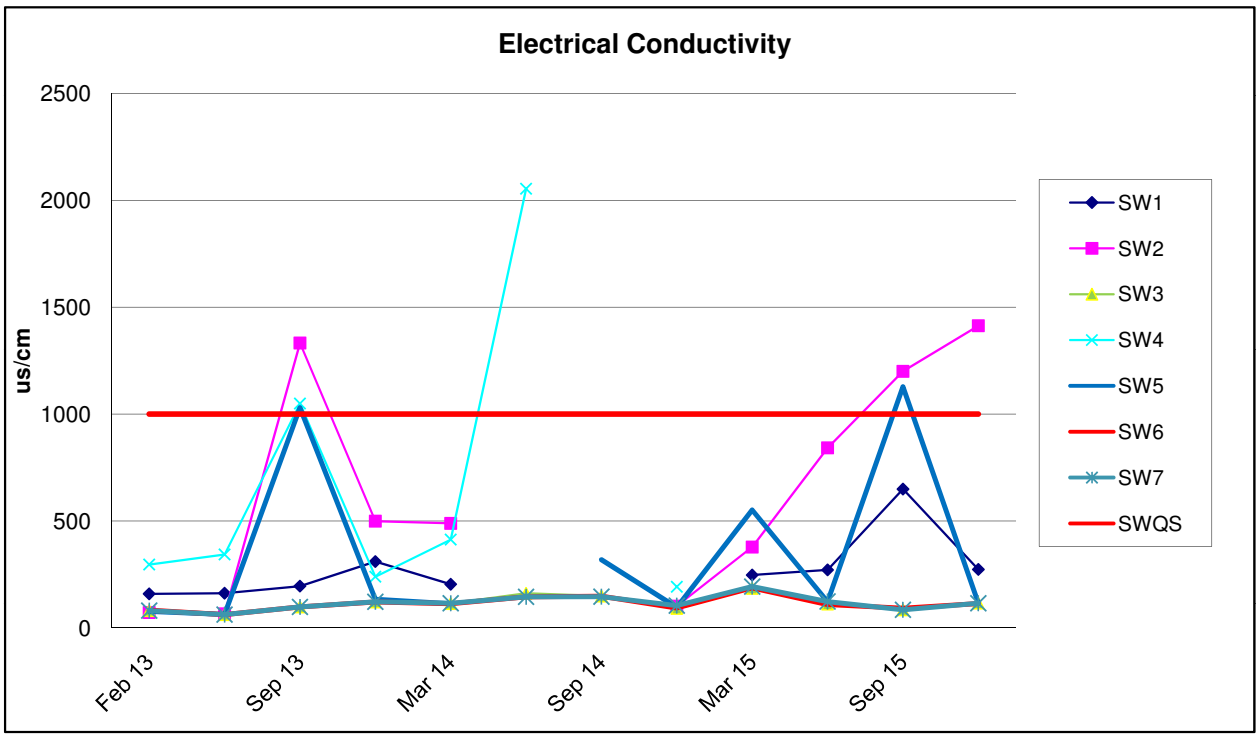
	Date	Alkalinity	Boron	Cadmium	Calcium	Chromium	Copper	Cyanide	Faecal Coliforms (E. coli)	Lead ug/l	Magnesium	Manganese	Mercury	Nitrate (as N)	Nitrite (as N)	Sulphate	Total Coliforms	Zinc
L1	Nov-15	39	<0.02	<0.0001	203.1	0.0311	<0.003	<0.009	47	0.0003	77.9	1.8	<0.00002	<0.100	<0.010	22	2419.6	0.013
L2	Nov-15	48	<0.02	<0.0001	161.7	0.0517	0.003	<0.009	70	0.0003	42.8	0.94	<0.00002	<0.100	0.024	15	64	0.0059
L3	Nov-15	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

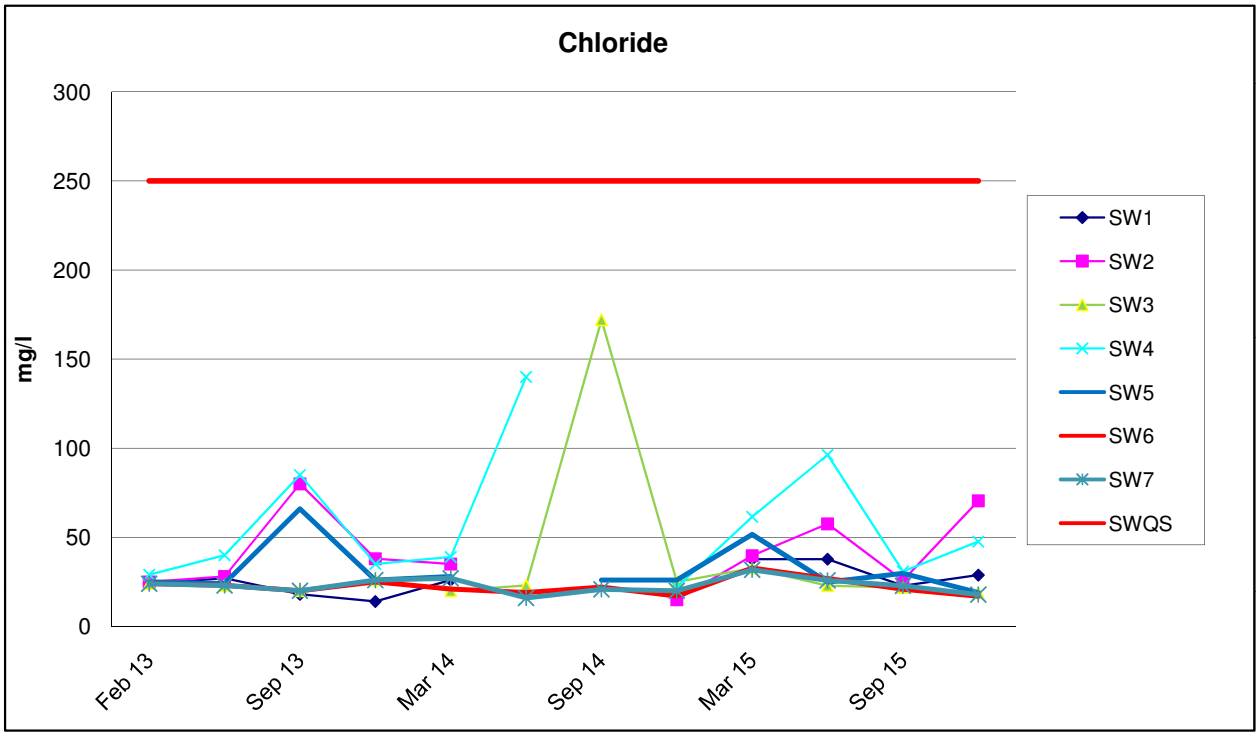

Ammonia
mg/l N
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Feb 13
Apr 13
Dec 13
Jun 14
Oct 14
Jun 15
Nov 15
BH1
BH3
BH4
GTV Lower
GTV Higher

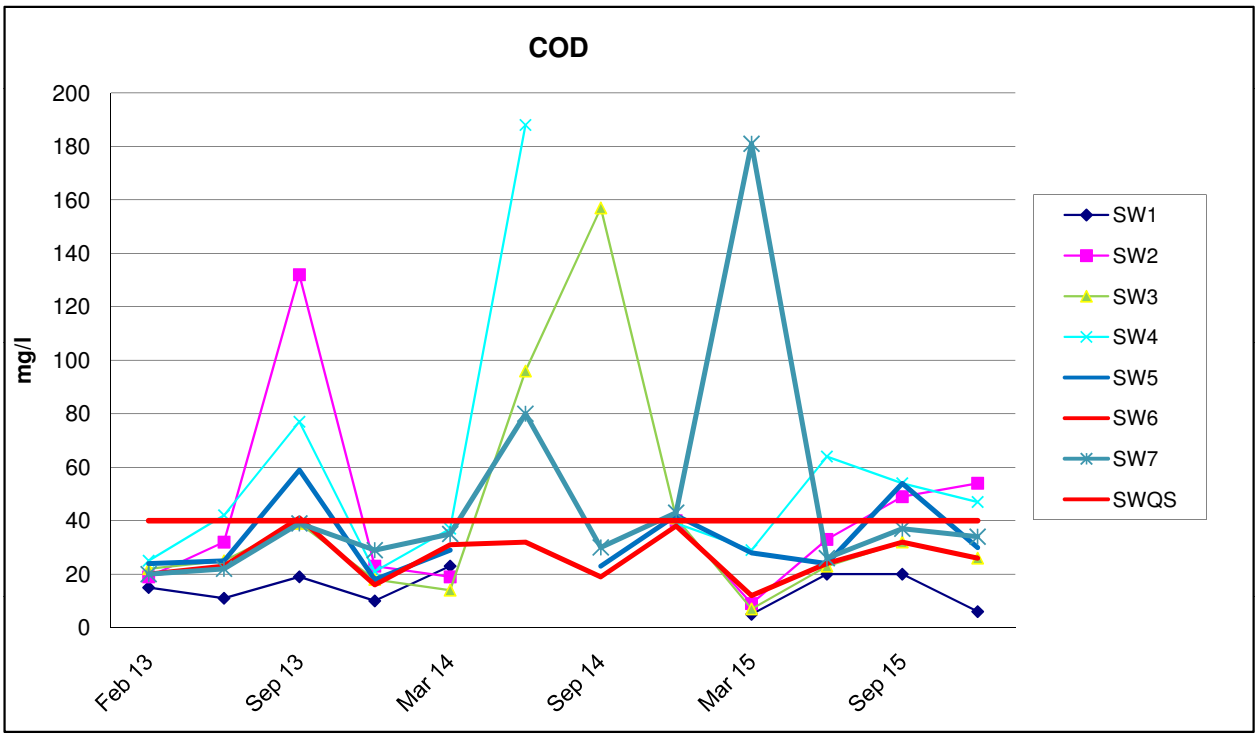

Electrical Conductivity
µS/cm
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Feb 13
Apr 13
Dec 13
Jun 14
Oct 14
Jun 15
Nov 15
BH1
BH3
BH4
GTV Lower
GTV Higher


Chloride
mg/l
200
180
160
140
120
100
80
60
40
20
0
Mar 13
Sep 13
Mar 14
Sep 14
Mar 15
Sep 15
BH1
BH3
BH4
GTV Lower
GTV Higher


Ammonia (as N)
mg/l N
70
60
50
40
30
20
10
0
Feb 13
Sep 13
Mar 14
Sep 14
Mar 15
Sep 15
SW1
SW2
SW3
SW4
SW5
SW6
SW7
EQS Good
EQS Higher


Electrical Conductivity
us/cm
2500
2000
1500
1000
500
0
Feb 13
Sep 13
Mar 14
Sep 14
Mar 15
Sep 15
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SWQS


Chloride
300
250
200
150
100
50
0
mg/l
Feb 13
Sep 13
Mar 14
Sep 14
Mar 15
Sep 15
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SWQS


COD
200
180
160
140
120
100
80
60
40
20
0
mg/l
Feb 13
Sep 13
Mar 14
Sep 14
Mar 15
Sep 15
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SWQS

		Churchtown BH1	Churchtown BH 3	Churchtown BH 4
	SampleCode	90724/001	90724/002	90724/003
	Customer Ref	5157	5158	5159
Acenaphthylene	**ug/L**	<1	<1	<1
Anthracene	**ug/L**	<1	<1	<1
Benzene	**ug/L**	<0.1	<0.1	<0.1
Bromodichloromethane	**ug/L**	<2	<2	<2
Bromoform	**ug/L**	<1	<1	<1
Chloroform	**ug/L**	<1	<1	<1
Chrysene	**ug/L**	<1	<1	<1
Dibromochloromethane	**ug/L**	<1	<1	<1
Fluoranthene	**ug/L**	<1	<1	<1
Fluorene	**ug/L**	<1	<1	<1
Naphthalene	**ug/L**	<2	<2	<2
Pentachlorophenol	**ug/L**	<1	<1	<1
Phenanthrene	**ug/L**	<1	<1	<1
Pyrene	**ug/L**	<1	<1	<1
Tetrachloroethene	**ug/L**	<0.1	<0.1	<0.1
Total THM (Calc)	**ug/L**	<5	<5	<5
Trichloroethene	**ug/L**	<0.1	<0.1	<0.1
Fluoride	**mg/L**	<0.1	0.13	<0.1
Sulphate	**mg/L**	2.6	5.5	10
Hexachlorobenzene	**ug/L**	<1	<1	<1
Hexachlorobutadiene	**ug/L**	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	**ug/L**	<1	<1	<1
2,4-Dichlorophenol	**ug/L**	<1	<1	<1
2,4-Dimethylphenol	**ug/L**	<1	<1	<1
2-Chlorophenol	**ug/L**	<1	<1	<1
Phenol	**ug/L**	<1	<1	<1
1,2,4-trichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,2-dichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,3-dichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,4-dichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
2,4,5-Trichlorophenol	**ug/L**	<1	<1	<1
2,4-Dinitrotoluene	**ug/L**	<1	<1	<1
2,6-Dinitrotoluene	**ug/L**	<1	<1	<1
2-Chloronaphthalene	**ug/L**	<1	<1	<1
2-Methylnaphthalene	**ug/L**	<1	<1	<1
2-Methylphenol	**ug/L**	<1	<1	<1
2-Nitrophenol	**ug/L**	<1	<1	<1
3&4-Methylphenol	**ug/L**	<1	<1	<1
4-Bromophenyl Phenyl Ether	**ug/L**	<1	<1	<1
4-Chloro-3-methylphenol	**ug/L**	<1	<1	<1
4-Chlorophenyl phenyl ether	**ug/L**	<1	<1	<1
4-Nitrophenol	**ug/L**	<5	<5	<5
Acenaphthene	**ug/L**	<1	<1	<1
Benzo(a)anthracene	**ug/L**	<1	<1	<1
Benzo(a)pyrene	**ug/L**	<1	<1	<1
Benzo(b)fluoranthene	**ug/L**	<1	<1	<1
Benzo(g,h,i)perylene	**ug/L**	<1	<1	<1
Benzo(k)fluoranthene	**ug/L**	<1	<1	<1
Benzyl Butyl Phthalate	**ug/L**	<1	<1	<1
Bis(2-chloroethoxy)methane	**ug/L**	<1	<1	<1
Bis(2-chloroethyl)ether	**ug/L**	<1	<1	<1
Bis(2-chloroisopropyl)ether	**ug/L**	<1	<1	<1
Bis(2-ethylhexyl)phthalate	**ug/L**	<5	<5	<5
Dibenz(a,h)anthracene	**ug/L**	<1	<1	<1

Dibenzofuran	**ug/L**	<1	<1	<1
Diethylphthalate	**ug/L**	<1	<1	<1
Dimethylphthalate	**ug/L**	<1	<1	<1
di-n-Butylphthalate	**ug/L**	<1	<1	<1
Di-n-octylphthalate	**ug/L**	<1	<1	<1
Diphenylamine	**ug/L**	<1	<1	<1
Hexachloroethane	**ug/L**	<5	<5	<5
Indeno(1,2,3-c,d)pyrene	**ug/L**	<1	<1	<1
Isophorone	**ug/L**	<1	<1	<1
Nitrobenzene	**ug/L**	<0.5	<0.5	<0.5
n-Nitrosodi-n-propylamine	**ug/L**	<1	<1	<1
Total Cyanide High	**ug/L**	<9	<9	<9
Acetone	**ug/L**	<2	<2	<2
Dichloromethane	**ug/L**	<5	<5	<5
Tetrahydrofuran	**ug/L**	<0.5	<0.5	<0.5
Toluene	**ug/L**	<0.5	<0.5	<0.5
Xylene -o	**ug/L**	<0.5	<0.5	<0.5
Dichlorodifluoromethane	**ug/L**	<10	<10	<10
Chloromethane	**ug/L**	<0.5	<0.5	<0.5
Ethyl Chloride/Chloroethane	**ug/L**	<0.5	<0.5	<0.5
Vinyl Chloride	**ug/L**	<0.1	<0.1	<0.1
Bromomethane	**ug/L**	<0.5	<0.5	<0.5
Trichloromonofluoromethane	**ug/L**	<0.5	<0.5	<0.5
Ethyl Ether/Diethyl Ether	**ug/L**	<0.5	<0.5	<0.5
11 Dichloroethene	**ug/L**	<0.5	<0.5	<0.5
Iodomethane/Methyl Iodide	**ug/L**	<0.5	<0.5	<0.5
Carbon Disulphide	**ug/L**	<0.5	<0.5	<0.5
Chlormethyl Cyanide/Chloroacetonitrile	**ug/L**	<0.5	<0.5	<0.5
Propanenitrile	**ug/L**	<10	<10	<10
Trans-1,2 Dichloroethene	**ug/L**	<0.5	<0.5	<0.5
MtBE	**ug/L**	<0.5	<0.5	<0.5
1,1-dichloroethane	**ug/L**	<0.5	<0.5	<0.5
2,2-dichloropropane	**ug/L**	<0.5	<0.5	<0.5
cis-12 Dichloroethene	**ug/L**	<0.5	<0.5	<0.5
2-Butanone	**ug/L**	<5	<5	<5
Methyl Acrylate	**ug/L**	<0.5	<0.5	<0.5
Bromochloromethane	**ug/L**	<0.5	<0.5	<0.5
Methacrylonitrile	**ug/L**	<5	<5	<5
1,1,1-trichloroethane	**ug/L**	<0.5	<0.5	<0.5
1-Chlorobutane	**ug/L**	<0.5	<0.5	<0.5
Carbon Tetrachloride	**ug/L**	<0.5	<0.5	<0.5
11 Dichloropropene	**ug/L**	<0.5	<0.5	<0.5
1,2 dicloroethane	**ug/L**	<0.1	<0.1	<0.1
1,2-dichloropropane	**ug/L**	<0.5	<0.5	<0.5
Dibromomethane	**ug/L**	<0.5	<0.5	<0.5
Methyl Methacrylate	**ug/L**	<0.5	<0.5	<0.5
13 Dichloropropene,cis	**ug/L**	<2	<2	<2
MIBK/4 Methyl 2 Pentanone	**ug/L**	<2	<2	<2
13 Dichloropropene,trans	**ug/L**	<2	<2	<2
Ethyl Methacrylate	**ug/L**	<2	<2	<2
112 Trichloroethane	**ug/L**	<0.5	<0.5	<0.5
1,3-dichloropropane	**ug/L**	<0.5	<0.5	<0.5
2-Hexanone	**ug/L**	<1	<1	<1
1,2-dibromoethane	**ug/L**	<0.5	<0.5	<0.5
Chlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,1,1,2-tetrachloroethane	**ug/L**	<2	<2	<2
Ethylbenzene	**ug/L**	<0.5	<0.5	<0.5

Xylene P&M	**ug/L**	<0.5	<0.5	<0.5
Styrene	**ug/L**	<2	<2	<2
Isopropylbenzene	**ug/L**	<0.5	<0.5	<0.5
Bromobenzene	**ug/L**	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	**ug/L**	<0.5	<0.5	<0.5
1,2,3-trichloropropane	**ug/L**	<2	<2	<2
Trans 14 Dichloro 2 Butene, tran	**ug/L**	<2	<2	<2
Propylbenzene	**ug/L**	<0.5	<0.5	<0.5
2-chlorotoluene	**ug/L**	<0.5	<0.5	<0.5
4-chlorotoluene	**ug/L**	<0.5	<0.5	<0.5
1,3,5-trimethylbenzene	**ug/L**	<0.5	<0.5	<0.5
Tert Butyl Benzene	**ug/L**	<0.5	<0.5	<0.5
1,2,4-trimethylbenzene	**ug/L**	<0.5	<0.5	<0.5
sec-butylbenzene	**ug/L**	<0.5	<0.5	<0.5
P Isopropyltoluene	**ug/L**	<0.5	<0.5	<0.5
N Butyl Benzene	**ug/L**	<0.5	<0.5	<0.5
1,2-dibromo-3-chloropropane	**ug/L**	<2	<2	<2
1,2,3-trichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
Epichlorohydrin	**ug/L**	<0.1	<0.1	<0.1
2-Propenenitrile/Acrylonitrile	**ug/L**	<2	<2	<2
Phenols-Total	**mg/L**	<0.1	<0.1	<0.1
Iron-Dissolved	**ug/L**	<20	<20	<20
Chromium-Total	**ug/L**	<3	128.7	<3
Manganese-Dissolved	**ug/L**	6.2	330	7.3
Residue on Evaporation (Tot Solids-TS)	**mg/L**	232	872	294
Potassium-Dissolved	**mg/L**	2.8	1.8	3.1
Sodium-Dissolved	**mg/L**	19.4	13.8	15.3
Cadmium-Dissolved	**ug/L**	<0.1	<0.1	<0.1
Calcium-Dissolved	**mg/L**	43	79	54
Copper-Dissolved	**mg/L**	<0.003	<0.003	<0.003
Lead-Dissolved	**ug/L**	<0.3	<0.3	<0.3
Magnesium-Dissolved	**mg/L**	9.9	11	5.6
Mercury-Dissolved	**ug/L**	<0.02	<0.02	<0.02
Zinc-Dissolved	**ug/L**	1.4	<1	6.4
Boron-Dissolved	**mg/L**	<0.02	<0.02	<0.02
1,2,4-Trichlorobenzene (Sub)	**ug/L**	<1	<1	<1
1,2-Dichlorobenzene (Sub)	**ug/L**	<1	<1	<1
1,3-Dichlorobenzene (Sub)	**ug/L**	<1	<1	<1
Allyl Chloride (DNU)	**ug/L**	<0.5	<0.5	<0.5
Hexachlorobutadiene (Sub)	**ug/L**	<1	<1	<1
Hexachloroethane (Sub)	**ug/L**	<1	<1	<1
Naphthalene (Sub)	**ug/L**	<2	<2	<2
Nitrobenzene (Sub)	**ug/L**	<1	<1	<1

		Churchtown BH1	Churchtown BH 3	Churchtown BH 4
	SampleCode	90724/001	90724/002	90724/003
	Customer Ref	5157	5158	5159
Acenaphthylene	**ug/L**	<1	<1	<1
Anthracene	**ug/L**	<1	<1	<1
Benzene	**ug/L**	<0.1	<0.1	<0.1
Bromodichloromethane	**ug/L**	<2	<2	<2
Bromoform	**ug/L**	<1	<1	<1
Chloroform	**ug/L**	<1	<1	<1
Chrysene	**ug/L**	<1	<1	<1
Dibromochloromethane	**ug/L**	<1	<1	<1
Fluoranthene	**ug/L**	<1	<1	<1
Fluorene	**ug/L**	<1	<1	<1
Naphthalene	**ug/L**	<2	<2	<2
Pentachlorophenol	**ug/L**	<1	<1	<1
Phenanthrene	**ug/L**	<1	<1	<1
Pyrene	**ug/L**	<1	<1	<1
Tetrachloroethene	**ug/L**	<0.1	<0.1	<0.1
Total THM (Calc)	**ug/L**	<5	<5	<5
Trichloroethene	**ug/L**	<0.1	<0.1	<0.1
Fluoride	**mg/L**	<0.1	0.13	<0.1
Sulphate	**mg/L**	2.6	5.5	10
Hexachlorobenzene	**ug/L**	<1	<1	<1
Hexachlorobutadiene	**ug/L**	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	**ug/L**	<1	<1	<1
2,4-Dichlorophenol	**ug/L**	<1	<1	<1
2,4-Dimethylphenol	**ug/L**	<1	<1	<1
2-Chlorophenol	**ug/L**	<1	<1	<1
Phenol	**ug/L**	<1	<1	<1
1,2,4-trichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,2-dichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,3-dichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,4-dichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
2,4,5-Trichlorophenol	**ug/L**	<1	<1	<1
2,4-Dinitrotoluene	**ug/L**	<1	<1	<1
2,6-Dinitrotoluene	**ug/L**	<1	<1	<1
2-Chloronaphthalene	**ug/L**	<1	<1	<1
2-Methylnaphthalene	**ug/L**	<1	<1	<1
2-Methylphenol	**ug/L**	<1	<1	<1
2-Nitrophenol	**ug/L**	<1	<1	<1
3&4-Methylphenol	**ug/L**	<1	<1	<1
4-Bromophenyl Phenyl Ether	**ug/L**	<1	<1	<1
4-Chloro-3-methylphenol	**ug/L**	<1	<1	<1
4-Chlorophenyl phenyl ether	**ug/L**	<1	<1	<1
4-Nitrophenol	**ug/L**	<5	<5	<5
Acenaphthene	**ug/L**	<1	<1	<1
Benzo(a)anthracene	**ug/L**	<1	<1	<1
Benzo(a)pyrene	**ug/L**	<1	<1	<1
Benzo(b)fluoranthene	**ug/L**	<1	<1	<1
Benzo(g,h,i)perylene	**ug/L**	<1	<1	<1
Benzo(k)fluoranthene	**ug/L**	<1	<1	<1
Benzyl Butyl Phthalate	**ug/L**	<1	<1	<1
Bis(2-chloroethoxy)methane	**ug/L**	<1	<1	<1
Bis(2-chloroethyl)ether	**ug/L**	<1	<1	<1
Bis(2-chloroisopropyl)ether	**ug/L**	<1	<1	<1
Bis(2-ethylhexyl)phthalate	**ug/L**	<5	<5	<5
Dibenz(a,h)anthracene	**ug/L**	<1	<1	<1

Dibenzofuran	**ug/L**	<1	<1	<1
Diethylphthalate	**ug/L**	<1	<1	<1
Dimethylphthalate	**ug/L**	<1	<1	<1
di-n-Butylphthalate	**ug/L**	<1	<1	<1
Di-n-octylphthalate	**ug/L**	<1	<1	<1
Diphenylamine	**ug/L**	<1	<1	<1
Hexachloroethane	**ug/L**	<5	<5	<5
Indeno(1,2,3-c,d)pyrene	**ug/L**	<1	<1	<1
Isophorone	**ug/L**	<1	<1	<1
Nitrobenzene	**ug/L**	<0.5	<0.5	<0.5
n-Nitrosodi-n-propylamine	**ug/L**	<1	<1	<1
Total Cyanide High	**ug/L**	<9	<9	<9
Acetone	**ug/L**	<2	<2	<2
Dichloromethane	**ug/L**	<5	<5	<5
Tetrahydrofuran	**ug/L**	<0.5	<0.5	<0.5
Toluene	**ug/L**	<0.5	<0.5	<0.5
Xylene -o	**ug/L**	<0.5	<0.5	<0.5
Dichlorodifluoromethane	**ug/L**	<10	<10	<10
Chloromethane	**ug/L**	<0.5	<0.5	<0.5
Ethyl Chloride/Chloroethane	**ug/L**	<0.5	<0.5	<0.5
Vinyl Chloride	**ug/L**	<0.1	<0.1	<0.1
Bromomethane	**ug/L**	<0.5	<0.5	<0.5
Trichloromonofluoromethane	**ug/L**	<0.5	<0.5	<0.5
Ethyl Ether/Diethyl Ether	**ug/L**	<0.5	<0.5	<0.5
11 Dichloroethene	**ug/L**	<0.5	<0.5	<0.5
Iodomethane/Methyl Iodide	**ug/L**	<0.5	<0.5	<0.5
Carbon Disulphide	**ug/L**	<0.5	<0.5	<0.5
Chlormethyl Cyanide/Chloroacetonitrile	**ug/L**	<0.5	<0.5	<0.5
Propanenitrile	**ug/L**	<10	<10	<10
Trans-1,2 Dichloroethene	**ug/L**	<0.5	<0.5	<0.5
MtBE	**ug/L**	<0.5	<0.5	<0.5
1,1-dichloroethane	**ug/L**	<0.5	<0.5	<0.5
2,2-dichloropropane	**ug/L**	<0.5	<0.5	<0.5
cis-12 Dichloroethene	**ug/L**	<0.5	<0.5	<0.5
2-Butanone	**ug/L**	<5	<5	<5
Methyl Acrylate	**ug/L**	<0.5	<0.5	<0.5
Bromochloromethane	**ug/L**	<0.5	<0.5	<0.5
Methacrylonitrile	**ug/L**	<5	<5	<5
1,1,1-trichloroethane	**ug/L**	<0.5	<0.5	<0.5
1-Chlorobutane	**ug/L**	<0.5	<0.5	<0.5
Carbon Tetrachloride	**ug/L**	<0.5	<0.5	<0.5
11 Dichloropropene	**ug/L**	<0.5	<0.5	<0.5
1,2 dicloroethane	**ug/L**	<0.1	<0.1	<0.1
1,2-dichloropropane	**ug/L**	<0.5	<0.5	<0.5
Dibromomethane	**ug/L**	<0.5	<0.5	<0.5
Methyl Methacrylate	**ug/L**	<0.5	<0.5	<0.5
13 Dichloropropene,cis	**ug/L**	<2	<2	<2
MIBK/4 Methyl 2 Pentanone	**ug/L**	<2	<2	<2
13 Dichloropropene,trans	**ug/L**	<2	<2	<2
Ethyl Methacrylate	**ug/L**	<2	<2	<2
112 Trichloroethane	**ug/L**	<0.5	<0.5	<0.5
1,3-dichloropropane	**ug/L**	<0.5	<0.5	<0.5
2-Hexanone	**ug/L**	<1	<1	<1
1,2-dibromoethane	**ug/L**	<0.5	<0.5	<0.5
Chlorobenzene	**ug/L**	<0.5	<0.5	<0.5
1,1,1,2-tetrachloroethane	**ug/L**	<2	<2	<2
Ethylbenzene	**ug/L**	<0.5	<0.5	<0.5

Xylene P&M	**ug/L**	<0.5	<0.5	<0.5
Styrene	**ug/L**	<2	<2	<2
Isopropylbenzene	**ug/L**	<0.5	<0.5	<0.5
Bromobenzene	**ug/L**	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	**ug/L**	<0.5	<0.5	<0.5
1,2,3-trichloropropane	**ug/L**	<2	<2	<2
Trans 14 Dichloro 2 Butene, tran	**ug/L**	<2	<2	<2
Propylbenzene	**ug/L**	<0.5	<0.5	<0.5
2-chlorotoluene	**ug/L**	<0.5	<0.5	<0.5
4-chlorotoluene	**ug/L**	<0.5	<0.5	<0.5
1,3,5-trimethylbenzene	**ug/L**	<0.5	<0.5	<0.5
Tert Butyl Benzene	**ug/L**	<0.5	<0.5	<0.5
1,2,4-trimethylbenzene	**ug/L**	<0.5	<0.5	<0.5
sec-butylbenzene	**ug/L**	<0.5	<0.5	<0.5
P Isopropyltoluene	**ug/L**	<0.5	<0.5	<0.5
N Butyl Benzene	**ug/L**	<0.5	<0.5	<0.5
1,2-dibromo-3-chloropropane	**ug/L**	<2	<2	<2
1,2,3-trichlorobenzene	**ug/L**	<0.5	<0.5	<0.5
Epichlorohydrin	**ug/L**	<0.1	<0.1	<0.1
2-Propenenitrile/Acrylonitrile	**ug/L**	<2	<2	<2
Phenols-Total	**mg/L**	<0.1	<0.1	<0.1
Iron-Dissolved	**ug/L**	<20	<20	<20
Chromium-Total	**ug/L**	<3	128.7	<3
Manganese-Dissolved	**ug/L**	6.2	330	7.3
Residue on Evaporation (Tot Solids-TS)	**mg/L**	232	872	294
Potassium-Dissolved	**mg/L**	2.8	1.8	3.1
Sodium-Dissolved	**mg/L**	19.4	13.8	15.3
Cadmium-Dissolved	**ug/L**	<0.1	<0.1	<0.1
Calcium-Dissolved	**mg/L**	43	79	54
Copper-Dissolved	**mg/L**	<0.003	<0.003	<0.003
Lead-Dissolved	**ug/L**	<0.3	<0.3	<0.3
Magnesium-Dissolved	**mg/L**	9.9	11	5.6
Mercury-Dissolved	**ug/L**	<0.02	<0.02	<0.02
Zinc-Dissolved	**ug/L**	1.4	<1	6.4
Boron-Dissolved	**mg/L**	<0.02	<0.02	<0.02
1,2,4-Trichlorobenzene (Sub)	**ug/L**	<1	<1	<1
1,2-Dichlorobenzene (Sub)	**ug/L**	<1	<1	<1
1,3-Dichlorobenzene (Sub)	**ug/L**	<1	<1	<1
Allyl Chloride (DNU)	**ug/L**	<0.5	<0.5	<0.5
Hexachlorobutadiene (Sub)	**ug/L**	<1	<1	<1
Hexachloroethane (Sub)	**ug/L**	<1	<1	<1
Naphthalene (Sub)	**ug/L**	<2	<2	<2
Nitrobenzene (Sub)	**ug/L**	<1	<1	<1

		Churchtown L 1	Churchtown L 2
	SampleCode	90722/001	90722/002
	Customer Ref	5147	5148
Acenaphthylene	**ug/L**	<4	<1
Anthracene	**ug/L**	<4	<1
Benzene	**ug/L**	<0.1	0.3
Bromodichloromethane	**ug/L**	<2	<2
Bromoform	**ug/L**	<1	<1
Chloroform	**ug/L**	<1	<1
Chrysene	**ug/L**	<4	<1
Dibromochloromethane	**ug/L**	<1	<1
Fluoranthene	**ug/L**	<4	<1
Fluorene	**ug/L**	<4	<1
Naphthalene	**ug/L**	<2	<2
Pentachlorophenol	**ug/L**	<4	<1
Phenanthrene	**ug/L**	<4	<1
Pyrene	**ug/L**	<4	<1
Tetrachloroethene	**ug/L**	<0.1	<0.1
Trichloroethene	**ug/L**	<0.1	<0.1
Fluoride	**mg/L**	<0.1	<0.1
Sulphate	**mg/L**	22	15
Hexachlorobenzene	**ug/L**	<4	<1
Hexachlorobutadiene	**ug/L**	<0.5	<0.5
2,4,6-Trichlorophenol	**ug/L**	<4	<1
2,4-Dichlorophenol	**ug/L**	<4	<1
2,4-Dimethylphenol	**ug/L**	<4	<1
2-Chlorophenol	**ug/L**	<4	<1
Phenol	**ug/L**	<4	<1
1,2,4-trichlorobenzene	**ug/L**	<0.5	<0.5
1,2-dichlorobenzene	**ug/L**	<0.5	<0.5
1,3-dichlorobenzene	**ug/L**	<0.5	<0.5
1,4-dichlorobenzene	**ug/L**	<0.5	<0.5
2,4,5-Trichlorophenol	**ug/L**	<4	<1
2,4-Dinitrotoluene	**ug/L**	<4	<1
2,6-Dinitrotoluene	**ug/L**	<4	<1
2-Chloronaphthalene	**ug/L**	<4	<1
2-Methylnaphthalene	**ug/L**	<4	<1
2-Methylphenol	**ug/L**	<4	<1
2-Nitrophenol	**ug/L**	<4	<1
3&4-Methylphenol	**ug/L**	<4	<1
4-Bromophenyl Phenyl Ether	**ug/L**	<4	<1
4-Chloro-3-methylphenol	**ug/L**	<4	<1
4-Chlorophenyl phenyl ether	**ug/L**	<4	<1
4-Nitrophenol	**ug/L**	<20	<5
Acenaphthene	**ug/L**	<4	<1
Benzo(a)anthracene	**ug/L**	<4	<1
Benzo(a)pyrene	**ug/L**	<4	<1
Benzo(b)fluoranthene	**ug/L**	<4	<1
Benzo(g,h,i)perylene	**ug/L**	<4	<1
Benzo(k)fluoranthene	**ug/L**	<4	<1
Benzyl Butyl Phthalate	**ug/L**	<4	<1
Bis(2-chloroethoxy)methane	**ug/L**	<4	<1
Bis(2-chloroethyl)ether	**ug/L**	<4	<1
Bis(2-chloroisopropyl)ether	**ug/L**	<4	<1
Bis(2-ethylhexyl)phthalate	**ug/L**	<20	<5
Dibenz(a,h)anthracene	**ug/L**	<4	<1
Dibenzofuran	**ug/L**	<4	<1

Diethylphthalate	**ug/L**	<4	<1
Dimethylphthalate	**ug/L**	<4	<1
di-n-Butylphthalate	**ug/L**	<4	<1
Di-n-octylphthalate	**ug/L**	<4	<1
Diphenylamine	**ug/L**	<4	<1
Hexachloroethane	**ug/L**	<5	<5
Indeno(1,2,3-c,d)pyrene	**ug/L**	<4	<1
Isophorone	**ug/L**	<4	<1
Nitrobenzene	**ug/L**	<0.5	<0.5
n-Nitrosodi-n-propylamine	**ug/L**	<4	<1
Total Cyanide High	**ug/L**	<9	<9
Acetone	**ug/L**	<2	14
Dichloromethane	**ug/L**	<5	<5
Tetrahydrofuran	**ug/L**	<5	<5
Toluene	**ug/L**	<0.5	<0.5
Xylene -o	**ug/L**	<0.5	<0.5
Dichlorodifluoromethane	**ug/L**	<10	<10
Chloromethane	**ug/L**	<0.5	<0.5
Ethyl Chloride/Chloroethane	**ug/L**	0.5	0.7
Vinyl Chloride	**ug/L**	<0.5	<0.5
Bromomethane	**ug/L**	<0.5	<0.5
Trichloromonofluoromethane	**ug/L**	<0.5	<0.5
Ethyl Ether/Diethyl Ether	**ug/L**	<0.5	<0.5
11 Dichloroethene	**ug/L**	<0.5	<0.5
Iodomethane/Methyl Iodide	**ug/L**	<0.5	<0.5
Carbon Disulphide	**ug/L**	<0.5	<0.5
Chlormethyl Cyanide/Chloroacetonitrile	**ug/L**	<0.5	<0.5
Propanenitrile	**ug/L**	<10	<10
Trans-1,2 Dichloroethene	**ug/L**	<0.5	<0.5
MtBE	**ug/L**	<0.5	<0.5
1,1-dichloroethane	**ug/L**	<0.5	<0.5
2,2-dichloropropane	**ug/L**	<0.5	<0.5
cis-12 Dichloroethene	**ug/L**	<0.5	<0.5
2-Butanone	**ug/L**	<5	<5
Methyl Acrylate	**ug/L**	<0.5	<0.5
Bromochloromethane	**ug/L**	<0.5	<0.5
Methacrylonitrile	**ug/L**	<5	<5
1,1,1-trichloroethane	**ug/L**	<0.5	<0.5
1-Chlorobutane	**ug/L**	<0.5	<0.5
Carbon Tetrachloride	**ug/L**	<0.5	<0.5
11 Dichloropropene	**ug/L**	<0.5	<0.5
1,2 dicloroethane	**ug/L**	<0.1	<0.1
1,2-dichloropropane	**ug/L**	<0.5	<0.5
Dibromomethane	**ug/L**	<0.5	<0.5
Methyl Methacrylate	**ug/L**	<0.5	<0.5
13 Dichloropropene,cis	**ug/L**	<2	<2
MIBK/4 Methyl 2 Pentanone	**ug/L**	<2	<2
13 Dichloropropene,trans	**ug/L**	<2	<2
Ethyl Methacrylate	**ug/L**	<2	<2
1,3-dichloropropane	**ug/L**	<0.5	<0.5
2-Hexanone	**ug/L**	<1	<1
1,2-dibromoethane	**ug/L**	<0.5	<0.5
Chlorobenzene	**ug/L**	<0.5	<0.5
1,1,1,2-tetrachloroethane	**ug/L**	<2	<2
Ethylbenzene	**ug/L**	<0.5	<0.5
Xylene P&M	**ug/L**	<0.5	<0.5
Styrene	**ug/L**	<2	<2

Isopropylbenzene	**ug/L**	<0.5	<0.5
Bromobenzene	**ug/L**	<0.5	<0.5
1,1,2,2-tetrachloroethane	**ug/L**	<0.5	<0.5
1,2,3-trichloropropane	**ug/L**	<2	<2
Trans 14 Dichloro 2 Butene, tran	**ug/L**	<2	<2
Propylbenzene	**ug/L**	<0.5	<0.5
2-chlorotoluene	**ug/L**	<0.5	<0.5
4-chlorotoluene	**ug/L**	<0.5	<0.5
1,3,5-trimethylbenzene	**ug/L**	<0.5	<0.5
Tert Butyl Benzene	**ug/L**	<0.5	<0.5
1,2,4-trimethylbenzene	**ug/L**	<0.5	<0.5
sec-butylbenzene	**ug/L**	<0.5	<0.5
P Isopropyltoluene	**ug/L**	<0.5	<0.5
N Butyl Benzene	**ug/L**	<0.5	<0.5
1,2-dibromo-3-chloropropane	**ug/L**	<2	<2
1,2,3-trichlorobenzene	**ug/L**	<0.5	<0.5
Epichlorohydrin	**ug/L**	<0.1	<0.1
2-Propenenitrile/Acrylonitrile	**ug/L**	<2	<2
1,1,2-trichloroethane	**ug/L**	<0.5	<0.5
1,2,4-Trichlorobenzene (Sub)	**ug/L**	<1	<1
1,2-Dichlorobenzene (Sub)	**ug/L**	<1	<1
1,3-Dichlorobenzene (Sub)	**ug/L**	<1	<1
Allyl Chloride (DNU)	**ug/L**	<0.5	<0.5
Hexachlorobutadiene (Sub)	**ug/L**	<1	<1
Hexachloroethane (Sub)	**ug/L**	<1	<1
Naphthalene (Sub)	**ug/L**	<8	3
Nitrobenzene (Sub)	**ug/L**	<1	<1

Iron-Dissolved	**ug/L**	3100	39000
Chromium-Total	**ug/L**	31.1	51.7
Manganese-Dissolved	**ug/L**	1800	940
Potassium-Dissolved	**mg/L**	77.4	47.5
Sodium-Dissolved	**mg/L**	111.5	45.5
Cadmium-Dissolved	**ug/L**	<0.1	<0.1
Calcium-Dissolved	**mg/L**	203.1	161.7
Copper-Dissolved	**mg/L**	<0.003	<0.003
Lead-Dissolved	**ug/L**	<0.3	<0.3
Magnesium-Dissolved	**mg/L**	77.9	42.8
Mercury-Dissolved	**ug/L**	<0.02	<0.02
Zinc-Dissolved	**ug/L**	13	5.9
Boron-Dissolved	**ug/L**	1.21	0.67

Appendix D
Water Balance Calculation

CHURCHTOWN WATER BALANCE CALCULATION

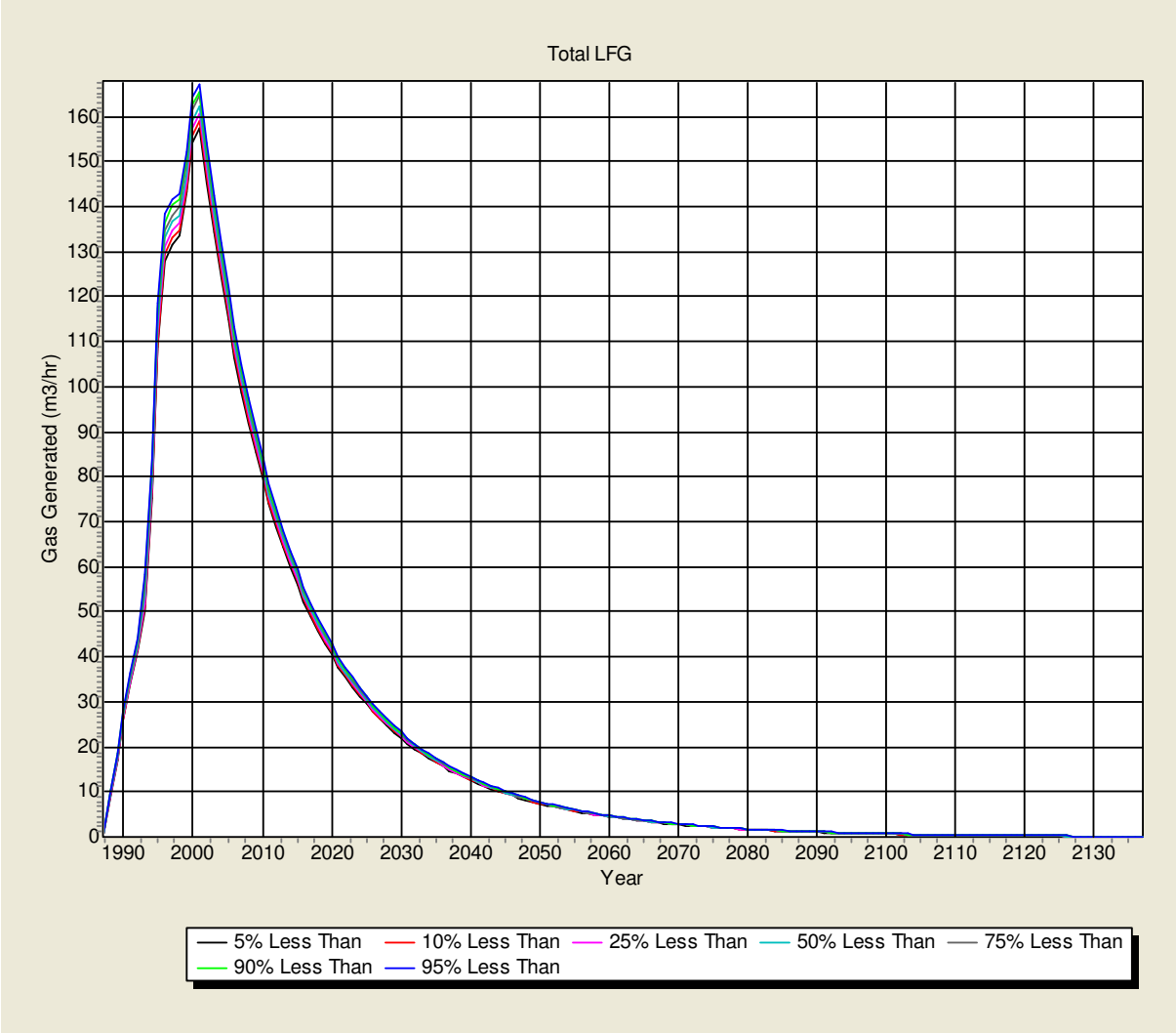
Year	Status	Rainfall (mm)	Restored area	Restored area infiltration IRCA(m3)	Total Water	Leachate produced Lo(m3)
2015	Closed	1,484	70,000	10,387	10,387	10,387
Total		1,484				10,387

Assumptions

IRCA=	Restored area infiltration of rainfall estimated % (3-10% of annual rainfall,EPA Manual)	10%	%
Restored area	Area of landfill site temporary restored.	70,000	m2
Rainfall Data	Data taken from Met Eireann Station Malin Head	1,484	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
Revised Gas Model Results



Total Bulk Landfill Gas 1988-2026

Year	M3/hr	Year	M3/hr	Year	M3/hr
1988	9.2	2001	162.43	2014	61.84
1989	17.7	2002	149.97	2015	57.77
1990	26.69	2003	138.59	2016	54.00
1991	35.13	2004	128.20	2017	50.52
1992	42.63	2005	118.70	2018	47.30
1993	53.85	2006	110.01	2019	44.32
1994	79.32	2007	102.05	2020	41.56
1995	113.84	2008	94.75	2021	39.00
1996	133.15	2009	88.05	2022	36.62
1997	136.69	2010	81.91	2023	34.41
1998	138.12	2011	76.26	2024	32.35
1999	147.38	2012	71.05	2025	30.43
2000	159.09	2013	66.26	2026	28.64

Appendix F

E-PRTR (AER Electronic Reporting System)

| PRTR# : W0062 | Facility Name : Churchtown Landfill | Filename : W0062_2015.xls | Return Year : 2015 |

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	Churchtown Landfill
PRTR Identification Number	W0062
Licence Number	W0062-01

Classes of Activity

No.	**class_name**
-	Refer to PRTR class activities below

Address 1	Churchtown
Address 2	Lifford
Address 3	
Address 4	
	Donegal
Country	Ireland
Coordinates of Location	-7.51908 54.8105
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	1-2 dichloroethane was entered as 0.0 kg/year in 2014 in error. Kg/year for 2015 is 0.00588 thus giving as 50% variance
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 | PRTR# : W0062 | Facility Name : Churchtown Landfill | Filename : W0062_2015.xls | Return Year : 2015 | 06/04/2016 14:20

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

* 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	GasSim 1.5	0.0	163000.0	0.0	163000.0
03	Carbon dioxide (CO2)	C	OTH	GasSim 1.5	0.0	0.0	0.0	547000.0
02	Carbon monoxide (CO)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.0773
07	Non-methane volatile organic compounds (NMVOC)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.191
55	1,1,1-trichloroethane	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.239
56	1,1,2,2-tetrachloroethane	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00433
34	1,2-dichloroethane (EDC)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00588
62	Benzene	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00255
58	Trichloromethane	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00368
35	Dichloromethane (DCM)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00518
73	Toluene	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00924
60	Vinyl chloride	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00793
78	Xylenes	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.0034
15	Chlorofluorocarbons (CFCs)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.295
14	Hydrochlorofluorocarbons (HCFCs)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.371
52	Tetrachloroethylene (PER)	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00743
54	**Trichlorobenzenes (TCBs)(all isomers)**	C	OTH	GasSim 1.5	0.0	0.0	0.0	0.00039

* 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: Churchtown Landfill

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	