



ANNUAL ENVIRONMENTAL REPORT

By

Louth County Council

To

Environmental Protection Agency

For

Waste licence Reference (W0033-01)

Reporting Period January – December 2016

DROGHEDA LANDFILL SITE COUNTY LOUTH

Document Control Sheet

Client	Louth County Council					
Project Title	Louth Landfill Sites Reporting 2017					
Document Title	Annual Environmental Report 2016					
Document No.	IBR1014					
This Document Comprises	DCS	TOC	Text	No. of Tables	No. of Figures	No. of Appendices
	1	2	38	14	1	6

Rev.	Status	Author(s)	Reviewed & Approved By	Issue Date
1.0	Draft	<p><i>Ciara Devine</i></p> <p>_____ Ciara Devine, Graduate Scientist</p>	<p><i>Angela McGinley</i></p> <p>_____ Angela McGinley, Senior Scientist</p>	13/04/17
1.0	Final	<p><i>Ciara Devine</i></p> <p>_____ Ciara Devine, Graduate Scientist</p>	<p><i>Angela McGinley</i></p> <p>_____ Angela McGinley, Senior Scientist</p>	21/04/17

Copyright RPS Ireland Limited. All rights reserved.

The report has been prepared for the exclusive use of our client and unless otherwise agreed in writing by RPS Ireland Limited no other party may use, make use of or rely on the contents of this report.

The report has been compiled using the resources agreed with the client and in accordance with the scope of work agreed with the client. No liability is accepted by RPS Ireland Limited for any use of this report, other than the purpose for which it was prepared.

RPS Ireland Limited accepts no responsibility for any documents or information supplied to RPS Ireland Limited by others and no legal liability arising from the use by others of opinions or data contained in this report. It is expressly stated that no independent verification of any documents or information supplied by others has been made.

RPS Ireland Limited has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy.

No part of this report may be copied or reproduced, by any means, without the written permission of RPS Ireland Limited.

Contents

1	INTRODUCTION	1
1.1	SITE GEOLOGY.....	1
1.1.1	Regional Bedrock Geology.....	2
1.1.2	Site Geology.....	2
1.1.3	Site Overburden.....	3
1.1.4	Groundwater Vulnerability.....	3
1.1.5	Hydrology.....	3
1.1.6	Regional Hydrogeology.....	3
1.2	RESTORATION WORKS UNDERTAKEN.....	4
1.3	REPORT PERIOD.....	4
2	WASTE ACTIVITIES CARRIED OUT AT THE FACILITY	5
3	QUANTITY AND COMPOSITION OF WASTE RECEIVED AND DISPOSED OF DURING THE REPORTING PERIOD AND EACH PREVIOUS YEAR	6
4	METHODS OF DEPOSITION OF WASTE	8
4.1	LANDFILL.....	8
4.2	CIVIC WASTE FACILITY.....	8
5	SUMMARY REPORT ON EMISSIONS	10
5.1	EMISSIONS TO AIR.....	10
5.2	EMISSIONS TO GROUNDWATER AND SURFACE WATER.....	10
5.3	EMISSIONS TO WASTE WATER TREATMENT WORKS.....	11
6	SUMMARY OF RESULTS AND INTERPRETATIONS OF ENVIRONMENTAL MONITORING	12
6.1	MONITORING LOCATIONS.....	12
6.2	GROUNDWATER.....	14
6.2.1	Upgradient.....	16
6.2.2	Downgradient.....	18
6.2.3	Borehole BH5A.....	19
6.3	HYDROGEOLOGICAL REVIEW.....	21
6.4	SURFACE WATER.....	21
6.4.1	Quarry Lake.....	23
6.4.2	Capped Area.....	23
6.5	DISCHARGE TO SEWER.....	25
6.6	PERIMETER GAS MONITORING.....	25
6.7	FLUE GAS MONITORING.....	26
6.8	DUST MONITORING.....	26
6.9	NOISE.....	26
6.10	ECOLOGY.....	26
6.11	ODOUR MONITORING.....	26

7	RESOURCE AND ENERGY CONSUMPTION SUMMARY	27
8	DEVELOPMENT WORKS	28
8.1	PROPOSED DEVELOPMENT OF THE SITE AND TIMESCALE OF SUCH DEVELOPMENT	28
8.2	REPORT ON DEVELOPMENT WORKS UNDERTAKEN DURING THE REPORTING PERIOD, AND ... THOSE PROPOSED DURING THE COMING YEAR.....	28
8.3	REPORT ON RESTORATION.....	28
9	VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE TRANSPORTED / DISCHARGED OFF-SITE	29
9.1	MONTHLY WATER BALANCE CALCULATION AND INTERPRETATION	29
10	SITE SURVEY SHOWING EXISTING LEVELS OF THE FACILITY AT THE END OF THE REPORTING PERIOD	30
11	ESTIMATED ANNUAL QUANTITY OF LANDFILL GAS EMITTED FROM THE SITE.....	31
12	ESTIMATED ANNUAL QUANTITY OF INDIRECT EMISSIONS TO GROUNDWATER	32
13	ENVIRONMENTAL OBJECTIVES AND TARGETS	33
13.1	SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR THE FORTHCOMING YEAR	33
14	FULL TITLE AND A WRITTEN SUMMARY OF ANY PROCEDURES DEVELOPED BY THE LICENSEE IN THE YEAR WHICH RELATES TO THE FACILITY OPERATION	34
15	TANK, PIPELINE AND BUND TESTING AND INSPECTION REPORT	35
16	REPORTED INCIDENTS AND COMPLAINTS SUMMARIES	36
17	REPORTS ON FINANCIAL PROVISION MADE UNDER THIS LICENCE, MANAGEMENT AND STAFFING STRUCTURE OF THE FACILITY, AND A PROGRAMME FOR PUBLIC..	37
17.1	MANAGEMENT AND STAFFING STRUCTURE.....	37
17.2	ANNUAL BUDGET AND SITE RUNNING COSTS	37
17.3	ENVIRONMENTAL LIABILITIES	38

Appendices

Appendix A	PRTR reporting
Appendix B	Water balance calculation
Appendix C	Drawings
Appendix D	Groundwater results
Appendix E	Surface water results
Appendix F	Landfill gas results

1 Introduction

This Annual Environmental Report (AER) has been prepared to meet the requirements of Condition 2.8 of Waste Licence W0033-01 for Drogheda Landfill and includes the information listed in Schedule C of the Waste Licence. Drogheda Landfill Site has been in operation since 1983 and has ceased accepting waste for disposal since the waste licence was granted on 30th December 1999 as required by the Waste Management (Licensing) Regulations, 1997.

The site is located 600 metres north of the River Boyne on the north-west edge of Drogheda town. The site is adjacent to Leonards Cross at the junction of the R168 road to Collon (and there on to the newly constructed M1) and Cement Road, a minor road linking the Slane Road and the N1 primary road northwards from Drogheda to Dundalk. The site is approximately 32 hectares in extent and was formally a limestone quarry. The site was developed on the benches of the redundant limestone quarry. The site has historically operated on a dilute and disperses principle.

Facility information summary is provided in Table 1.1

Table 1.1 Facility Information Summary

AER Reporting Year	2016
Licence Register Number	W0033-01
Name of site	Drogheda Landfill Site
Site Location	Collon Road
NACE Code	3821
Class/Classes of Activity	Landfill HRC

1.1 Site Geology

A hydrogeology review was undertaken for the site in 2014. The site geology description below is taken from this report (Drogheda Landfill Hydrogeological Review, BlueRock Environmental Limited, 2014).

1.1.1 Regional Bedrock Geology

According to the GSI Bedrock Geology Map of Ireland the site is underlain by limestone bedrock of Lower Carboniferous age and classified as Dinantian Pure Bedded Limestones of the Tullyallen Formation (TF). Geological mapping records these rocks dipping less than 20 degrees to the south-southwest with an approximate east-west strike. The Tullyallen Formation is bounded to the north by Silurian metasediments and volcanics belonging to the Glaspistol Formation (GF) and to the west by Dinantian pure bedded limestones of the Platin Formation (PT). The limestones have been deformed into a syncline that dips towards the River Boyne. The bedrock in the region is tectonically juxtaposed by the Slane Fault which trends in an ENE-WSW direction approximately 650 metres to the north of the northern site boundary. Two cross faults are recorded intersecting the Slane Fault, trending in a NNW – SSE direction – one approximately 700 metres west of the site and the second approximately 1200 metres east of the site. The cross fault to the west throws the Tullyallen Formation against the stratigraphically younger Glaspistol Formation.

1.1.2 Site Geology

Depths to bedrock recorded within existing monitoring boreholes at the site range between 0 and 44 bgl. Exposed limestone is evident at the landfill cliff edges surrounding the flooded former quarry void. The bedrock walls show strong vertical jointing and incorporate clay-infilled collapse structures and solution cavities. Logs from two boreholes drilled into the Tullyallen Formation to depths of 54 and 72 m in the same area also report cavities accounting for approximately 10% of the total rock penetration (NERDO, 1981). A previous borehole, drilled in 1998 along the southern boundary of the site (i.e. borehole BH10), recorded a 6m water filled void 27m below the surface. The width and extent of this karst feature is unknown.

Borehole logs from the surrounding area also record well developed karstification. Two trial boreholes drilled in Mell townland through the Tullyallen and Yellowbatter limestone formations (penetrating to 72 and 54.7 metres deep) showed cavities accounting for approximately 10% of the total rock penetration (NERDO, 1981). Both the geological log and the caliper log of the 1979 drilling work at borehole PWSBH01 at Drybridge (to the west of the landfill site) show substantial karstification, including fissure zones at 15 m, 25 m and at 40 mbgl (NERDO, 1981). The three fissures intersected were filled with unconsolidated material. Borehole records from the site investigation for the M1 Northern Motorway recorded cavities/fissures with vertical depths of up to 3 metres (BMA, 1996).

Depths to bedrock were recorded by both boreholes and a Geophysical Survey undertaken by BMA Geoservices in June 2005. Levels recorded ranged between 10 and 30 mOD.

1.1.3 Site Overburden

Most of the overburden was removed during the quarrying activities at the site. However, subsoils surrounding the quarried area of the site (*i.e.* along the northern and western site boundaries) comprise till derived from Lower Palaeozoic shale and sandstones (TLPSsS). Closer to Drogheda and along the Boyne Valley, subsoils consist of Irish Sea Till, derived from Irish Sea basin deposits. Depths of overburden at the site range between 0m (in the southern region of the site) and 44 mbgl (borehole BH5A) to the north of the site. The waste material, as mentioned previously was placed on the exposed limestone benches of the former quarry. Thickness of this waste material across the site is currently unclear. The depth of waste at the site is currently unclear. However, the geophysical survey undertaken by BMA Geoservices in June 2005 suggests thickness of waste ranging between 5 and 35 mbgl.

1.1.4 Groundwater Vulnerability

Groundwater vulnerability is dictated by the nature and thickness of the material overlying the uppermost groundwater. This means that vulnerability relates to the permeability and thickness of the subsoils. A detailed description of the groundwater vulnerability categories can be found in the Groundwater Protection Schemes document (DELG/EPA/GSI, 1999) and in the draft GSI Guidelines for Assessment and Mapping of Groundwater Vulnerability to Contamination (Fitzsimons et al, 2003).

A draft groundwater vulnerability map for Co. Louth has been developed by the GSI. The vulnerability rating for the site, given the exposed bedrock, is classified as extreme vulnerability.

1.1.5 Hydrology

Surface water in this area generally drains from the high ground southwards towards the River Boyne which is located approximately 450 metres south of the site and flows in a west-east direction towards the Irish Sea. A stream, named as Drybridge stream for this report, flows in a north-south direction approximately 450 metres to the west of the site.

1.1.6 Regional Hydrogeology

The GSI has classified the underlying bedrock aquifer as a regionally important karstified aquifer (Rkd) dominated by diffuse flow. The site is located within the Drogheda Urban Groundwater Body (GWB), which has been classified as being of “Good” status. The groundwater body descriptions are available from the GSI website: www.gsi.ie and the

'status' is obtained from the Water Framework Directive website:
www.wfdireland.ie/maps.html.

1.2 Restoration Works Undertaken

The following restoration works were undertaken at the site during 2005-2007;

- Installation of 55 No. gas extraction wells;
- Installation and commissioning of an active gas extraction flare and methane stripper;
- Installation of capping layers consisting of Gas Drainage Layer, LLDPE capping and Surface Water Drainage Layer (A total area of approximately 101,650m²);
- Reinforcement of the capping system using geogric on slopes greater than 1 in 2.5;
- Surface Water Drainage System;
- Construction of a 1.0m high safety bund along cliff edges on the site to improve safety;
- Subsoil and topsoil have been placed above the capping layer to a depth of 850mm and 150mm respectively across the site.

1.3 Report Period

The report period for this Annual Environmental Report (AER) is from January to December 2016.

2 Waste Activities Carried Out at the Facility

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

- 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

Licensed waste recovery activities, in accordance with the Fourth Schedule of the Waste Management Act, 1996, are restricted to those listed as follows;

- Class 2 Recycling or reclamation of organic substances, which are not used as solvents (including composting and other biological transformation processes).
- Class 3 Recycling or reclamation of metals and metal compounds.
- Class 4 Recycling or reclamation of other inorganic materials.
- Class 10 The treatment of waste on land with a consequential benefit for an agricultural activity or ecological system.
- Class 11 Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
- Class 13 Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collecting, on the premises where such waste is produced.

3 Quantity and Composition of Waste Received and Disposed of During the Reporting Period and Each Previous Year

Table 3.1 shows waste quantities accepted at Drogheda landfill site from 1997-2006. The landfill site is now closed. The site ceased accepting waste for disposal since the waste licence was granted on 30th December 1999; however waste were brought on site for restoration and capping following this date.

Table 3.2 provide the quantities of waste accepted for recycling at Drogheda Civic Waste Facility in 2016. 61 tonnes was sent for disposal as results of contamination of the recyclables, waste accepted for disposal and bulky waste.

Table 3.1 Waste Quantities Accepted (Tonnes) at Landfill Site

Waste Types	1997	1998	1999	2000	2001
Total	75,350 ¹	86,000 ¹	40,000 ¹	58,506 ¹	27,085 ¹
Waste Types	2002	2003	2004	2005	2006
Total	21,288 ¹	-	8,744	-	58,584 ²

Table 3.2 Waste Quantities (Tonnes) at Civic Waste Facility

Waste Types	2006	2007	2008	2009	2010	2011
Accepted for Recycling	1,405		3,170	3,521	4,020	3,447
To landfill/incinerator					52	
Waste Types	2012	2013	2014	2015	2016	
Accepted for Recycling	3,086	2,578	2,622	2,726	2,530	
To landfill/incinerator	390	387	317	166	61	

¹ 1997 to 2002 figures based on estimates.

² Capping material under the Capping and Restoration Contract.

Table 3.3 Waste Quantities Accepted for Recycling at Drogheda Civic Waste Facility in 2016

Material Type	EWC Codes	Tonnage	Name of Destination Facility(ies), or Collector(s) if Directly Exported
Mixed residual waste	20 03 01	61	Indaver Incinerator W0167-03
Garden	20 02 01	911	Dundalk Council W0034-02
Cardboard and Paper (packaging)	15 01 01	308	Peute Europe NI6000076
Cardboard and Paper (non packaging)	20 01 01	130	Peute Europe NI6000076
Glass packaging	15 01 07	180	Glasson NI LN06/08
Metals (aluminium cans)	15 01 04	10	Tinnelly N.I LN09/10
Metals (steel cans)	15 01 04	45	Tinnelly N.I LN09/10
Other municipal metals (non-packaging)	20 01 40	247	Tinnelly N.I LN09/10
Plastic packaging	15 01 02	216	Shabra Plastics MN 080022-01
Clothes/textiles for recovery or disposal	20 01 10 & 20 01 011	33	Secondhand Clothing
Wood packaging	15 01 03	170	Dundalk Council W0034-02
Wood non-packaging	20 01 38	265	Dundalk Council W0034-02
Lead acid batteries and accumulators	16 06 01*	15	Rilta W0192/03
Total		2,591	

4 Methods Of Deposition Of Waste

4.1 Landfill

The site ceased to accept waste for disposal when the waste licence was granted in December 1999. The only materials accepted at the site were inert wastes, which was utilised for capping at the site. Phase 1 capping works were completed in September 2007.

4.2 Civic Waste Facility

The Civic Waste Facility is open;

- Monday - Friday 9.30am - 6.00pm
- Saturday 9.00am – 2.45pm

The following are accepted at the Civic Waste Facility;

- cardboard,
- magazines/paper,
- glass (green, brown, clear),
- aluminium cans,
- steel food tins,
- domestic plastics,
- textiles (e.g. clothes) and footwear,
- car and household batteries,
- scrap metal,
- wood,

- electrical and domestic appliances,
- green garden waste,
- miscellaneous.

All waste deposited at the Civic Waste Facility are placed;

- Into a receptacle for recovery, or
- into a designated inspection area.

The storage containers and storage areas are clearly labelled with yellow backgrounds and black/green writing to indicate their content.

There are samples or signage describing the type of waste which can deposited into each container.

5 Summary Report on Emissions

5.1 Emissions to Air

There is no continuous air emission monitoring at Drogheda landfill site. Periodic/non-continuous monitoring is carried out on the flare. This is further discussed in Section 6.7.

In accordance with The PRTR Regulations releases of pollutants and off site transfers of waste by facilities operating in relevant industrial sectors are to be reported by the EPA to the European E-PRTR website where the facility exceeds specified thresholds. The PRTR reporting and landfill gas survey have been completed for Drogheda landfill site and submitted to the EPA. The PRTR is including in Appendix A.

There is a 750m³/hr landfill gas flare in operation at Drogheda landfill site. Based on model predications and information from the landfill gas flares the estimated net emission of methane from the flare combustion process and both surface and lateral emissions from the landfill body is 152,987 kg/year.

Table 5.1 Net Methane Emission

Quantities of Methane Flared and / or Utilised	T (Total) kg/Year
Total estimated methane generation (as per site model)	232,234
Methane flared	79,247
Methane utilised in engine/s	0.0
Net Methane Emission	152,987

5.2 Emissions to Groundwater and Surface Water

There are no direct emissions to groundwater. A water balance calculation has been completed for Drogheda landfill site and is presented in Appendix B. The site is unlined and an area of approximately 101,650 m² has been capped. There is no active leachate extraction system on the site. Infiltration in restored areas has been calculated using range of 2-10% of total rainfall. This equates to 1,986 to 7,789 m³ of leachate produced.

Water discharges from the capped areas of the site via two concrete silt interceptors which discharge the surface water into the quarry lake (SW4 and SW5). This is further discussed in Section 6.4.

5.3 Emissions to Waste Water Treatment Works

There is no continuous wastewater (sewer) emissions monitoring at Drogheda landfill site. Periodic/non-continuous monitoring is carried out at discharge point to sewer from Civic Waste Facility (S2). This is further discussed in Section 6.5.

Condensate from the landfill gas extraction system is currently transported off site to Drogheda wastewater treatment plant via tanker. An estimated 15 m³ was sent for disposal.

The estimated volume discharged from Civic Waste Facility (area 13,500 m²) is approximately 9,634 m³ for 2016. This is within the volume limit of the licence.

6 Summary of results and interpretations of environmental monitoring

6.1 Monitoring Locations

Monitoring is carried out at locations and at frequencies as specified in Schedule F of the waste licence. Permanent access to all monitoring points is maintained.

The results contained in this report were assessed as follows;

- EPA Interim guideline values³ (IGV);
- SI No 278 of 2007 EC (Drinking water) Regulations (DWR);
- SI No 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 as amended (GWR 2010);
- 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).

Boreholes BH4A and BH10A were installed in March 2000. Boreholes BH1A, BH2A, BH3A, BH5A, BH6A, BH7, BH8A, BH9A and BH11A were installed in August 2001.

These points were surveyed in October 2001 and grid reference points are given in Table 6.1 below. LG1 to LG7 were installed in October 1998. LG8 to LG10 were installed in February 2012.

Leachate monitoring points L1A to L5A were installed in February 2000. No samples of leachate were collected as these monitoring locations are dry. All monitoring points are shown in Drawing No. IBR1014/100 Monitoring Locations in Appendix C.

³EPA (2003) Towards setting guideline values for the protection of groundwater in Ireland. Interim Report

Table 6.1 Grid References of Monitoring Points

Monitoring Points	Easting	Northing
Groundwater Boreholes		
BH1A	306775	276408
BH2A	306865	276466
BH3A	307057	276060
BH4A	306955	276519
BH5A	307044	276559
BH6A	307183	275915
BH7	307208	276602
BH8A	307248	275888
BH9A	307396	275852
BH10A	307501	275928
BH11A	307368	276157
Surface Water		
SW1	307164	276270
SW2	307414	276470
SW3	307388	275910
SW4	307076	276233
SW5	307244	276187
Gas Piezometers Boreholes		
LG1A ⁴	To be surveyed	To be surveyed
LG2	306831	276333
LG3	306878	276285
LG4	306923	276221
LG5	306961	276174
LG6	307564	276281
LG7	307580	276241
LG8	307029	276152
LG9	306963	276270
LG10	306925	276277
Leachate Boreholes		
L1A	307016	276244
L2A	307027	276332
L3A	307214	276375

⁴ LG1 was redrilled in 2016 due to a change in boundary and renamed LG1A

Monitoring Points	Easting	Northing
L4A	307290	276332
L5A	307359	276279
Noise		
N1	306786	276384
N2	306850	276238
N3	307311	275840
Dust		
DG1	306854	276352
DG2	307024	276073
DG3	307539	275993
DG4	307131	275903

6.2 Groundwater

As required under the Waste Licence, groundwater monitoring has been undertaken at the borehole locations as set out in Table 3 of the waste licence. Schedule F of the waste licence requires the monitoring of certain parameters on either a quarterly or annual basis as shown in Table 6.2.

Table 6.2 Groundwater Parameters Monitoring Frequencies

Monitoring Frequency	BH1A, BH4A, BH6A, BH9A, BH10A, BH11A	BH2A, BH3A, BH5A, BH7A, BH8A
Quarterly	Visual Inspection and Odour, Groundwater Level, Ammoniacal Nitrogen, Chloride, Cadmium, Chromium, Electrical Conductivity, pH, Temperature, Iron, Lead, Manganese, Potassium, Sodium, Barium, Nickel, Nitrate, Nitrite, Phenol, Zinc, Dissolved Oxygen, Total Suspended Solids, TON, TOC, Zinc	Visual Inspection and Odour, Groundwater Level, Ammoniacal Nitrogen, Electrical Conductivity, pH, Temperature, Chloride, Dissolved Oxygen, Cadmium, Chromium, Iron, Lead, Manganese, Potassium, Sodium, TON, TOC, Barium, Nickel, Nitrate, Nitrite, Phenol
Annually	Boron, Calcium, Copper, Cyanide, Fluoride, Magnesium, Mercury, Sulphate, Total Alkalinity, Total Phosphorous, Residues on Evaporation, Faecal Coliforms, Total Coliforms, List I & II substances	Boron, Calcium, Copper, Cyanide, Fluoride, Magnesium, Mercury, Sulphate, Total Alkalinity, Total Phosphorous, Residues on Evaporation, Zinc, Faecal Coliforms, Total Coliforms

These results are presented graphically and in table format in Appendix D.

Parameters that are indicative of possible leachate contamination include Ammoniacal-N, Conductivity, Iron, Chloride and heavy metals.

Boreholes BH1A BH2A, BH4A and BH7A provide an indication of the upgradient baseline groundwater characteristics whilst BH3A, BH6A, BH8A, BH9A, BH10A and BH11A considered as intermediate and downgradient locations.

BH6A, BH8A and BH9A typify the downgradient location for flow from the site. In addition, BH11A provides information on the nature of the groundwater deep beneath the landfill site and BH10A provides downgradient information in a borehole, which was penetrated through a karst and hence is potentially an area of relatively high groundwater flows emanating from the site. BH5A is no longer considered an upgradient borehole as it appears to be influenced by leachate emission from the adjacent waste.

Table 6.3 provides a summary of results in 2016 from groundwater monitoring boreholes throughout the monitoring period.

Table 6.3 Summary of 2016 Results from Groundwater Monitoring Boreholes

Parameter	Units	No. of Samples	Minimum	Maximum	Minimum ⁵	Maximum ⁵
Alkalinity	mg/l CaCO ₃	11	65.82	352.42		
Ammonia	mg/l N	44	0.229	0.71		
Barium	ug/l	44	12.94	1090	0.012	0.08
Boron	µg/l	11	20.58	74.36		
Cadmium	µg/l	44	< 0.09	28.71	< 0.0006	< 0.0006
Calcium	mg/l Ca	11	27.38	141.2		
Chloride	mg/l Cl	44	9.2	54.09		
Chromium	µg/l	44	< 0.68	16.59	< 0.002	0.012
Conductivity	µS/cm @ 25	44	357	964		
Copper	µg/l	11	0.761	7.612		
Cyanide	mg/l	11	< 5	< 5		
D.O.	%	32	75	90	7.38	8.9
Fluoride	mg/l	11	0.09	0.41		
Iron	µg/l	44	71.26	12170	< 0.23	< 0.23

⁵ Barium, cadmium, chromium, iron, manganese, nickel and zinc were measured in mg/l instead of ug/l in March and June 2016. Dissolved oxygen was measured in mg/l instead of % in March and June 2016.

Parameter	Units	No. of Samples	Minimum	Maximum	Minimum ⁵	Maximum ⁵
Lead	µg/l	44	0.808	110.3		
Magnesium	mg/l Mg	11	2.93	27.53		
Manganese	µg/l	44	7.602	10280	0.006	0.055
Mercury	µg/l	11	< 0.04	< 0.04		
Nickel	µg/l	44	0.456	617.5	< 0.003	0.016
Nitrate	mg/l N	44	0.11	8.9		
Nitrite	mg/l N	44	0.002	0.51		
o-Phosphate	mg/l P	11	0.005	0.081		
pH	0	43	6.82	7.9		
Phenol	µg/l	44	< 0.1	< 0.5		
Potassium	mg/l	44	0.39	64.21		
Sodium	mg/l	44	7.13	38.05		
Strontium	µg/l	11	79.37	265.5		
Sulphate	mg/l SO ₄	33	5.89	86.82		
Temp	°C	32	13.5	17		
T.O.C.	mg/l	44	0.56	41.93		
T.O.N	mg/l N	33	0.7	9.2		
Total S Solids	mg/l	11	117	768		
Uranium	µg/l	11	0.531	4.446		
Vanadium	µg/l	11	0.219	19.32		
Zinc	µg/l	44	6.251	1252	< 0.018	< 0.018

6.2.1 Upgradient

The pH levels for all upgradient boreholes remain between the IGW and DWR of 6.5 and 9.5.

Upgradient ammonia concentrations were below the GWR 2010 (0.175 mg/l N), IGW (0.15 mg/l N) and DWR (0.30 mg/l) throughout the year.

Electrical Conductivity levels in all upgradient boreholes were below the IGW of 1,000 µS/cm and DWR of 2,500 µS/cm.

Chloride levels exceeded the IGW of 30 mg/l in BH4A throughout the monitoring period and BH7 in December. Concentrations in all upgradient boreholes were below the GWR 2010 (187.5 mg/l Cl) and DWR (250 mg/l). The highest chloride level was recorded in BH4A in March (37.8 mg/l).

Elevated concentrations of potassium were consistently recorded in BH7A. The highest concentration was 64.21 mg/l detected in December.

The following parameters exceeded the relative IGW, GWR 2010 and DWR in upgradient borehole BH4A in September:

- Barium concentration of 1,090 ug/l exceeded the GWR 2010 (0.1 mg/l);
- Cadmium concentration of 28.71 ug/l exceeded the GWR 2010 (3.75 ug/l), IGW (0.005 mg/l) and DWR (5 ug/l);
- Iron concentration of 12,170 ug/l exceeded the IGW (0.2 mg/l) and DWR (200 ug/l);
- Manganese concentration of 10,280 ug/l exceeded the IGW (0.05 mg/l) and DWR (50 ug/l);
- Nickel concentration of 617.5 ug/l exceeded the GTV (15 ug/l), IGW (0.02 mg/l) and DWR (20 ug/l); and
- Zinc concentration of 1,252 ug/l exceeded the IGW (0.1 mg/l).

Iron concentrations exceeded the IGW (0.2 mg/l) and DWR (200 ug/l) in BH1A in September and in BH1A and BH2A in December.

Elevated manganese concentrations above the IGW (0.05 mg/l) and DWR (50 ug/l) were recorded in BH1A in September and in BH1A and BH2A in December.

Lead exceeded the GTV (18.75 ug/l), IGW (0.01 mg/l) and DWR (10 ug/l) in BH2A in September (110.3 ug/l).

All upgradient boreholes showed no abnormal change in TOC and TON concentrations except for an elevated TOC concentration in BH2A (14.98 mg/l) and BH4A (41.93 mg/l) in September.

Ortho-Phosphate exceeded the IGW at BH2A and BH7A in December.

Boron, Calcium, Chromium, Copper, Magnesium, Mercury Nitrate, Nitrite, Sodium and Sulphate concentrations were below the relative GWR 2010, DWR and IGW.

Concentrations above the limit of detection were measured for the following parameters;

- Strontium;
- Vanadium; and
- Uranium⁶.

Total Phenol levels were analysed and were less than the lower detection limit for the methodology used. (This varies throughout the monitoring period) and as a result could be below the IGTV of 0.5 µg/l.

Cyanide concentration of <5 ug/l were detected in all upgradient boreholes. This concentration is the lowest limit of detection for the methodology used for cyanide; therefore this could be lower than the IGTV of 0.01 mg/l. The results were below the GTV 2010 of 37.5 ug/l and the DWR of 50 ug/l.

All other parameters were below the IGTV, GWR 2010 and DWR for those comparable or below the limit of detection.

6.2.2 Downgradient

The pH levels for all boreholes remain between the IGTV and DWR of 6.5 to 9.5 pH units throughout the monitoring period.

Ammonia concentrations downgradient were below the GWR 2010 (0.175 mg/l N), IGTV (0.15 mg/l N) and the DWR (0.3 mg/l) except BH3A in September (0.229 mg/l).

All downgradient boreholes recorded Electrical Conductivity levels were below the IGTV of 1,000 µS/cm and DWR of 2,500 µS/cm.

Chloride concentrations exceeded the IGTV of 30 mg/l at times in all downgradient boreholes except BH6A. Concentrations were below the GWR 2010 (187.5 mg/l Cl) and DWR (250 mg/l). The highest chloride level was recorded in BH10A in September (54.09 mg/l).

Elevated concentrations of potassium were consistently recorded mid gradient in BH3A and BH11A. BH10A concentrations of potassium slightly exceeded the IGTV (5 mg/l) throughout

⁶ World Health Organisation (2011) Guidelines for Drinking-water Quality, Fourth Edition. Table A3.3 Guideline values for chemicals that are of health significance in drinking-water. Uranium 30 µg/l.

the monitoring period except in December. Potassium levels were highest in BH11A in September (16.05 mg/l).

Iron concentrations exceeded the IGV (0.2 mg/l) and DWR (200 ug/l) in all downgradient boreholes except BH6A at times throughout the monitoring period. The highest concentration was recorded in BH11A in December (685 ug/l).

Elevated manganese concentrations above the IGV (0.05 mg/l) and DWR (50 ug/l) were recorded in BH9A and BH10A in September and BH8A and BH11A in December. The highest concentration was recorded in BH10A in September (326.4 ug/l).

Downgradient boreholes showed no abnormal change in TOC and TON concentrations except for an elevated TOC concentration in BH3A in September (12.22 mg/l).

Ortho-Phosphate exceeded the IGV at BH3A in December.

Barium, Boron, Calcium, Cadmium, Chromium, Lead, Magnesium, Manganese, Sodium, Nickel, Nitrate, Nitrite, Zinc and Total Suspended Solids concentrations were below the GWR 2010, DWR and IGV.

Concentrations above the limit of detection were measured for Uranium and Vanadium.

Total Phenol levels were analysed and were less than the lower detection limit for the methodology used. (This varies throughout the monitoring period) and as a result could be below the IGV of 0.5µg/l.

Cyanide concentration of <5 ug/l were detected in all downgradient boreholes. This concentration is the lowest limit of detection for the methodology used for cyanide; therefore this could be lower than the IGV of 0.01 mg/l. The results are below the GTV 2010 of 37.5 ug/l and the DWR of 50 ug/l.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

6.2.3 Borehole BH5A

BH5A is no longer considered an upgradient borehole as it appears to be influenced by leachate emission from the adjacent waste.

The pH levels remain between the IGV and DWR of 6.5 and 9.5.

Ammonia concentration ranged from < 0.01 to 0.71 mg/l N during the monitoring period. BH5A exceeded the GWR 2010 (0.175 mg/l N), IGV (0.15 mg/l N) and DWR (0.30 mg/l) for ammonia in March and June.

Electrical conductivity levels were below the IGV of 1,000 µS/cm and DWR of 2,500 µS/cm.

Chloride concentrations were above the IGV of 30 mg/l throughout the monitoring period but were below the GWR 2010 of 187.5 mg/l C (ranging between 32.7 and 40.2 mg/l).

Iron concentrations exceeded the IGV (0.2 mg/l) and DWR (200 µg/l) in BH5A in December when a concentration of 509.8 µg/l was recorded.

Elevated manganese concentrations above the IGV (0.05 mg/l) and DWR (50 µg/l) in BH5A were recorded in 3 of the 4 monitoring periods ranging from 0.041 mg/l to 164.7 µg/l.

BH5A recorded the highest TON concentration (9.2 mg/l) during the monitoring period.

Barium, Boron, Electrical Conductivity, Cadmium, Chromium, Fluoride, Lead, Mercury, Nickel, Nitrite, Nitrate, Potassium, Sodium, Sulphate and Zinc concentrations were below the relative GWR 2010, DWR and IGV.

Concentrations above the limit of detection were measured for the following parameters;

- Strontium;
- Uranium⁷; and
- Vanadium.

Total Phenol levels were analysed and were less than the lower detection limit for the methodology use.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

⁷ World Health Organisation (2011) Guidelines for Drinking-water Quality, Fourth Edition. Table A3.3 Guideline values for chemicals that are of health significance in drinking-water. Uranium 30 µg/l.

6.3 Hydrogeological Review

A hydrogeological review was undertaken for the site in 2014 and a conceptual site model has been developed for the site. The report found that water quality results from all monitoring boreholes suggest that monitoring boreholes BH4A and BH5A have been impacted from leachate generated from the waste body. The elevated concentrations of ammonia and manganese within BH5A and manganese, iron, nickel and barium within BH4A have regularly been recorded above typical background concentrations for the general region in addition to the IGV and GWR. The remaining monitoring boreholes and flooded former quarry void do not indicate significant impact from the waste body and the risks posed to groundwater wells to the south or downgradient of the site is considered to be low.

6.4 Surface Water

SW1 and SW3 are samples from the lake on site. Water within the former quarry void is considered to be groundwater and will be assessed against the DWR, IGV and GWR 2010. Monitoring point SW2 is located in the cement works pond, which is adjacent and upstream of the site.

Schedule F of the waste licence requires the monitoring of certain parameters on either a quarterly or annual basis; the frequency of the monitoring of surface water parameters are shown in Table 6.4.

Surface water results are presented in Appendix E.

Table 6.4 Surface Water Monitoring Frequency

Monitoring Frequency	Parameter
Quarterly	Ammoniacal Nitrogen, BOD, COD, Chloride, Dissolved Oxygen, Electrical Conductivity, pH, Total Suspended Solids, Temperature, Cadmium, Chromium, Iron, Lead, Potassium, Total Phosphorous, Barium, Nickel, Nitrate, Nitrite, and Phenol
Annually	Calcium, Copper, Magnesium, Manganese, Mercury, Sulphate, Sodium, Total Alkalinity, TON, and Zinc

Table 6.5 provides a summary of results in 2016 from quarry surface water locations throughout the monitoring period.

Table 6.5 Summary of 2016 Results from Surface Water Monitoring locations in the Quarry Lake

Parameter	Units	No. of Samples	Minimum	Maximum	Minimum ⁸	Maximum ⁸
Alkalinity	mg/l	3	64.45	105.27		
Ammonia	mg/l N	12	< 0.01	0.043		
Barium	ug/l	12	15.54	43.85	0.035	0.04
B.O.D.	mg/l O2	12	1.54	2.41	1.54	2.41
Boron	µg/l	3	38.57	147.2		
Cadmium	µg/l	6			< 0.0006	< 0.0006
Calcium	mg/l Ca	3	23.88	29.76		
C.O.D.	mg/l O2	12	5	< 25		
Chloride	mg/l Cl	12	35.65	54.61	50	52.5
Chromium	µg/l	12	< 0.58	20.03	< 0.002	< 0.002
Conductivity	µS/cm @	12	333	528	430	528
Copper	µg/l	3	0.531	1.982		
Cyanide	mg/l	0	0	0		
D.O.	%	9	78	88	7.81	8.72
Iron	µg/l	12	16.35	150.6	< 0.23	< 0.23
Lead	µg/l	6			< 0.006	< 0.006
Magnesium	mg/l Mg	3	3.732	9.426		
Manganese	µg/l	3	16.9	36.91		
Mercury	µg/l	3	< 0.04	0.033		
Nickel	µg/l	12	0.786	3.176	< 0.003	0.003
Nitrate	mg/l N	12	< 0.110	0.67		
Nitrite	mg/l N	12	< 0.002	0.022		
o-Phosphate	mg/l P	12	< 0.005	0.034		
pH		12	7.7	8.3		
Potassium	mg/l	12	2.34	79.58		
Sodium	mg/l	3	15.39	37.94		
Strontium	µg/l	3	84.4	93.21		
Sulphate	mg/l SO4	3	13.87	88.52		
Suspended	mg/l	9	< 2	9		
T.O.C.	mg/l	3	< 0.07	0.67		
Total S	mg/l	3	< 2	8		
Uranium	µg/l	3	< 0.42	0.374		
Vanadium	µg/l	3	0.217	21.46		
Zinc	µg/l	3	7.295	16.6		

⁸ Barium, cadmium, chromium, iron, lead and nickel were measured in mg/l instead of ug/l in March and June 2016. Dissolved oxygen was measured in mg/l instead of % in March and June 2016.

6.4.1 Quarry Lake

SW1, SW2, SW3 were below the DWR, IGV and GWR 2010 for the following parameters, Alkalinity, Ammonia, Barium, Boron, Cadmium, Calcium, Chromium, Conductivity, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Nitrate, Nitrite, pH, Sodium, Sulphate and Zinc.

Chloride concentrations were above the IGV of 30 mg/l in all locations but were within the GWR 2010 overall threshold value range of 24-187.5 mg/l Cl.

Potassium exceeded the IGV of 5 mg/l in all locations. Ortho-phosphate slightly exceeded the IGV of 0.03 mg/l at SW3 in December (0.034 mg/l).

Dissolved Oxygen levels ranged from 7.81 to 8.72 mg/l in March and June and 78 to 88% in September and December.

Concentrations above the limit of detection were measured for the following parameters:

- Strontium;
- Uranium⁹; and
- Vanadium.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

6.4.2 Capped Area

SW4 and SW5 monitor the surface water arising from the capped area. Table 6.6 provides a summary of results in 2016 from surface water locations SW4 and SW5 throughout the monitoring period.

⁹ World Health Organisation (2011) Guidelines for Drinking-water Quality, Fourth Edition. Table A3.3 Guideline values for chemicals that are of health significance in drinking-water. Uranium 30 µg/l.

Table 6.6 Summary of 2016 Results from Capped Area

Parameter	Units	No. of Samples	Minimum	Maximum	Minimum	Maximum
Ammonia	mg/l N	8	< 0.01	0.089		
Barium	ug/l	8	38.49	55.78	0.021	0.034
B.O.D.	mg/l O2	8	1.53	< 2		
Cadmium	µg/l	4			< 0.0006	< 0.0006
C.O.D.	mg/l O2	8	< 5	< 25		
Chloride	mg/l Cl	8	< 2	9.31		
Chromium	µg/l	8	< 0.58	< 2.14	< 0.002	< 0.002
Conductivity	µS/cm @	8	410	546		
D.O.	%	6	86	91	8.53	8.75
Iron	µg/l	8	18.41	83.01	< 0.23	< 0.23
Lead	µg/l	4			< 0.006	< 0.006
Nickel	µg/l	8	0.497	1.167	< 0.003	< 0.005
Nitrate	mg/l N	8	< 0.7	3.14		
Nitrite	mg/l N	8	< 0.002	0.079		
o-Phosphate	mg/l P	8	< 0.07	0.091		
pH	0	8	7.6	8.02		
Potassium	mg/l	8	1.34	6.325		
Suspended Solids	mg/l	8	< 2	21		

The majority of the parameters were below the lower level of detection for the methodology used for analysis or the Surface Water Quality Standards (SWQS) laid out in the European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations 1989, European Communities Environmental Objectives (Surface Water) Regulations 2009 Environmental quality standard (EQS) and the European communities (Drinking Water) (No. 2) Regulations 2007 parametric value (DWR) where comparable.

Ammonia, Barium, BOD, COD, Cadmium, Chromium, Chloride, Dissolved Oxygen, Electrical Conductivity, Lead, Iron, Nickel, Nitrate, Nitrite, Potassium ,pH, Total Suspended Solids, were below the SWQS, EQS and DWR.

Dissolved Oxygen levels ranged from 8.53 to 8.75 mg/l in March and June and 86 to 91% in September and December.

All other parameters were below the IGV, GWR 2010 and DWR for those comparable or below the limit of detection.

6.5 Discharge to Sewer

There are two discharge points to sewer, treated condensate from the methane stripper (S1) and the discharge point to sewer from Civic Waste Facility (S2).

Monitoring at S2 during the year showed no exceedances in the emission limits to sewer except for elevated COD and Suspended Solids in March as shown in Table 6.7. The estimated volume discharged from Civic Waste Facility (area 13,500 m²) was approximately 9,634 m³ for 2016. This is within the limit of the licence.

S1 was not sampled during the monitoring period as the tank was empty on sampling dates.

Condensate from the methane stripper is tankered from site following agreement with EPA and Waste Water Treatment Plant Operator. There were no emissions to sewer from S1.

Table 6.7 Emission Limit Values for Emissions to Sewer Civic Waste Facility (S2)

Parameter Emission Limit Value	Grab Sample mg/l ELV	Mar	June	Sept	Dec
BOD ₅	335	63	41	10	33
COD	450	995	363	23	104
Ammoniacal Nitrogen NH ₄ -N	35	0.54	0.36	0.047	0.201
Suspended Solids	294	1,630	35	15	11
Sulphates (as SO ₄)	240	111	36	76.25	15.41
pH	6 – 9	7.26	7.06	7.3	7.4
Temperature	32°C	NM	NM	NM	NM

6.6 Perimeter Gas Monitoring

The licence trigger levels for the following landfill gases are greater than or equal to 1.0% v/v Methane (CH₄) and greater than or equal to 1.5% v/v Carbon Dioxide (CO₂). Landfill gas monitoring results have been provided for the period and are shown in Appendix F.

From the results it can be seen that CH₄ was not detected around the perimeter of the site (LG1 – LG9) except in LG3 in February, April and December. Readings ranged from 0.0 to 0.2% v/v which is below the trigger level of 1.0% v/v.

CO₂ ranged from 0.0 to 1.5% v/v around the perimeter of the site (LG1 - LG9) which is below the trigger level of 1.5% v/v.

CH₄ was not detected in the groundwater boreholes (BH1A to BH11A). CO₂ ranged from 0.0 to 1.4 % v/v which is below the trigger level of 1.5% v/v.

6.7 Flue Gas Monitoring

Flue gas monitoring was also undertaken on the permanent landfill gas flare. All monitoring was carried out in accordance with Environmental Protection Agency Office of Environmental Enforcement (OEE) Air Emission Monitoring Guidance Note 2 (AG2). This report has been submitted to the EPA.

CO, NO_x as NO₂ and SO₂ results were compliant with the typical emission limit values used for such installations in Ireland.

6.8 Dust Monitoring

Dust monitoring was not undertaken during this monitoring period.

6.9 Noise

Noise monitoring was not undertaken during this monitoring period.

6.10 Ecology

An assessment of the ecology of the Quarry Lake and adjoining habitats was undertaken on 20th September 2016. This has been submitted to the EPA. The macroinvertebrate data indicate moderately productive conditions at all three sites assessed, with no significant change in the trophic status of the two quarry lakes since 2015.

6.11 Odour Monitoring

Total Volatile Organic compound monitoring was undertaken at the site on 10th February 2016. There were no surface emissions zones greater than or equal to 50 ppm averaged over the capped area. There were no surface emissions zones greater than or equal to 500 ppm instantaneous reading on open surfaces within the landfill footprint. These reports have been submitted to EPA.

7 Resource 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. Consumption of resources for the reporting period is shown in Table 7.1 below.

Table 7.1 Consumption of Resources

Parameters	Unit	CWF and Landfill	CWF and Landfill	CWF and Landfill	CWF and Landfill
		2013	2014	2015	2016
Water	m ³	340	310	300	310
Electricity	kWh	3,560	3,120	2950	3,060

8 Development Works

8.1 Proposed Development of the Site and Timescale of Such Development

Completion of Phase 2 of capping works when consultation with landowners re - historical waste deposited outside the facility boundary is complete.

8.2 Report on Development Works Undertaken During the Reporting Period, and Those Proposed During the Coming Year

Approximately 15,000m² of capping (Phase 2) in the former CRH lands to the north of the site was completed in December 2016. The slope slippage was also repaired in 2016.

8.3 Report on Restoration

Phase 1 of the Restoration Capping Works for Drogheda Landfill Site has been completed satisfactorily in accordance with the contract specification, the licence conditions and EPA correspondence Ref. W0033-01/AK17EM. The CQA report has been completed and is available on site for inspection. Approximately 15,000m² of capping (Phase 2) was completed in December 2016.

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

The site was permanently capped during 2007 except for an area along the boundary of the site. Approximately 15,000m² of capping in the former CRH lands to the north of the site was completed in December 2016. No leachate is collected from the facility.

Condensate from the landfill gas extraction system is currently transported off site to Drogheda wastewater treatment plant. An estimated 15 m³ was sent for disposal.

9.1 Monthly Water Balance Calculation and Interpretation

A water balance calculation for 2016 is presented in Appendix B using rainfall data from metrological station at Dublin Airport. Infiltration in restored areas would be in the range of 2-10% in the worst case scenario for a geosynthetic clay liner cap. This estimates the leachate production for 2016 will be in the range of 1,986 to 7,789 m³.

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

A topographical survey was undertaken at the site in 2007 following the completion of Phase 1 restoration. This survey was submitted to the EPA in December 2007. A topographical survey was also undertaken in 2015.

11 Estimated Annual Quantity of Landfill Gas Emitted from the Site

A 750m³/hr flare has been installed at the facility. Field balancing is undertaken at the facility as required. The average flow rate from the flare in 2016 was 132 m³/hr. The average methane concentration was 29% v/v. The total hours run was 3,036.

The landfill gas extraction system shut down periodically during 2016 due to low methane levels. Once landfill gas flow and concentration are sufficient the flare was restarted.

12 Estimated Annual Quantity of Indirect Emissions to Groundwater

The site was formally a limestone quarry and the landfill was developed on the benches of the redundant limestone quarry. The site has historically operated on a dilute and disperse principle.

The GSI has classified the underlying bedrock aquifer as a regionally important karstified aquifer (Rkd) dominated by diffuse flow. The site is located within the Drogheda Urban Groundwater Body (GWB) which has been classified as being of “Good” status. The vulnerability rating for the site, given the exposed bedrock, is classified as extreme vulnerability.

The site was permanently capped during 2007 except for an area along the boundary of the site (approximately 3,000m²). No leachate is collected from the facility. Condensate from the landfill gas extraction system is currently transported off site to Drogheda wastewater treatment plant. An estimated 15 m³ was sent for disposal

There are no direct discharges to groundwater. A water balance calculation has been undertaken and is included in Appendix B using rainfall data from meteorological station at Dublin Airport. This estimates the leachate production for 2016 will be in the range of 1,986 to 7,789 m³.

13 Environmental Objectives and Targets

13.1 Schedule of Environmental Objectives and Targets for the Forthcoming Year

Objectives and targets to be undertaken in 2017 for Drogheda Landfill Site are as follows:

- Continue to liaise with landowners re - historical waste deposited outside the facility boundary. This is an ongoing process.
- Investigate downsizing flare to improve run times

14 Full Title and a Written Summary of Any Procedures Developed by the Licensee in the Year which Relates to the Facility Operation

The Environmental Management System (EMS) for the facility was updated in 2007 to take into consideration works undertaken at the site. This has been forwarded to the OEE under a separate cover.

15 Tank, Pipeline and Bund Testing and Inspection Report

There are no tanks or bunds on site. The landfill gas extraction system including condensate tank is serviced annually.

16 Reported Incidents and Complaints Summaries

No complaints were reported to the EPA during the monitoring period. Six incidents were reported in 2016 as shown on Table 16.1.

A compliance investigation is currently ongoing with the EPA due to the historic waste placed outside the site boundary. The slope slippage compliance investigation has been closed as it was repaired in 2016.

Table 16.1 Incidents for 2016

Incident	Description of Incident
Category 1	1 Incident reported due to high COD in emission to sewer 5 incidents reported due to shut down of flare

17 Reports on Financial Provision Made Under this Licence, Management and Staffing Structure of the Facility, and a Programme for Public

17.1 Management and Staffing Structure

The management and staffing structure for the facility is as follows;

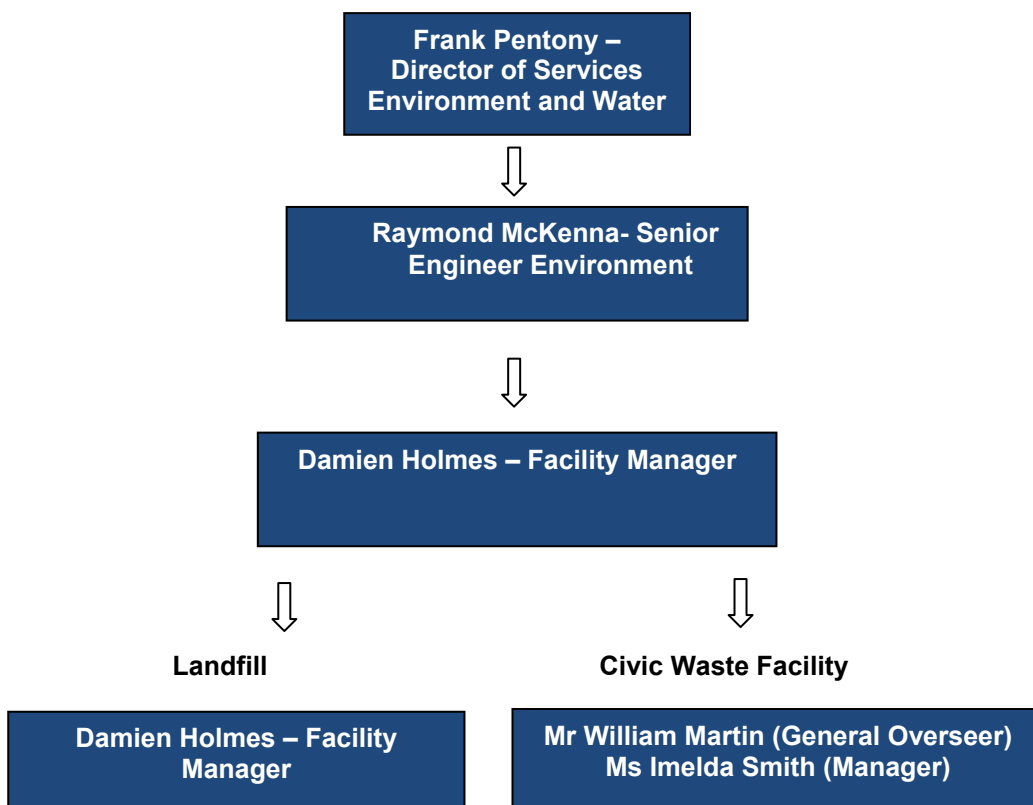


Figure 17.1 Management Structure at Drogheda Landfill Site

The public information programme is provided in the Environmental Management System for the site.

17.2 Annual Budget and Site Running Costs

The civic amenity facility is operated by third party (V & W Recycling) on behalf of Drogheda Borough Council. A €3.00 entrance charge is applicable to all users of the site except for the disposal of electrical goods.

Funding is provided by Louth County Council for all monitoring requirements.

17.3 Environmental Liabilities

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.

Appendix A

PRTR Reporting



Environmental Protection Agency

| PRTR# : W0033 | Facility Name : Drogheda Landfill - Drogheda Borough Council |
 Filename : Copy of W0033_2016 (1).xls | Return Year : 2016 |

[Guidance to completing the PRTR workbook](#)

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2016
-----------------------	------

1. FACILITY IDENTIFICATION

Parent Company Name	Louth County Council
Facility Name	Drogheda Landfill - Drogheda Borough Council
PRTR Identification Number	W0033
Licence Number	W0033-01

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Collon Road
Address 2	Mell
Address 3	Drogheda
Address 4	
	Louth
Country	Ireland
Coordinates of Location	-6.37152 53.7277
River Basin District	IEEA
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Damien Holmes
AER Returns Contact Email Address	damien.holmes@louthcoco.ie
AER Returns Contact Position	Executive Scientist
AER Returns Contact Telephone Number	042 9392920
AER Returns Contact Mobile Phone Number	086 6097315
AER Returns Contact Fax Number	042 9334549
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	6
User Feedback/Comments	
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# : W0033 | Facility Name : Drogheda Landfill - Drogheda Borough Council | Filename : Copy of W0033_2016 (1).xls | Return Year : 2016 |

19/04/2017 13:05

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT		METHOD			QUANTITY			
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

POLLUTANT		METHOD			QUANTITY			
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 minus actual	0.0	152987.0	0.0	152987.0

* 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)

POLLUTANT		METHOD			QUANTITY			
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:

Drogheda Landfill - Drogheda Borough Council

Please enter summary data on the quantities of methane flared and / or utilised

	T (Total) kg/Year	M/C/E	Method Used		Facility Total Capacity m3 per hour
			Method Code	Designation or Description	
Total estimated methane generation (as per site model)	232234.0	C	Gassim model	Gassim Lite	N/A
Methane flared	79247.0	C	Actual flared	from records	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)	152987.0	C	Gassim minus flared	net figure	N/A

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : W0033 | Facility Name : Drogheda Landfill - Drogheda Borough Council | Filename : Copy of W0033_2016 (1).xls | Return Year : 2016 |

19/04/2017 13:05

Please enter all quantities on this sheet in Tonnes

3

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste - Name and Licence/Permit No of Next Destination Facility Haz Waste - Name and Licence/Permit No of Recoverer/Disposer	Non-Haz Waste - Address of Next Destination Facility Non-Haz Waste - Address of Recoverer/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	15 01 01	No	308.0	paper and cardboard packaging	R3	M	Weighed	Abroad	Peute Europe,Ni6000076	Baahoekweg 4,LA Dordrecht,,Netherlands		
Within the Country	15 01 02	No	216.0	plastic packaging	R3	M	Weighed	Offsite in Ireland	Shrabra,MN 080022-01 Dundalk Town Council,W0034-02	Monaghan ,Ireland Newry Road,,Dundalk,,Ireland Newtowncloughogue,Newry, Co Down,BT38 8LZ,United Kingdom		
To Other Countries	15 01 04	No	55.0	metallic packaging	R4	M	Weighed	Abroad	John Tinnelly & Sons,LN09/10	Road,Toomebridge,Co Antrim,BT41 3SE,United Kingdom		
To Other Countries	15 01 07	No	180.0	glass packaging	R5	M	Weighed	Abroad	Glassdon ,Ni licenceLN/06/08			
Within the Country	16 06 01	Yes	15.0	lead batteries	R4	M	Weighed	Offsite in Ireland	Rilta Environmental Ltd,Licence No W0192-02	Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland	Rilta Environmental Ltd,Licence No W0192-02,Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland	Block 402,Grants Drive,Greenogue Business Park,Rathcoole Co Dublin,Ireland
Within the Country	16 06 04	No		alkaline batteries (except 16 06 03) landfill leachate other than those mentioned in 19 07 02	R4	M	Weighed	Offsite in Ireland	Rilta Environmental Ltd,Licence No W0192-02	Dublin,Ireland		
Within the Country	19 07 03	No			D9	C	Volume Calculation	Offsite in Ireland	Drogheda Waste Water Treatment Plant ,D0041-01	Marsh Road ,Drogheda ,Co Louth,,Ireland		
To Other Countries	20 01 01	No	130.0	newspaper and magazines	R3	M	Weighed	Abroad	Peute Europe,Ni6000076	Baahoekweg 4,LA Dordrecht,,Netherlands		
To Other Countries	20 01 11	No	33.0	textiles	R3	M	Weighed	Abroad	Cookstown NI,WMEX 01/11	Road,Randalstown,County Antrim,BT41 2NT,United Kingdom		
Within the Country	20 01 38	No	265.0	wood other than that mentioned in 20 01 37	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	Newry Road ,Dundalk,Co Louth,,Ireland Newtowncloughogue,Newry, Co Down,BT38 8LZ,United Kingdom		
To Other Countries	20 01 40	No	247.0	metals	R4	M	Weighed	Abroad	John Tinnelly & Sons,WMEX 20/01	Co Down,BT38 8LZ,United Kingdom		
Within the Country	20 02 01	No	911.0	biodegradable waste	R3	M	Weighed	Offsite in Ireland	V&W Recycling,W0034-02	Newry Road ,Dundalk,Co Louth,,Ireland		
Within the Country	20 03 01	No	61.0	mixed municipal waste	D5	M	Weighed	Offsite in Ireland	Indaver Ireland,W0167-02	Carranstown,Duleek,,Ireland		

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

Appendix B

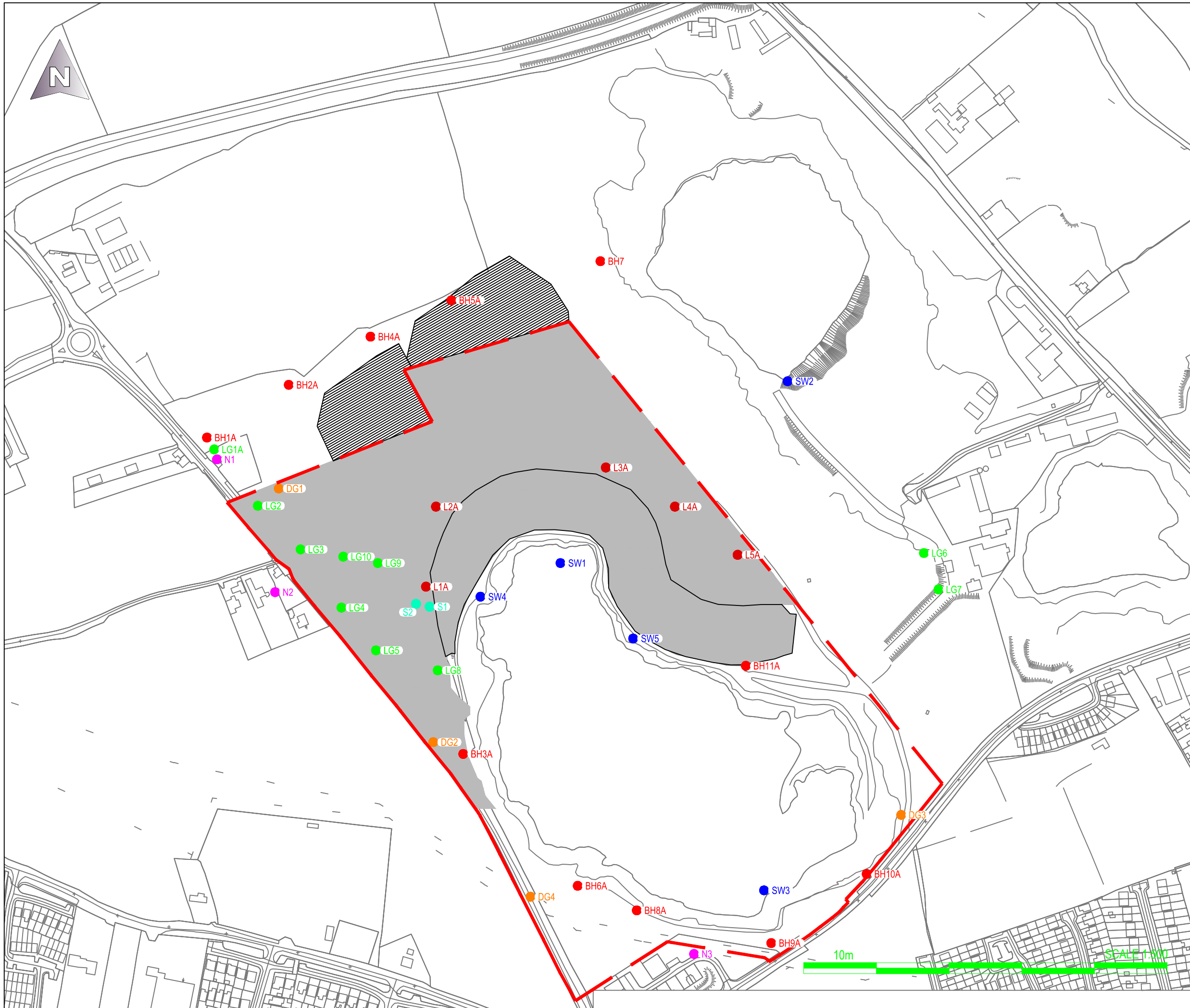
Water Balance Calculation

WATER BALANCE CALCULATION - Drogheda															
Year 2016	Active Phase	Active Area A(m ²)	Waste Input t/year	Active Area Infiltration R(A)(m ³)	Liquid Waste LW(m ³)	Temporary Restored Area	Temporary Restored area infiltration IRCA(m ³)	Permanently Restored Area	Restored area infiltration IRCA(m ³)	Total Water	Cumulative Water	Absorptive Capacity aW(m ³)	Cumulative Absorptive Capacity	Cumulative leachate	Leachate produced Lo(m ³)
2016	Closed	0	0	713.60	0	3,000	535	101650	7254	7789	7789	0	0	7789	7789
Total				714											7789

Assumptions

1. IRCA =	Temporary	25%	% of annual rainfall
	Permanently (2-10%)	10%	% of annual rainfall
2. Absorptive Capacity = Waste density of 0.8 tonnes/m ³ . Estimated absorptive capacity		0.06	t/m ³
3. Rainfall data (R) taken from Dublin Airport (=		713.6	mm
4. Capping Area		101,650	m ²
Future permanent cap area		3,000	m ²

Appendix C Drawings



- 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. Keys:

	Site Boundary
	Capped Area
	Approx Extent of Waste Licensed Boundary
	L2A Leachate Boreholes
	LG3 Landfill Gas Monitoring Point
	DG1 Dust Monitoring Points
	BH1A Groundwater Boreholes
	N1 Noise Monitoring Points
	SW2 Surfacewater Monitoring Points
	S1 Sewer

rev	amendments	drawn	date

	RPS Consulting Engineers	T	+353 (0) 74 91 61927
	Enterprise Fund Business Centre	F	+353 (0) 74 91 61928
	Ballyraine	W	www.rpsgroup.com/ireland
	Letterkenny	E	ireland@rpsgroup.com
	Co. Donegal		

Client



Project
Drogheda Landfill Site

Title
Monitoring Locations

Drawing Status	Sheet Size	Drawing Scale
Preliminary	A3	1:4000

Drawing Number	Rev
IBR1014 /100	-

Project Leader	Drawn By	Date	Initial Review
DD	AMB	Apr - 2017	AMcG

Appendix D

Groundwater Results

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH1A																						
Date Collected	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16	
Alkalinity	mg/l CaCO3												202				305						206.83	
Aluminium	ug/l	200	200	150	<5	113.7	<5	<5	<5	<10	<10	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0					
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	0.03	<0.03	<0.03	0.03	0.035	0.02	0.028	0.047	<0.020	<0.020	<0.020	<0.020	<0.020	0.028	<0.11	<0.11	<0.01	<0.01	
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Arsenic	ug/l		10	7.5	1.27	1.12	1.58	2.42	1.95	1.5	2.14	3.24	<1.0	<1.0	<1.0	2.2	1.2	1.1	1.8					
Barium	ug/l	100			17.8	66.1	33.3	18.4	19.9	19.1	46.8	29.7	80	77	80	42	59	43	29	24	0.08	0.06	43.9	72.02
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
B.O.D.	mg/l O2																							
Boron	ug/l	1000	1000	750	21.3	17	26.8	22.8	21.6	22.4	21.6	27.6	12	12	11	21	16	29	20	21			<4.33	
Cadmium	ug/l	5	5	3.75	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.03	0.03	0.06	0.11	0.1	0.23	0.24	0.4	<0.0006	<0.0006	<0.09	<0.09	
Calcium	mg/l Ca		200		136.73	114.28	135.45	139.73	138.33	147.88	102.77	104.95	85	70	78	110	100	110	140	140				53.13
C.O.D.	mg/l O2																							
Chloride	mg/l Cl	250	30		29	19	25	30	39	39	26	28	13	12	12	23	18	23	27	34	11.4	9.2	14.08	15.66
Chromium	ug/l	50	30	37.5	1.4	0.7	1.5	0.9	1	1.7	1.3	3.9	1.4	<1.0	<1.0	1.5	1.8	1.3	1.3	1.9	<0.002	<0.002	1.961	<2.14
Cobalt	ug/l				<0.5	0.6	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Coliform Bacteria	(No/100 ml)	0												172					109					
Conductivity	µS/cm @ 25	2500	1000	1875	819	636	752	820	849	860	650	704	504	430	477	668	581	670	771	822	377	412	508	422
Copper	ug/l	2000	30	1500	4.9	6.5	3.9	4.5	3.5	5.1	2	2	2.2	<1.0	1.6	1.5	1.9	3.4	3	4.6				3.367
Cyanide	mg/l	0.05	10											<0.05			<0.05							<5
D.O.	% Saturation						28					30			60	67	92	52	52	45	34	32	8.24	8.51
E. Coli	No/100 ml	0																						
Fluoride	mg/l	0.8	1000											0.15					2					0.21
Iron	ug/l	200	200		<10	256.8	21.9	<10	20	<10	<10	<10.0	<10.0	<10.0	<10.0	<10.0	16	<10.0	<10.0	<10.0	<0.23	<0.23	802.8	1668
Lead	ug/l	25	10	18.75	<0.5	5.2	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	802.8	4.662	
Magnesium	mg/l Mg	50	50		9.08	10.47	10.27	9.82	9.14	9.27	9.99	9.41	9.3	10	10	9.4	9.8	9.5	9.7	9.3				8.951
Manganese	ug/l	50	50		1.2	208.4	3	1.5	1.9	1.5	<5	<5	<5.0	<5.0	<5.0	7	5	<5.0	14	0.008	0.01	53.07	349	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm	nm	<0.050				<0.020						<0.04
Molybdenum	ug/l	35			<0.5	<0.5	1.4	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	5	<1.0	<1.0	<1.0	<1.0					
Nickel	ug/l	20	20	15	7.4	5.8	2.8	4.6	4.3	6.3	1.4	1.9	<1.0	<1.0	<1.0	1.1	1.3	3.3	3.1	5.2	<0.003	<0.003	1.783	0.615
Nitrate	mg/l N																							
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.08	<0.08	0.003	<0.002
o-Phosphate	mg/l P		30											<0.010				0.048						0.019
pH		6.5 - 9.5			7.2	7.3	7.2	7.4	7.1	7.1	7.3	7.1	7.2	7.1	7.5	7.1	7.1	7.1	7	7.2	6.82	6.95	7.1	7.4
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.50	<0.50	<0.10	<0.10
Potassium	mg/l		5		6.41	3.4	5.31		7	7.72	3.84	4.47	1.3	0.98	0.74	3.4	2.6	4.1	5	6.9	0.44	0.48	3.065	0.583
Sampling Depth	m				21.4	20.9	22.8	23.2	24.1	22.6	22.9	22	18	19.9	22.1	21.6	19.2	20.8	23.6	23.9				
Selenium	ug/l	10			<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Silver	ug/l																							
Sodium	mg/l	200	150	150	16.21	12.88	15.21	16.53	17.7	18.69	15.72	15.19	8.8	8.7	8.3	13	11	14	15	18	7.16	8.26	13.9	7.898
Strontium	ug/l				200.11	220.4	210.61	218.41	199.58	212.03	189.86	189.2	190	190	200	200	200	200	200	200				183.4
Sulphate	mg/l SO4	250	200	187.5									6.8					18						5.89
Suspended Solids	mg/l																							
Temp	°C				11.5	11.3	21.3	14.2	10.7	13.4	8.2	8.1	9	13.7	12.3	12.9	9.1	10.7	11.1	10.1	15.3	14.6		
Thallium	ug/l				0.34	0.2	0.27	0.33	0.4	0.45	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Time sampled					13:20	12:55	0.4513889	0.548611111	0.5625	10:50	10:35	13:35	12:55	10:45	13:00	10:20	10:40	13:10	14:35	13:55				
Tin (µg/l)	ug/l																							
T.O.C.	mg/l	NAC					<1.5			2.1		<1.5	1.8	3	1.9	1.7	2.5	1.6	<1.5	<1		0.66	2.65	
T.O.N	mg/l N		NAC		2.9	1.47	2.27	3.11	2.73	2.83	1.5	2.2	<0.20	<0.20	1.9	1.1	2	2.9	3.5	<0.7	<0.7	2.8		
Total S Solids	mg/l																							237
Uranium	ug/l				14.34	9.42	15.06	21.38	14.94	12.51	17.88	26.88	2.3	<1.0	<1.0	17	8.8	11	14	9				1.527
Vanadium	ug/l				1.67	1.75	2.5	3.48	2.78	1.83	3.5	5.55	<1.0	<1.0	<1.0	3.3	1.6	1.7	2.5	<1.0				1.943
Zinc	ug/l		100		20.5	23.9	23.6	13.3	11.4	13.6	15.2	15.1	13	12	8.6	11	20	20	12	20	<0.018	<0.018	31.31	11.91
Water Level m OD		31.953			10.553	11.053	9.153		7.853		9.053	9.953	13.953	12.053	9.853	10.353	12.753	11.153	8.353	8.053				

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH2A																						
Date Collected	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16	
Alkalinity	mg/l CaCO3												353				308							
Aluminium	ug/l	200	200	150		5.1			<5			<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	12	<10.0					296.81
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03		<0.03	<0.03	<0.020	<0.020	<10.0	0.021	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.11	<0.11	<0.01	<0.01	
Antimony	ug/l	5				<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Arsenic	ug/l		10	7.5		<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Barium	ug/l		100			64.2			62.9			56	59	57	55	56	57	57	60	0.053	0.047	54.83	53.8	
Beryllium	ug/l					<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
B.O.D.	mg/l O2																							
Boron	ug/l	1000	1000	750		30.3			33.1			58	36	32	25	26	29	22	23					20.58
Cadmium	ug/l	5	5	3.75		<0.1			<0.1			0.03	0.06	0.03	0.06	0.04	0.05	0.03	0.03	<0.0006	<0.0006	<0.09	<0.09	
Calcium	mg/l Ca		200			128.86			128.36			140	130	120	110	120	110	110	110					101.5
C.O.D.	mg/l O2																							
Chloride	mg/l Cl	250	30			16			16			20	19	18	18	18	16	18	16	16	15.1	16.29	16.28	
Chromium	ug/l	50	30	37.5		1.4			1.4			2.2	<1.0	<1.0	1	2	1.1	1.2	1.5	<0.002	<0.002	<0.68	<2.14	
Cobalt	ug/l					<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Coliform Bacteria	(No/100 ml)	0											365											
Conductivity	uS/cm @ 25	2500	1000	1875	724	722	719	726	730	728	738	735	719	724	703	664	639	645	636	668	649	645	527	587
Copper	ug/l	2000	30	1500		1.6			1.8			<1.0	2.1	2	2.7	3	3.2	3.5	2.4					2.961
Cyanide	mg/l	0.05	10										<0.05				<0.05							<5
D.O.	% Saturation					36			98			51	49	56	71	55	53	62	44	8.11	8.15	82		
E. Coli	No/100 ml	0											3				0							
Fluoride	mg/l	0.8	1000										0.16				<0.20							0.14
Iron	ug/l	200	200			<10			<10			<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	11	28	<0.23	<0.23	91.99	133.7	
Lead	ug/l	25	10	18.75		<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	110.3	1.234	
Magnesium	mg/l Mg		50			11.42			11.27			9.4	12	12	10	10	10	9.2	10					10.63
Manganese	ug/l	50	50			3.2			<1			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15	<5.0	0.015	0.012	21.78	73.69	
Mercury	ug/l	1	1	0.75		nm			nm			<0.050				<0.020								<0.04
Molybdenum	ug/l		35			<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0					
Nickel	ug/l	20	20	15		<0.5			1			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.005	<0.003	2.182	3.019	
Nitrate	mg/l N																			1.5	<0.7	1.69	2.13	
Nitrite	mg/l N	0.5	0.1	0.375		<0.002			<0.002			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.08	<0.08	0.006	<0.002	
o-Phosphate	mg/l P		30										0.033				0.048							0.056
pH		6.5 - 9.5			7.1	7.1	7.1	7.2	7.2	7.1	7.2	7.2	7.2	7.2	7.4	7.1	7.1	7.2	7.2		7.12	7.1	7.2	
Phenol	mg/l		0.0005			<0.002			<0.002			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.50	<0.50	<0.10	<0.10
Potassium	mg/l		5			3.23			3.44			24	3.9	3.1	2.6	2.7	2.7	2.9	2.9	2.36	1.96	2.639	2.613	
Sampling Depth	m				21	21.7	22.7	24.5	25	14.2	14.9	22.4	17	21.1	22	21.7	19.9	21.5	22.4	23				
Selenium	ug/l	10				0.7			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Silver	ug/l																							
Sodium	mg/l	200	150	150		11.19			11.83			22	14	13	9.8	10	10	9.3	11	8.64	8.68	10.83	11	
Strontium	ug/l					219.43			228.56			200	210	210	190	190	190	180	200					192.6
Sulphate	mg/l SO4	250	200	187.5									20.7				16							15.01
Suspended Solids	mg/l																							
Temp	°C				11.5	11.3	21.4	14.5	10.5	15.2	9.2	nm	8.6	10.7	10.9	12.4	6.9	10.9	12.1	10.1	15.5	13.5	13.6	
Thallium	ug/l					<0.1			0.11			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Time sampled					13.00	12.40	11.15	12.50	13.05	11.20	10.50	13.15	12.40	11.15	12.40	10.50	10.55	12.40	14.15	13.35				
Tin (ug/l)	ug/l																							
T.O.C.	mg/l	NAC				3.9			4.1			3.5	3.6	4.6	5.8	5.4	5.2	6.2	4	2.02	2.16	14.98	5.59	
T.O.N	mg/l N		NAC			2			2.13			2.3	2.1	1.9	1.2	1.4	1.5	1.9	2	1.5	0.9	2.8		
Total S Solids	mg/l																							768
Uranium	ug/l					0.99			1.07			<1.0	1	1	<1.0	<1.0	<1.0	<1.0	<1.0					0.757
Vanadium	ug/l					0.55			0.75			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					0.509
Zinc	ug/l		100			6.4			7.6			5.2	8.1	4.7	5.7	9.6	10	5.9	11	<0.018	<0.018	17.21	11.1	
Water Level m OD		32.362			11.362	10.662	9.662		7.362	17.462		15.362	11.262	10.362	10.662	12.462	10.862	9.962	9.362					

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH3A																							
Date Collected		DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16	
Alkalinity	mg/l CaCO3													254				285						277.62	
Aluminium	ug/l	200	200	150			<5			5.2			<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0				
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	0.23		0.9	0.34	<0.020	0.058	<0.020	0.038	<0.020	<0.020	0.094	0.025	<0.11	<0.11	0.229	<0.01	
Antimony	ug/l	5					<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Arsenic	ug/l		10	7.5			<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Barium	ug/l		100				54.3			56.5			63	53	50	44	47	52	48	54	0.047	0.041	37.32	45.75	
Beryllium	ug/l						<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
B.O.D.	mg/l O2																								
Baron	ug/l	1000	1000	750		61.6				59.4			31	66	66	58	62	64	60	60	-	-		54.44	
Cadmium	ug/l	5	5	3.75		<0.1				<0.1			0.04	0.03	0.06	0.05	0.04	0.05	0.04	0.03	<0.0006	<0.0006	0.128	<0.09	
Calcium	mg/l Ca		200			139.73				134.28			130	140	140	120	130	140	130	130				115.3	
C.O.D.	mg/l O2																								
Chloride	mg/l Cl	250	30			56				51			77	67	63	51	55	75	51	41	39.7	28.8	36.89	34.2	
Chromium	ug/l	50	30	37.5		2				2			2.1	1.1	<1.0	1.4	2.1	1.5	1.7	1.7	<0.002	<0.002	0.868	<2.14	
Cobalt	ug/l					<0.5				<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Coliform Bacteria	(No/100 ml)	0												>2420											
Conductivity	uS/cm @ 25	2500	1000	1875	895	889	879	862	864	874	903	901	922	898	882	812	812	904	842	794	834	783	702	964	
Copper	ug/l	2000	30	1500			<0.5			1.2			4.2	<1.0	2.1	<1.0	<1.0	1.6	<1.0	<1.0				1.458	
Cyanide	mg/l	0.05	10											<0.05				<0.05						<5	
D.O.	% Saturation					50				62			50	47	52	60	nm	59	68	74	8.03	8.1	80		
E. Coli	No/100 ml	0												0				0							
Fluoride	mg/l	0.8	1000										0.16					<0.20						0.19	
Iron	ug/l	200	200			<10				11.9			<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<0.23	<0.23	134.9	221.1	
Lead	ug/l	25	10	18.75		<0.5				<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	1.718	3.443	
Magnesium	mg/l Mg		50			9.09				9.03			12	9.5	9.6	7.9	8.6	9.3	8	7.6				7.628	
Manganese	ug/l	50	50			3.1				4.6			<5.0	<5.0	7.4	11	<5.0	<5.0	6.5	27	0.016	0.016	9.359	26.5	
Mercury	ug/l	1	1	0.75		nm				nm			<0.050					<0.020						<0.04	
Molybdenum	ug/l		35			<0.5				<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Nickel	ug/l	20	20	15		<0.5				1			1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.003	<0.003	0.723	0.594	
Nitrate	mg/l N																				6.5	5.2	5.74	5.27	
Nitrite	mg/l N	0.5	0.1	0.375																	<0.08	<0.08	0.018	<0.002	
o-Phosphate	mg/l P		30											0.039		0.005	0.043	<0.004	0.005	0.025	<0.004	<0.08	<0.08	0.018	0.081
pH		6.5 - 9.5			7.2	7.2	7.1	7.2	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.1	7.2	7.1	7.2	7.2	6.9	6.92	7	7.2	
Phenol	mg/l		0.0005			<0.002				<0.002			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.50	<0.50	<0.10	<0.10
Potassium	mg/l		5			24.58				25.5			3.4	27	22	18	19	20	15	13	11.4	8.6	10.82	9.047	
Sampling Depth	m				25	26.4		26.3	27	13	13.2	27.8	26.1	26.8	25.8	24.9	26	25.7	26.1	26.5					
Selenium	ug/l	10				0.7				0.7			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Silver	ug/l																								
Sodium	mg/l	200	150	150		20.88				20.53			13	23	23	19	20	30	20	20	17.7	15.6	20.18	18.98	
Strontium	ug/l					195				204.77			220	180	190	170	180	190	170	170				159.6	
Sulphate	mg/l SO4	250	200	187.5									74.7					66						44.86	
Suspended Solids	mg/l																								
Temp	°C				11.1	11	13.8	13	10.7	11.8	10.4	8.6	10.3	10.7	11.8	10.9	10	10.9	11.3	10.3			14.1		
Thallium	ug/l					<0.1				<0.1			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16.1	14.2			
Time sampled					10:35	10:10	10:30	10:00	14:30	10:40	11:35	nt	09:35	13:40	14:40	10:30	13:15	10:30	10:15	10:00					
Tin (ug/l)	ug/l																								
T.O.C.	mg/l	NAC				2.6				3.3			2.1	2.3	4.3	2.9	2.7	2.8	2.6	2.4	<1	<1	12.22	3.17	
T.O.N	mg/l N		NAC			4.52				4.16			6.7	6.1	6.9	6.7	6.6	6.5	6.2	5.6	6.5	5.2	2.571		
Total S Solids	mg/l																							437	
Uranium	ug/l					0.71				0.73			1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				0.644	
Vanadium	ug/l					<0.5				0.59			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				0.219	
Zinc	ug/l		100			5.9				25			8.3	22	16	24	21	18	16	20	<0.018	<0.018	10.02	11.66	
Water Level m OD		33.664			8.664	7.264	6.864		6.664		20.464	5.864	7.564	6.864	7.864	8.764	7.664	7.964	7.564	7.164					

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH4A																					
Date Collected	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16
Alkalinity	mg/l CaCO3																387						
Aluminium	ug/l	200	200	150	<5							<10.0			<10.0	<10.0	<10.0						
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03							<0.020			<0.020	<0.020	<0.020			<0.11	<0.11	<0.01	<0.01
Antimony	ug/l	5			<0.5							<1.0			<1.0	<1.0	<1.0						
Arsenic	ug/l		10	7.5	<0.5							<1.0			<1.0	<1.0	<1.0						
Barium	ug/l		100		9.5							12			10	11	12			0.012	0.013	1090	24.96
Beryllium	ug/l				<0.5							<1.0			<1.0	<1.0	<1.0						
B.O.D.	mg/l O2																			-	-		
Boron	ug/l	1000	1000	750	29.5							29			34	32	40						31.49
Cadmium	ug/l	5	5	3.75	<0.1							<0.020			<0.020	0.02	0.02			<0.0006	<0.0006	28.71	0.233
Calcium	mg/l Ca		200		150.84							160			150	160	150						141.2
C.O.D.	mg/l O2																			-	-		
Chloride	mg/l Cl	250	30		42							41			40	41	41			37.8	35.2	36.78	37.73
Chromium	ug/l	50	30	37.5	1.1							1.7			<1.0	1.8	1.1			<0.002	<0.002	8.58	<2.14
Cobalt	ug/l				<0.5							<1.0			<1.0	<1.0	<1.0						
Coliform Bacteria	(No/100 ml)	0															5						
Conductivity	uS/cm @ 25	2500	1000	1875	921							882			888	865	866			933	825	838	846
Copper	ug/l	2000	30	1500	0.8							<1.0			<1.0	<1.0	<1.0						2.634
Cyanide	mg/l	0.05	10														<0.05						<5
D.O.	% Saturation											87			70	75	72			8.36	8.05	79	
E. Coli	No/100 ml	0															0						
Fluoride	mg/l	0.8	1000														<0.20						0.22
Iron	ug/l	200	200		<10							<10.0			13	17	47			<0.23	<0.23	12170	509.8
Lead	ug/l	25	10	18.75	<0.5							<1.0			<1.0	<1.0	<1.0			<0.006	<0.006	4.513	0.966
Magnesium	mg/l Mg		50		12.89							13			13	14	14						15.63
Manganese	ug/l	50	50		2.4							<5.0			<5.0	<5.0	<5.0			0.046	0.036	10280	164.7
Mercury	ug/l	1	1	0.75	nm												<0.020						<0.04
Molybdenum	ug/l		35		<0.5							<1.0			<1.0	<1.0	<1.0						
Nickel	ug/l	20	20	15	1.1							<1.0			<1.0	<1.0	<1.0			<0.003	<0.003	617.5	4.82
Nitrate	mg/l N																			3.7	3.5	3.72	3.86
Nitrite	mg/l N	0.5	0.1	0.375	<0.002							<0.004			<0.004	<0.004	<0.004			<0.08	<0.08	0.002	<0.002
o-Phosphate	mg/l P		30														<0.010						0.005
pH		6.5 - 9.5			7.3												7						7
Phenol	mg/l		0.0005		<0.002							7.2			7.3	7.2	7			7.15	7.2	7	7
Potassium	mg/l		5		1.39							<0.002			nm	<0.002	<0.002			<0.50	<0.50	<0.10	<0.10
Sampling Depth	m											18.5			16.3	24.1	24.5			1.14	2.22	2.375	1.182
Selenium	ug/l	10			<0.5							<1.0			<1.0	<1.0	<1.0						
Silver	ug/l																						
Sodium	mg/l	200	150	150	17.94							19			19	19	20			19.1	18.3	20.85	21.46
Strontium	ug/l				248.87							260			250	260	260						265.5
Sulphate	mg/l SO4	250	200	187.5													49			-	-		49.33
Suspended Solids	mg/l																						
Temp	°C				11.7							9.2			12.3	9	10.8						
Thallium	ug/l				<0.1							<1.0			<1.0	<1.0	<1.0			16.8	16.1	14	
Time sampled					12.45							12.20			11:10	11:15	12:15						
Tin (ug/l)	ug/l																						
T.O.C.	mg/l	NAC										<1.5			1.8	1.8	3			<1	<1	41.93	3.77
T.O.N	mg/l N		NAC		3.11							4			3.8	3.5	3.7			3.7	4.1	2.24	
Total S Solids	mg/l																						457
Uranium	ug/l				4.58							4.5			4.4	4.4	4.5						4.446
Vanadium	ug/l				<0.5							<1.0			<1.0	<1.0	<1.0						2.226
Zinc	ug/l		100		4.7							2.5			2.3	2.1	2.2			<0.018	<0.018	1252	13.1
Water Level m OD		33.57			11.57																		

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH6A																							
Date Collected		DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16	
Alkalinity	mg/l CaCO3													198				163							
Aluminium	ug/l	200	200	150	<5	25.1	<5	<5		5.5	<10	<10	<10.0	10	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	171.33
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	0.08	0.03	<0.020	0.022	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Arsenic	ug/l		10	7.5	<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium	ug/l		100		35.2	33.7	36	36		36	38.5	39.5	41	40	37	35	36	38	38	40	0.041	0.043	32.59	39.69	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
B.O.D.	mg/l O2																								
Boron	ug/l	1000	1000	750	27.1	34.9	42.3	42.3		44	49.4	55.9	37	37	48	46	42	46	33	33	-	-			36
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.020	<0.020	0.02	<0.020	<0.020	0.02	<0.020	<0.020	<0.0006	<0.0006	<0.09	<0.09	<0.09
Calcium	mg/l Ca		200		67.47	70.84	69.16	69.16		66.69	66.58	64.84	68	71	67	64	68	65	66	64					63.59
C.O.D.	mg/l O2																								
Chloride	mg/l Cl	250	30		16	17	23	23		27	38	44	22	20	27	26	21	22	17	20	20.4	19.6	21.13	22	
Chromium	ug/l	50	30	37.5	0.8	0.7	1	1		1.2	<1	1.8	1.5	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	1.3	<0.002	<0.002	<0.68	<2.14	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Coliform Bacteria	(No/100 ml)	0												35				1							
Conductivity	uS/cm @ 25	2500	1000	1875	423	415	419	419	611	438	463	485	424	423	428	428	407	409	405	408	432	426	376	394	
Copper	ug/l	2000	30	1500	0.6	1.3	0.5	0.5		0.7	<1	1.2	6.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9				0.761	
Cyanide	mg/l	0.05	10											<0.05				<0.05						<5	
D.O.	% Saturation						54	54		65				73	67	72	80	74	72	78	81	8.55	8.26	82	
E_Coil	No/100 ml	0																							
Fluoride	mg/l	0.8	1000											0.21				<0.20						0.21	
Iron	ug/l	200	200		<10	92.9	<10	<10		<10	15.5	10.1	<10.0	<10.0	<10.0	15	<10.0	10	<10.0	<10.0	<0.23	<0.23	112.2	78.18	
Lead	ug/l	25	10	18.75	<0.5	2.1	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	1.281	0.875		
Magnesium	mg/l Mg		50		2.68	2.79	2.65	2.65		2.58	2.76	2.68	2.6	2.8	2.7	2.5	2.7	2.8	2.4	2.5				2.93	
Manganese	ug/l	50	50		1.1	1.7	1.5	1.5		1.6	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.2	0.009	0.006	7.602	12.56	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm		nm	nm	nm		<0.050				<0.020						<0.04	
Molybdenum	ug/l		35		<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Nickel	ug/l	20	20	15	1.3	2.1	0.6	0.6		1.3	1.1	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.003	<0.003	<0.374	0.706	
Nitrate	mg/l N																				0.7	<0.7	0.5	0.8	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	<0.002		0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.08	<0.08	0.002	<0.002	
o-Phosphate	mg/l P		30											0.028				<0.010						0.01	
pH		6.5 - 9.5			7.6	7.6	7.6	7.6	7.3	7.6	7.6	7.4	7.8	7.6	7.7	7.7	7.6	7.6	7.7	7.8	7.51	7.48	7.3	7.6	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	nm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.025	<0.10	<0.10	
Potassium	mg/l		5		1.23	0.81	1.3			1.11	1.54	1.41	1.3	1	0.96	0.86	0.91	1.3	0.76	0.88	0.62	0.5	0.635	0.684	
Sampling Depth	m				28.4	28.8	29.6	29.6	27.6	28.6	29.2	28.7	28.1	28.9	29	28.6	28.4	28.5	29	28.8					
Selenium	ug/l		10		<0.5	<0.5	<0.5	<0.5		<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Silver	ug/l																								
Sodium	mg/l	200	150	150	11.86	14.56	15.87	15.87		16.44	18.56	19.86	14	15	18	16	15	17	13	14	12.9	11.6	15.42	15.17	
Strontium	ug/l				88.59	92.25	88.38	88.38		93.63	89.41	91.79	91	87	88	86	86	89	83	89				92.96	
Sulphate	mg/l SO4	250	200	187.5										11.9				14						12.25	
Suspended Solids	mg/l																								
Temp	°C				10.4	10.6	13.8	13.8	14.8	11	10	8.3	10.1	10.4	11	10.9	9.8	10.5	10.7	10.3	15.5	14.5	14.5		
Thallium	ug/l				<0.1	<0.1	<0.1	<0.1		<0.1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Time sampled					10.50	10.25	11.20	11.20	12.30	11.20	12.10	10.45	9.45	10.15	10.05	10.50	10.15	11.00	10.45	10.20					
Tin (ug/l)	ug/l																								
T.O.C.	mg/l		NAC				<1.5	<1.5		2.5				<1.5	<1.5	3.4	1.5	<1.5	1.8	<1.5	3.2	<1	<1	0.56	3.04
T.O.N	mg/l N		NAC		1.25	1.04	0.78	0.78		1.51	0.59	0.3	0.72	0.67	0.76	0.7	0.76	0.85	0.75	0.76	0.7	<0.7	2.52		
Total S Solids	mg/l																							117	
Uranium	ug/l				0.39	0.47	0.39	0.39		0.44	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				<0.42	
Vanadium	ug/l				<0.5	<0.5	<0.5	<0.5		0.52	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				0.224	
Zinc	ug/l		100		8.6	13.6	4.4	4.4		18.7	29.7	17.2	16	8.7	5.1	15	6.4	7.4	9.1	11	<0.018	<0.018	11.04	6.251	
Water Level m OD		35.951			7.551	7.151	6.351		8.351		6.751	7.251	7.851	7.051	6.951	7.351	7.551	7.451	6.951	7.151					

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:		BH7A																						
		DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16
Alkalinity	mg/l CaCO3													158			140							65.82
Aluminium	ug/l	200	200	150			29.4			59.5			<10.0	<10.0	11	<10.0	<10.0	140	<10.0	<10.0				
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	0.06	<0.020	<0.020	<0.020	<0.020	0.026	0.024	<0.020	<0.020	<0.020	<0.020	<0.020	<0.11	<0.11	<0.01	<0.01
Antimony	ug/l	5					0.95			1.16			<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0				
Arsenic	ug/l		10	7.5			44.61			47.05			<1.0	8.2	15	15	8.2	6.7	9.8	6				
Barium	ug/l		100				10.3			8.4			41	30	24	28	31	28	29	32	0.029	0.03	15.35	18.42
Beryllium	ug/l						<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
B.O.D.	mg/l O2																				-	-		
Boron	ug/l	1000	1000	750			26.2			33.6			37	53	60	55	49	50	60	65				41.73
Cadmium	ug/l	5	5	3.75			0.2			0.1			<0.020	0.03	0.05	0.04	0.03	0.03	0.02	0.03	<0.0006	<0.0006	<0.09	<0.09
Calcium	mg/l Ca		200				13.39			12.16			68	75	46	56	62	60	46	58				27.38
C.O.D.	mg/l O2																				-	-		
Chloride	mg/l Cl	250	30				67			60			22	23	27	27	20	17	17	18	16.7	15.5	28.94	32.77
Chromium	ug/l	50	30	37.5			24.7			24.6			1.5	6.7	12	8.7	6.1	5.3	8.3	7.8	0.007	0.006	14.58	16.59
Cobalt	ug/l						<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Coliform Bacteria	(No/100 ml)	0												236				980						
Conductivity	uS/cm @ 25	2500	1000	1875	561	565	627	621	606	595	451	454	424	539	471	540	468	442	439	511	470	451	416	446
Copper	ug/l	2000	30	1500			1			1.4			6.6	2.9	2.3	3.8	2.7	2.1	2.6	3.3				2.342
Cyanide	mg/l	0.05	10										<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				<5
D.O.	% Saturation						50			57			73	85	82	91	92	84	92	92	8.9	8.52	90	
E_Coil	No/100 ml	0												1				0						
Fluoride	mg/l	0.8	1000										0.22					<0.20						0.41
Iron	ug/l	200	200				<10			<10			<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<0.23	<0.23	71.26	152.2
Lead	ug/l	25	10	18.75			<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	0.808	1.749
Magnesium	mg/l Mg		50				1.59			2.1			2.6	9.6	7.6	8.6	8.8	8.6	9.1	13				4.146
Manganese	ug/l	50	50				<1			<1			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.01	0.011	10.18	20.78
Mercury	ug/l	1	1	0.75			nm			nm			<0.050					<0.020						<0.04
Molybdenum	ug/l		35				63.9			70			<1.0	7.6	22	16	9.2	6.8	10	9.1				
Nickel	ug/l	20	20	15			1.3			1			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.003	<0.003	1.466	0.843
Nitrate	mg/l N																				<0.7	<0.7	0.48	0.93
Nitrite	mg/l N	0.5	0.1	0.375			<0.002			<0.002			<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.08	<0.08	0.002	<0.002
o-Phosphate	mg/l P		30										<0.010					<0.010						0.032
pH		6.5 - 9.5			8	7.9	9.1	9.5	9.7	9.5	7.8	7.6	7.8	7.9	8	8.1	8.3	8.1	7.9	8.2	7.84	7.6	7.6	7.9
Phenol	mg/l		0.0005				<0.002			<0.002			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0025	<0.50	<0.50	<0.10	<0.10
Potassium	mg/l		5				124.56			113.3			1.3	23	39	33	21	16	30	22	15.4	11.4	46.36	64.21
Sampling Depth	m				8.7	9.2	9.3	10.2	13.1	9.8	10.3	9.1	28.1	9.4	12.3	11.7	8.4	8	12	10.9				
Selenium	ug/l	10					109			100			<1.0	86	100	110	68	62	77	110				
Silver	ug/l																							
Sodium	mg/l	200	150	150			18.09			16.66			14	11	10	11	9.8	9.1	7.4	8.3	7.13	7.56	12.5	14.22
Strontium	ug/l						267.75			47.14			91	230	150	210	210	210	170	190				106.9
Sulphate	mg/l SO4	250	200	187.5									89.8					64						86.82
Suspended Solids	mg/l																							
Temp	°C				nm	11.4	19.5	14.6	10.6	14	9.6	nm	10.1	10.7	10.8	15.8	9.8	11.5	11.6	10.3	15.8	14.5	14.2	
Thallium	ug/l						<0.1			<0.1			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Time sampled					12:10	11:50	12:35	12:00	12:30	12:35	14:25	12:30	9:45	12:30	11:45	12:40	12:05	11:15	13:05	12:40				
Tin (ug/l)	ug/l																							
T.O.C.	mg/l	NAC					1.8			2.3			<1.5	2.3	4.5	4.1	3.6	2.3	3.3	3.3	<1	<1	1.05	3.56
T.O.N	mg/l N		NAC				0.9			0.79			0.72	<0.20	0.36	0.36	0.25	0.25	0.44	<0.20	<0.7	<0.7	2.52	
Total S Solids	mg/l																							310
Uranium	ug/l						0.36			0.3			<1.0	1.5	<1.0	1.3	1.4	1.4	1	1.4				<0.42
Vanadium	ug/l						41			44.47			<1.0	2	7.4	5	2	1.7	3.5	2.6				19.32
Zinc	ug/l		100				1.3			5.8			16	4.4	2.6	13	6.4	24	2.7	5.7	<0.018	<0.018	7.562	8.449
Water Level m OD		25.172			16.472	15.972	15.872		12.072		14.872	16.072		15.772	12.872	13.472	16.772	17.172	13.172	14.272				

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:	BH8A																							
	Date Collected	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16
Alkalinity	mg/l CaCO3													202				219						172.61
Aluminium	ug/l	200	200	150			<5			<5			<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0				
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.11	<0.11	<0.01	<0.01
Antimony	ug/l	5					<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Arsenic	ug/l		10	7.5			<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Barium	ug/l		100				18.4			20.9			18	17	19	18	18	18	19	18	0.018	0.021	17.72	21.44
Beryllium	ug/l						<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
B.O.D.	mg/l O2																				-	-		
Boron	ug/l	1000	1000	750			55.1			78.7			23	26	41	27	23	24	49	26				73.79
Cadmium	ug/l	5	5	3.75			<0.1			<0.1			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.0006	<0.0006	<0.09	<0.09
Calcium	mg/l Ca		200				77.41			76.42			84	85	78	84	81	77	75	76				75.47
C.O.D.	mg/l O2																				-	-		
Chloride	mg/l Cl	250	30				53			55			16	17	41	16	19	18	43	15	22.2	22.6	42.69	39.71
Chromium	ug/l	50	30	37.5			1.1			1.2			2.2	<1.0	<1.0	1.4	1.6	1.1	1	1.5	<0.002	<0.002	0.851	<2.14
Cobalt	ug/l						<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Coliform Bacteria	(No/100 ml)	0												9				5						
Conductivity	uS/cm @ 25	2500	1000	1875	491	510	524	528	539	549	492	497	471	464	507	488	451	452	493	449	488	474	424	430
Copper	ug/l	2000	30	1500			<0.5			0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				1.076
Cyanide	mg/l	0.05	10											<0.05				<0.05						<5
D.O.	% Saturation						56			49			90	84	74	93	91	87	62	94	8.88	8.45	85	
E. Coli	No/100 ml	0												0				0						
Fluoride	mg/l	0.8	1000											<0.150				<0.20						0.13
Iron	ug/l	200	200				<10			17.1			22	<10.0	32	50	<10.0	<10.0	<10.0	<10.0	<0.23	<0.23	102.7	249.2
Lead	ug/l	25	10	18.75			<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	4.55	4.771
Magnesium	mg/l Mg		50				3.2			3.72			4	4.1	4.1	4.1	3.8	3.8	2.8	3.7				3.633
Manganese	ug/l	50	50				1.4			1.9			<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.012	0.02	22.18	63.67
Mercury	ug/l	1	1	0.75			nm			nm				<0.050				<0.020						<0.04
Molybdenum	ug/l		35				2			0.9			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Nickel	ug/l	20	20	15			<0.5			2.2			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.003	<0.003	2.142	2.466
Nitrate	mg/l N																				<0.7	<0.7	0.17	0.4
Nitrite	mg/l N	0.5	0.1	0.375			<0.002			<0.002			0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.08	<0.08	<0.002	<0.002
o-Phosphate	mg/l P		30											<0.010				<0.010						<0.005
pH		6.5 - 9.5			7.4	7.5	7.5	7.6	7.5	7.5	7.4	7.5	7.3	7.5	7.5	7.4	7.4	7.5	7.6	7.8	7.33	7.26	7.4	7.6
Phenol	mg/l		0.0005				<0.002			<0.002				<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.50	<0.50	<0.10	<0.10
Potassium	mg/l		5				0.87			1.73			0.65	0.41	0.93	0.32	0.34	0.37	0.63	0.42	<0.18	<0.18	0.727	1.162
Sampling Depth	m				28.7	29.1	29.7	29.3	29.6	28.2	28.9	29.2	26.9	28.7	29.1	24.6	29	29	29	29.2				
Selenium	ug/l	10					<0.5			<0.5			1	<1.0	<1.0	1.2	1.1	<1.0	<1.0	<1.0				
Silver	ug/l																							
Sodium	mg/l	200	150	150			23.65			27.8			11	12	23	9.9	11	12	21	11	10.3	9.51	25.93	26.03
Strontium	ug/l						85.5			91.66			91	88	90	95	87	89	78	88				79.37
Sulphate	mg/l SO4	250	200	187.5										8.7				7						11.5
Suspended Solids	mg/l																							
Temp	°C				10.5	10.4	12.4	11.9	10.4	11	9.9	8.4	10.3	10.7	10.8	10.8	10.1	10.6	10.9	10.3	15.4	16.2	14.3	
Thallium	ug/l						<0.1			0.1			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				
Time sampled					11:10	10:40	11:50	10:55	11:20	11:40	12:40	11:10	10:10	10:45	10:20	11:15	10:40	11:20	11:05	10:40				
Tin (ug/l)	ug/l																							
T.O.C.	mg/l	NAC					1.8			2.4			<1.5	<1.5	3.4	2.2	<1.5	<1.5	1.9	<1.5	<1	<1	1.02	3.26
T.O.N	mg/l N		NAC				0.12			0.27			0.44	0.2	<0.20	0.34	0.21	0.27	0.25	0.29	<0.7	<0.7	2.24	
Total S Solids	mg/l																							245
Uranium	ug/l						0.25			0.27			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				<0.42
Vanadium	ug/l						<0.5			<0.5			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				0.463
Zinc	ug/l		100				14.6			12.3			4.2	4.2	4.5	11	2.2	4.8	3.6	7.5	<0.018	<0.018	19.55	8.579
Water Level m OD		36.151			7.451	7.051	6.451		6.551		7.251	6.951	9.251	7.451	7.051	11.551	7.151	7.151	7.151	6.951				

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

Drogheda Landfill Site Groundwater Quality

Monitoring Point:	BH9A																								
	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16		
Alkalinity	mg/l CaCO3																							179.96	
Aluminium	ug/l	200	200	150	<5	18.7	<5	<5	<5	<5	<10	<10	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0		
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.020	0.026	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.01
Antimony	ug/l	5		7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.11
Arsenic	ug/l		10	7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.11
Barium	ug/l		100	7.5	24.2	27.9	28.2	26.8	27.9	28.6	29.2	28.6	27	25	28	25	26	27	26	29	0.025	0.025	34.21	30.76	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
B.O.D.	mg/l O2																								
Boron	ug/l	1000	1000	750	30.6	69.5	112.2	108.5	117.3	109	86.8	78.8	26	29	57	28	31	73	51						49.36
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.02	<0.02	0.02	<0.020	0.02	<0.020	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.09
Cadmium	ug/l				97.02	94.68	80.88	75.04	73.45	82.83	86.84	89.65	110	110	100	100	100	90	95						69.1
Calcium	mg/l Ca		200																						
C.O.D.	mg/l O2																								
Chloride	mg/l Cl	250	30		23	38	54	56	60	57	48	42	19	19	35	23	19	20	41	34	15.4	16.8	37.92	32.01	
Chromium	ug/l	50	30	37.5	1	0.7	1	<0.5	<0.5	1.9	<1	2	2.2	<1.0	<1.0	1.3	1.7	1.2	<1.0	1.6	<0.002	<0.002	0.913	<2.14	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Coliform Bacteria	(No/100 ml)	0																							
Conductivity	µS/cm @ 25	2500	1000	1875	561	569	573	580	590	602	608	603	567	563	579	572	546	557	567	575	570	512	498	407	
Copper	ug/l	2000	30	1500	0.5	1	0.7	0.8	0.9	0.6	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.058
Cyanide	mg/l	0.05	10											<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<5
D.O.	% Saturation						26				24				61	50	43	79	56	59	35	56	7.93	8.01	79
E. Coli	No/100 ml	0																							
Fluoride	mg/l	0.8	1000										<0.150					<0.20							0.18
Iron	ug/l	200	200		<10	34.5	<10	<10	16.8	<10	<10	<10	<10	26	<10.0	11	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Lead	ug/l	25	10	18.75	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Magnesium	mg/l Mg		50		4.28	4.88	5.16	4.78	4.74	4.9	4.89	5.03	4.3	4.5	4.9	4.1	4.6	4.5	4.4	4.3					3.228
Manganese	ug/l	50	50		<1	13	<1	<1	<1	<1	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.014	0.015	165.1	42.38	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm		<0.050											<0.04
Molybdenum	ug/l		35		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	ug/l	20	20	15	1.1	2.4	1.7	2.5	2	1.9	1.6	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrate	mg/l N																								
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
o-Phosphate	mg/l P		30											0.012				<0.010							
pH		6.5 - 9.5			7.2	7.3	7.4	7.5	7.4	7.4	7.3	7.2	7.1	7.2	7.3	7.2	7.3	7.2	7.4	7.3	7.21	7.18	7.2	7.6	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/l		5		1.08	1.31	2.45		2.5	2.55	2	1.81	0.64	0.97	1.1	0.39	0.59	0.67	1.1	1	0.39	0.86	1.047	0.964	
Sampling Depth	m				27	27.4	28.7	27.5	28.1	27.1	27.5	28	25.2	27	25.4	28.4	28.9	26	26.1	26.2					
Selenium	ug/l	10			<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/l																								
Sodium	mg/l	200	150	150	10.29	21.46	31.21	30.46	31.43	30.16	24.85	21.42	8.3	9.7	18	8.1	9.5	10	21	17	9.02	8.78	22.75	21	
Strontium	ug/l				110.48	110.3	99.91	103.42	94.35	107.75	109.47	107.5	120	110	120	120	110	120	100	120					85.85
Sulphate	mg/l SO4	250	200	187.5										4.9				5							11.59
Suspended Solids	mg/l																								
Temp	°C				10.5	10.6	11.8	12.3	10.5	11	9.7	8.7	10.3	10.6	10.8	10.6	10	10.6	10.9	10.4	15.6	14.8	14.6		
Thallium	ug/l				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Time sampled					11:30	11:05	12:10	11:15	11:45	12:05	13:00	11:35	10:30	11:15	10:45	11:35	11:05	11:45	11:45	10:55					
Tin (ug/l)	ug/l																								
T.O.C.	mg/l	NAC					1.6				2.3			<1.5	<1.5	2.4	<1.5	<1.5	1.6	3	<1.5	<1	<1	0.97	3.42
T.O.N	mg/l N		NAC		0.08	<0.08	<0.08	0.16	0.23	<0.08	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.25	<0.20	<0.20	<0.7	<0.7	1.4		
Total S Solids	mg/l																								250
Uranium	ug/l				0.25	0.27	0.23	0.24	0.24	0.24	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.42
Vanadium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	0.51	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.414
Zinc	ug/l		100		4.4	3.5	2.7	4.2	5.1	7.6	21.2	5.6	5.1	4	5.9	8.8	1.8	3.7	4.6	13	<0.018	<0.018	27.02	8.899	
Water Level m OD		34.345			7.345	6.945	5.645		6.245		6.8														

Drogheda Landfill Site Groundwater Quality

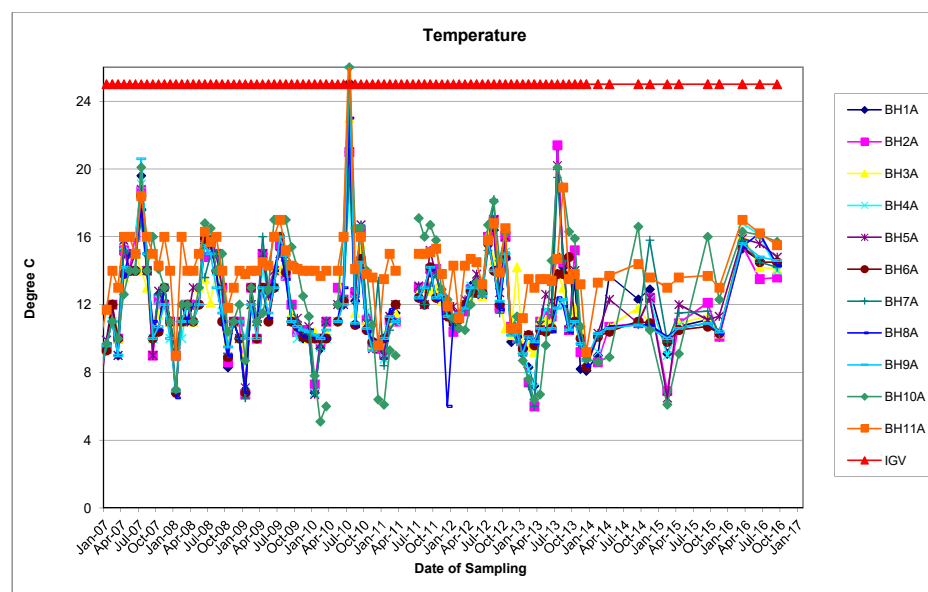
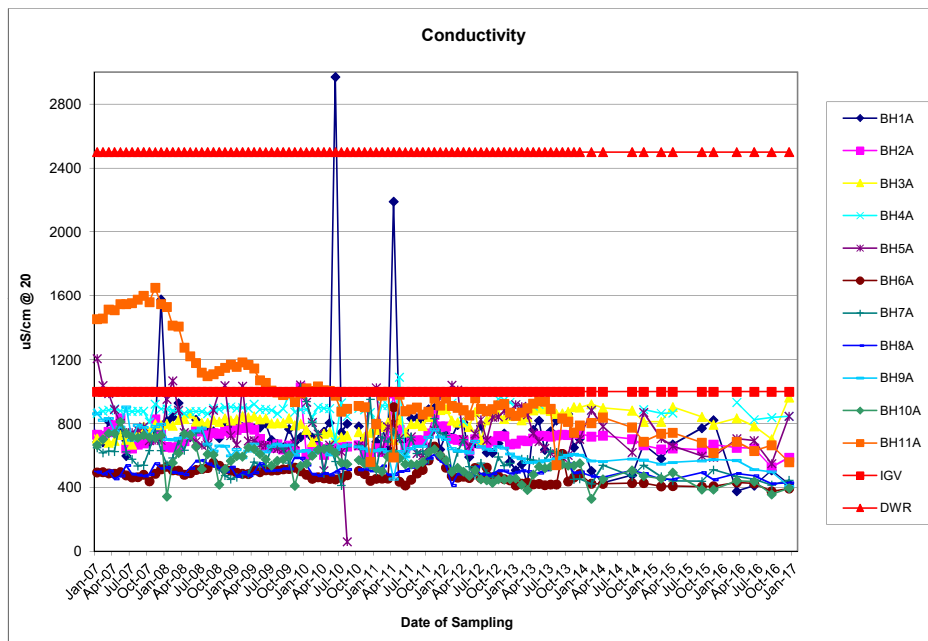
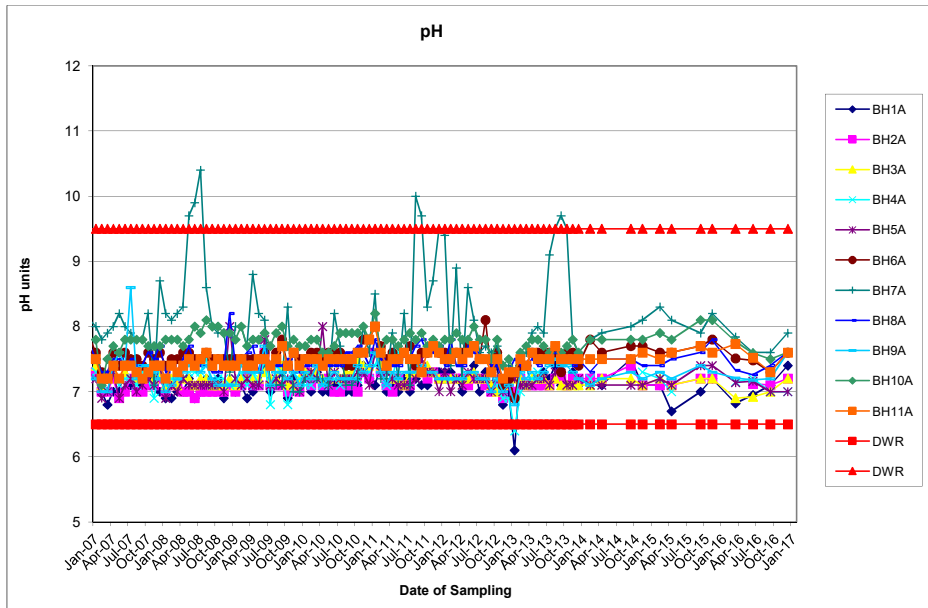
Monitoring Point:		BH10A																							
Date Collected	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16		
Alkalinity	mg/l CaCO3												142				141							177.53	
Aluminium	ug/l	200	200	150	6.6	200.3	10.3	6.3	13.3	11.9	14	<10	11	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0						
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	0.15	0.05	<0.03	<0.020	0.049	<0.020	0.028	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Arsenic	ug/l		10	7.5	0.63	1.23	1.78	2.45	1.56	1.25	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0				
Barium	ug/l		100		47.3	53.9	58.7	65.7	58.6	63.3	68.6	72.3	22	47	57	47	49	60	26	33	0.041	0.045	44.73	35.7	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
B.O.D.	mg/l O2																								
Boron	ug/l	1000	1000	750	172.1	191.8	206.4	193.6	194.7	204.2	191.6	186.9	33	120	190	160	130	160	170	160				38.88	
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.020	<0.020	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.0006	<0.0006	<0.09	<0.09	
Calcium	mg/l Ca		200		41.82	43.75	42.68	40.85	38.97	41.5	42.65	42.38	47	51	41	39	47	46	21	23				66.33	
C.O.D.	mg/l O2																								
Chloride	mg/l Cl	250	30		70	72	74	75	76	75	71	72	20	45	69	58	55	59	63	60	51.5	37.2	54.09	26.57	
Chromium	ug/l	50	30	37.5	<0.5	0.6	0.5	<0.5	<0.5	0.7	<1	<1	3.8	1.6	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<0.002	<0.002	<0.68	<2.14	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Coliform Bacteria	(No/100 ml)	0											93				23								
Conductivity	µS/cm @ 25	2500	1000	1875	531	521	532	541	545	537	538	551	330	452	507	472	456	493	388	387	442	438	357	396	
Copper	ug/l	2000	30	1500	2.5	2.5	7.2	1.3	1.9	1	1.3	1.2	<1.0	1.2	1.3	1.5	<1.0	1.6	1.3	1				1.759	
Cyanide	mg/l	0.05	10										<0.05				<0.05							<5	
D.O.	% Saturation					13					30			87	62	46	66	71	51	63	64	8.36	8.39	84	
E. Coli	No/100 ml	0												0				0							
Fluoride	mg/l	0.8	1000										0.19				<0.20							0.15	
Iron	ug/l	200	200		18	287.2	26.4	24.7	98.6	20.2	35	<10	13	<10.0	15	15	<10.0	17	<10.0	<10.0	<0.23	<0.23	200.9	550.1	
Lead	ug/l	25	10	18.75	<0.5	0.9	<0.5	<0.5	1.1	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	0.956	5.331	
Magnesium	mg/l Mg		50		9.04	10.17	10.44	9.9	10.02	10.17	10.46	10.58	3.4	7.3	10	8.5	8.2	9.3	8.2	8.3					3.098
Manganese	ug/l	50	50		2	56.2	25.5	926.7	74.1	81.7	48.4	202.8	<5.0	<5.0	11	<5.0	<5.0	<5.0	<5.0	<5.0	0.007	0.01	326.4	34.26	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm	<0.050				<0.020							<0.04	
Molybdenum	ug/l		35		<0.5	0.6	1	1.1	1	0.7	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Nickel	ug/l	20	20	15	4.6	6.2	4	6.6	5.6	5.7	5.8	5	<1.0	2.6	3.9	3.2	2.5	3.5	3.6	3.1	0.01	0.016	4.397	0.91	
Nitrate	mg/l N																				<0.7	<0.7	0.11	0.68	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	0.002	0.012	0.009	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.08	<0.08	0.002	<0.002	
o-Phosphate	mg/l P		30										0.019				<0.010							0.0087	
pH		6.5 - 9.5			7.8	7.7	7.6	7.7	7.6	7.7	7.8	7.6	7.8	7.8	7.8	7.8	7.9	7.8	8.1	8.1	7.77	7.59	7.5	7.6	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.50	<0.50	<0.10	
Potassium	mg/l		5		7.88	8.64	9.18		8.89	9.4	8.91	8.6	1.4	5.4	8.3	6.7	5.9	7.1	6.9	6.5	5.64	8.63	5.744	0.838	
Sampling Depth	m				25	25.3	26.9	26	25.9	17.9	18.2	25.5	23.9	25.1	24.7	24.2	25.7	25.9	25.9	26.1					
Selenium	ug/l	10			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Silver	ug/l																								
Sodium	mg/l	200	150	150	39.01	43.05	44.14	42.45	42.79	43.54	41.79	41.1	16	30	42	33	30	36	36	35	30.4	25.6	38.05	17.99	
Strontium	ug/l				108.46	114.26	114.08	116.26	113.36	122.44	118.3	120.41	87	110	120	110	110	120	81	82				88.83	
Sulphate	mg/l SO4	250	200	187.5									24				23							11.88	
Suspended Solids	mg/l																								
Temp	°C				9.6	14.6	20.1	18.9	16.3	15.9	10.7	8.8	8.6	8.9	16.6	10.5	6.1	9.1	16	12.3	16.3	16.1	15.7		
Thallium	ug/l				<0.1	<0.1	0.13	0.18	0.13	0.12	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Time sampled					11:45	11:25	12:30	11:35	12:00	12:20	13:15	11:55	11:55	11:45	11:10	11:55	11:30	12:10	12:20	11:15					
Tin (µg/l)	ug/l																								
T.O.C.	mg/l	NAC				6.9				7.1			1.5	3.7	7.5	4.9	4.2	5.1	9.4	4.3	3.14	2.84	3.46	2.77	
T.O.N	mg/l N		NAC		0.3	0.31	0.09	0.09	0.22	0.28	0.29	<0.20	2.4	0.64	<0.20	<0.20	0.47	<0.20	<0.20	<0.20	<0.7	<0.7	<1.00		
Total S Solids	mg/l																							239	
Uranium	ug/l				0.43	0.44	0.31	0.26	0.3	0.28	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				<0.42	
Vanadium	ug/l				<0.5	0.78	<0.5	<0.5	<0.5	0.61	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				0.336	
Zinc	ug/l		100		4	5	2.3	4.7	61.3	2.3	16.7	2	6.1	3.2	7.4	6.3	3.2	5.6	<1.0	1.9	<0.018	<0.018	14.11	10.95	
Water Level m OD		32.776			7.776	7.476	5.876		6.876		14.576	7.276	8.876	7.676	8.076	8.576	7.076	6.876	6.876	6.876					

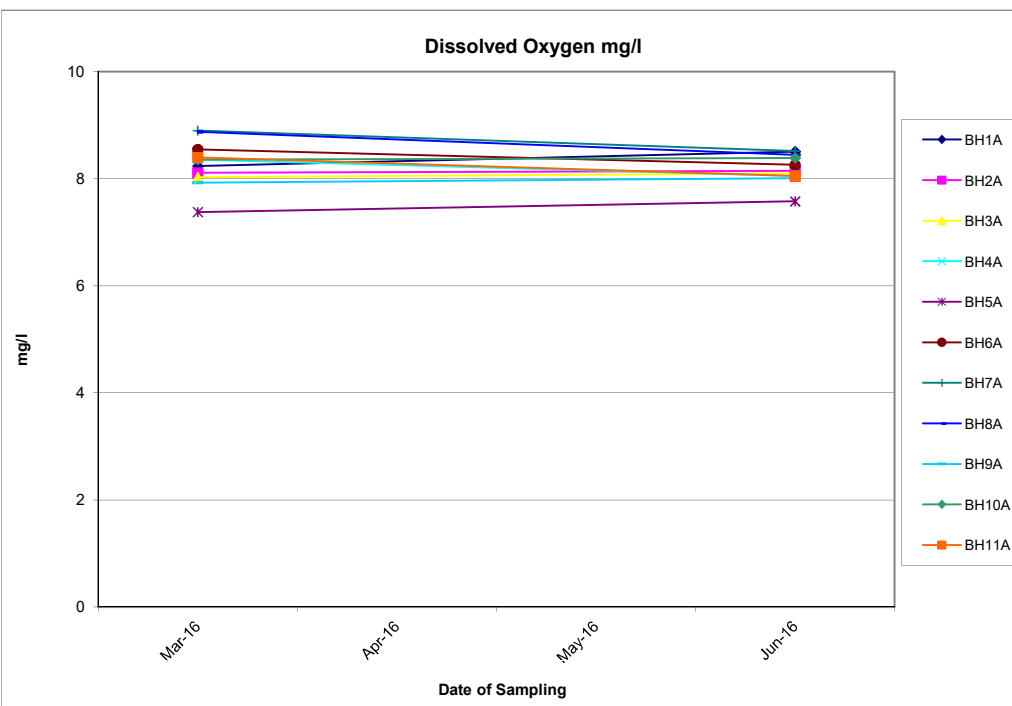
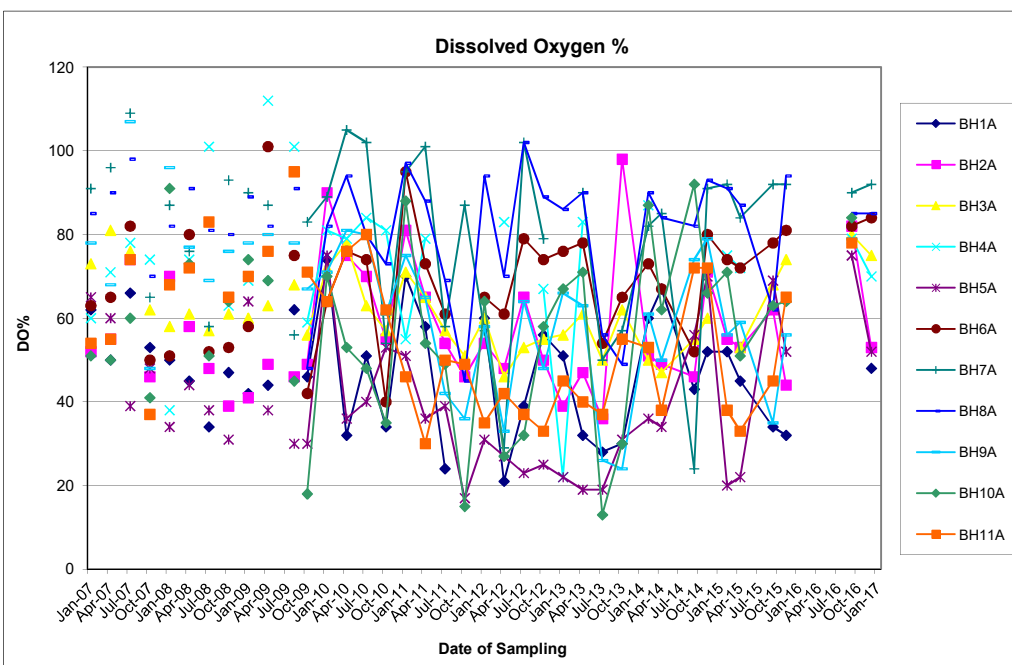
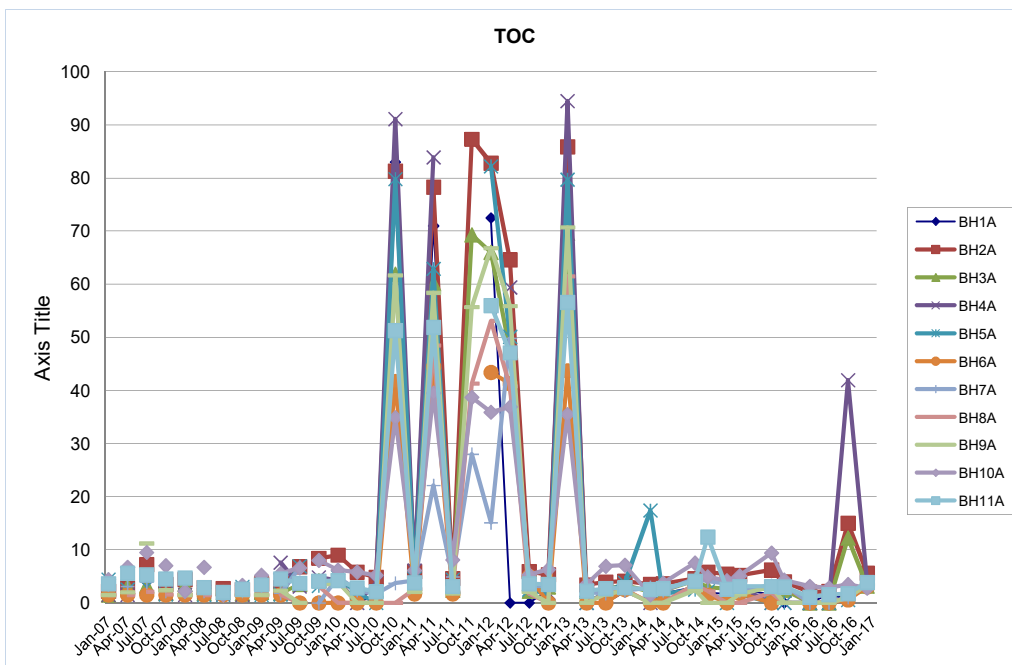
D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

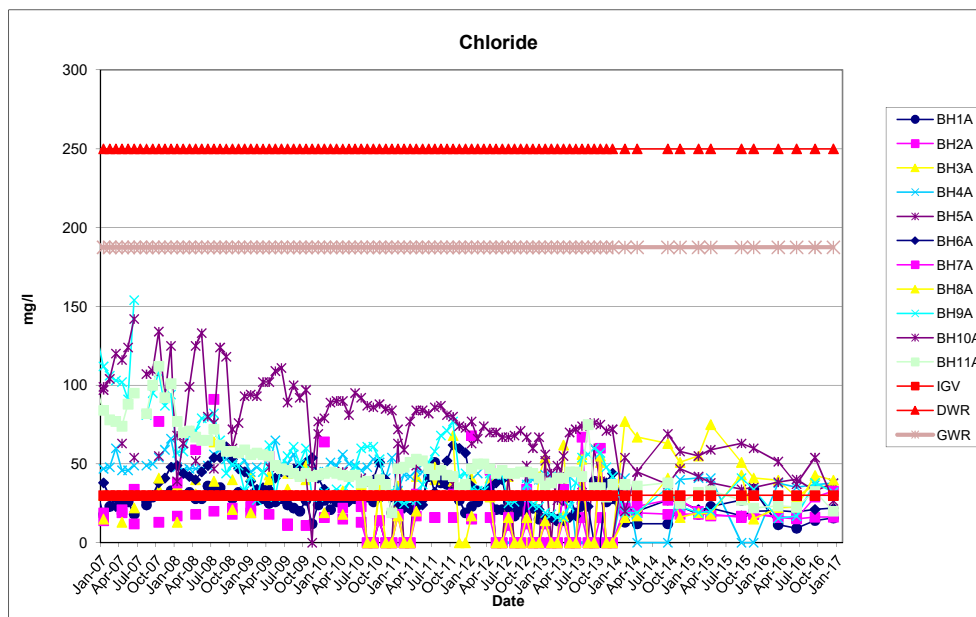
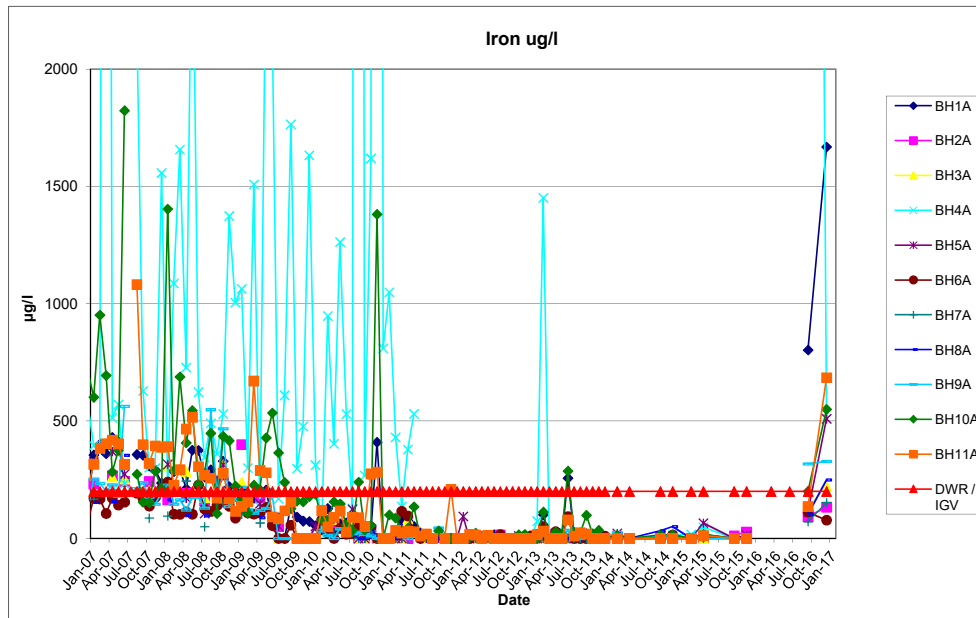
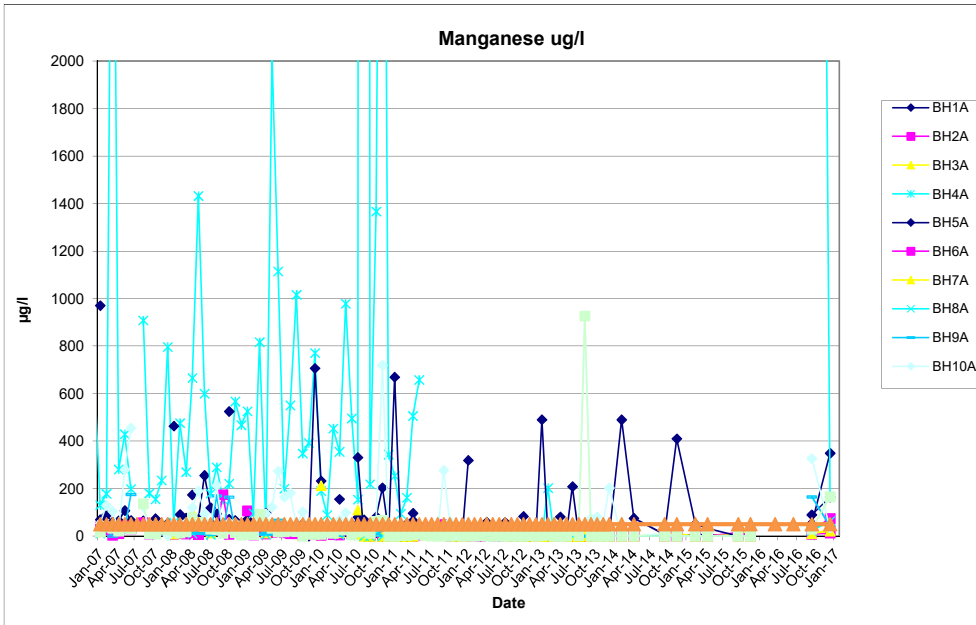
Drogheda Landfill Site Groundwater Quality

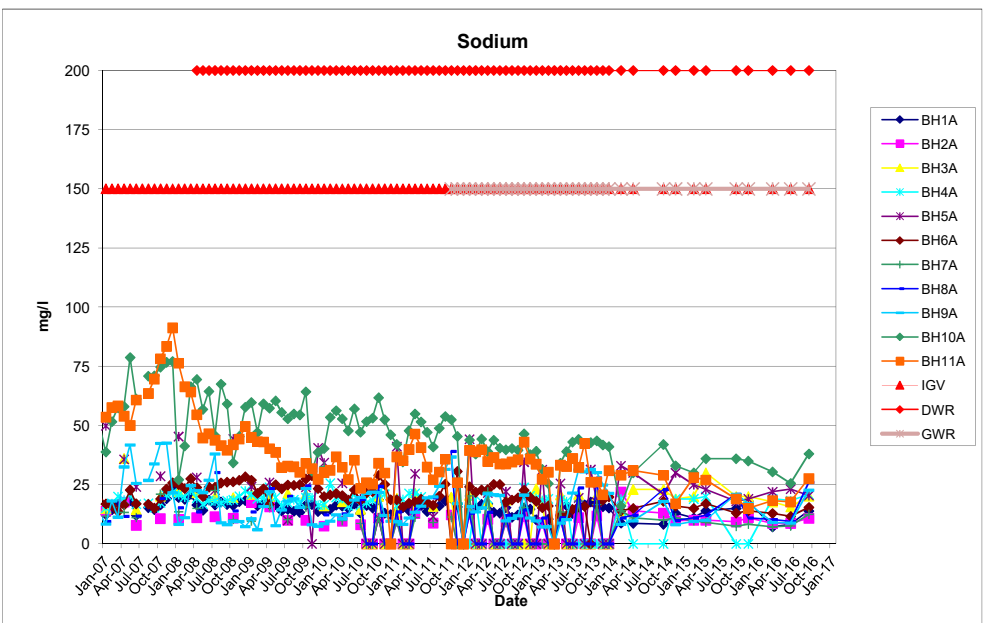
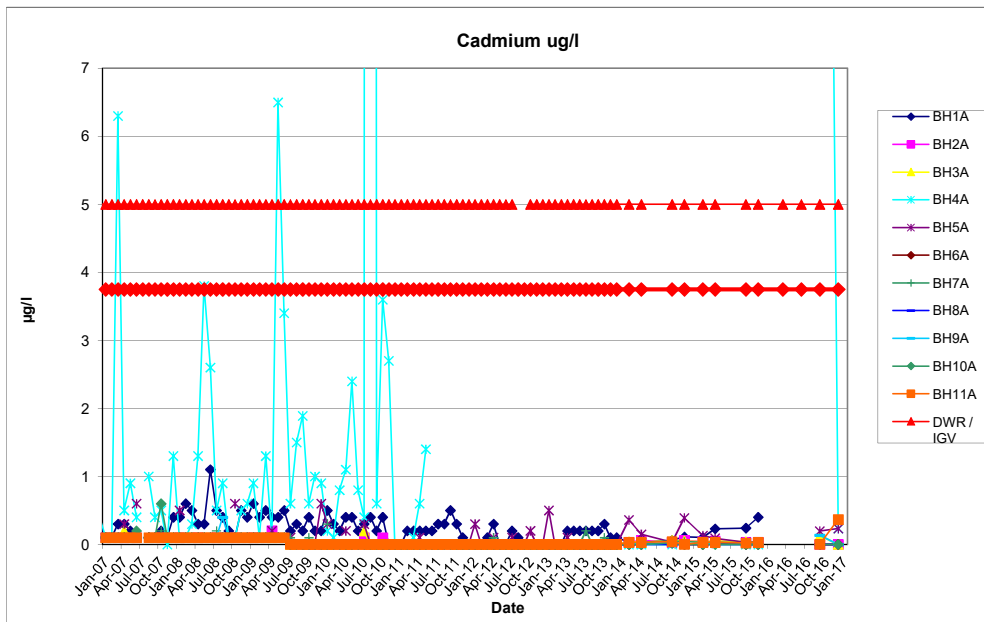
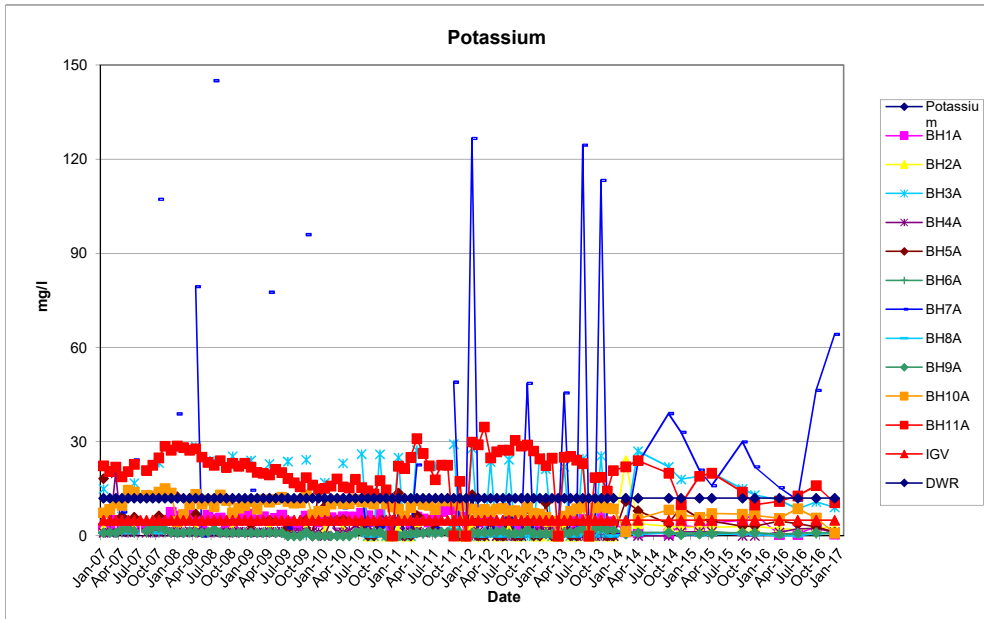
Monitoring Point:		BH11A																							
Date Collected	DWR	IGV	2010 GW Regs	08-May-13	11-Jun-13	23-Jul-13	07-Aug-13	17-Sep-13	08-Oct-13	19-Nov-13	03-Dec-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	08-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16		
Alkalinity	mg/l CaCO3												222				225						209.11		
Aluminium	ug/l	200	200	150	<5	28	<5	6.3	<5	<5	<10	<10	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0			
Ammonia	mg/l N	0.23 mg/l N	0.11 mg/l N	0.175	<0.03	<0.03	<0.03	0.15	<0.03	<0.03	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.022	<0.11	<0.11	<0.01	<0.01
Antimony	ug/l	5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Arsenic	ug/l	10	10	7.5	<0.5	<0.5	<0.5	2.45	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Barium	ug/l	100	100		36.3	40.6	36.5	65.7	31.6	31.1	27.4	31.6	41	39	36	34	42	41	31	33	0.043	0.044	40.42	45.51	
Beryllium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
B.O.D.	mg/l O2																								
Boron	ug/l	1000	1000	750	207.2	208.2	189.2	193.6	149.3	150.3	102.7	173.1	170	190	170	80	160	170	100	71				74.36	
Cadmium	ug/l	5	5	3.75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.03	0.03	0.04	<0.020	0.03	0.03	0.02	0.03	<0.0006	<0.0006	<0.09	0.366	
Calcium	mg/l Ca		200		96.47	107.97	101.55	40.85	85.98	89.87	81.77	81.41	87	96	84	78	93	80	77	73				89.16	
C.O.D.	mg/l O2																								
Chloride	mg/l Cl	250	30		45	45	42	75	35	35	29	37	37	36	38	25	32	33	27	22	23.4	22.6	32.51	19.98	
Chromium	ug/l	50	30	37.5	2	1.7	2.3	<0.5	2	2.6	2.9	3.7	2.6	2.1	1.6	2.9	2.4	1.9	2.3	2.8	<0.002	<0.002	1.314	2.447	
Cobalt	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Coliform Bacteria	(No/100 ml)	0												172											
Conductivity	µS/cm @ 25	2500	1000	1875	942	938	892	541	833	812	744	788	804	838	776	687	736	742	681	617	686	629	664	559	
Copper	ug/l	2000	30	1500										<1.0	<1.0	2.2	<1.0	<1.0	<1.0	<1.0				7.612	
Cyanide	mg/l	0.05	10		1	1.5	<0.5	1.3	0.8	<0.5	<1	1	1.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				<5	
D.O.	% Saturation						37			55			53	38	55	72	38	33	45	65	8.4	8.05	78		
E. Coli	No/100 ml	0											1												
Fluoride	mg/l	0.8	1000										0.15				<0.20							0.09	
Iron	ug/l	200	200		<10	79.4	10.2	24.7	19.2	<10	<10	<10	<10.0	<10.0	<10.0	<10.0	<10.0	12	<10.0	<10.0	<0.23	<0.23	135.9	685	
Lead	ug/l	25	10	18.75	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.006	<0.006	1.55	7.052	
Magnesium	mg/l Mg		50		32.65	30.7	32.08	9.9	29.72	27.85	28.43	28.66	29	26	27	23	26	25	24	22				27.53	
Manganese	ug/l	50	50		<1	24.2	2.9	926.7	<1	<1	<5	<5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0.01	0.022	29.78	165.7	
Mercury	ug/l	1	1	0.75	nm	nm	nm	nm	nm	nm	nm	nm	nm	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050				<0.04	
Molybdenum	ug/l	35	35		<0.5	<0.5	1.1	1.1	0.6	<0.5	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Nickel	ug/l	20	20	15	2.1	2.3	<0.5	6.6	0.8	1.2	<1	1.3	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.003	<0.003	0.456	6.847	
Nitrate	mg/l N																				1.5	1.8	1.92	1.4	
Nitrite	mg/l N	0.5	0.1	0.375	<0.002	<0.002	<0.002	0.012	<0.002	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.008	<0.008	0.002	<0.002	
o-Phosphate	mg/l P		30										<0.010	<0.004	<0.004	<0.004	<0.010							<0.005	
pH		6.5 - 9.5			7.5	7.5	7.5	7.7	7.5	7.5	7.5	7.5	7.5	7.5	7.6	7.5	7.6	7.7	7.6	7.7	7.73	7.52	7.3	7.6	
Phenol	mg/l		0.0005		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.025	<0.50	<0.50	<0.10	<0.10
Potassium	mg/l		5		25.32	24.15	23.03		18.62	18.71	14.33	20.84	22	24	20	10	19	20	14	9.9	11	12.75	16.05	10.53	
Sampling Depth	m				14.7	14	16	26	15	15.8	16.3	15.1	14	14.2	18.6	18.2	14.8	14.9	15	17					
Selenium	ug/l	10			0.9	0.9	1.1	<0.5	1.1	1.3	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Silver	ug/l																								
Sodium	mg/l	200	150	150	32.72	36.08	32.35	42.45	26.01	26.16	20.78	30.98	29	31	29	17	28	27	19	15	18.3	17.7	27.58	16.45	
Strontium	ug/l				173.86	187.86	175.08	116.26	151.87	161.31	141.87	148.07	180	170	150	180	190	150	130	150				155.1	
Sulphate	mg/l SO4	250	200	187.5										125.6										77.07	
Suspended Solids	mg/l																								
Temp	°C				13.5	13.4	14.7	18.9	13.5	13.8	13.2	9.2	13.3	13.7	14.4	13.6	13	13.6	13.7	13	17	16.2	15.5		
Thallium	ug/l				0.33	0.33	0.23	0.18	0.19	0.17	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0					
Time sampled					13:55	13:25	13:10	11:35	14:00	13:15	13:35	13:50	13:30	12:45	13:45	12:50	12:15	12:55	15:05	11:55					
Tin (µg/l)	ug/l																								
T.O.C.	mg/l	NAC				2.7			2.9				2.5	2.7	4.1	12.4	2.6	3.1	3.1	3	1.08	1.66	1.72	3.85	
T.O.N	mg/l N	NAC			2.41	1.59	1.91	0.09	1.31	1.32	1.6	2.1	2.5	2.6	2.2	0.98	1.9	2.3	1.2	0.92	1.5	1.8	2.52		
Total S Solids	mg/l																							767	
Uranium	ug/l				0.82	0.87	0.82	0.26	0.78	0.75	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				0.531	
Vanadium	ug/l				<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<1	1.13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0				1.81	
Zinc	ug/l	100	100		2.6	7.2	3.8	4.7	7	5	17.3	6.2	6.6	17	5.4	6.4	5.9	4	3	8.8	<0.018	<0.018	12.62	22.92	
Water Level m OD	21.715				7.015	7.715	5.715		6.715		5.415	6.815	7.715	7.515	3.115	3.515	6.915	6.815	6.715	4.715					

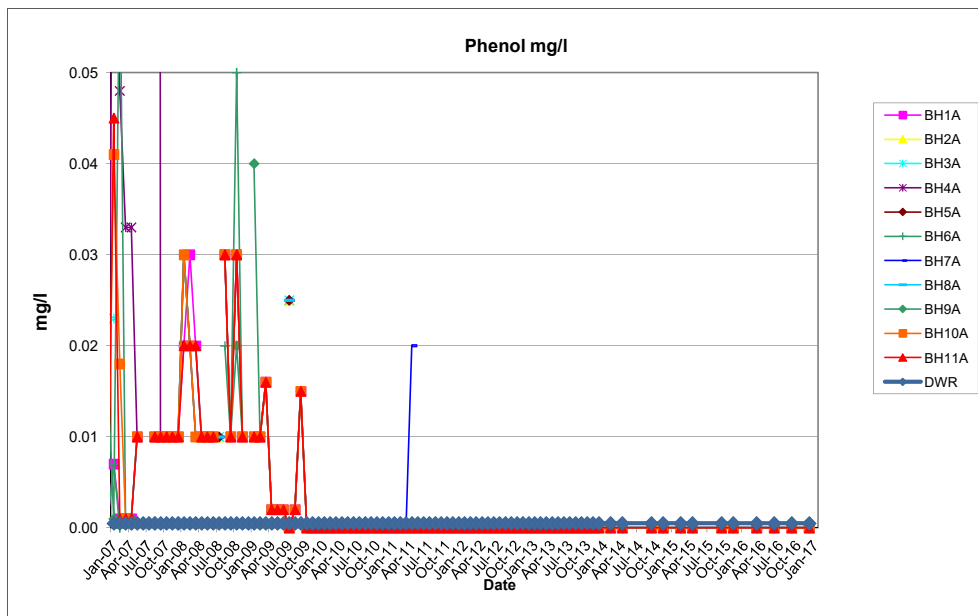
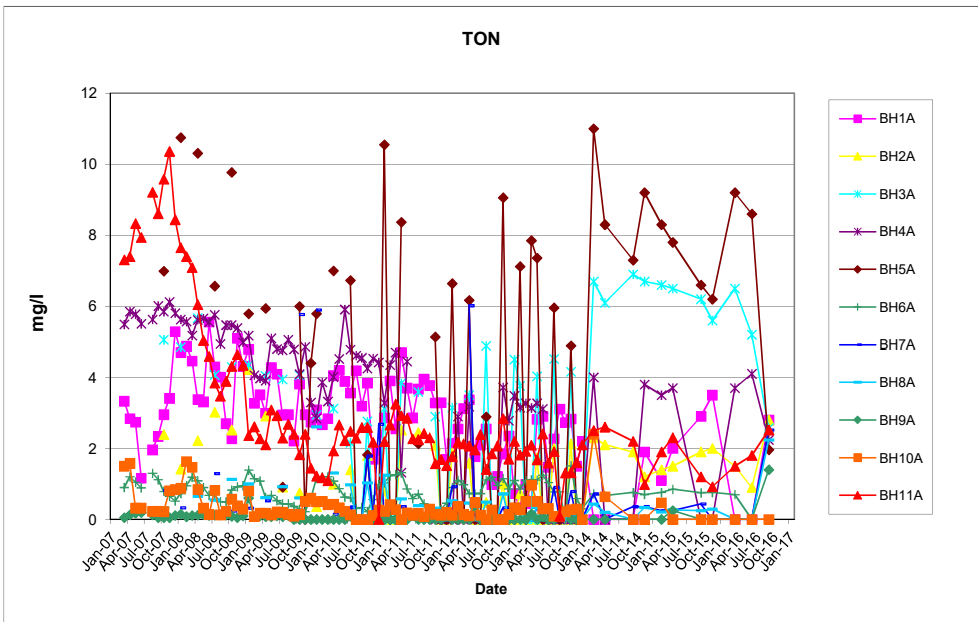
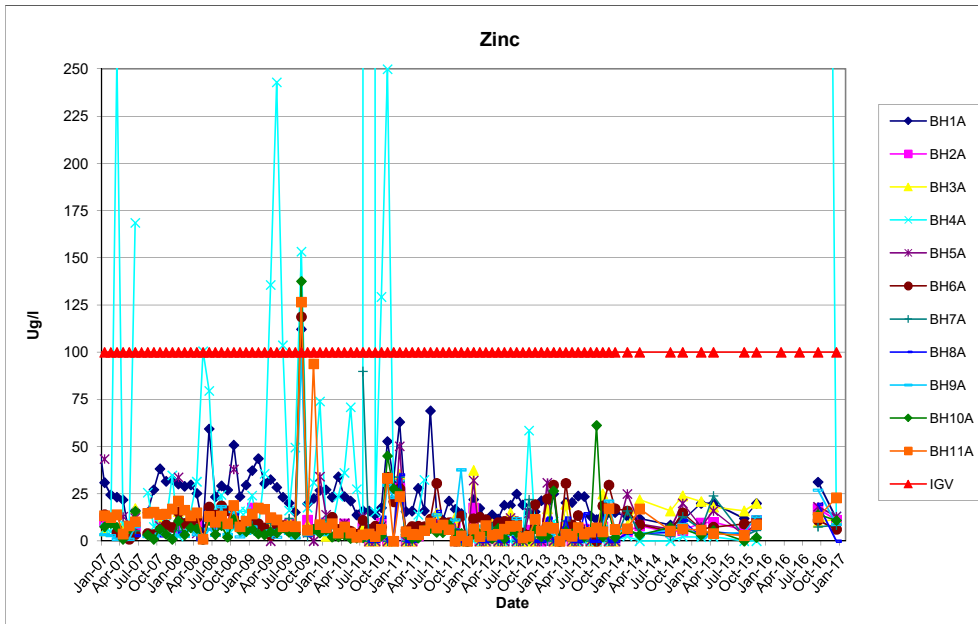
D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analysis.
 Barium, Cadmium, Chromium, Iron, Manganese, Nickel and Zinc were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analysis.
 Phenol is measured in ug/l instead of mg/l since March 2016 due to a change in laboratory for laboratory analysis.

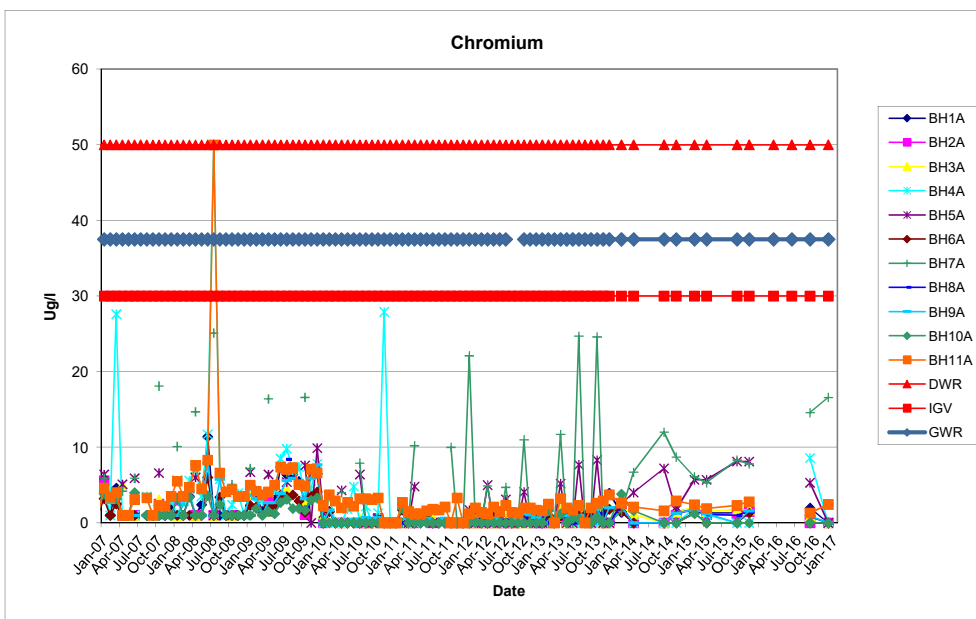
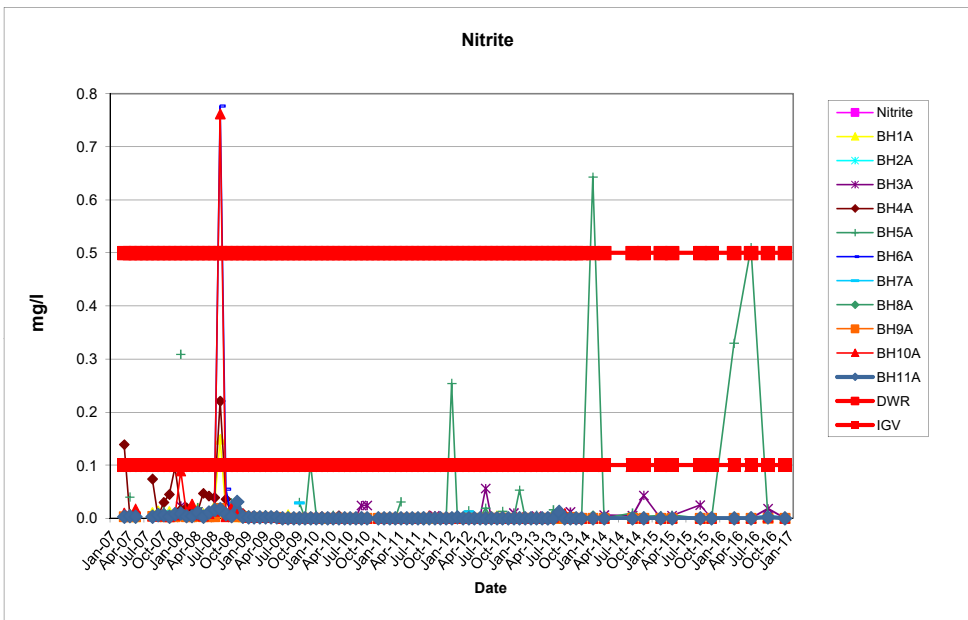
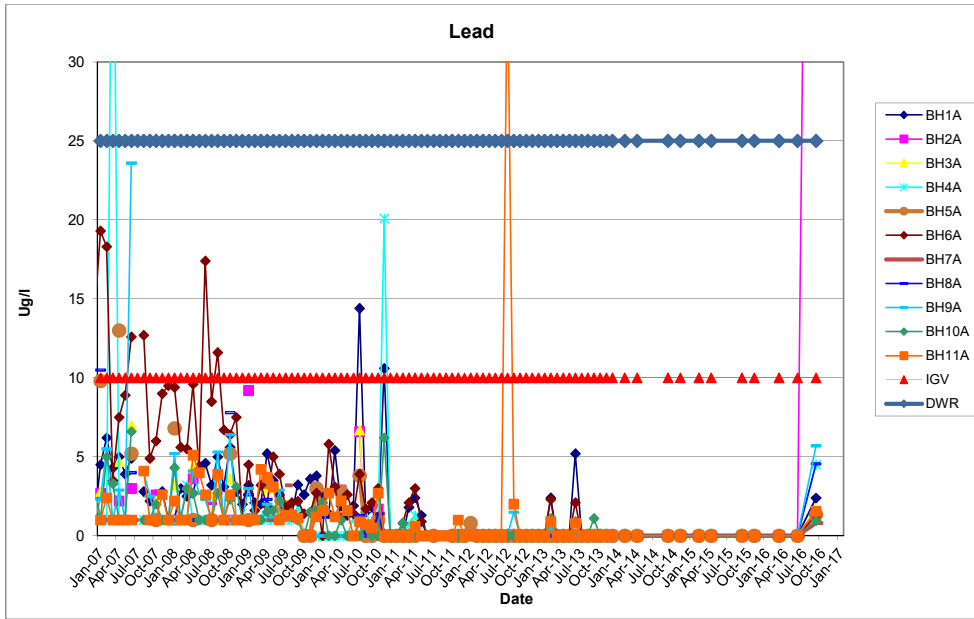












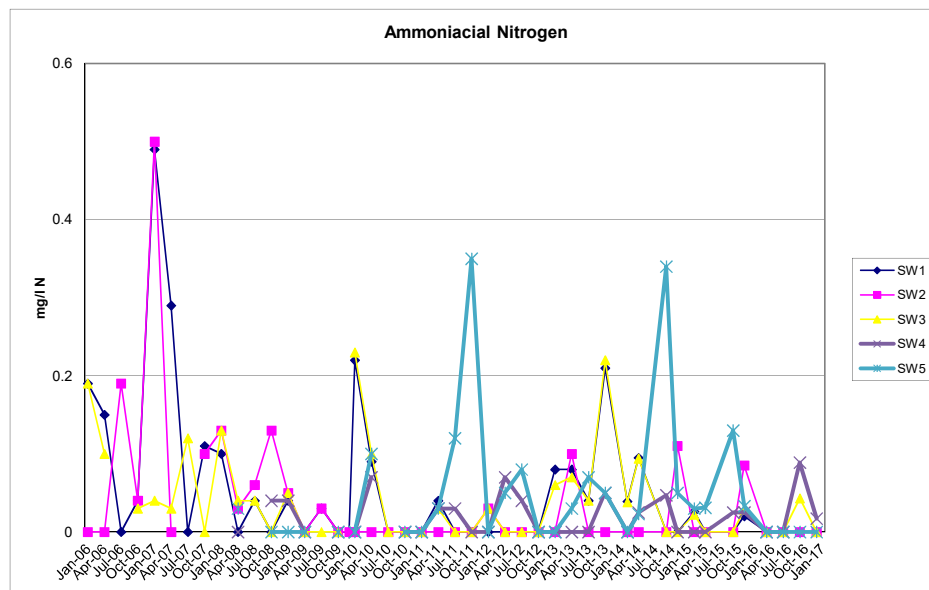
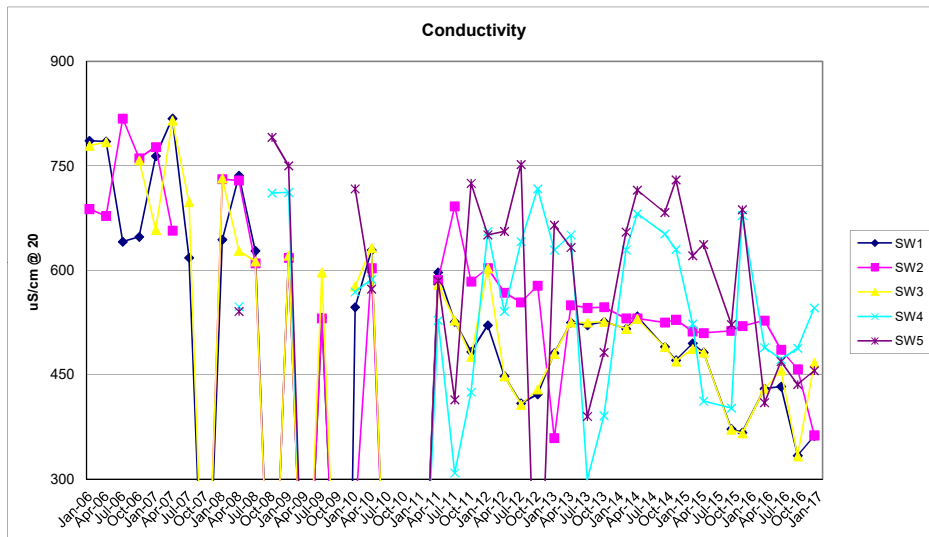
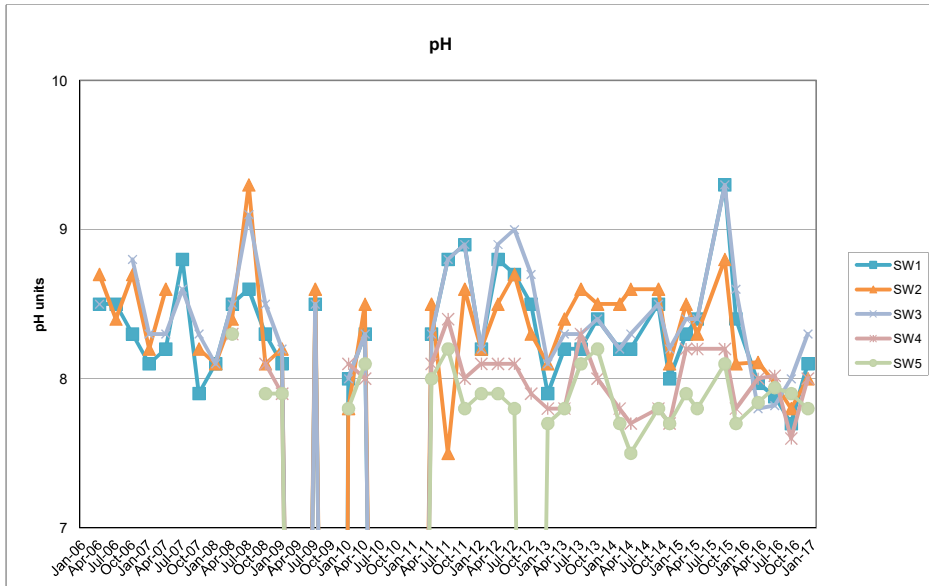
Appendix E

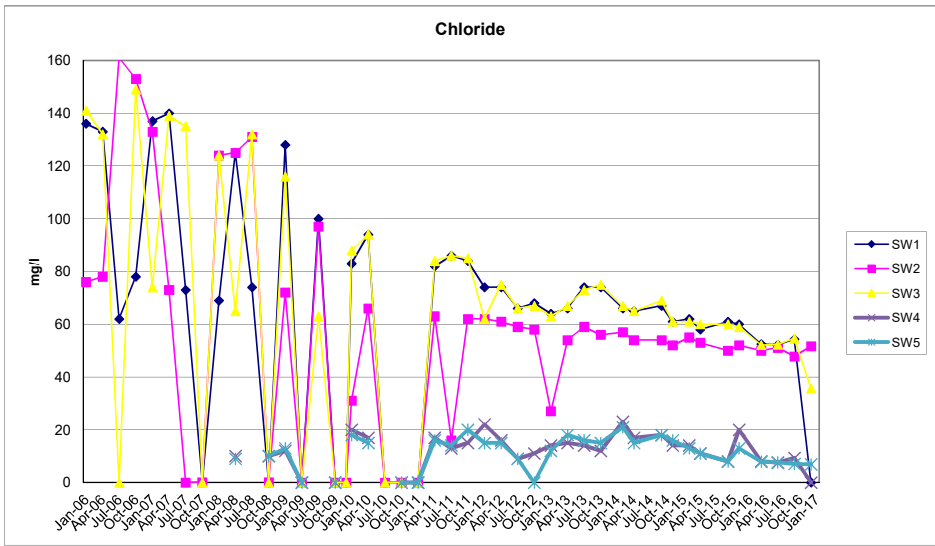
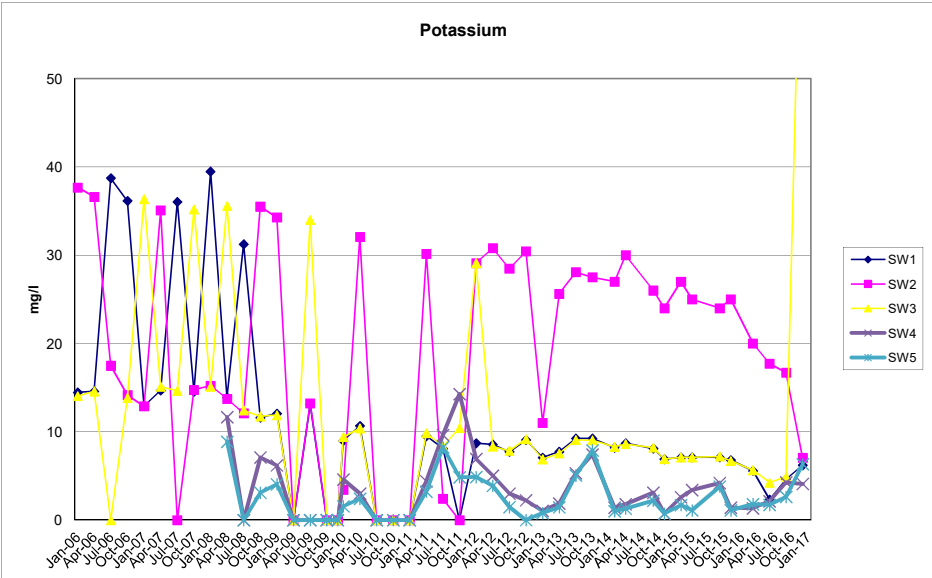
Surface Water Results

Drogheda Landfill Site Surfacewater Quality																																						
Monitoring Point																																						
Date Collected																																						
	29-Apr-08	31-Jul-08	30-Oct-08	20-Jan-09	28-Apr-09	21-Jul-09	20-Oct-09	08-Dec-09	13-Jan-10	27-Apr-10	27-Jul-10	19-Oct-11	20-Jan-11	12-Apr-11	12-Jul-11	04-Oct-11	17-Jan-12	24-Apr-12	25/07/2012	09-Oct-12	31-Jan-13	16-Apr-13	23-Jul-13	08-Oct-13	18-Feb-14	08-Apr-14	09-Sep-14	18-Nov-14	24-Feb-15	14-Apr-15	05-Sep-15	17-Nov-15	31-Mar-16	29-Jun-16	29-Sep-16	16-Dec-16		
	SWS																																					
Alkalinity	mg/l CaCO3	216			222					254									316	16.2	14.9	9.1	9.2	94	76.9	12	<10.0	23	<10.0	10	<10.0	50	<10.0					
Aluminium	ug/l																		268																			
Ammonia	mg/l N	0.03		<0.03	<0.03	0.10		0.05																														
Antimony	ug/l																																					
Arsenic	ug/l																																					
Barium	ug/l	<50		<50	<50	<50		53.9																														
Beryllium	ug/l																																					
B.O.D.	mg/l O2	<1.5		<2.0	<1.5	<1.5		<3.0																														
Boron	ug/l																																					
Cadmium	ug/l	<0.10		<0.10	<0.10	<0.10		<0.1																														
Calcium	mg/l Ca	94.56				93.00																																
C.O.D.	mg/l O2	<10		57	24	23		45																														
Chloride	mg/l Cl	9		10	13	17		10																														
Chromium	ug/l	<1		<1	3.2	2.5		<1																														
Cobalt	ug/l																																					
Coliform Bacteria	(No/100 ml)																																					
Conductivity	µS/cm @ 25	541		791	750	565		752																														
Copper	ug/l	4				3.3																																
Cyanide	mg/l																																					
D.O.	% Saturation	89		80	82	124		56																														
E. Coli	No/100 ml																																					
Fluoride	mg/l	68		152.7	106.3	87.1		<50																														
Iron	ug/l																																					
Lead	ug/l	<1		<1	<1	<1		<1																														
Magnesium	mg/l Mg	6.07				7.32																																
Manganese	ug/l	<1				<1																																
Mercury	ug/l	<0.10				<0.1																																
Molybdenum	ug/l																																					
Nickel	ug/l	<1		<1	<1	1.2		1.1		<1		1.4	6.7	1	<0.5	<0.5	1.1	<0.5	<0.5	0.5	<0.5	1.2	3.3	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Nitrate	mg/l N																																					
Nitrite	mg/l N	0.006		<0.003	<0.002	0.003		<0.002	0.002																													
o-Phosphate	mg/l P	0.02				0.02																																
pH		8.3		7.9	7.9	8.1		7.8		7.9	8.1	8.1	8.0	8	8.2	7.8	7.8	7.8	7.8	7.8	8.1	8.2	7.7	8.1	8.2	7.7	7.5	7.8	7.7	7.9	7.8	8.1	7.7	7.8	7.9	7.8		
Phenol	mg/l	<0.01		0.03	nm																																	
Potassium	mg/l	8.88		3.1	4.06	8.15		5.69																														
Sampling Depth	mg/l																																					
Selenium	ug/l																																					
Silver	ug/l																																					
Sodium	mg/l	10.85				12.24																																
Strontium	ug/l																																					
Sulphate	mg/l SO4	56.3				43.0																																
Suspended Solids	ug/l																																					
Temp	°C	10.2		8.9	5.9	11.5		12.1																														
Thallium	ug/l																																					
Time sampled	ug/l	14.2		13.1	13.2	13.50		13.00																														
Tin (ug/l)	ug/l																																					
T.O.C.	mg/l																																					
T.O.N	mg/l N	2.58		1	2.84	3.26		0.53																														
Total Suspended Solids	mg/l	9		<5	6	<5																																
Uranium	ug/l																																					
Vanadium	ug/l																																					
Zinc	ug/l	<1																																				

D.O. is measured in mg/l instead of % in March and June of 2016 due to a change in laboratory for laboratory analyses.

Barium, Chromium, Iron and Nickel were measured in mg/l instead of ug/l in March and June 2016 due to a change in laboratory for laboratory analyses.





Appendix F Landfill Gas Results

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill	Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01		
Licensee: Drogheda Borough Council		
Date of licensing:	Date of sampling: 25-01-2016	Time of sampling: 10.00hrs
Instrument used: GEM5000	Date Next Full Calibration: June 2016	
	Last Field Calibration: (include date and gases)	
Monitoring Personnel: Damien Holmes	Weather: Dry	Barometric pressure: 1015mb

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.4	19.2	1	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.2	1	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.2	20.4	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.4	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.1	20.4	2	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.0	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.2	20.2	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.2	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	20.4	1	0	21.715m A.O.D Top of Cover
LG1	0.0	0.0	20.1	0	0	
LG2	0.0	0.2	21.2	1	0	
LG3	0.0	1.2	19.4	0	0	
LG4	0.0	1.2	19.2	1	0	
LG5	0.0	0.0	20.4	2	0	
LG6	0.0	0.0	20.2	0	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.0	20.3	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.4	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling:	Time of sampling:	
	19-02-2016	12.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2016		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel:	Weather:	Barometric pressure	
Damien Holmes	Dry	1014mb	

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.2	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.2	20.0	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.2	19.4	2	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.2	0	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.6	19.6	2	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.2	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.0	20.4	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.2	20.2	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.2	20.2	1	0	21.715m A.O.D Top of Cover
LG1	0.0	0.0	20.2	1	0	
LG2	0.0	0.2	20.2	1	0	
LG3	0.2	1.3	18.6	0	0	
LG4	0.0	1.1	19.1	0	0	
LG5	0.0	0.2	20.4	2	0	
LG6	0.0	0.0	20.4	1	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.0	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.0	20.4	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.2	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling:	Time of sampling:	
	30-03-2016	15.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2016		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel:	Weather:	Barometric pressure	
Damien Holmes	Dry	1020mb	

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.1	19.4	1	2	33.664m A.O.D Top of Cover
BH4A	0.0	0.0	20.4	1	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.2	20.4	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.4	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.2	20.1	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.0	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.5	20.0	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.2	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.4	20.4	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.1	20.2	0	0	
LG2	0.0	0.2	20.1	1	0	
LG3	0.0	1.1	19.2	0	0	
LG4	0.0	1.3	19.1	0	0	
LG5	0.0	0.4	20.2	1	0	
LG6	0.0	0.1	20.2	0	0	
LG7	0.0	0.0	20.2	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.2	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.2	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling:	Time of sampling:	
	21-04-2016	10.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2016		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel:	Weather:	Barometric pressure	
Damien Holmes	Dry	1025mb	

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.2	19.2	1	1	33.664m A.O.D Top of Cover
BH4A	0.0	0.0	20.4	0	1	33.570m A.O.D Top of Cover
BH5A	0.0	0.2	20.4	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.4	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.2	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.0	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.6	19.9	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.4	0	1	32.776m A.O.D Top of Cover
BH11A	0.0	0.4	20.0	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.2	0	0	
LG2	0.0	0.2	20.1	1	0	
LG3	0.0	1.1	19.2	0	2	
LG4	0.0	1.1	19.2	1	0	
LG5	0.0	0.2	20.2	0	1	
LG6	0.0	0.1	20.2	0	0	
LG7	0.0	0.0	20.6	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.2	1	0	Constructed 26/02/12
PZ10	0.0	0.0	20.4	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling:	Time of sampling:	
	26-04-2016	11.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2016		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel:	Weather:	Barometric pressure	
Damien Holmes	Dry	1021mb	

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.2	20.2	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.0	19.6	1	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.2	0	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.4	20.0	2	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.2	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.4	1	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.0	20.4	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.0	20.4	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.2	20.2	1	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.2	1	0	
LG2	0.0	0.2	20.2	1	0	
LG3	0.2	1.4	19.0	1	0	
LG4	0.0	1.0	19.2	0	0	
LG5	0.0	0.2	20.4	0	0	
LG6	0.0	0.2	20.4	1	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.0	20.2	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.4	1	0	Constructed 26/02/12
PZ10	0.0	0.0	20.2	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM		
Facility Name: Drogheda Landfill	Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01		
Licensee: Drogheda Borough Council		
Date of licensing:	Date of sampling: 16-06-2016	Time of sampling: 14.00hrs
Instrument used: GEM5000	Date Next Full Calibration: June 2016	
	Last Field Calibration: (include date and gases)	
Monitoring Personnel: Damien Holmes	Weather: Dry	Barometric pressure: 1018mb

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.2	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.1	19.4	1	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.2	1	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.0	20.4	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.4	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.0	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.2	20.2	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	20.4	1	0	21.715m A.O.D Top of Cover
LG1	0.0	0.0	20.4	0	0	
LG2	0.0	0.2	21.2	1	0	
LG3	0.0	1.2	19.4	0	0	
LG4	0.0	1.3	19.6	2	0	
LG5	0.0	0.0	20.4	2	0	
LG6	0.0	0.0	20.2	1	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.0	20.3	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.4	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM		
Facility Name: Drogheda Landfill	Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01		
Licensee: Drogheda Borough Council		
Date of licensing:	Date of sampling: 29-07-2016	Time of sampling: 13.00hrs
Instrument used: GEM5000	Date Next Full Calibration: December 2016	
	Last Field Calibration: (include date and gases)	
Monitoring Personnel: Damien Holmes	Weather: Dry	Barometric pressure 1020mb

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.6	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.2	20.6	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.0	19.4	0	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.6	0	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.4	20.4	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.2	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.8	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.0	20.8	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.0	20.6	1	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.6	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.2	20.6	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.4	0	0	
LG2	0.0	0.2	20.2	0	0	
LG3	0.0	1.5	19.2	0	1	
LG4	0.0	0.8	19.6	0	0	
LG5	0.0	0.2	20.4	0	0	
LG6	0.0	0.2	20.6	0	0	
LG7	0.0	0.0	20.6	0	0	
PZ8	0.0	0.0	20.6	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.8	1	0	Constructed 26/02/12
PZ10	0.0	0.0	20.8	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM		
Facility Name: Drogheda Landfill	Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01		
Licensee: Drogheda Borough Council		
Date of licensing:	Date of sampling: 24-08-2016	Time of sampling: 10.00hrs
Instrument used: GEM5000	Date Next Full Calibration: December 2016	
	Last Field Calibration: (include date and gases)	
Monitoring Personnel: Damien Holmes	Weather: Dry	Barometric pressure: 1024mb

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.6	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.8	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.1	19.6	1	1	33.664m A.O.D Top of Cover
BH4A	0.0	0.0	20.6	0	1	33.570m A.O.D Top of Cover
BH5A	0.0	0.2	20.6	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.6	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.2	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.4	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.8	19.6	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.6	0	1	32.776m A.O.D Top of Cover
BH11A	0.0	0.4	20.4	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.6	0	0	
LG2	0.0	0.2	20.0	1	0	
LG3	0.0	1.1	19.4	0	2	
LG4	0.0	1.2	19.0	1	0	
LG5	0.0	0.2	20.4	0	1	
LG6	0.0	0.1	20.4	0	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.6	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.6	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM		
Facility Name: Drogheda Landfill	Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01		
Licensee: Drogheda Borough Council		
Date of licensing:	Date of sampling: 29-09-2016	Time of sampling: 14.00hrs
Instrument used: GEM5000	Date Next Full Calibration: December 2016	
	Last Field Calibration: (include date and gases)	
Monitoring Personnel: Damien Holmes	Weather: Dry	Barometric pressure: 1022mb

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.2	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.2	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.2	19.2	0	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.2	1	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.0	20.6	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.6	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.2	20.2	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.0	20.4	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	20.4	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.0	20.6	0	0	
LG2	0.0	0.4	20.4	1	0	
LG3	0.0	1.0	19.8	0	0	
LG4	0.0	1.0	19.8	0	0	
LG5	0.0	0.0	20.4	0	0	
LG6	0.0	0.0	20.6	1	0	
LG7	0.0	0.0	20.6	0	0	
PZ8	0.0	0.2	20.6	0	0	Constructed 26/02/12
PZ9	0.0	0.0	20.8	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.4	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling: 13-10-2016	Time of sampling: 13.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2017		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel: Damien Holmes	Weather: Dry	Barometric pressure 1020mb	

Results						
Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.0	20.2	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.0	20.2	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.3	19.0	1	1	33.664m A.O.D Top of Cover
BH4A	0.0	0.0	20.4	0	1	33.570m A.O.D Top of Cover
BH5A	0.0	0.0	20.4	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.4	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.2	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.0	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.5	19.8	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.4	0	1	32.776m A.O.D Top of Cover
BH11A	0.0	0.4	20.0	0	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.2	0	0	
LG2	0.0	0.2	20.1	1	0	
LG3	0.0	1.2	19.0	0	2	
LG4	0.0	1.1	19.2	1	0	
LG5	0.0	0.2	20.2	0	1	
LG6	0.0	0.2	20.0	0	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.2	1	0	Constructed 26/02/12
PZ10	0.0	0.0	20.4	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling:	Time of sampling:	
	15-11-2016	15.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2017		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel:	Weather:	Barometric pressure	
Damien Holmes	Dry	1021mb	

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.2	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.4	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.2	19.2	1	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.4	20.2	1	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.2	20.2	0	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.2	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.4	0	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.4	20.0	0	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.2	20.2	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.0	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.0	20.4	1	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.4	0	0	
LG2	0.0	0.2	21.2	1	0	
LG3	0.0	1.2	19.4	0	0	
LG4	0.0	1.0	19.6	2	0	
LG5	0.0	0.0	20.2	2	0	
LG6	0.0	0.0	20.2	1	0	
LG7	0.0	0.0	20.4	0	0	
PZ8	0.0	0.2	20.4	0	0	Constructed 26/02/12
PZ9	0.0	0.0	20.2	0	0	Constructed 26/02/12
PZ10	0.0	0.0	20.4	0	0	Constructed 26/02/12

LANDFILL GAS MONITORING FORM

Facility Name: Drogheda Landfill		Facility Address: Mell Drogheda	
Waste Licence no.: W0033-01			
Licensee: Drogheda Borough Council			
Date of licensing:	Date of sampling:	Time of sampling:	
	22-12-2016	11.00hrs	
Instrument used: GEM5000	Date Next Full Calibration: June 2017		
	Last Field Calibration: (include date and gases)		
Monitoring Personnel:	Weather:	Barometric pressure	
Damien Holmes	Dry	1020mb	

Results

Sample Station Number	CH ₄ (%v/v)	CO ₂ (% v/v)	O ₂ (% v/v)	CO ppm	H ₂ S ppm	Comments
BH1A	0.0	0.2	20.4	0	0	31.953m A.O.D Top of Cover
BH2A	0.0	0.2	20.4	0	0	32.362m A.O.D Top of Cover
BH3A	0.0	1.3	19.2	1	0	33.664m A.O.D Top of Cover
BH4A	0.0	0.2	20.0	0	0	33.570m A.O.D Top of Cover
BH5A	0.0	0.4	20.2	2	0	36.130m A.O.D Top of Cover
BH6A	0.0	0.2	20.4	0	0	35.951m A.O.D Top of Cover
BH7A	0.0	0.0	20.4	1	0	25.172m A.O.D Top of Cover
BH8A	0.0	0.0	20.4	1	0	36.151m A.O.D Top of Cover
BH9A	0.0	0.0	20.4	0	0	34.345m A.O.D Top of Cover
BH10A	0.0	0.2	20.4	0	0	32.776m A.O.D Top of Cover
BH11A	0.0	0.2	20.4	1	0	21.715m A.O.D Top of Cover
LG1	0.0	0.2	20.2	1	0	
LG2	0.0	0.2	20.4	1	0	
LG3	0.2	1.2	19.2	1	0	
LG4	0.0	1.0	19.2	0	0	
LG5	0.0	0.4	20.2	0	0	
LG6	0.0	0.2	20.2	1	0	
LG7	0.0	0.0	20.2	0	0	
PZ8	0.0	0.0	20.2	0	0	Constructed 26/02/12
PZ9	0.0	0.2	20.4	1	0	Constructed 26/02/12
PZ10	0.0	0.0	20.2	0	0	Constructed 26/02/12