Ballyguyroe Landfill Site

Annual Environmental Report

January 2010 – December 2010

Cork County Council

Waste Licence Reg.	No. W0002-02

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BALLYGUYROE LANDFILL SITE

ANNUAL ENVIRONMENTAL REPORT

January 2010 - DECEMBER 2010

Client:
Cork County Council

Keywords:
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Reporting Period:
This report presents the landfill monitoring results for Ballyguyroe Landfill, Co. Cork to the Environmental Protection Agency. The report covers the annual reporting period of 2010.

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1. INTRODUCTION

1.1 Scope and Purpose of the Report

Cork County Council held a waste licence (Register No. 2-1) to operate Ballyguyroe Landfill Site until 15th March 2004 when it obtained a new Waste Licence (Register No. 2-2/ W 0002-2). The aim of this Annual Environmental Report (AER) is to provide a review of activities at Ballyguyroe Landfill Site within the past 12 months. The full scope of the type of report is outlined in Schedule F of the waste licence.

1.2 Background to the Report

The landfill facility at Ballyguyroe North has been in operation since 1990, accepting waste at an annual rate of approximately 20,000 tonnes. The site reached full capacity and closed for the acceptance of waste on Thursday 27th September 2001.

The Environmental Protection Agency (the Agency) issued the site with a waste management licence on December 22nd 1999 (Waste Licence No. 2-2).

In accordance with the requirements of Condition 11.3 of the waste licence, an AER for the facility is submitted to the Agency annually by 31st March.

This is the eleventh AER to be submitted and covers the reporting period 1st January to 31st December 2010.

1.3 Site Location

The facility is located at:
Ballyguyroe North
Kildorrery
Mallow
Co. Cork

Tel: (063) 91614

The location of the site is shown on Figure 1.1.

The National Grid Reference for the site is: -16625E, 11455N

1.4 Environmental Policy

Cork County Council is committed to conducting all activities such that they have a minimal effect on the environment.

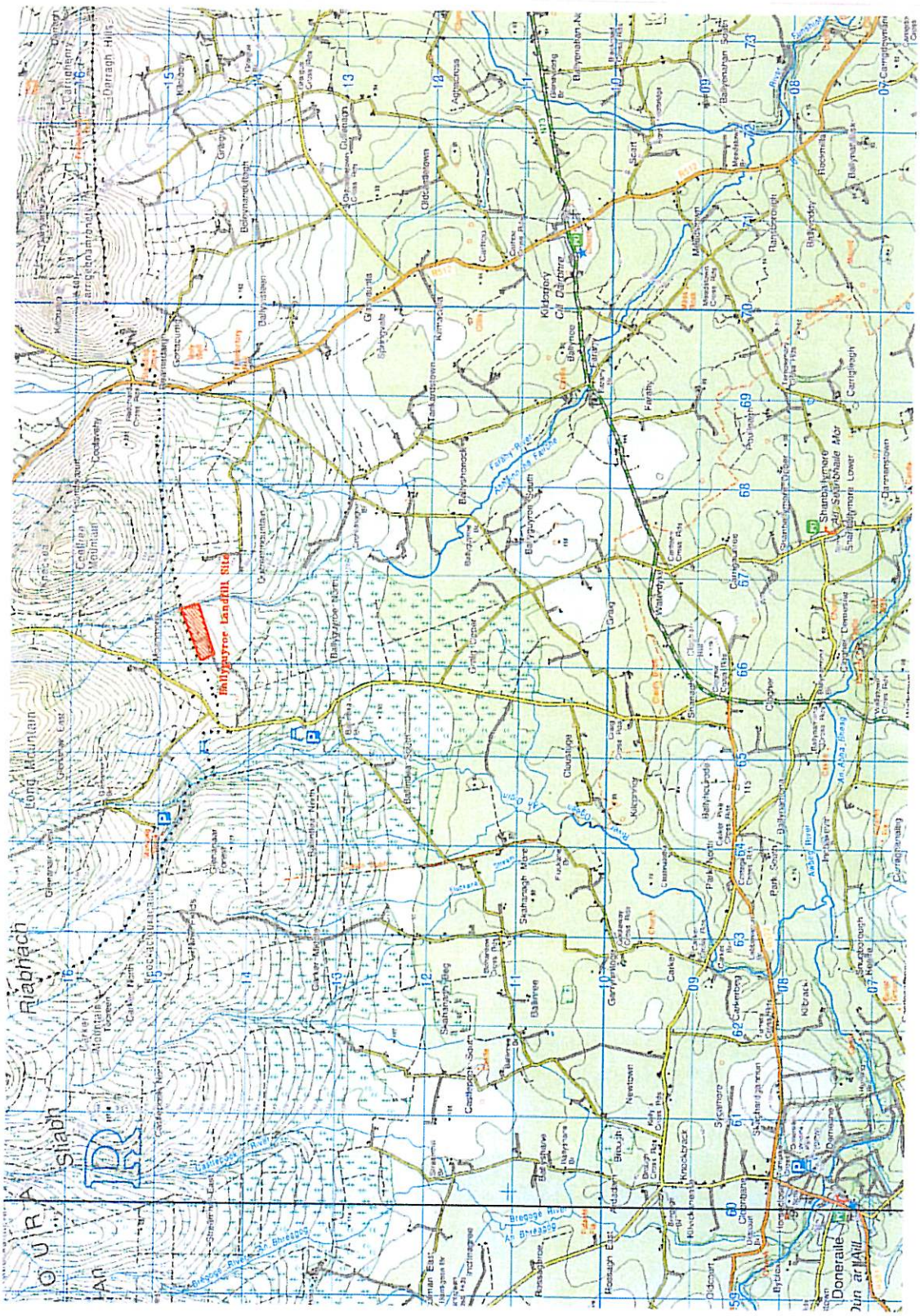
The main objectives of the Council are:

- A commitment to comply with the waste licence and all relevant environmental legislation and approved code of practice;
- To reduce negative environmental impacts by continually developing and modifying all procedures;

- To provide adequate training and awareness to all employees with regard to minimizing environmental risks; and

- To ensure that management and all personnel working on the site are familiar with the conditions of the waste licence, the content of the Environmental Management Plan and the Emergency Response Procedures.

Figure 1.1: Location of Ballyguyroe Landfill



2. SITE DESCRIPTION AND ACTIVITIES

2.1 Description of the Site

The Ballyguyroe Landfill Site occupies an area of approximately 15 hectares and is located in the townland of Ballyguyroe North on the southern lower slopes of the Ballyhoura Mountains. It is situated 6 km north-west of the village of Kildorrery.

The site lies in the Blackwater catchment with the Farahy River flowing southwards within a valley outside the eastern boundary. Surface water on the site drains towards this river.

There are no major water abstractions within the immediate catchment of the landfill. Several local residents do depend on water wells for domestic and farm supplies, however, historical monitoring results have confirmed that the landfill is not a threat to these supplies. The groundwater quality is indicative of the overburden geology, being high in manganese, and has not changed in quality over the years.

The meteorological station on site indicates prevailing winds from the southwest. The annual rainfall at the site during 2010 is outlined in Table 2.1.

Table 2.1: Site Rainfall 2010

Month	*Rainfall (mm)*
January	75.8
February	39.9
March	94
April	33.3
May	28.7
June	48.7
July	107.8
August	38.3
September	71.1
October	82
November	87
December	34
Total	**740.6**

The site consists of a total of seven waste cells. Cells 1 to 7 have been completed and the site has reached full capacity. The site closed for the acceptance of waste on September 27th 2001.

2.2 Waste Activities carried out at the Facility

Waste Disposal activities at Ballyguyroe Landfill Facility are restricted to those outlined in the waste licence as specified below. The only main activity at the site when open was the land-filling of non-hazardous domestic and commercial waste only.

Class 4. Surface impoundment, including placement of liquid or sludge discards into pits, ponds, or lagoons

Class 13. Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

The Waste Recovery Activities permitted are outlined below:

Class 4. Recycling or reclamation of other inorganic materials

Class 10. The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system

2.3 Waste Quantity and Composition

The site ceased accepting waste on the 27th September 2001. No waste was accepted at the facility during the reporting period.

The weighbridge was installed at the site in 1997. Therefore, accurate tonnages are only available from 1998 onwards. It is estimated that approximately 20,000 tonnes per annum were land-filled during the period 1990 to 1997.

Table 2.2: Quantities of waste received and disposed of during the lifetime of the site

Year	Quantity of Waste (tonnes)
1990-1997	160,000
1998	18,577
1999	20,207
2000	22,892
2001	16,523
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	0
2009	0
2010	0
Total	238,199

2.4 Remaining Capacity

The site reached full capacity on September 27th 2001. The landfill facility ceased to accept waste on this date.

2.5 Methods of waste deposition

No waste was accepted at the site during the reporting period.

2.6 Tank Pipeline and Bund Testing

Integrity testing of the new Leachate lagoon was carried out between December 2002 and June 2003. Results were submitted to the Environmental Protection Agency on September 19th 2003.

A successful structural integrity test was carried out on the new Leachate lagoon by consultants Fehily Timoney and Company in June 2008. Copies of this report have been forwarded to the EPA. (Ref EPA-080901). The lagoon shall be retested in June 2011 in line with license requirments.

A permanent Automatic Pneumatic Leachate Extraction System was commissioned during 2003. The leachate is removed under contract by Cork County Council. The contractor has a site specific risk assessment and operating procedure to ensure any spillages during removal are effectively controlled.

3. SUMMARY OF MONITORING AND EMISSIONS

3.1 Landfill Gas

Condition 8 and Schedule D.2 of the Licence Resister W0002-02 requires that the licensee conducts monthly monitoring in the gas borehole/vents/wells in order to detect offsite gas migration and weekly monitoring in the site office, shed and canteen in order to detect accumulation of landfill gas.

The gas is monitored using "GA94" automatic infra-red analyser, which detects levels of carbon dioxide, methane, and oxygen. This analyser is calibrated in accordance with manufacturer's specifications.

All monitoring locations are illustrated in Drawing NC-11-034-001, attached Appendix 1.

3.1.1 Gas Monitoring Results

3.1.1.1 . Site Buildings

In September 2008 new gas detectors and alarms were fitted in the office, canteen and the storage container. There is no evidence of landfill gas in site buildings.

3.1.1.2 Gas Wells outside Filled Cells

Elevated levels of gas were detected in gas wells GS1, GS5 and GS10. The levels and dates of these exceedences are illustrated in Table 3.1, below.

3.1.2 Long Term Proposals

The installation of a permanent gas collection system at the site was carried out during 2003. The gas flaring system has been operating since January 2004. The unit is maintained quarterly under contract.

Table 3.1: Gas Monitoring Exceedences for 2010

Date	Location	Methane (CH_4)	Carbon Dioxide (CO_2)
		% v/v	% v/v
13/01/2010	GS1	**67.2**	**5.5**
	GS5	0	**3.9**
	GS10	2.3	**1.6**
20/01/2010	GS1	**60.1**	**10.7**
	GS5	0	**3.4**
27/01/2010	GS1	**59.2**	**6.7**
	GS5	0	**3.2**
03/02/2010	GS1	**69.6**	**5.8**
	GS5	0	**4.2**
	GS10	2.5	**1.8**
10/02/2010	GS1	**62.5**	**5**
	GS5	0	**3.4**
16/02/2010	GS1	**72.5**	**5.6**
24/02/2010	GS1	**75**	**5.6**
	GS5	0	**3.2**

03/03/2010	GS1	1	**2.4**
	GS5	0	**3.54**
10/03/2010	GS1	1	**2.4**
	GS5	0	**3.5**
16/03/2010	GS1	6.2	**6.7**
	GS5	0	**1.9**
24/03/2010	GS1	**31.9**	**7.6**
	GS5	0.1	**1.7**
31/03/2010	GS5	0.1	**2.5**
07/04/2010	GS5	0.1	**2.2**
14/04/2010	GS1	**41.3**	**6.8**
	GS5	0	**2.4**
21/04/2010	GS1	**73.1**	**11.2**
	GS5	0	**2.7**
	GS10	2.1	**1.6**
28/04/2010	GS1	**61.8**	**10.4**
	GS5	0	**2.1**
05/05/2010	GS1	**32.5**	**10.6**
	GS5	0.1	**2.1**
12/05/2010	GS1	**57**	**10.2**
	GS5	0.1	**2.5**
26/05/2010	GS1	**68**	**14.9**
	GS5	0.1	**2.4**
	GS10	2.3	**1.9**
02/06/2010	GS1	16.3	**9.3**
	GS5	0.5	**2.8**
	GS10	2	**1.6**
09/06/2010	GS1	15.7	**8.2**
	GS5	0.8	**3**
23/06/2010	GS1	**36.5**	1
	GS5	6.2	**3.7**
30/06/2010	GS1	**48.8**	**14.6**
	GS5	6.7	**3.4**
08/07/2010	GS1	**32.8**	**13.7**
	GS5	6.4	**3.5**
14/07/2010	GS1	**66.2**	**18.5**
	GS5	6.9	**3**
21/07/2010	GS1	**66**	**20.1**
	GS5	7.2	**2.8**
04/08/2010	GS1	**67.5**	**22.3**
	GS5	0	**2.1**
11/08/2010	GS1	**64.8**	**19.2**
	GS5	0.9	**2.4**
17/08/2010	GS1	**60.5**	**15.7**
	GS5	0.3	**2**
	GS10	2.3	**1.8**
25/08/2010	GS1	**56.7**	**17.1**
	GS5	0	**1.8**
01/09/2010	GS1	**50.1**	**15.5**
	GS5	1.4	**2.2**
	GS10	2.2	**1.6**
08/09/2010	GS1	**52.6**	**13.4**
	GS5	1.2	**1.9**
	GS10	2.5	**1.8**

15/09/2010	GS1	1.5	**2.8**
	GS5	1.5	**1.8**
	GS10	2.8	**2**
22/09/2010	GS1	**64.1**	**15.4**
	GS10	3	**2.1**
30/09/2010	GS1	**35.2**	**12.9**
	GS5	0.7	**2.4**
	GS10	2.7	**1.9**
06/10/2010	GS1	**67.7**	**16.3**
	GS5	0.3	**4**
13/10/2010	GS1	**65.4**	**18.6**
	GS5	0.5	**3.8**
	GS10	2.5	**1.7**
20/10/2010	GS1	**67.6**	**13.4**
	GS5	0.8	**3.3**
	GS10	2.7	**1.8**
27/10/2010	GS1	**66.7**	**12.2**
	GS5	1.2	**3.8**
	GS10	3	**2.1**
03/11/2010	GS1	**56.5**	**8.6**
	GS5	0.9	**3.5**
	GS10	2.5	**1.8**
10/11/2010	GS1	**53.7**	**16.3**
	GS5	3	**3.1**
17/11/2010	GS1	**51.9**	**14.5**
	GS5	2.5	**2.7**
	GS	2.7	**1.8**
24/11/2010	GS1	**68.8**	**21.4**
	GS10	3.1	**2**
02/12/2010	GS1	**65.3**	**17.2**
	GS10	2.9	**1.9**
08/12/2010	GS1	**68**	**17**
	GS10	2.7	**1.8**
15/12/2010	GS1	**65.1**	**18.2**
22/12/2010	GS1	**63.7**	**17.1**
29/12/2010	GS1	**64.9**	**17.7**

3.2 Surface Water

Condition 8 and Schedule D.4 of the waste licence require the licensee to conduct surface water monitoring at various locations throughout the site and at points upstream and downstream on the River Farahy. The frequency of monitoring varies from weekly to quarterly depending on the location.

Surface water results for the report period have been submitted to the Agency in four quarterly reports and have been compared to limits outlined in the Surface Water Regulations S.I. No. 294 of 1989 (implementing the Surface Water Directive (75/440 EEC).

The iron levels (Table 3.2) indicate high levels of iron that are naturally occurring due to the iron rich geology of the site.

The suspended solids are monitored monthly at locations SS2 and SS5, from table 3.3 it is apparent that there was no exceedances of the 35 mg/l limit outlined by the EPA.

Table 3.2: Surface Water Iron Levels

Iron (mg/Fe/l)

Monitoring Location	Q1 2010	Q2 2010	Q3 2010	Q4 2010
RS1	12.7	0.18		0.968
RS2	0.18	0.187	0.366	0.626
SS2	0.4			
SS5	0.9			

Table 3.3: Suspended Solids SS2 and SS5

Suspended Solids (mg/l)

	SS2	SS5
January	4	7.5
February	1.6	2.4
March	4	4
April	19	2.2
May	4	0
June	0	5.3
July	10	5.8
August	11	0
September	10	4
October	9	4
November	8.6	1.6
December	2.2	4.8

3.2.1. Long Term Trends

Levels of ammonical nitrogen, chloride, pH, BOD, and COD in the upstream sampling location RS1 and the downstream sampling location RS2 have been compared in order to detect any impact the landfill site may be having upon the surface water. These comparisons are illustrated in Tables 3.4 to 3.8 inclusive.

Levels of ammonical nitrogen (Table 3.4) are similar upstream and downstream of the landfill site and are consistently below the limit of 0.2 mg/l as set out in the Surface Water Regulations.

Chloride levels upstream and downstream are similar (Table 3.5) and are significantly below the Surface Water Regulation limits of 250 mg/l in each quarter.

BOD levels upstream and downstream of the site (Table 3.6) did not exceed the limit of 5 mg/l for A1 waters as outlined in the Surface Water Regulations in the reporting period.

Levels of pH (Table 3.7) do not differ significantly between the upstream site and downstream site and generally remain between 7 and 8.

COD levels (Tables 3.8) are similar during each sampling date during the reporting period.

In conclusion, surface water monitoring results from the upstream sampling location RS1 and the downstream sampling location RS2 do not indicate that there is any contamination of the Farahy River as a result of activities at the landfill site.

Table 3.4: Surface Water Ammonia Levels

Ammonical Nitrogen (mg NH3-N/l)

Surface Water Ammonia Levels - 2010				
Monitoring location	Q1 2010	Q2 2010	Q3 2010	Q4 2010
RS1	0.059	0.536		0.199
RS2	0.031	0.02	0.031	0.02
EPA Limit	0.2	0.2	0.2	0.2

Table 3.5: Surface Water Chloride Levels

Chloride Concentration (mg Cl/l)

Surface Water Chloride Levels - 2010				
Monitoring Location	Q1 2010	Q2 2010	Q3 2010	Q4 2010
RS1	12.7	13.3		10.2
RS2	12.9	13.2	11.9	10.2

Table 3.6: Surface Water BOD

BOD (mg/l)

Surface Water BOD - Ballyguyroe landfill site				
Monitoring Location	Q1 2010	Q2 2010	Q3 2010	Q4 2010
RS1	1	1		1.2
RS2	1	1	1	1
EPA Limit	5	5	5	5

Table 3.7: Surface Water pH levels

Surface Water pH - 2010				
Monitoring Location	Q1 2010	Q2 2010	Q3 2010	Q4 2010
RS1	7.41	8.3		7.16
RS2	7.34	7.75	7.47	7.26

Table 3.8: Surface Water Chemical Oxygen Demand (COD) Levels

COD (mg/l)

Surface Water COD - Ballyguyroe landfill site				
Monitoring Pt	Q1 2010	Q2 2010	Q3 2010	Q4 2010
RS1	10	10		39
RS2	12.9	10	10	23

3.3. Groundwater

Condition 8 and Schedule D.4 of the waste licence require the licensee to conduct groundwater monitoring on an annual basis at various locations within the site and outside the site boundary including two domestic wells. The samples were taken in quarter two in 2010, inline with direction from the EPA to rotate the quarter that the samples are taken each year.

Table 3.9 shows the levels of iron detected in the various wells over the reporting period, only elevated levels were recorded in 96-5S.

There was no Total Coliforms levels detected in 2010. This is shown in Table 3.10. This is in contrast to 2009 where one of the private wells had elevated reading.

Levels of manganese recorded were high. This can also be attributed to the geology of the site. Refer to Table 3.11. These evaluated manganese results are an established trend as can be seen from previous AER's.

Table 3.9: Groundwater Iron Levels

Groundwater Iron Levels - 2010	
Monitoring Locations	Iron Con (mg Fe/l)
G18	28
98-1D	0.1
96-5S	127
96-5D	0.1
02-1S	1.5
96-4S	0.3
96-4D	1.1
96-3D	0.1
96-3S	0.5
99-1D	0.1
991S	0.1
Connerys	0.1
Carrolls	3.3

Table 3.10: Groundwater Coliforms Levels

Groundwater Coliforms Levels - 2010	
Monitoring Locations	Total Coliforms (MPN/l)
G18	0
98-1D	0
96-5S	0
96-5D	0
02-1S	0
96-4S	0
96-4D	0
96-3D	0
96-3S	0
99-1D	0
99-1S	0
Connerys	0
Carrolls	0

Figure 3.11: Groundwater Manganese Concentrations

Groundwater Manganese Concentrations - 2010	
Monitoring Locations	Manganese (µg MN/l)
G18	993
98-1D	77
96-5S	6,034
96-5D	195
02-1S	720
96-4S	290
96-4D	720
96-3D	12
96-3S	165
99-1D	587
99-1S	4,839
Connerys	47
Carrolls	1,422

3.3.1 Long Term Trends

As discussed above, levels of manganese are naturally elevated in the groundwater as a result of the geology of the site.

The normal indicative parameters of leachate contamination in groundwater include ammonia, chloride, total organic carbon (TOC), conductivity, pH, iron and heavy metals such as cadmium, nickel, zinc, copper and lead.

Chloride levels measured in wells, both upgradient and downgradient of the site, throughout the monitoring period were below the Drinking Water Regulations 2000 limit of 250 mg/l.

Cadmium and lead levels upgradient and downgradient of the site are consistently less than 2 ug/l, which are below the limits as set out in the Drinking Water Directive.

Ammonia levels (NH_3-N) did not exceed the Drinking Water Regulations 2000 limit of 0.2 mg/l on any occasion.

3.4 Leachate

3.4.1 Leachate Levels

There have been no exceedances in leachate levels in the cells during the reporting period.

3.4.2 Chemical Analysis

Indicators of decomposition of leachate include BOD, COD, conductivity, pH, chloride, sodium, iron, manganese, cadmium and VOCs. Generally, leachate constituents tend to rise during landfill operation, peaking approximately at the time of closure followed by a gradual post closure decrease (Krug and Ham, 1997: Proceedings of the Sixth International Landfill Symposium). Tables 3.12 to 3.23 inclusive illustrate the levels of the some of the above-mentioned parameters over time.

Leachate sampling for this reporting period consisted of one central measurement for each parameter taken from the Leachate Lagoon, rather than separate results taken from each cell. Hence the measurement shown as Cell 7 in the legend, relates to the measurement taken from the leachate lagoon from 2005 onwards.

The samples from the Leachate Lagoon were taken on 25th May 2010. The months of April and May in 2010 were very dry with total rainfall of 62 mm for the period. This could be the principle reason for the elevated results as outlined below.

Table3.12 illustrates that in the leachate BOD levels have decreased since 2003, however there is a rise in BOD from 2007 to 2009 from 4 to 39 mg per litre and back to 7 in the reporting year.

Table 3.13 shows COD levels, these levels while consistently higher than BOD, reflect a similar trend to that illustrated in Table 3.11 with levels falling in all cells since 2003.

Table 3.14 illustrates the electrical conductivity of the leachate in the lagoon.

Table 3.15 illustrates pH levels in the cells and shows that the pH in all of the cells has fluctuated little in previous years between 6.5 and 8.18.

Table 3.16, show that leachate chloride levels increased after capping. Chloride levels for 2010 is 363 mg chloride per litre.

Sodium and Iron levels increased slightly over this reporting period as seen in Table 3.17 and Table 3.18. Manganese levels have decreased slightly as outlined in Table 3.19.

Table 3.12: Leachate Biological Oxygen Demand

Leachate Lagoon	
Sampling	BOD (mg/l)
Dec-99	4300
Mar-00	100
Mar-01	670
Sep-02	80
Mar-03	29
Sep-03	75
Mar-04	65
Feb-05	44
Mar-06	15
Feb-07	4
Jul-09	39
May-10	7

Table 3.13: Leachate Chemical Oxygen Demand

Leachate Lagoon	
Sampling	COD (mg/l)
Dec-99	8030
Mar-00	500
Mar-01	1835
Sep-02	728
Mar-03	505
Sep-03	1303
Mar-04	2940
Feb-05	101
Mar-06	117
Mar-07	40
Jul-09	121
May-10	290

Table 3.14: Leachate Conductivity

Leachate Lagoon	
Sampling	Conductivity (us/m)
Dec-99	14440
Mar-00	6750
Mar-01	11895
Sep-02	8010
Mar-03	5040
Sep-03	12070
Mar-04	26360
Feb-05	31300
Mar-06	2192
Feb-07	1827
Jul-09	3030
May-10	3770

Table 3.15: Leachate pH Levels

Leachate Lagoon	
Sampling	pH
Dec-99	7.3
Mar-00	7.3
Mar-01	7.3
Sep-02	7.1
Mar-03	6.9
Sep-03	7.2
Mar-04	7.7
Feb-05	9.5
Mar-06	6.4
Feb-07	7.1
Jul-09	7.5
May-10	8.18

Table 3.16: Leachate Chloride Levels

Leachate Lagoon	
Sampling	Chloride (mg Cl/l)
Dec-99	1242
Mar-00	500
Mar-01	1015.7
Sep-02	601
Mar-03	411.6
Sep-03	1376
Mar-04	2904.5
Feb-05	42
Mar-06	120.6
Feb-07	85
Jul-09	192
May-10	363

Table 3.17: Leachate Sodium Levels

Leachate Lagoon	
Sampling	Sodium (mg Na/l)
Dec-99	1575
Mar-00	600
Mar-01	797
Sep-02	570
Mar-03	382
Sep-03	101
Mar-04	2800
Feb-05	12
Mar-06	69
Feb-07	36
Jul-09	161
May-10	260

Table 3.18: Leachate Iron Levels

Leachate Lagoon	
Sampling	Iron (mg Fe/l)
Dec-99	158
Mar-00	20
Mar-01	14
Sep-02	9.4
Mar-03	11
Sep-03	5
Mar-04	3
Feb-05	0.6
Mar-06	18.3
Feb-07	16
Jul-09	0.568
May-10	4.5

Table 3.19: Leachate Manganese Levels

Leachate Lagoon	
Sampling	Manganese (mg Mn/l)
Dec-99	8.678
Mar-00	4
Mar-01	2.075
Sep-02	1.631
Mar-03	1.678
Sep-03	0.463
Mar-04	0.365
Feb-05	1.06
Mar-06	1.06
Feb-07	2.54
Jul-09	2.65
May-10	0.758

3.5 Biological Monitoring

According to the findings of a Biological Assessment of the quality of surface waters at Ballyguyroe Landfill the Q rating is as outlined in Table 3.20 below. This analysis was carried out by Bord na Mona Technical Services on samples taken during Quarter two in 2010.

Table 3.20 Q Rating

Q Rating - 2010	
Monitoring Locations	Result
RS1	Q4-5
RS2	Q4
RS2A	Q4
RS4	Q4-5

4. SITE DEVELOPMENT WORKS

The landfill site has been in operation since 1990, prior to the application for a waste licence, and therefore much of the infrastructure of the site was already complete by the time the licence came into being.

Site development works that were carried out in accordance with the conditions of the licence, during 2003 are outlined below:

- Installation of leachate management system.
- Replacement of gas boreholes and installation of a gas flare system.

4.1 Progress towards Site Restoration

The Cells 1 to 6 inclusive have been grassed at this stage and a landscaping proposal has been approved by the Agency. The final cap has been applied to Cell 7 during works carried out in 2002. A surface water settling pond was created in 2004.

4.2 Site Survey

In accordance with Condition 8.3 of the licence, a topographical survey of the site including the void space was conducted in March 2010 and is submitted within this report (Appendix 1 – Drawing No NC-11-034-001).

Cell 7 settled and as a result a depression formed in the landfill cap. This depression had the effect of gathering rainfall as leachate. Remedial works to cell 7 were commenced in 2006 and completed and re-seeded in 2007.

4.3 Landfill Gas Quantities

The gas flare has been installed and is currently operational. Steady state conditions have not yet been arrived at. Landfill gas emissions will not exceed the capacity of the flare which is 250 m^3/hr.

4.4 Indirect Emissions to Groundwater

There are no direct or indirect emissions to groundwater from the site for the following reasons:

- all of the cells are underlain by a very low permeability clay layer (cells 1-6) or are lined with a HDPE liner (cell 7).
- all leachate levels in the cells are kept within limits set by the Agency with the exceptions outlined in section 4.3.1.
- surface water and groundwater monitoring data indicates that there is no direct or indirect emission to the groundwater from the landfill site.

4.5 Monthly Water Balance Calculations

The monthly water balance calculations have been calculated as outlined in Appendix 2. The results are summarized in Table 4.1. The predicted amount of leachate can be compared with the actual amount tankered off site for each month.

The differences in actual and predicted quantities month to month can be explained by the absorptive capacity of the waste mass, which has a balancing effect. That is, high rainfall in one

month, which would lead to a high-predicted leachate quantity, may only be realized in actual leachate quantity the following month after the water has percolated down through the waste mass.

Table 4.1 Water Balance Calculations 2010

Month	Predicted Leachate	Actual Leachate
	m^3	m^3
January	513	1,197
February	270	1,105
March	637	1,118
April	226	817
May	194	78
June	330	155
July	730	1,335
August	259	326
September	482	422
October	555	659
November	589	2,363
December	230	0
Total	5,017	9,575
		4,558

Predicted leachate (5,017) — Actual leachate (9,575) = -4,558 m^3.

It is a condition of the waste licence that the level of leachate in Cells 1 to 7 has to remain within 1m above the base of the cell. As a pumping system is in place on site all efforts are made to maintain the leachate level below 1m above the base of the cell. In order to keep the leachate at this level excess volumes have to be removed.

In conclusion, the volume of leachate tankered off the site in 2010 was 90.85% more than the predicted volume.

5. WASTE RECEIVED BY THE FACILITY

Ballyguyroe Landfill Facility provided a final disposal point for municipal solid waste up to September 27th 2001, at which stage it ceased to accept waste. No waste was accepted by the facility during the reporting period.

6. ENVIRONMENTAL INCIDENTS AND COMPLAINTS

6.1 Incident Summary

Condition 9 of the waste licence requires that the licensee shall make written records of environmental incidents.

Corrective actions taken in response to incidents and complaints are in accordance with the requirements of the licence and with the site Corrective Action Procedure.

Table 6.1: Recordable Incidents during the Reporting Period

Date	Incident	Cause	Corrective Action
16/09/2010	Failure to maintain a minimum burn temperature of 1000 Degrees Celsius.	Accidental damage to flare unit control equipment	Run flare in engineering mode until repaired

6.2 Complaints Received During the Reporting Period

No complaints were received during this reporting period.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME

In compliance with Condition 2.3 of the waste licence, an Environmental Management Programme (EMP) has been established for the facility.

The EMP includes the Environmental Management Plan, the Schedule of Drawings, the timescale for achieving the Objectives and Targets and the designation of responsibility for achieving the Objectives and Targets.

7.1 Summary of procedures associated with the facility

Documented procedures governing the operation of the facility are outlined in Table 7.1 below.

Table 7.1: Operational Procedures

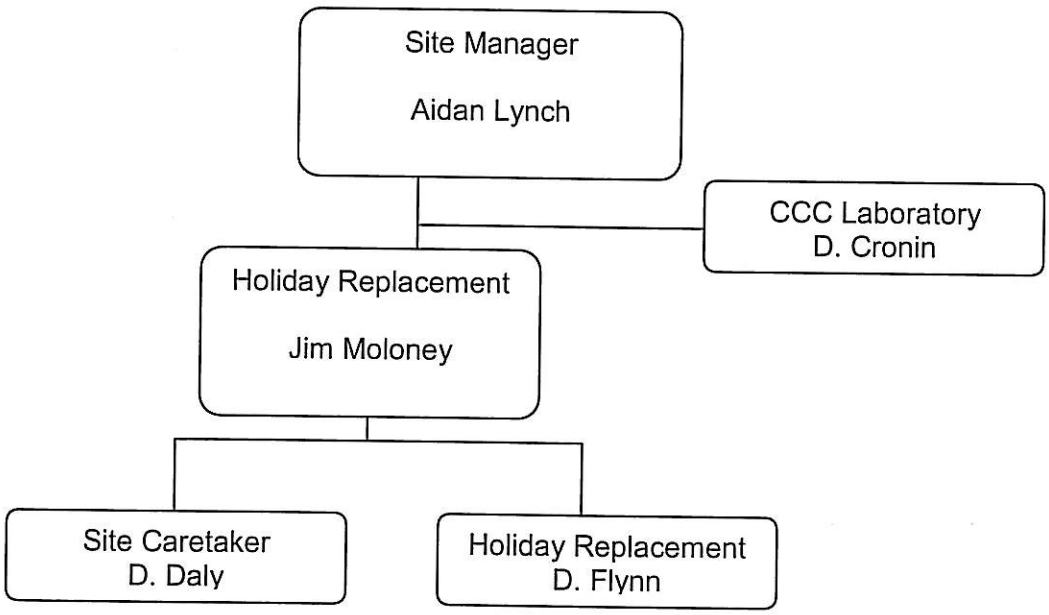
Procedure No.	Procedure Title
2	Smoking rules on site.
3	Rules for the refuse drivers entering the site.
4	Pumping of leachate on site.
5	Leachate levels on site.
7	Gas monitoring on site.

8	Use of absorbent material on site.
9	Site security and site fencing.
10	Loading of leachate.
11	Collection of litter.
12	Water ponding on cells.
14	Filling of the diesel tank
15	Loading of leachate from Cells 1 to 4
16	Discharging of leachate at Charleville Sewage Works
17	Spraying of flies

7.2 Management and Staff Structure

Cork County Council operates the landfill facility under the management structure illustrated in Figure 7.1 below.

Figure 7.1: Management Structure



- **Site Manager: Aidan Lynch**

Responsibilities: Entire management of the facility
Qualifications: B.E.

- **Holiday Replacement Site Manager: Jim Moloney**

Responsibilities: Entire management of the facility
Qualifications: B.E

- **Laboratory: Diarmuid Cronin**

Responsibilities: Sampling, analysis and interpretation of all in-house sampling on the landfill site.
Qualifications: Technician Grade I

- **Site Caretaker: D. Daly**

Responsibilities: Control of access to site, all weighbridge duties, canteen/storage container, machinery hire, leachate levels, measurement of stream discharges, gas measurement, well level measurement, daily environmental records.
Experience: Seven years as Site Caretaker on Ballyguyroe Landfill Site

- **Holiday Replacement: Denis O'Flynn**

Responsibilities: As above when substituting for D. Daly

The contingency arrangements for the absences of the main persons from the facility are outlined below:

Person Absent	Replacement
A. Lynch	J. Moloney
D. Daly	D. O'Flynn
D. O'Flynn	Operative is supplied by a County Council area office.

7.3 Budget

The operational budget for 2010 was €258,347.

7.4 Staff Training

No training was carried out in this reporting period.

7.5 Nuisance Controls

The nuisance control methods that were in place during the monitoring period have been reviewed and have been deemed as adequate. These include litter fencing, a silt discharge pond and gas detection metres.

7.6 Any Other Items Specified by the Agency

The Agency has not specified any additional items to be included in this report.

8. RESOURCE CONSUMPTION

During the reporting period the following resources were utilised at the site:

- Electricity 36,950 kilowatt hours

Water use on site was for domestic use only.

APPENDIX 1

Topographical Survey Contour Drawing

NOTES

1. Dimensions are not to be scaled from drawing. For any discrepancies found consult with the design office.
2. This drawing is to be read in conjunction with the Specification.
3. This drawing is to be read in conjunction with all other contract drawings.

No.	Date	Drwn	Surv	Chkd	Revision Description

Cork County Council,
Northern Division.

N. O'KEEFFE, B.E.,
A/COUNTY ENGINEER,
COUNTY HALL,
CORK.

Job Title:

BALLYGUYROE LANDFILL SITE,

Drawing Title:

Landfill Site Survey

Scales:	Surveyed by:	Drawn by:
1:1000	D.L.	D.L.
Designed by:	**Checked by:**	**Date:**
A.L.	A.L.	March 2011
Drawing number:		**Rev:**
NC-11-034-001		

APPENDIX 2

Water Balance Calculations

Ballyguyroe Landfill

Monthly Leachate Prediction for Year 2010

Month	Active Cell No.	Active Area (m2)	Waste Input (t)	Rainfall (mm)	Evapotranspiration (mm)	Active Infiltration (m3)	Restoration Cell No.	Restored Area No. 1 (m2) 1 to 4	Restored Area No. 2 (m2) 5 & 6	Restored Area No. 3 (m2) 7	Restored Infiltration Area No. 1 (m3)	Restored Infiltration Area No. 2 (m3)	Restored Infiltration Area No. 3 (m3)	Liquid Waste (m3)	Total Leachate (m3)	Cummulative Leachate (m3)	Absorptive Capacity (m3)	Cummulative Absorptive Capacity (m3)	Monthly Leachate Generation (m3)	Monthly Leachate Generation (gallons)
1	7	0	0.00	75.8	0.0	0	1 to 7	29,820	15,810	14,400	339	120	55	0	513	513	0	5,850	513	135,556
2	7	0	0.00	39.9	0.0	0	1 to 7	29,820	15,810	14,400	178	63	29	0	270	784	0	5,850	270	71,355
3	7	0	0.00	94	0.0	0	1 to 7	29,820	15,810	14,400	420	149	68	0	637	1421	0	5,850	637	168,104
4	7	0	0.00	33.3	0.0	0	1 to 7	29,820	15,810	14,400	149	53	24	0	226	1646	0	5,850	226	59,552
5	7	0	0.00	28.7	0.0	0	1 to 7	29,820	15,810	14,400	128	45	21	0	194	1840	0	5,850	194	51,325
6	7	0	0.00	48.7	0.0	0	1 to 7	29,820	15,810	14,400	218	77	35	0	330	2170	0	5,850	330	87,092
7	7	0	0.00	107.8	0.0	0	1 to 7	29,820	15,810	14,400	482	170	78	0	730	2901	0	5,850	730	192,783
8	7	0	0.00	38.3	0.0	0	1 to 7	29,820	15,810	14,400	171	61	28	0	259	3160	0	5,850	259	68,493
9	7	0	0.00	71.1	0.0	0	1 to 7	29,820	15,810	14,400	318	112	51	0	482	3642	0	5,850	482	127,151
10	7	0	0.00	82	0.0	0	1 to 7	29,820	15,810	14,400	367	130	59	0	555	4197	0	5,850	555	146,644
11	7	0	0.00	87	0.0	0	1 to 7	29,820	15,810	14,400	389	138	63	0	589	4787	0	5,850	589	155,585
12	7	0	0.00	34	0.0	0	1 to 7	29,820	15,810	14,400	152	54	24	0	230	5017	0	5,850	230	60,803
																			5,017	1,324,442

Density of in-situ waste = 0.75 t/m3

Absorptive Capacity = 0.075 m3/t

Final Infiltration = 15% of Effective rainfall p.a. in cells 1 to 4

Final Infiltration = 10% of Effective rainfall p.a. in cells 5 & 6

Final Infiltration = 5% of Effective rainfall p.a. in cell 7

Active Infiltration = Total rainfall

Liquid waste input = 0 t/year

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.11

REFERENCE YEAR	2010

1. FACILITY IDENTIFICATION

Parent Company Name	Cork County Council
Facility Name	Ballyguyroe Landfill Site
PRTR Identification Number	W0002
Licence Number	W0002-02

Waste or IPPC Classes of Activity

No.	class_name
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
4.10	The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
4.4	Recycling or reclamation of other inorganic materials.

Address 1	Ballyguyroe North
Address 2	Mallow
Address 3	Co. Cork
Address 4	
Country	Ireland
Coordinates of Location	-8.49413 52.2825
River Basin District	IESW
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Aidan Lynch
AER Returns Contact Email Address	aidan.lynch@corkcoco.ie
AER Returns Contact Position	Assistant Engineer
AER Returns Contact Telephone Number	022 - 30483
AER Returns Contact Mobile Phone Number	086 8146519
AER Returns Contact Fax Number	022 21983
Production Volume	0.0
Production Volume Units	
Number of Installations	1
Number of Operating Hours in Year	660
Number of Employees	2
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(c)	Installations for the disposal of non-hazardous waste
5(c) 50.1	Installations for the disposal of non-hazardous waste General

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

Is it applicable?	No
Have you been granted an exemption ?	No
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4.1 RELEASES TO AIR

Link to previous years emissions data

9

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	ALT	Testo 350 flue gas analyser	4.86642	4.86642	0.0	0.0
01	Methane (CH4)	C	ALT	Testo 350 flue gas analyser	22696.0	22696.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
02	Carbon monoxide (CO)	M	ALT	Testo 350 flue gas analyser	30.577	30.577	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ALT	Testo 350 flue gas analyser	0.486642	0.486642	0.0	0.0
80	Chlorine and inorganic compounds (as HCl)	M	ALT	Anaylsis of gas collected in impenger solution	0.2149	0.2149	0.0	0.0
84	Fluorine and inorganic compounds (as HF)	M	ALT	Anaylsis of gas collected in impenger solution	0.01297	0.01297	0.0	0.0

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

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

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

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	881200.0	C	US EPA LandGem		N/A	
Methane flared	20444.0	C	hitech instruments infrared analyser		250.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	22696.0	C	oth	Testo 350 Flue Gas Analyser	N/A	

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	9574.18	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Onsite in Ireland	Cork County Council,Charleville Waste Water Treatment Plant	Rathgoggan North,Charleville ,Co. Cork ,cork ,Ireland		

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