



**Limerick County Council**  
Comhairle Chontae Luimnigh

**GORTADROMA LANDFILL SITE**  
**ANNUAL ENVIRONMENTAL REPORT 2008**

Waste License Register: No. W0017-03

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**March 2008**

# **ANNUAL ENVIRONMENTAL REPORT**

**FOR THE REPORTING PERIOD  
JANUARY 2008 TO DECEMBER 2008**

FOR

**LIMERICK COUNTY COUNCIL  
COUNTY BUILDINGS  
DOORADOYLE  
LIMERICK**

Approved By:

Report Ref: 4070/M41  
EURO environmental services  
March 2008

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## **1.0 INTRODUCTION AND SITE DESCRIPTION**

### **1.1 Introduction**

Gortadroma Landfill, Ballyhahill, County Limerick is operated by Limerick County Council (LCC) in accordance with Waste License Register No. 0017- 03 issued by the Environmental Protection Agency on 22<sup>nd</sup> September 2005.

The reporting period for the purposes of the Annual Environmental Report is January 2008 to December 2008. The report has been completed by EURO environmental services and includes information provided by Limerick County Council.

The Annual Environmental Report (AER) for Gortadroma landfill includes, where applicable, the information specified in Schedule G of the Waste License, Content of Annual Environmental Report, in accordance with the EPA publication Waste Licensing - Draft Guidance on Environmental Management Systems and Reporting to the Agency.

### **1.2 Site Description**

The landfill site is located in the townland of Gortadroma, Ballyhahill, County Limerick, which is located approximately 12 km north of Newcastle West and 9 km south-west of Foynes. The location of the site is shown in Figure B2 of the Waste License Application (W0017-03). The facility is known and operates as the Gortadroma Landfill.

The site is located in a landscape of undulating lowlands separated by areas of gently sloping farmland. There are pockets of poorly-drained fields and bogland located at low points. The location of the landfill site itself is on a gentle south-facing slope.

The land use in the area is predominantly agricultural with a mixture of pasture and a significant amount of marginal agricultural land as damp pasture.

The bedrock underlying the general area has been mapped as the Cummer Flagstone Formation which is Namurian in age and up to 230m thick. These generally consist of bedded, argillaceous, coarse siltstones and mudstones overlain by an upper unit of more massive fine grained quartzitic, argillaceous sandstones or coarse siltstones with alternating mudstones.

There are two main soil types underlying this site; (a) sand and gravel and (b) silty clay and these are overlain in places by peat.

The site lies within the White River catchment. This river flows from east to west just to the south of the site. The regional formation has been classified as a poor aquifer by the Geological Survey of Ireland.



Long term meteorological reports from Shanagolden (1960 - 1997) indicate that the annual mean rainfall in the locality is estimated at 1100 millimeters (mm) with the months of October to January receiving the greatest monthly rates.

The site is bounded by agricultural land on the eastern, western and northern perimeters. Local Road L1226 bounds the site to the south.

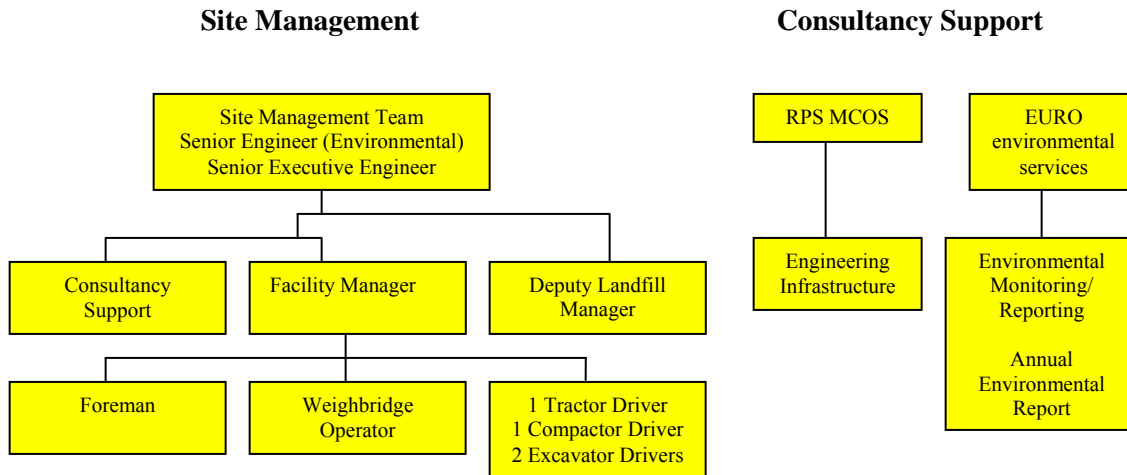
The current landfill facility at Gortadroma including the extension area occupies an area of 76 hectares.

## 2.0 MANAGEMENT OF THE ACTIVITY

### 2.1 Management of the Activity

The site is managed and operated by Limerick County Council. Details of the management structure for the facility were submitted to the Agency as part of the Environmental Management Programme in November 2000, February 2002, March 2003, March 2004, March 2005, March 2006, February 2007 and January 2008. The management structure is outlined in Figure 2.1 below.

**Figure 2.1 Management Structure**



LCC has overall responsibility for the management and operation of the Gortadroma Landfill site. The LCC senior engineer is responsible for the management of municipal waste and waste facilities in the County. With reference to Condition 2.1 of the Waste License, the facility manager for landfill, and a deputy site manager have responsibility for day to day site operation.

The facility manager and the deputy landfill manger are present on site from day to day during the operation of the facility. The facility manager has overall responsibility for the monitoring and day to day operations at the landfill. The senior executive engineer has responsibilities for areas such as development and waste license applications.

## **2.2 Environmental Management System**

An Environmental Management System (EMS) is in operation for the site and is updated annually in accordance with site requirements and conditions, as required under Condition 2.2 of the Waste License.

## **2.3 Environmental Management Programme**

The objective of the EMP is to act as the site manual, which will assist the site in achieving its objectives and targets during the current and future operation of the site. An updated EMP for 2008 has been prepared and was submitted separately to the Agency in January 2008.

## **2.4 Schedule of Environmental Objectives and Targets for 2009**

The schedule of Environmental Objectives and Targets for the forthcoming year is described in the EMP for 2008, which was forwarded separately to the Agency and will become part of the public record for the site. The list of objectives and targets is reproduced from the EMP in Appendix I.

## **2.5 Report on the progress towards achievement of the Environmental Objectives and Targets contained in 2007**

The 8 objectives and targets established for the EMP of March 2007 were reviewed to assess the progress towards achievement. In total 4 objectives were completed and 2 are ongoing, 1 is in progress and 1 has not yet been completed. Section 4.1 outlines the progress made towards achievement of the objectives and targets contained in the previous year's report.

## **2.6 Procedures developed by the licensee in 2007**

There were two new procedures developed for use at the landfill facility in 2007.

1. Procedure for removing the fly sprayer from the site tractor.
2. New waste inspection procedures.

## 2.7 Report on programme for Public Information

LCC submitted details of a Waste License Communications Programme to the Agency in May 2000, in accordance with Condition 2.7 of the then Waste License. The Agency requested additional information in September 2000 in relation to the follow-up of complaints and incidents and the availability of information to the public. A detailed response was submitted and the Programme was approved by the Agency on November 1<sup>st</sup>, 2000.

LCC provide the following documentation for the public to view:

- Waste License 17-1 (superseded), WL17-2 (superseded), WL0017-03 (currently in operation)
- Environmental Impact Statement
- Conditioning Plan
- Waste License Application form
- Waste License Review Application
- Periodic reports
- All monitoring records
- Waste transfer and acceptance dockets
- Leachate removal log books
- Incident/Complaints reports
- Once-off reports submitted to the Agency
- MSDS sheets
- Calibration records
- Bait box inspection records
- Rejected loads log
- Bird control reports
- Agency correspondence, EPA approvals and request for additional information
- Monitoring personnel, experience and training
- Audit records
- Litter fines, rejected load, compliance, bund integrity
- Daily site log
- Weekly site inspection forms
- Surface water inspection forms
- Litter picking reports
- Monthly review of odour control measures report

### 3.0 NOTIFICATION AND RECORD KEEPING

All copies of environmental data and prescribed reports obtained and prepared on behalf of the licensee are forwarded to the Agency. Copies of reports and correspondence are retained and available for inspection at Gortadroma Landfill reception building.

Waste records and leachate removal logbooks are retained in the site office.

#### 3.1 Non-Compliances

The Agency inspected the site on the 14<sup>th</sup> February 2007, at which time no non-compliances were noted, as reported to the L.C.C on 16<sup>th</sup> April 2007 and again on the 29<sup>th</sup> August 2007, during which two non-compliances were noted and reported to the L.C.C on the 14<sup>th</sup> September 2007.

**Table 3.1 Details of Non-Compliances at Gortadroma Landfill Facility during 2007 (with reference to certain conditions of the site waste license)**

Date	Details	Date of Response	Details
29/08/07	Leachate drainage layer in Cell 14 was not constructed as set out in Condition 3.18(c) of the License	01/11/2007	Immediate actions specified by The Agency were completed and forwarded to the Agency
29/08/07	Written prior agreement was not obtained from the Agency before the leachate drainage layer, consisting of 250mm of 5-20mm stone, overlaid by 250mm of 20-40mm stone, was installed.	01/11/2007	L.C.C confirmed to the Agency that the testing regime for the leachate stone has been amended for the remaining cells to be constructed as part of Contract 12.

#### 3.2 Reported Incidents and Complaints Summaries

##### 3.2.1 Incidents

During the reporting period a total of 19 incidents occurred and were reported to the Agency. They are summarised in Table 3.2.

**Table 3.2 Summary of Incidents and their Corrective Actions, 2007**

Date	Nature of Incident	Corrective Actions/Conclusions
04/01/2007	Scada System not recording leachate levels in the cells and in the leachate holding lagoon. The reason for this was most likely due to a blown fuse or PLC card.	Call placed with EPS Ltd., to rectify problem. Pumps operated manually during working hours until Scada system back on-line.
04/01/2007	Fluctuation in pressure gauges on Flare, indicating possible water ingress in gas main. Condensate pump malfunction.	Limerick County Council Maintenance Staff called out to replace condensate pump. Gas Flare shut down from 11:30 to 16:50 to facilitate work.
25/01/2007	CO <sub>2</sub> trigger level exceeded at gas monitoring borehole C2 (2.7% v/v).	Gas monitoring borehole C2 to be observed closely for any increase in CO <sub>2</sub> or CH <sub>4</sub> occurrences.
25/01/2007	Scada System not recording leachate levels in the cells and in the leachate holding lagoon. The reason for this was due to malfunction on a PLC card. Pumps in the cells and holding lagoon operating normally, but not communicating with Scada screen in Office.	Called out Dynamic Automation. PLC card to be replaced within one week.
26/01/2007	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 11/01/2007). Elevated suspended solids result most likely due to earthworks in the extension area.	Limerick County Council to visually check surface water flows from the extension area on a daily basis. Additional silt traps have been installed and measures will be imposed on the contractor to control suspended solids from the extension works if required.
05/02/2007	Detection of area of hot ground near main gas carrier line. An area of ground near one of the pumps was observed to be hot. A small area of peat in this area was smoldering, but no evidence of fire. Leak suspected in gas carrier pipe and leaking gas ignited by faulty electrical cable.	Area of ground excavated and sprayed with water. Landfill gas flare shut down for two hours.
21/02/2007	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 30/01/2007 and 15/02/2007). Elevated suspended solids result most likely due to earthworks in the extension area.	Silt traps recently installed working well during periods of low rainfall but, during high periods of rainfall silt traps over-topping giving rise to increased levels of suspended solids. Limerick Co Co advised engineer (RPSMCOS) of issue. Additional surface water control measures to be put in place.
09/03/2007	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 28/02/2007). Elevated suspended solids result most likely due to earthworks in the extension area.	Surface water being pumped to adjoining grass field to filter water. Working well during low rainfall periods but at high periods of rainfall measures are less effective due to increased volumes of storm water.
16/03/2007	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 06/03/2007). Elevated suspended solids result most likely due to earthworks in the extension area.	All drains leading from extension area de-silted and installation of additional silt traps.

**Table 3.2 Summary of Incidents and their Corrective Actions, 2007 (Continued)**

28/03/2007	Malfunction of Scada System (27/03/2007). Display on Scada PC blank.	Blown CPU due to lightening strike. Installation of new CPU and lightning protection device. Leachate extraction pumps operated manually while Scada system out of operation.
01/06/2007	Fire on mobile pump. A mobile three-inch petrol pump was being used to transfer the raw leachate out of the holding lagoon for lagoon integrity testing. During pumping, the pump caught fire.	General Operative on site extinguished fire using fire extinguisher. L.C.C to investigate replacing petrol pump with diesel pump to reduce risk of fire.
03/07/2007	Diesel oil spillage. Priority Construction re-fuelling machine on site on 02/07/2007. Machine left unattended for 2 minutes during which time an overspill occurred.	Small quantity of diesel was immediately contained by creating a soil bund. Contaminated material stored in contained area and collection is being arranged between Priority Construction and Atlas Oils. Priority Construction have confirmed that all re-fuelling operations will be supervised from now on.
30/07/2007	Malfunction of landfill gas flare on 27/07/2007. Flare shutdown due to malfunction of UV sensor on flare unit.	L.C.C. keep critical spare flare parts on site. However, on three occasions in the past two weeks the UV sensor had malfunctioned and was replaced. Therefore all spare UV sensors were used up. Order placed last week with UV sensor due in on 30/07/2007.
02/08/2007	CO <sub>2</sub> trigger level exceeded at gas monitoring borehole C3 (5.9% v/v – 31/07/2007).	Monitoring borehole C3 to be observed closely in future monitoring events for any increase in CO <sub>2</sub> and CH <sub>4</sub> occurrences.
21/08/2007	Landfill Gas Flare operating without temperature display. Display unit malfunction.	Replacement part ordered and due in for 27/08/2007.
11/09/2007	Exceedence of emission limit for suspended solids at SW4 (outlet storm water – sampled on 09/08/2007 and 23/08/2007). Elevated suspended solids result most likely due to stream diversion works in the extension area.	Stream diversion works have since been completed.
02/10/2007	Emission limit for Dust deposition exceeded at monitoring locations D1 and D4 for Quarter 3 of 2007.	Exceedence at D1 attributable to excavation works for cable ducting and a combination of excavation works in the extension area and activity on active cell 11. L.C.C. recently purchased a new tractor and a larger 2000 gallon vacuum tanker.
23/10/2007	Diesel oil slick. L.C.C. recently conducted cleaning works on the storm water restoration tanks. When the inlet flow of tank was opened, a diesel odour was detected and an oil slick observed on the water surface. The source of the diesel is attributable to cleaning works recently carried out by contractors on the wheel wash at the construction entrance.	Inlet of tank closed off immediately and diesel oil slick contained in tank. Atlas Oil to conduct assessment and remove diesel oil slick for appropriate disposal.
30/11/2007	Exceedence of methane and carbon dioxide levels in Gas Monitoring Boreholes C18, C21 and C22.	Monitoring of these 3 wells will be increased to weekly and an investigation into the source of the methane and carbon dioxide will be conducted.

### 3.2.2 *Complaints*

In summary there were 46 complaints or queries during the reporting period of January 1<sup>st</sup> to December 31<sup>st</sup>, 2008. The vast majority of complaints were attributed to odour. Other issues included litter, dust, site noise and bird control at the site. Complaints were responded to as soon as possible and were recorded in the complaints register. Corrective action, if considered necessary, is recorded and reported to the Agency. Details of all complaints, responses and corrective actions are maintained and available for inspection on-site. There was a reduction in the number of complaints from 60 in 2006 to 46 in 2007.



### **3.3 Waste Records**

All waste materials accepted at the site are recorded on two separate documents, including a waste transfer document and a computer printout of the waste accepted. The following details are recorded:

#### **Computer Printout:**

- Ticket Number/Transaction Number
- Customer code
- Operator / driver signature
- Net weight
- Vehicle Registration Number
- Contractor Name
- Waste Code for site
- Waste Type
- Name of person who checked load
- Waste Source
- Accepted or rejected status
- Weight entering and weight of container leaving site
- Waste collection permit number

#### **Waste Transfer Docket includes additional headings of:**

- How waste is contained
- European waste catalogue number
- Physical description
- Odour/Description of odour
- Special problems/requirements of waste
- Knowledge with regard to waste
- Waste Producer
- Waste Collection Permit Number

All waste records are retained at the site office.

#### 4.0 SITE INFRASTRUCTURE

**Table 4.1 Report on Development Works Undertaken during 2007**

<b>PROPOSED DEVELOPMENT</b>	<b>STATUS</b>	<b>COMMENT</b>
Gas Utilisation	Preparing tender documents for appointment of operator	ESB Substation and Grid Connection in place.
Upgrade Civic Amenity Site and Public Tipping Area	Completed	Upgrade complete. Re-surfacing to be completed.
Install air diffusion system in Leachate Treatment Plant	Ongoing	Ongoing.
Capping of current active cell 11	In progress	Contract awarded to Priority Construction (Contract 12).
Install Oil separator on storm water discharge	Not complete	Oil separator design to be agreed with the Agency and installed under Contract 12.
Provide FAS Waste Management on site training for all site Staff	Completed	Limerick County Council arranged training in Quarter 2, 2007.
Dust and Fire Control improvements	Completed	Tender for purchase of new tractor and a larger 9m <sup>3</sup> vacuum tank approved.
Upgrade Landfill Gas Flare from 750 m <sup>3</sup> /hr to 1500 m <sup>3</sup> /hr.	Completed	750 m <sup>3</sup> /hr Organics Flare traded in and replaced with 1500 m <sup>3</sup> /hr Organics Flare.

#### 4.2 Lagoon Structures Inspection Report

An Electrical Leak Location Survey (EELS) was carried out on the First Settling Lagoon, Final Settling lagoon and Slow Sand Filter in September 2007 by Geomembrane Testing Services Ltd. Further to this, a Mobile Electrical Leak Location Survey (MELLS) was carried out using geophysical techniques to verify the integrity of the lining system. The EELS identified no defects. On completion of the survey, it was the opinion of Geomembrane Testing Services Ltd that the High Density Polyethylene Membrane in the First Settling Lagoon, Final Settling Lagoon and Slow Sand Filter were free of all defects at the time of the inspection. Copies of the Certificates of Integrity are presented in Appendix II.

#### 4.3 Calculated remaining capacity of the site and the year in which final capacity is expected to be reached

Cells 1 to 13 are now filled to capacity. The three available cells for waste disposal 14, 15 and 16 have a design capacity of approximately 750,000 m<sup>3</sup>. However, when filling these cells without adjacent cells to east and south, the capacity is reduced to 550,000 m<sup>3</sup>. Waste disposal commenced in cell 14 on the 30<sup>th</sup> of October 2007. Approximately 10,200 tonnes of waste have been placed in cell 14 up to the end of December 2007 at a compaction rate of 1 tonne/m<sup>3</sup>. Therefore the remaining void capacity at the 1<sup>st</sup> January 2008 was approximately 539,800 m<sup>3</sup>.

**Table 4.2 Estimated volume in each cell**

Cell	Final Capacity (t)
5	108,790
6	110,174
7	125,583
8	119,692
9	48,301
10	84,161
11-13	308,000
14-16	550,000

#### **4.4 Area Occupied by Waste**

The area occupied by waste at Gortadroma Landfill is 124,200m<sup>2</sup>. Cells 1-4 are unlined and occupy an area of 20,800m<sup>2</sup>, while cells 5-13 are lined cells and occupy an area of 94,800m<sup>2</sup>. Current active cell 14 is lined and occupies an area of 8,600 m<sup>2</sup>.

#### **4.5 Tank, pipeline and bund testing and inspection report**

The integrity and water tightness of all bunds, tanks and pipelines must be demonstrated on a 3-yearly basis. The first settling lagoon, final settling lagoon and Slow Sand Filter in the leachate treatment plant were tested during September 2007. The reports along with the certificate of integrity of these tests are presented in Appendix II.

### **5.0 WASTE ACCEPTANCE AND HANDLING**

#### **5.1 Licensed waste disposal activities carried out at the facility**

Part I of the Waste License details the activities that are licensed at the site under the Waste Management Act, 1996: Third Schedule and include:

- Class 1: Deposit on, in or under land (including landfill)
- Class 5: Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment;
- Class 6: Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule;
- Class 7: Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule;
- Class 11: Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule;
- 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.

#### **5.2 Licensed recovery activities under the Waste Management Act, 1996, Fourth Schedule**

- 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 9: Use of any waste principally as a fuel or other means to generate energy;
- 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 12: Exchange of waste for submission to any activity referred to in preceding paragraph of this schedule;
- Class 13. Storage of waste intended for submission to any activity referred to in preceding paragraphs of Schedule A, other than temporary storage, pending collection, on the premises where such waste is produced. (Limited to the temporary storage of recyclable and reusable waste pending their collection).

### 5.3 Quantity and composition of waste received, disposed of and recovered during the reporting period and each previous year

The total tonnage of materials received at the site from January 2007 to December 2007 inclusive, and during each previous years, is given in Table 5.1 below.

**Table 5.1 Annual Waste Tonnages to 2007**

Year	Tonnage Accepted at Site
1998	91,631
1999	120,358
2000	125,186
2001	132,678
2002	138,320
2003	82,184
2004	50,219
2005	43,252
2006	82,119
2007	39,578

Waste source and tonnes per month for this reporting period are summarised in Table 5.2 and in Figure 5.1 overleaf. A more detailed summary is presented in Appendix III.

### 5.4 Methods of Waste Deposition

Cell 11 was filled to final capacity during the end of October 2007 and capping is currently in progress. Cell 14 is the current active cell in which landfilling commenced on the 30<sup>th</sup> of October 2007.

**Table 5.2 Quantities of Waste Types Accepted at Gortadroma during 2007**

Month	Commercial/Industrial	Private Domestic	Council Refuse	City Street Cleaning	Sludge
January	436.30	869.68	142.04	81.46	162.14
February	443.87	593.03	95.88	100.08	195.72
March	609.66	581.46	146.76	56.52	47.30
April	504.09	488.71	133.78	63.22	0.00
May	618.00	561.92	157.97	63.94	77.82
June	592.49	926.58	102.92	74.32	0.36
July	2,974.94	629.83	65.32	54.08	32.82
August	2,876.56	2,185.98	90.44	58.36	3.26
September	2,926.66	2,092.64	55.32	51.28	0.00
October	4,153.36	1,882.72	91.38	71.56	136.50
November	3,219.58	2,058.08	139.16	58.46	0.00
December	2,147.20	2,492.72	42.16	64.84	0.48
<b>SUBTOTAL</b>	<b>21,502.71</b>	<b>15,357.35</b>	<b>1,263.13</b>	<b>798.12</b>	<b>656.40</b>
<b>ANNUAL TOTAL</b>			<b>39,577.71 tonnes</b>		

### 5.5 Recyclables

Table 5.3 below outlines the quantity of recyclables transferred from Gortadroma Civic Amenity Site for recovery during 2007. In addition to this the following materials were accepted on site for reuse, road making and as landfill cover:

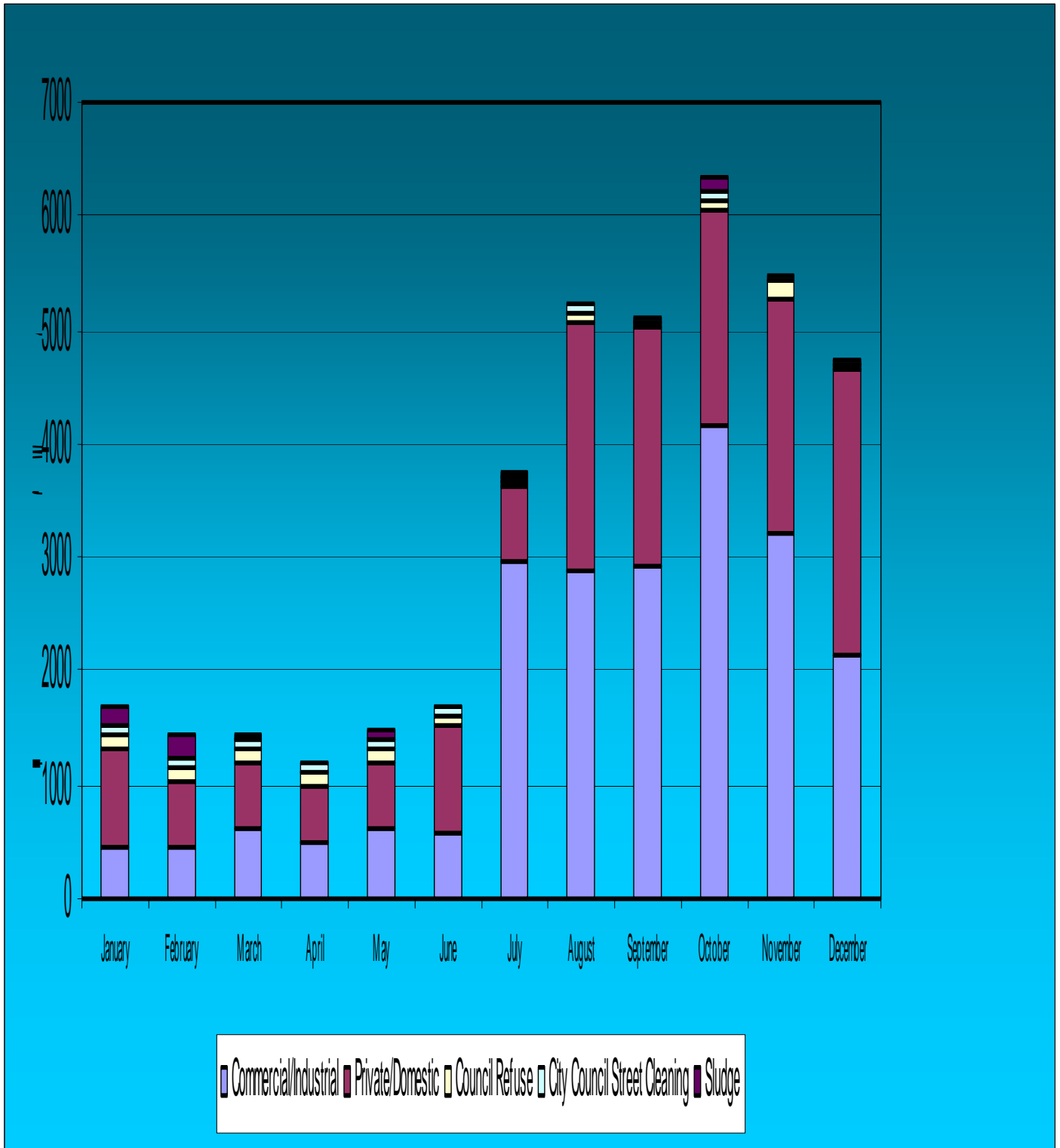
- EWC 17 05 04 Soil & Stones 2,574.68 Tonnes
- EWC 03 01 99 Woodchip 268.96 Tonnes
- EWC 19 10 04 Automobile Shredder Residue 6,247.86 Tonnes
- EWC 17 01 01 Concrete 1,332.52 Tonnes

Also 20.02 Tonnes of green waste was accepted on site and transferred of-site to Mungret composting facility.

**Table 5.3      Recyclables transferred from Civic Amenity Site for recovery during 2007**

<b>Waste Type Name</b>	<b>EWC Code</b>	<b>Quantity Tonnes</b>
Plastic Bottles	20 01 39	11.08
Tetrapacks	20 01 01	16.01
Newspapers/Magazines	20 01 01	31.62
Glass	20 01 02	12.53
Food Cans	20 01 05	6.80
Drink Cans	20 01 05	7.18
Cardboard	20 01 01	40.04
Fluorescent Tubes	20 01 21	0.22
Batteries	20 01 20	14.00
Waste Oil	20 01 09	7.70
Waste Oil Filters	20 01 09	0.86
LDA Non-Haz	20 01 36	24.08
Fridge Freezers	20 01 35	11.90
Mixed Metals	20 01 40	152.78
Textiles	20 01 11	11.74
Small WEEE	20 01 35	23.31

**Figure 5.1 Waste Types and Quantities Received During 2007**





## 6.0 *ENVIRONMENTAL NUISANCES*

### 6.1 Report on environmental nuisance control at the facility for 2007

The site is inspected daily and weekly by the landfill manager and recorded on separate inspection sheets. The daily inspection sheet records environmental nuisances such as flies, loose litter, vermin, birds, odour, dust, fires and complaints. The sheet also provides for the recording of descriptions of works on the day of inspection and provides for comments and required actions.

Litter picking is carried out daily and as required. Daily and weekly inspection sheets are maintained at the site office. The site manager carries out daily litter inspection in the area surrounding the landfill site. An overhead CCTV camera has been located at the weighbridge to enable inspection of loads brought to the facility. The weighbridge operator inspects each load brought to the facility and ensures that they are covered with appropriate netting.

An active litter management plan has been agreed with the Agency and has made provisions for an 8m high anti-litter fence placed at the north eastern corner during August 2000. The Agency has approved the use of Geo-hess as daily waste cover. In the event of wind speeds in excess of 8m/s an inspection is required to check the possibility of litter becoming airborne. In the event of litter becoming airborne, the site will be temporarily closed. Wind conditions are constantly monitored by staff.

Weekly inspection sheet provides for the recording of nuisances as well as site security, infrastructure and housekeeping.

A suction sweeper is employed two times per week to brush the access road outside the landfill and the entrance road into the landfill. LCC also carries out a daily odour check at 5 sensitive locations along the perimeter road of the landfill. Results of all inspections are recorded in the daily log sheet. During 2002 the landfill gas flare was commissioned which further reduces potential for nuisance odour emissions. Cells 1 to 10 and cells 12 and 13 are capped and have gas extraction in place in these cells. Cell 14 is currently being capped and vertical gas extraction wells will be drilled and connected to the flare. A horizontal gas collection system is currently being installed in Active Cell 11.

Limerick County Council appointed a new full time falconer in April 2004 this prevents birds congregating at the landfill. A daily log of bird activity on site has been completed.

Rodent infestation is prevented by the following measures:

- Application of daily cover material
- Approx 30 bait boxes are at the perimeter of landfill and they are serviced on the first Thursday of every month by Rentokil. They are also checked twice a month by LCC staff.

## 7.0 EMISSIONS AND ENVIRONMENTAL IMPACTS

### 7.1 Summary Report on Emissions

A summary of emissions is contained in Table 7.1 below.

**Table 7.1 Emissions Summary**

<b>Emission</b>	<b>Significance</b>
Noise	Noise monitoring during the reporting period indicated daytime LAeq readings at 6 locations (M1, M6, M7, and M9) in excess of the licence limit of 55dB(A), for which traffic noise was the causative factor for all except location M1. Night time readings at M1, M4 and M8 exceeded the limit of 45 dB(A). M1 exceeded due to traffic noise, M4 due to wind in the trees and M8 due to silage operations nearby.
Dust	During the course of the year there were 3 exceedences of the limit of 350 mg/m <sup>2</sup> /day as specified in Schedule C.3 of the Waste Licence.
Odour	Odourous compounds measured at the landfill site were all recorded below the Licence limit of detection. Issues with nuisance odours continue to be reduced following restoration of phases and commissioning of the gas flare system.
Landfill Gas	Methane did exceed the trigger level at Monitoring Boreholes C18, C21 and C22 once during the monitoring period. Carbon dioxide exceedences have been detected at a number of monitoring points as outlined in Chapter 9. Gas monitoring in gas vents is indicative of early stages of waste decomposition and are also discussed in Chapter 9.
Emission to surface water	There was no treated leachate discharged to the White River during 2007.
Leachate	A volume of 48, 836.72m <sup>3</sup> was tankered off site to waste water treatment plants.

## 7.2 Resource and Energy Consumption

Resource and energy consumption for on site can be summarised for 2007 as follows:

**Table 7.2 Energy Consumption Summary**

Energy	2003	2004	2005	2006	2007
Diesel fuel (used for council machinery and pumps)	17,500 litres	19,020 litres	10,529 litres	11,947 litres	9,812 litres
Pesticides: BioKill Pro (fly spray) concentrate	1,250 litres	900 litres	700 litres	900 litres	750 litres
Electricity consumption	465,270 kWh	635,700 kWh	517,500 kWh	380,405 kWh	604,631 kWh

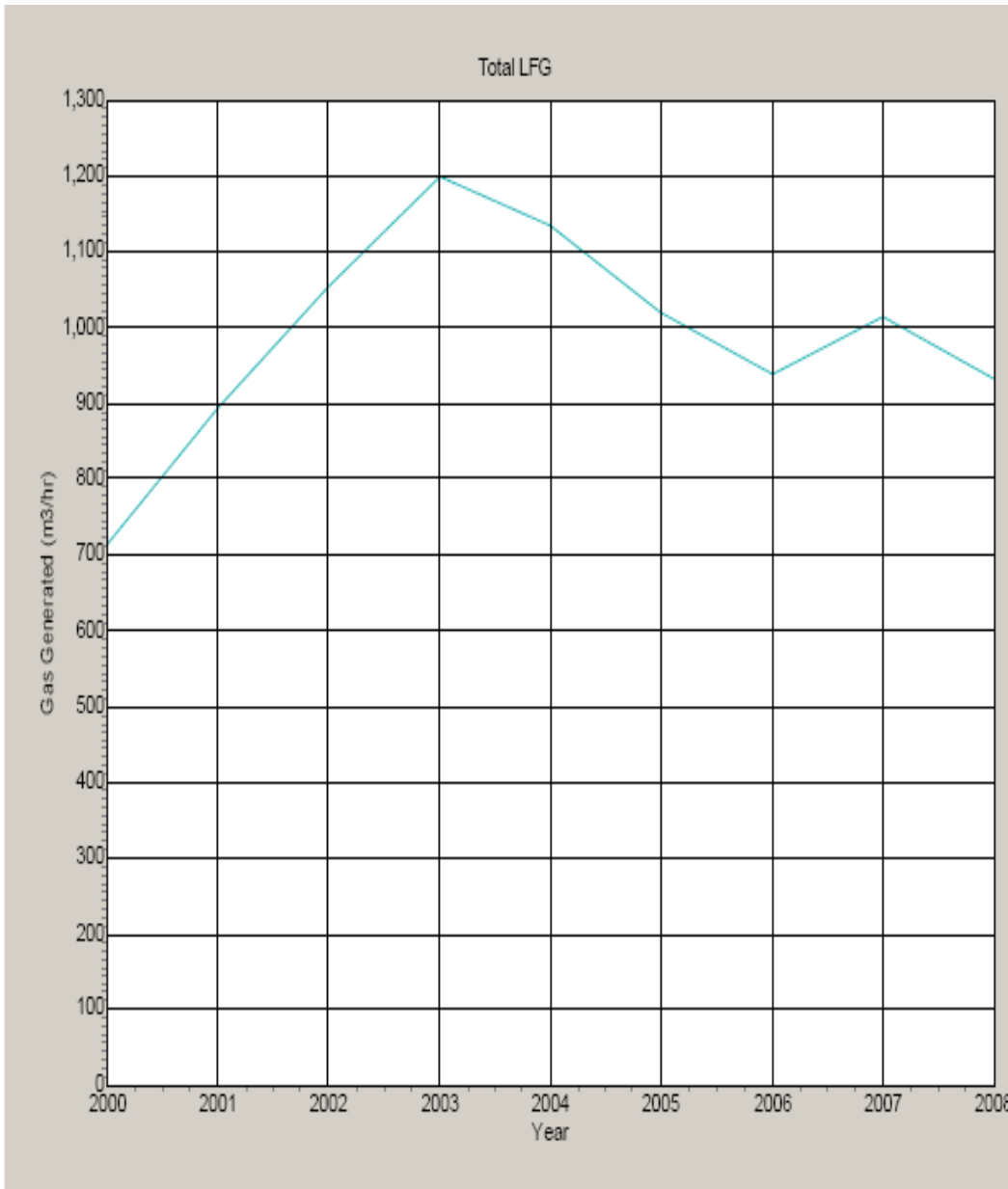
## 7.3 Estimated Annual and Cumulative Quantities of Gas Emitted from the Site

There are currently 95 gas wells at Gortadroma Landfill and a series of horizontal gas collection pipe-work within Cell 11. This Cell is currently being capped as part of the Contract 12 works. The new cap will incorporate 21 new vertical gas wells, and should be fully operational by the end of the first quarter 2008. The landfill gas collected by these wells is transported via a manifold system with two mains connecting to a carrier main and in turn to a 1,500m<sup>3</sup>/hr gas flare. For the main part of 2007 the flow of gas to the flare was running at 1,200 m<sup>3</sup>/hr. This began to drop off towards the end of 2007 and is currently running at approximately 900-1,000 m<sup>3</sup>/hr.

Landfill Gas is produced principally in the year after waste is deposited. Therefore when discussing volumes of gas generated in 2007 it is appropriate to discuss waste quantities and compositions from 2006. In 2006 a total of 82,119 tonnes of waste was landfilled at Gortadroma. This was an increase over the previous number of years and as such it would generally be predicted that this would result in a slight increase in the volume of landfill gas generated on-site in 2007. As the volume of waste being landfilled began to decrease towards the end of 2006 and at the beginning of 2007 this would see a corresponding decrease in the volumes of landfill gas produced on site and this is reflected in the drop in gas flow towards the end of 2007.

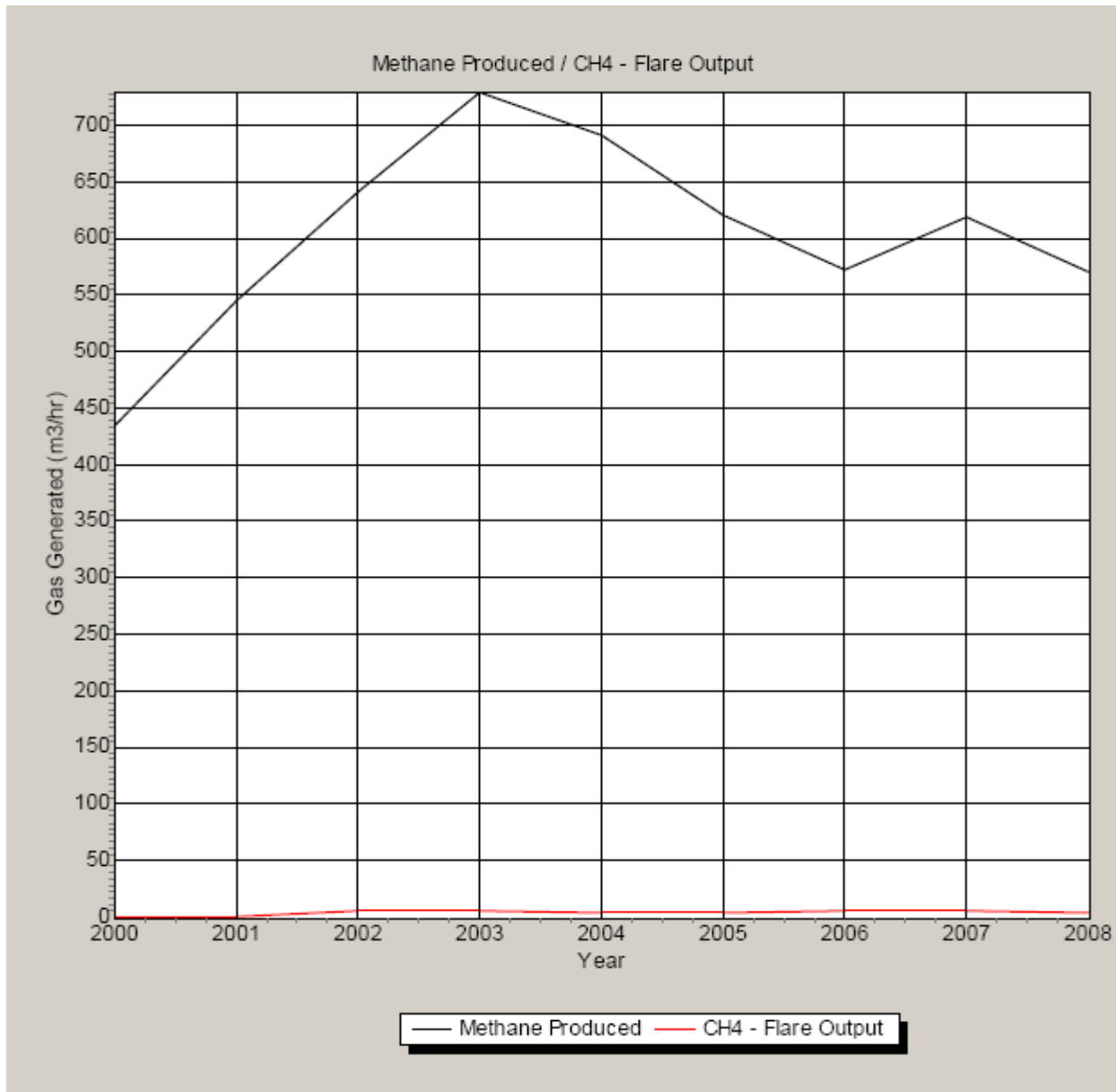
The landfill Gas package, GASSIM is used to model the gas production at Gortadroma. Figure 7.1, taken from GASSIM, illustrates the total bulk landfill gas which is generated from the landfill in the period 2000-2007. For 2007 a figure of approximately 1,010m<sup>3</sup>/hr is outputted from the model at the 50<sup>th</sup> percentile.

**Figure 7.1 Total Bulk Landfill Gas Generated 2000-2007**



Of the total bulk gas generated at Gortadroma in 2007 approximately 619 m<sup>3</sup>/hr was modelled as methane. The total flare output of methane, post combustion, was estimated at 4.5m<sup>3</sup>/hr (99% destruction efficiency).

**Figure 7.2 Methane Production and Flare Methane Output, 2000-2007**



GASSIM also estimates the global warming potential of the emissions from Gortadroma Landfill in 2007. This is estimated in tonnes of Carbon Dioxide since CO<sub>2</sub> is the main greenhouse gas. Emissions of other greenhouse gases are converted to CO<sub>2</sub> equivalent on the basis of their global warming potential (GWP). For example, the GWP of methane is 21, which means that one tonne of methane is equivalent to 21 tonnes of CO<sub>2</sub>.

932 tonnes of methane was emitted from the Site in total. 19,572 tonnes of methane as Carbon Dioxide equivalent were emitted from Gortadroma in 2007. 14,000 tonnes of Carbon Dioxide were emitted from Gortadroma in 2007 totalling 33,572 tonnes of Carbon Dioxide equivalent.

#### 7.4 Estimated Annual and Cumulative Quantity of Indirect Emissions to Groundwater

Gortadroma Landfill consists of 14 individual landfill cells and two further cells, 15 and 16, are under construction. Cells 5-14 contain a fully engineered liner while Cells 1-4 have an in-situ clay base. Cells 1-4 have been fully capped with 1m of subsoil/topsoil, drainage blanket, GCL and an LLDPE geosynthetic layer. This capping system essentially prevents any ingress of water into these cells. This removes the possibility of the leachate head increasing and thus assuming that the leachate head will reduce and eventually stabilise and that the emissions to groundwater will be significantly reduced. In addition leachate pumping wells have been installed within each of the four cells. The function of these pumps is to draw down the leachate head within the four cells. These pumps have been operational since mid December 2003 and are drawing the leachate head down constantly. The leachate abstraction wells were re-drilled in August 2004 in an attempt to retrieve leachate from a lower level, since the original wells had run dry. Five wells were drilled, four to abstract leachate and a fifth to monitor the leachate head. Leachate levels were maintained at 1m from the base of the wells throughout the year and additional pumping was carried out when capacity in the treatment plant allowed for it.

**Table 7.3** Depths of the wells and the leachate heads

Well ID	Depth of Well b.g.l.	Leachate Levels b.g.l.
1/4a	11.4m	10.4
1/4b	12m	11
1/4c	16.7m	15.7
1/4d	13.75m	12.75

The leachate head is reducing within cells 1-4 due to the lack of ingress of water into the cells and the pumping from the cells. The pumps will only activate when there is sufficient volume available in the leachate management system.

At the highest point of cells 1-4 the depth from ground level to the basal clay liner is approximately 14m, and varies between 11 and 16m below the top of the cap across the cells. At present (taking the annual average values) the head of leachate is at between 10-16m (average 12.5m) below ground level, giving an estimated leachate head of 1.5m above the base of the cells. On average, across cells 1-4, the leachate head is assumed to be 1.5m over an area of 22,000m<sup>2</sup>. It is assumed that the waste has an overall moisture content of 25% below this level.

$1.5\text{m} \times 22,000\text{m}^2 \times 0.25 = 8,250\text{ m}^3$  of leachate within cells 1-4 in 2007. This figure can be used to calculate the hydraulic gradient above the basal clay liner per unit area.

The hydraulic conductivity of the clay liner can be taken to be approximately  $1 \times 10^{-9}$  m/s.

Using Darcy's law, ( $Q=kiA$ ) the flow volume through the clay liner can be calculated as follows:

Where  $k$  is the hydraulic conductivity of the clay liner (using  $1 \times 10^{-9}$  in this incidence)

$I = (h + L)/L$  (m/m) is the hydraulic gradient, where  $h$  is the head of leachate (taken to be 0.375 in this case because of the relationship between the hydraulic conductivity of the waste and its moisture content) and  $L$  is the thickness of the mineral layer (1m in this case), therefore  $I$  is 1.375.

$A$  is the area, in this case  $22,000\text{m}^2$ .

Therefore the flow ( $Q$ ) can be calculated to be  $3.0 \times 10^{-5} \text{ m}^3 / \text{s}$  through the clay liner at the base of cells 1-4.

For the one-year period of 2007 the flow rate of leachate emissions to groundwater is calculated to be  $930 \text{ m}^3 / \text{year}$  (or  $2.5\text{m}^3 / \text{day}$ ).

A 1m head of leachate is not exceeded above the base of the wells, and the pumps within cells 1-4 are rarely operational due to a lack of leachate in the borehole, indicating that their max pumping depths have been achieved at this stage.

It is assumed that as the leachate head is reduced in cells 1-4 through the limited ingress of water and the leachate abstraction pumping, the leachate head within cells 1-4 will continue to reduce, at very low detection rates, thereby reducing the flow rate through the clay basal liner and limiting the emissions to groundwater. Ground water monitoring in the surrounding boreholes should indicate a marked improvement in groundwater quality in the future.

## 7.5 Theoretical leachate generated vs. tankered

The theoretical leachate generated was calculated for each month of 2007 using the following data.

- Monthly rainfall figures in meters;
- Effective cell area open m<sup>2</sup> for each month and hard standing area m<sup>2</sup> from the composting slab and waste inspection area;
- The effective area open for each of the months January to October 2007 was 18,540 m<sup>2</sup>.
- Landfilling commenced in Cell 14 on the 30<sup>th</sup> of October 2007 and effective open area for the remainder of the year was 27,140 m<sup>2</sup>.

**Table 7.4 Theoretical Leachate Volumes and Tankered**

Month 2007	Rainfall m	Effective area open m <sup>2</sup>	Theoretical Leachate produced m <sup>3</sup>	Volume of leachate discharged m <sup>3</sup>	Volume of leachate tankered off-site m <sup>3</sup>	Difference between Theoretical and tankered m <sup>3</sup>
January	0.1238	18,540	2295.26	0	6343.1	4047.84
February	0.106	18,540	1965.24	0	5388.2	3422.96
March	0.1154	18,540	2139.52	0	5053.4	2913.88
April	0.0182	18,540	337.43	0	4510.9	4173.47
May	0.1126	18,540	2087.61	0	5023.4	2935.79
June	0.1322	18,540	2450.99	0	4587.3	2136.31
July	0.182	18,540	3374.28	0	4916.2	1541.92
August	0.1284	18,540	2380.54	0	4951.72	2571.18
September	0.0824	18,540	1527.7	0	850.4	-677.3
October	0.07315	18,540	1356.21	0	0	-1356.21
November	0.0866	27,140	2350.33	0	3780.2	1429.87
December	0.2226	27,140	6041.37	0	3431.9	-2609.47
<b>Annual Total</b>	<b>1.38335</b>		<b>28,306.48</b>	<b>0</b>	<b>48,836.72</b>	<b>20,530.24</b>

## 7.6 Volume of Leachate Produced and Volume of Leachate Transported/Discharged off-site

There was no treated leachate discharged to the White River during 2007.

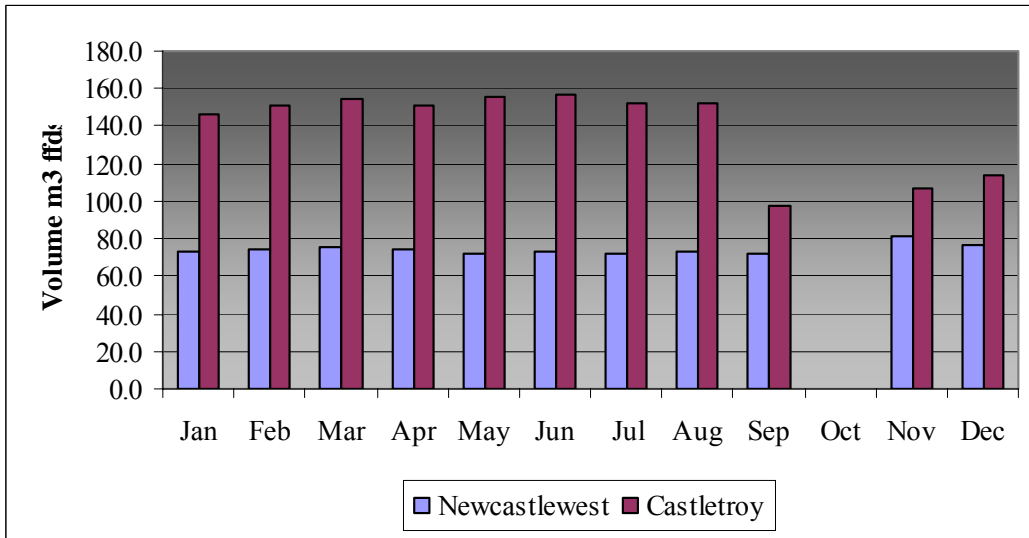
The difference between the actual figure generated and that, which should be generated in theory (Table 7.4), is in most likelihood caused by defects in the permanent capping system. This is currently being investigated and will be reported on in full on completion of investigations.



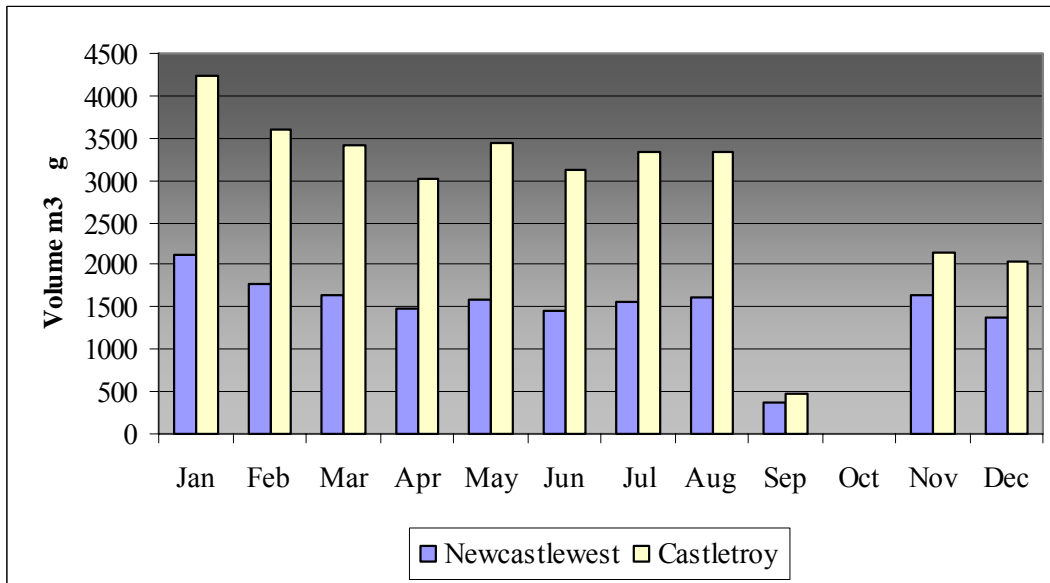
A volume of 48,836.72 m<sup>3</sup> was tankered off site to waste water treatment plants. All tankered leachate was collected and sent to wastewater treatment plants (WWTPs) in Castletroy and Newcastlewest.

Figures 7.3 to 7.5 summarise daily and monthly volumes of leachate being tankered off-site. The total volume of leachate tankered off-site between January and December 2007 was 48,836.72 m<sup>3</sup>.

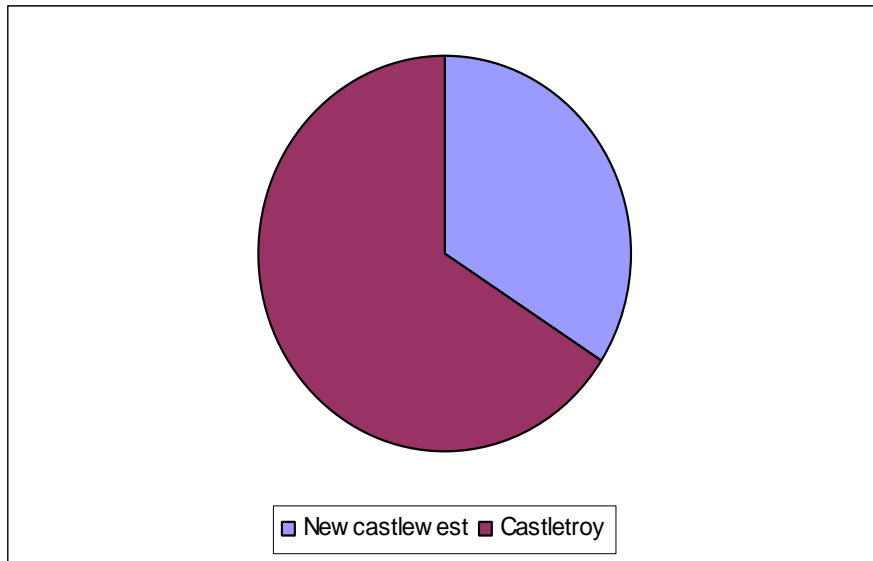
**Figure 7.3 2007 Average Daily Tankered Leachate**



**Figure 7.4 2007 Monthly Tankered Leachate**



**Figure 7.5**      **Location of Tankered 2007 Leachate**



## 7.7 Monthly Surface Water Balance

The surface water management system at Gortadroma is designed so that all surface water entering the site boundary and all runoff from the site is collected and diverted through the surface water lagoons at the main entrance to the site. The stormwater lagoons are the designated point of discharge of surface water from the landfill. The monthly totals of surface water discharged are provided in Table 7.7 below.

The design catchment area for the stormwater lagoons is 90 hectares in total. Of the 90 hectares, 35 are the licenced site which contains 11 hectares of landfill area, 3.3 hectares of which are open cells. Approximately 5% of the remaining 24 hectares can be classified as hard standing areas.

The total catchment, which feeds to the surface water lagoons, can be broken down into common permeability areas as follows:

**Table 7.5 Percentage run-offs for each area**

<b>Area</b>	<b>Type</b>	<b>Percentage Run-off</b>
55 hectares	Agricultural land	35%
7.7 hectares	Landfill area - capped	75%
3.3 hectares	Landfill area - open cells	0%
1.2 hectares	Hardstanding areas	90%
22.8 hectares	Other land within licenced boundary	35%

The predicted estimated flow in l/sec can be assessed using a simple equation based on area, rainfall (for 2007) and percentage run offs from table 7.5. Since the volumes are required monthly a figure for each month has been generated in Table 7.7, and follows the procedure set out below for an annual figure.

$$Q = \text{Area (m}^2\text{)} \times \text{Rainfall (m for 2007)} \times \text{percentage runoff.}$$

The flows for the different areas listed in Table 7.5 above can be calculated and then added together for a total flow in m<sup>3</sup>/year. Since the rainfall data from 2007 is being used the Total Flow is specifically for 2007.

**Table 7.6 Surface water flow from each area and total for the site 2007**

Area (m <sup>2</sup> )	Rainfall (m)	Percentage Run-Off	Q (m <sup>3</sup> /year)
550,000	1.38335	0.35	266,295
77,000	1.38335	0.75	78,888
33,000	1.38335	0.00	0
12,000	1.38335	0.90	14,940
228,000	1.38335	0.35	110,391
<b>Total Flow (m<sup>3</sup>)</b>			<b>471,515</b>

**Table 7.7 Monthly Surface Water Balance**

Month (2007)	Rainfall (m)	Record of discharge from surface water lagoons (m <sup>3</sup> )
January	0.1221	41,618
February	0.106	36,130
March	0.11495	39,181
April	0.0182	6,203
May	0.1114	37,971
June	0.1322	45,060
July	0.182	62,035
August	0.1284	43,765
September	0.0824	28,086
October	0.0731	24,916
November	0.0866	29,518
December	0.226	77,032
<b>Annual Total</b>	<b>1.38335</b>	<b>471,515</b>

Volumes of surface water discharge during 2007 do not include large volumes extracted from the storm water tanks for road spraying. It does not include surface water over topping the retaining berm during very high flows. This method of calculation is a preliminary estimate and does not take account of storm conditions, light rainfalls, lag times between rain falling and entering the stream, evaporation and transpiration and as such is reflecting a larger, more conservative volume of surface water discharged from the site.

## 8.0 RESTORATION AND AFTERCARE

### 8.1 Report on restoration of completed cells/phases

The remaining life span of each cell and time frame for restoration of these cells is outlined in Table 8.1. This time frame is estimated at December 2006 filling rates. The restoration dates indicate the period in which the restoration / final capping contract will be carried out. The development of new landfill cells in the extension area is in progress. Cell 14 has been completed and is the current active cell. Cells 15 and 16 will be completed during Quarter 2 of 2008.

A Closure Restoration & Aftercare Management plan (CRAMP) is currently being developed for the landfill.

**Table 8.1 Life Spans and Proposed Restoration Dates**

Cell No.	Life Span –Years (Based on Current Filling Rates)	Proposed Date for Commencement of Restoration
1-4		Restored
5		Restored
6		Restored
7		Restored
8		Restored
9		Restored
10		Restored
11		Restoration in progress
12		Restored
13		Restored
14	2	Q3 2010

## 9.0 ENVIRONMENTAL MONITORING

Monitoring is carried out according to Schedule C of Waste Licence W0017-03. There is permanent access to all permanent on-site monitoring points. All monitoring equipment was calibrated during the reporting period.

### 9.1 Landfill Gas

In accordance with Schedule C.2.1 of Waste Licence W0017-03, the following points are monitored on a monthly basis for methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>), atmospheric pressure and temperature:

- Perimeter gas monitoring locations - C1 to C22. (Results for perimeter locations have been grouped according to their location at the northern, southern, eastern or western boundary.);
- Gas vents - Cells 1-4, Vents A-D; 5A, 6A, 7A, 9A, 10B, 8B, 11A, 12A, 13B and 14B;
- Site Office - gas levels continuously monitored and gas alarm installed.

#### 9.1.1 Perimeter Gas Monitoring

##### Methane

Methane did exceed the trigger level of 1% (v/v) at Monitoring Boreholes C18, C21 and C22 once during the monitoring period.

##### Carbon dioxide

Exceedances of the CO<sub>2</sub> trigger level occurred at several locations during the reporting period and are outlined in Table 9.1.

Location	Date
C2	January, February, March, April, May, June, July, August, September, October, November, December
C3	July, August, September, October, November
C4	August, September, October, November, December
C5	January, February, July, November
C7	June, July, August, September, October, November
C8	
C12	January, February, December
C14	January, March, April, May, June, July, August, September, October, November, December
C15	April, May, June
C16	November, December
C17	December
C18	November
C19	December
C21	November, December
C22	December

These exceedances are not accompanied by elevated methane levels. Exceedances of CO<sub>2</sub> levels at these boreholes have all previously been reported as incidents and are highlighted in all quarterly monitoring reports.

### ***9.1.2 Site Office Gas Monitoring***

Monitoring of methane and carbon dioxide levels in the site office has indicated that there have been no breaches of the trigger levels during the 2007 reporting period.

### ***9.1.3 Gas Vent Monitoring***

Gas quality is measured at a total of 13 points. Results for most cells indicate that levels of CH<sub>4</sub> and CO<sub>2</sub> were relatively low for in-waste wells until capping works were completed. Landfill gas emissions from mature waste can be in the region of 60% methane, 40% carbon dioxide; these levels are now being seen on occasion in Cells 1 - 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13.

### ***9.1.4 Landfill Gas Flare***

EURO environmental services personnel conducted the monitoring surveys for the landfill gas flare on 18<sup>th</sup> January 2008 and 1<sup>st</sup> August 2008. All parameters monitored over the course of the first survey complied with the Waste License limits.

## **9.2 Dust**

On-site dust monitoring was carried out by TMS Environment Ltd and EURO environmental services as per Schedule C.3, once per quarter as outlined in Table 9.2 below. Dust monitoring was carried out using Standard Method VDI 2119 (Measurement of Dust-fall, Determination of Dust-fall using Bergerhoff Instrument (Standard Method) German Institute) at six locations labelled D1, D3, D4, D5, D6 and D7 on Figure 1.

Results for dust monitoring are presented in Table 9.2.



**Table 9.2 Dust Monitoring Results**

Sampling Point	Dust Deposition Rate mg/m <sup>2</sup> /day			
	February 12 <sup>th</sup> to March 18 <sup>th</sup> 2008	April 8 <sup>th</sup> to May 13 <sup>th</sup> 2008	July 15 <sup>th</sup> to August 12 <sup>th</sup> 2008	November 9 <sup>th</sup> to December 4 <sup>th</sup> 2008
D1	338.18	232.95	322.42	n/a
D3	259.93	<b>363.84</b>	238.87	n/a
D4	220.57	95.72	166.51	84.64
D5	337.73	<b>354.03</b>	232.4	248.25
D6	325.37	185.66	n/a	106.8
D7	<b>414.15</b>	330.40	n/a	<b>403.34</b>

n/a – Dust jar were invalid

There were 4 exceedences of the limit of 350mg/m<sup>2</sup>/day as specified in Schedule B.1 of the waste license, one recorded at D3, one recorded at D5 and two at D7.

### 9.3 Odour

On-site odour monitoring was carried out quarterly by TMS Environment Ltd and EURO environmental services as per Schedule C.3. Odour monitoring was carried out at four monitoring locations namely Noise Monitoring Locations M1, M2, M7 and M10. Monitoring was carried out in order to identify if measurable concentrations of hydrogen sulphide, mercaptans and organic acids were present. In all cases the measured parameters were below the limit of detection.

### 9.4 Noise

Noise monitoring was conducted by EURO environmental services personnel on the 10<sup>th</sup> to 12<sup>th</sup> June 2008 to satisfy condition 6.9 of Waste Licence Register W0017-3. Results are included in Table 9.4 and in Figures 9.1 and 9.2. The two figures also include the relevant license limit.

**Table 9.4 Noise monitoring results**

Monitoring Point	LAeq, 30 mins	
	Daytime	Night time
	10 <sup>th</sup> and 11 <sup>th</sup> June 2008	10 <sup>th</sup> , 11 <sup>th</sup> and 12 <sup>th</sup> June 2008
M1	49	54*
M2	61*	41
M3	48	53*
M4	45	59*
M5	56*	47*
M6	57*	52*
M7	49	41
M9	49	45
M10	60*	54*
M11	53	41

(\* Exceeds licence limit)

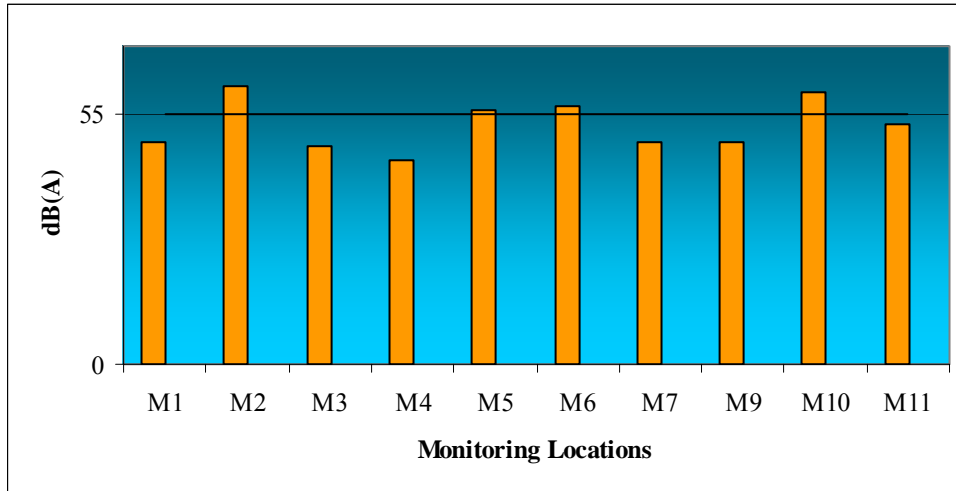
The report by EURO environmental services included the following conclusions:

Daytime noise measurements exceeded the license limit, of 55dBA, on M2, M5, M6 and M10. These exceedences were due to both landfill activity and traffic movement.

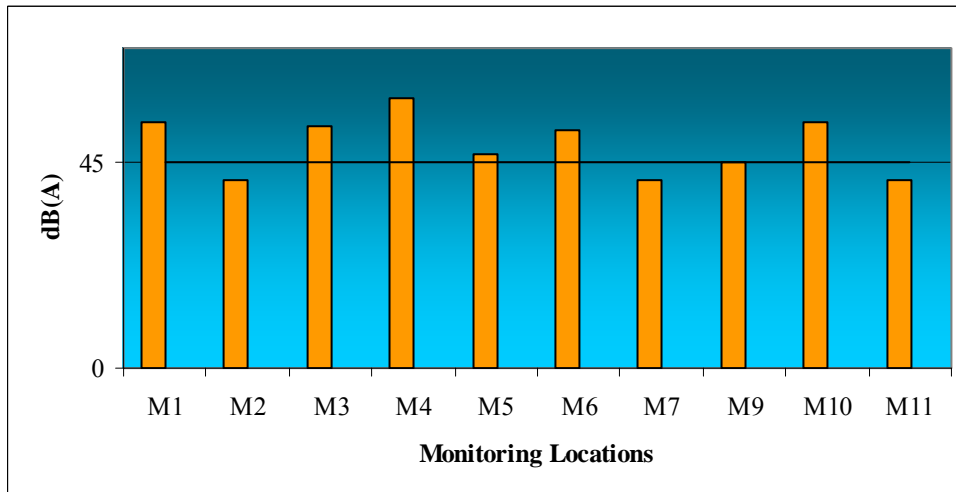
Night time readings were consistent with calm, dry weather. M1, M3, M4, M5, M6 and M10 were all over the night time license limit of 45dBA. M1, M3, M4, M5 and M6 exceeded the limit due to dogs barking continuously and cattle bellowing. M10 exceeded the limit due to banging in the distance and rainfall.

M1 and M11 had tonal components during the daytime survey which were attributable to the site. Both monitoring points were attributable to traffic movement. No tonal noise was recorded from the site during the night monitoring campaign.

**Figure 9.1 2008 Daytime Noise Results**



**Figure 9.2 2008 Night time Noise Results**



## 9.5 Surface Water

Under Schedules C.2.3 and C.3 of Waste Licence W0017-03 weekly visual inspections and quarterly and annual analysis of surface water monitoring points were conducted at S1, S2, S6, S7, S8, SW1, SW2, SW3, SW4, SW9, SW10 and SW11. In addition, there was weekly analysis of the storm water retention pond (SW4) carried out.

### 9.5.1 Visual Inspection

Visual inspections are carried out weekly on monitoring points S1, S2, S6, S7, S8, SW1, SW2, SW3, SW4, SW9, SW10 and SW11. Observations of water flow rate, water clarity, and colour and vegetation growth are recorded. Inspections throughout the reporting period noted that surface water was generally of good quality. Reports of vegetation growth were also experienced at SW1, SW2, SW3 and S2. Occasionally there was no flow experienced at monitoring locations SW1, SW2 and SW4 in 2008.

### 9.5.2 Chemical Analysis

Quarterly and annual samples from ten surface water monitoring locations were taken as specified in Waste Licence 0017-03. The results are compared with the Quality Standards for Surface Water, EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1988 [S.I. No. 294 of 1989] and the EC (Quality of Salmonid Waters) Regulations, 1988 [S.I. No. 293 of 1988]. The parameters included in the scope of this analysis for which Water Quality Standards exist are listed in Table 9.5 together with the Maximum Admissible Concentration (MAC) for each parameter. It should also be noted that water is not abstracted for potable use from surface water in the immediate vicinity of the site.

The range of conductivity measurements recorded during 2008 was from 163 uS/cm at S6 to 790 uS/cm at SW2. All of the results for conductivity are within the 1000uS/cm limit value as specified in the surface water regulations.

The results for pH for all monitoring locations are of neutral compositions and within the expected range for surface waters.

Ammonia was detected in low concentrations at all monitoring locations. All levels recorded are below the limits specified in the EC (Quality of Salmonid Waters) Regulations, 1988 [S.I. No. 293 of 1988] with the exception of one result recorded at S7 during Quarters 1, five results during Quarter 2 and two results during Quarter 3. There were no monitoring locations that exceeded the license limit during Quarter 4.

The measured results for BOD ranged from <2 mg/L to 43 mg/L. All monitoring location results are within the MAC A3 limit of the Surface Water Regulations, except SW1 during Quarter 2 and S2, S8 and SW2 during Quarter 3. Results have shown that COD concentrations ranged from 8 mg O<sub>2</sub>/L to 215 mg O<sub>2</sub>/L. COD results were shown to exceed the MAC A3 limit at many locations, however this may be due to several factors including stream substrate type and inputs from surrounding peatland.

Chloride results ranged from 14.28 mg/l Cl to 49.26 mg/l Cl at the surface water monitoring locations.

The results for suspended solids for some of the monitoring locations are low at < 3mg/l. The highest concentration of suspended solids of 11,396 mg/l was detected at monitoring location S7, where the flow of water was very low and disturbance of the bottom sediments may have caused the high suspended solids result. In total, nine monitoring points exceeded the A1 quality standard MAC of 50mg/L, S1 during Quarter 1 at 65 mg/L; S2 during Quarters 1 and 3 at 217 mg/L and 84 mg/L respectively; S6 during Quarter 1 at 620 mg/L, S7 during Quarters 1, 2 and 3 at 11,396 mg/L, 529 mg/L and 167 mg/L respectively, S8 during Quarter 3 at 156 mg/L, SW2 during Quarters 1 and 3 at 723 mg/L and 314 mg/L respectively, SW9 during quarters 1 and 3 at 104 mg/L and 189 mg/L respectively and SW11 during Quarters 1 and 2 at 123 mg/L and 110 mg/L respectively.

Storm water samples were collected on a weekly basis and analysed for a number of parameters as described in Schedule C.2.3 of Waste Licence W0017- 03. The trigger levels for the discharge from the storm water tank were exceeded for suspended solids on the 08/01/08, 15/01/08, 30/01/08, 05/02/08, 12/02/08, 04/03/08, 11/03/08, 03/07/08, 01/08/08, 09/09/08, 30/09/08 and 14/10/08. (to include 4 remaining weeks).

The measured results for DO range considerably depending on the time of year. The lower measurement values were recorded at monitoring locations where there was an insufficient flow of water and where turbulence and mixing was minimal. There is no specified DO limit under the surface water regulations.

Results for sulphates ranged from <2.11 mg/l at S6 and SW2 to 57.92 at surface water monitoring point SW11. All of the results are within the A1 Quality Standard (SI 298 of 1989) of 250 mg SO<sub>4</sub>/l.

Iron was detected at concentrations greater than the A1 Surface Water MAC at each location. All monitoring locations were within the A1 MAC of 50 ug/L for lead. With regard to the remaining metal parameters other than iron and lead, all locations, apart from SW2 (4.226 mg/L) which exceeded the limit for manganese and SW11 (0.085 mg/L) which exceeded the limit for chromium, comply with A1 Standard for Surface Water Quality as per EC (Quality of Surface Water intended for the abstraction of Drinking Water) Regulations 1988.

**Table 9.5 Surface Water Quality Standards for Parameters Analysed**

PARAMETER	QUALITY STANDARDS			
	SURFACE WATER REGULATIONS [1]			SALMONID WATERS REGULATIONS [2]
	A1 MAC	A2 MAC	A3 MAC	
Temperature, °C	25	25	25	NS
Dissolved oxygen, mg/L	NS	NS	NS	50% ≥9
Dissolved oxygen, % Saturation	> 60%	> 50%	> 30%	NS
Conductivity, µS/cm at 20° C	1000	1000	1000	NS
pH	5.5 – 8.5	5.5 - 9	5.5 – 9.0	6-9
BOD, mg/L O <sub>2</sub>	5	5	7	≤5
COD, mg/L O <sub>2</sub>	NS	NS	40	NS
Chloride, mg/L Cl	250	250	250	NS
Total Ammonium, mg N/L	0.16	≤ 0.80	3.1	≤0.016
Suspended solids, mg/L	50	NS	NS	≤25
Manganese, mg/l Mn	0.05	0.3	1	NS
Copper, mg/l Cu	0.05	0.1	1	NS
Zinc, mg/l Zn	3	5	5	NS
Cadmium, mg/l Cd	0.005	0.005	0.005	NS
Iron, mg/l Fe	0.2	2	2	NS
Sulphates, mg/l SO <sub>4</sub>	200	200	200	NS
Lead, mg/l Pb	0.05	0.05	0.05	NS
Mercury, mg/l Hg	0.001	0.001	0.001	NS
Total Chromium, mg/l Cr	0.05	0.05	0.05	NS

1. EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regs, 1988[S.I. No. 294 of 1989] Categories A1, A2 and A3 Surface Waters, as defined in the Regulations are classified on the basis of quality standards requiring simple to intensive methods of treatment. MAC = Maximum Admissible Concentration; NS = Not Specified
2. EC (Quality of Salmonid Waters) Regs, 1988 [S.I. No. 293 of 1988].

### 9.5.3 Discharge to surface water

There was no discharge of treated leachate to surface water in 2008.

### 9.5.4 White River

As required under Schedule C.3, a biological survey of the White River was conducted on 29<sup>th</sup> August 2008 at Sites A, B, C and D as shown in Appendix IV.

A summary of trends in biological water quality at these points since 1997 is provided in Table 9.6 below.

**Table 9.6 Biological Water Quality along the White River**

Site Reference	A	B	C	D
Results 1997	Q4	Q4	Q4	Q4
Results 2000	Q4	Q4	Q4	Q3-4
Results 2001	Q4	Q3-4	Q4	Q3-4
Results 2002	Q4	Q3-4	Q3-4	Q3-4
Results 2003	Q3-4	Q4	Q4	Q4
Results 2004	Q4	Q4-5	Q4	Q4
Results 2005	Q4	Q4	Q4	Q4
Results 2006	Q4	Q4	Q4	Q4
Results 2007	Q4	Q4	Q4	Q4
Results 2008	Q3-4	Q4	Q4	Q4

These figures show that water quality remained the same at three locations over the last year. Site reference A had a Q-rating of 3-4. The water quality has remained constant over the three previous years with a Q4 measurement recorded at all locations, between 2005 and 2007.

Overall, this is a good indicator of the water management at the landfill, as Location B is located upstream of the landfill, C and D are located downstream of the site and A, is located furthest away from the site and all points are achieving a Q4 rating.

## 9.6 Groundwater

As required under Schedule C.3 of Waste Licence W0017-03, monthly levels were recorded and quarterly/annual analysis conducted on groundwater monitoring points GW2-B, GW2-O, GW8-B, GW8-O, SW SA2, GW3-O, GW5, GW6-O, GW6-B, GW SA1, GW7-B, GW4-O, Collins Well, GW7-O, GW11-B, GW11-O, GW9-B, GW9-O, GW10-O, GW10-B and GW1-O.

### 9.6.1 Monthly/Quarterly Groundwater Monitoring

When assessing groundwater quality, the limits prescribed in the Drinking Water Regulations (Statutory Instrument No 278 of 2007) are generally used as a guide, based on the principal that uncontaminated groundwater should be potable.

Analysis of groundwater during this reporting period indicates that the overall water quality has generally been satisfactory.

Ammoniacal nitrogen has been found in all wells across the site and a number of wells have consistently elevated levels. GW8-B had the highest levels of ammonia measured across the site with a high of 3.64 mg/L N being recorded here in Quarter 4. Trigger levels set for ammonia at monitoring locations SA1 (1.2 mg/l), GW5 (2.2 mg/l), and Collins Well (1.7 mg/l) were not exceeded at any time during 2008.

The measured results for Electrical Conductivity ranged from 310 $\mu$ S/cm to 1,033 $\mu$ S/cm in 2008. Trigger levels set for Conductivity at SA1 (800  $\mu$ S/cm), GW5 (800  $\mu$ S/cm), and Collins Well (1,500  $\mu$ S/cm) were not exceeded at any time during 2008.

Chloride levels were below the trigger levels set for all of the 2008 monitoring period. Sulphate concentrations, where detected, did not exceed the 250 mg/l limit specified in the Drinking Water Regulations for all samples. Concentrations of Sulphate ranged from <2.11 mg/l to 98.18 mg/l (recorded at GW9-B). Groundwater samples analysed were all below the limit of detection for analysis of organic compounds.

The samples for metal analysis were collected in separate bottles and the water acidified. Consistent with previous monitoring events, Chromium, Copper, Manganese, Iron, Nickel, Magnesium, Potassium and Zinc were the only metals that showed slightly elevated levels above the parametric values. However as iron is naturally present and reflect the basic solid geology of the area, these concentrations are of little significance.

Heavy metals Cadmium and Mercury concentrations were below their respective limits of detection. The concentration of Nickel marginally exceeded the limit of 0.02 mg/l in two of the monitoring points at GW5 and GW11-O. Zinc concentrations exceeded the limit of 0.1 mg/l at Collins Well. The wells sampled are monitoring wells only and not used for drinking water purposes.

Total Coliforms were detected at 15 sample locations - GW SA2, GW3-O, GW4-O, GW2-O, GW2-B, GW1-O, GW6-O, GW7-O, GW7-B, GW9-O, GW9-B, GW10-O, GW10-B, GW11-O and GW11-B. Faecal Coliforms were tested through analysis for E. Coli. Faecal Coliforms concentrations were detected at four sample locations – GW3-O, GW2-B, GW7-O and GW11-B.



### **9.6.2 Private Wells**

Boreholes sampled were all within the 500m boundary of Gortadroma Landfill. There were 15 boreholes in total both up-gradient and down-gradient of the landfill.

Four of the wells tested were deemed to exceed the Maximum Admissible Concentration (MAC) for Ammonia. Nine wells were determined to be contaminated with Total Coliforms. Seven wells exceeded the MAC for Iron. Nine wells exceeded the MAC for manganese and one well exceeded the MAC for Sodium.

#### **South East**

Of the seven wells analysed to the south east of the landfill (wells 1-7), three were determined to have elevated Ammonia levels. Four of the adjacent wells were within the limit of 0.30 mg/L, it is unlikely that the landfill is contributing to the elevated levels. Five wells had elevated Total Coliform concentrations. Three wells showed elevated iron concentrations, above the Maximum Admissible Concentration (MAC). Four wells had elevated concentrations of Manganese and one well had elevated concentrations of Sodium.

#### **North West**

Well 17 had elevated Ammonia concentrations of 0.50 mg/L as N. Other parameters that were elevated above the MAC were Total Coliforms on PW14 and PW17 and Mercury, iron on PW17 and PW18 and Manganese on PW14, PW17 and PW18. As the wells were within 500 metres of each other and are upstream of the landfill site, it is unlikely that the landfill was contributing to the elevated Ammonia. Conclusions would indicate that agricultural practices or poor percolation areas might be responsible.

#### **South West**

Of the three wells analysed to the south west of the landfill, none of the wells indicated any elevated Ammonia concentrations. Well number PW19 and PW20 did show Total Coliform contamination, while PW20 and PW24 showed Iron and Manganese concentrations above the recommended MAC.

Limerick County Council have issued the results to all Well Owners and have also issued Boil-Notices where appropriate.

## **9.7 Leachate**

### **9.7.1 Leachate Levels**

Under Schedule C2.5 in Waste license 0017-03, leachate levels in cells are monitored on a weekly basis at two locations in cells 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14. Levels are also monitored in Cells 1 to 4 A, 1 to 4 B and 1 to 4 C. Levels during 2008 were below the acceptable 1 metre limit.

### **9.7.2 Leachate Composition Analysis**

A leachate sample is collected from the raw leachate storage lagoon and analysed on a quarterly and annual basis in accordance with Table C.2.5 in Waste Licence W0017-03. Quarterly monitoring requirements for leachate include measurement of BOD and COD levels. The results for these parameters are within the expected range for leachate from a landfill site.

Conductivity and pH were measured on-site on the day of the sampling. The conductivity result was 7610  $\mu\text{S/cm}$ , which is higher than that recorded in 2007 (5020 $\mu\text{S/cm}$ ). The pH result was 7.8.

Ammonia (468.78 mg/L N) and sulphate (<2.11 mg/L SO<sub>4</sub>) concentrations were dissimilar to those found in the previous annual monitoring. Chloride concentration was higher than previously with a value of 806.29 mg/L.

Concentrations of metals were in general higher to the results observed in 2007. Trace concentrations of cadmium (<0.09  $\mu\text{g/L}$ ), chromium (0.15 mg/L), copper (30 mg/L), cyanide (35 $\mu\text{g/L}$ ), nickel (0.108 mg/L), zinc (0.107 mg/L) and lead (0.056mg/L) were found. Sodium (889 mg/L) and potassium (260.1 mg/L) were also detected.

There was an increase in the concentration of total phosphorous from 0.337 mg/l P to 2.468 mg/l P. There was an increase in the concentration of iron (10130 mg/L) and a decrease in manganese (2301  $\mu\text{g/L}$ ) on the previous annual monitoring event. A fluoride concentration level of 0.9 mg/L was recorded.

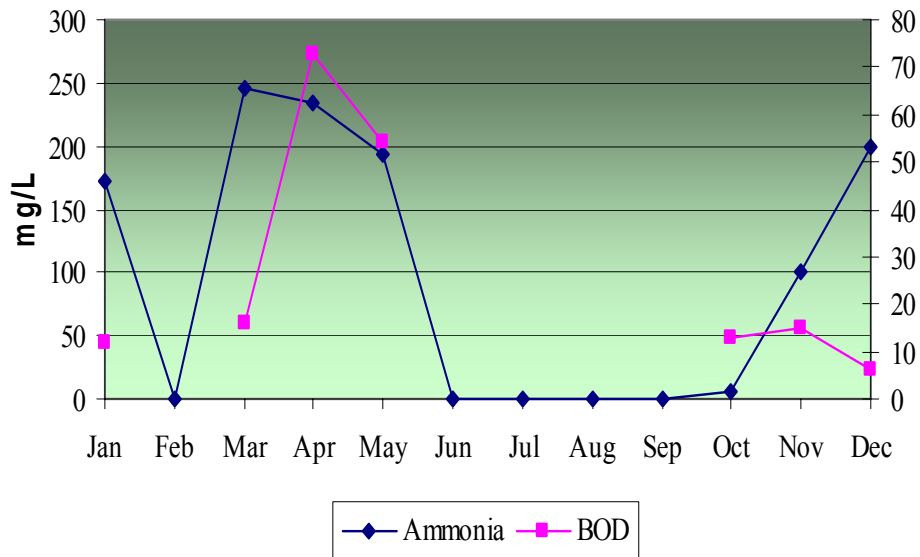
Pesticides, volatile and semi-volatile organic carbons were below the limit of detection.

### 9.7.3 Leachate Treatment Plant

Weekly sampling was carried out at the Outlet of the leachate treatment plant. The results are summarised as follows: (ask Aadil)

The results indicated that pH levels recorded were within the license limit value. Results obtained for suspended solids and ammonia were often in exceedence of their respective stipulated license limit values. Figure 9.3 presents the maximum result obtained per month for ammonia and BOD. Where emission limits were exceeded, the leachate was returned to the leachate treatment plant for re-treatment. There were no results recorded for February, June, July, August and September 2007 as the plant was out of commission for these months. There was no treated leachate discharged during 2007.

**Figure 9.3 Treated Leachate - Monthly Maximum Results**



### 9.8 Meteorological Monitoring

Meteorology is monitored in accordance with Schedule C.3 of Waste Licence W0017-03. A Vaisala Meteorological station was installed at the landfill in June 2000. The following parameters are recorded:

- Temperature
- Evaporation
- Evapotranspiration
- Relative Humidity
- Pressure
- Wind Direction
- Wind Speed
- Precipitation

A summary of meteorological data recorded during the reporting period is provided in Appendix V.

## **9.9 Ecological Monitoring**

During the December 2000 ecological survey 98 plant species were identified, 4 more than a survey carried out in 1997. It was considered that there has been no loss of floral biodiversity due to operations of the site since the last survey in 1997.

The ecological survey of August 2001 reported 114 plant species were identified, and no loss of floral, faunal or habitat diversity was noted.

During the ecological survey of July 2002 a total of 129 floral species were noted. This represents a slight increase in diversity, and although seasonal and observational factors must be taken into account, the increase reflects the appearance of many opportunistic grasses and forbs which are common to disturbed ground and which are found around recently disturbed or capped areas of the site.

The Ecological Survey carried out during October 2003 referred new habitats having been created within the landfill site, pointed out that the landfill did not appear to be having any significant impacts on the ecology of the land in the surrounding areas. In relation to the White River the survey indicated that it had an excellent diversity of riparian fauna, with important species such as otter and dipper (and undoubtedly kingfisher), all of which are dependent on good water quality.

The survey carried out in 2004 referred to new habitats been created within the landfill site. Of these, unfertilised grassland (on the consolidated landfill) and immature woodland strips were the most obvious. The landfill does not appear to be having any impacts on the habitats which surround the site, none of which are considered of conservation importance. The White River is the most significant ecological feature in the area. The survey indicated that it had an excellent diversity of riparian fauna, with important species such as otter, kingfisher and dipper, all of which are dependent on good water quality. On available information, the landfill site did not seem to be affecting the populations of these animals.

The 2005 survey was carried out in December and found that the habitats within the landfill site itself were continuing to develop in terms of their establishment and biodiversity. It appeared that the landfill operations were not impacting on the surrounding area, and based on the results of both the aquatic and terrestrial surveys conducted, it would appear that the landfill activities are not having a significant impact on the habitats and species in the riparian zone of the White River.

The 2006 survey found that new habitats have been, and are being, created within the landfill site. Of these, unfertilised grassland, immature woodland and a pond are the most obvious.

The landfill does not appear to be having any impacts on the habitats which surround the site, none of which are considered of conservation importance.

The Owvane/White River is the most significant ecological feature in the area. Survey indicates that it has an excellent diversity of riparian fauna, with important species such as otter, kingfisher and dipper, all of which are dependent on moderate to good water quality. On available information, the landfill site does not seem to be affecting the populations of these animals.

The 2007 survey, carried out on 29th November 2007, found that overall the site is currently of minor local ecological value for mammals, especially where construction works are ongoing. It is likely that mammal use of the overall site will increase once construction works have finished, especially in sections set aside from operational activities including screening, planted woodlands, grasslands and ponds. The areas landscaped including the capped landfill and boundary areas are already of some local value for mammals such as Fox (*Vulpes vulpes*), Rabbit (*Oryctolagus cuniculus*), hedgehog (*Erinuseuropaeus*), Wood mouse (*Apodemus sylvaticus*) and Pygmy shrew (*Sorex minutus*). Minor negative impacts on mammals as a result of loss of habitat will be temporary, with long-term positive impacts possible if the site is managed for nature conservation purposes following restoration.

### **9.10 Site Survey During Reporting Period**

The most recent topographical survey of the site was carried out in November 2007. A copy of this drawing and survey report was forwarded to the Agency on 21<sup>st</sup> November 2007.

### **9.11 Pollution Emission Register**

The pollution emissions register is described in Appendix VI.

### **9.12 Industrial Sludge Test Results**

A copy of sampling results taken from industrial sludge accepted at the facility is included Appendix VII.

## ***10.0 CONTINGENCY ARRANGEMENTS***

LCC have developed and submitted an Emergency Response Procedure (ERP) to the Agency. The ERP is linked to the Major Emergency Plan for LCC and outlines the activation of the ERP, control of operations and responsibility and demobilisation of the ERP.

## ***11.0 FINANCIAL ARRANGEMENTS***

Reports on financial provision made under this licence, management and staffing structure of the facility.

### **11.1 Financial Provision**

LCC had made the necessary provisions to ensure that there is adequate funding for the management, development and restoration of Gortadroma landfill site.

According to condition 12.3 of Waste Licence W0017-03 Limerick County Council must provide, as part of the Annual Environmental Report, a statement on the measures taken or adopted at the site in relation to the prevention of environmental damage, and the financial provisions in place in relation to the underwriting of costs for remedial actions following anticipated events or accidents/incidents, as may be associated with the carrying on of the activity.

This statement is presented in Appendix VIII.



## ***12.0 STAFF TRAINING***

There were two new Standard Operation Procedures developed at the site during 2007. These are described in Section 2.6.

FETAC/FAS certificate in Construction (Construction plant operation) in the operation of the site dumper was awarded to Brendan Brosnan, Martin Daly and Michael O'Neill.

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## **APPENDICES**

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## **APPENDIX I – Objectives and Targets for 2009**

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		Targets & Objectives				
	Objective	2009	Reason for Undertaking Project	Project Summary	Target in 2009 EMP.	Responsibility for Project.
1	Install condensate lances on 5 landfill gas manifolds on Cells 1/10.		Reduce condensate going to the Flare	Condensate lances to be fabricated and installed by LCC. SEW submitted to Agency.	Quarter 1 2009	L.C.C
2	Electrical distribution system to be installed in extension area.		Power supply for pumps and temporary flare.	System to be designed and tendered during quarter 1 2009.	Quarter 3 2009	L.C.C/RPSMCOS
3	Fabricate leachate spillage tray near raw leachate lagoon		Collect any leachate spillage that may occur during tankering.	Steel tray to be fabricated and drainage to be diverted to raw leachate lagoon.	Quarter 2 2009	L.C.C
4	Install gas main between gas compound and extension area		Gas collection	Gas main to be designed and tendered for during quarter 1 2009.	Quarter 3 2009	L.C.C/RPSMCOS
5	Upgrade Scada System		Increase control and including extension area	Existing Scada system to be upgraded or new Scada System to be installed.	Quarter 3 2009	L.C.C/RPSMCOS
6	Gas Utilisation		Licence Condition	ESB substation and grid connection in place. Contract for supply of engine agreed.	Quarter 1 2009	L.C.C

Objective	Reason for Undertaking Project	Project Summary	Target in 2009 EMP.	Responsibility for Project.
7 Install horizontal gas collection system in active cell 15.	Reduce odour nuisance	Horizontal gas collection pipe work to be put in place at different waste lifts and connected to flare	Ongoing	L.C.C
8 Label all gas extraction wells and gas manifolds	Achieve better control over gas field	Labels fabricated and to be placed on wells and manifolds.	Quarter 1 2009	L.C.C
9 Install temporary liner on exposed side slope of cell 14 and place temporary cap on top.	Reduce odour nuisance	Temporary liner ordered	Quarter 1 2009	L.C.C

**APPENDIX II – Lagoon Certificate of Integrity**

# Geomembrane Testing Services Limited

Thornback Road, Troyswood, Co Kilkenny, Ireland

Tel/Fax: (056) 7770953 Mobile: (086 8323113)

Email: gts@o2.ie

## Project: Gortadroma Landfill Development Storm Water Retention Tank

The Storm Water Retention Tank at Gortadroma Landfill Development has been tested to the requirements of Section 9 of BS 8007:1987 British Standard Code of Practice of Concrete Structures for Retaining Aqueous Liquids.

The test under BS 8007 calls for a 7-day test. The recorded levels for the test carried out on the above structure are outlined in Table 1. The net water increase over the 7-day period was **4.25mm** as recorded in the control. The increase in water level in the Storm Water Retention Tank during the same period was **2.33mm**. The still well and hook gauge method was applied to record water levels. BS 8007 allows for a decrease in water level of up to 10mm in the concrete tank within the test period. The actual decrease in water level was **1.92mm** which is within the standard, thus the Storm Water Retention Tank integrity is within the requirements of BS 8007.

**Table 1: Storm Water Settling Tank**

Water Level in Bund (mm)	Change +/- (mm)	Control Water Level (mm)	Change +/- (mm)	Date	Time
90.87		75.40		14/02/08	10.45am
91.02	+0.15	75.76	+0.36	15/02/08	11.40am
91.89	+0.87	76.18	+0.42	18/02/08	10.25am
92.43	+0.54	77.80	+1.62	19/02/08	10.40am
93.20	+0.77	79.65	+1.85	20/02/08	11.45am
Net Change	+2.33	Net Change	+4.25		

Signed:



Frank Lennon

Geomembrane Testing Services Limited

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## **APPENDIX III – Waste Figures 2008**

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**GORTADROMA WASTE QUANTITIES 2008**

SOURCE	JAN		FEB		MAR		APRIL		MAY		JUNE		JULY		AUG		SEPT		OCT		NOV		DEC		TOTAL		
	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES	TONNES
<b>COMMERCIAL</b>																											
VEOLIA	714.72	1,610.50	1,529.36	2,647.62	2,385.62	2,147.04	2,429.40	2,166.16	1,941.58	73.70	26.48	85.64	17,757.82														
MR. BIN MAN	17.70	45.62	54.52	87.40	78.90	86.98	56.16	116.22	74.72	32.68	226.98	111.62	989.50														
BUCKLEY	144.70	172.70	137.06	90.68	118.82	104.16	122.82	81.22	150.50	132.38	140.68	82.46	1,478.18														
Wards Waste Disposal	86.48	65.48	78.86	90.84	66.18	88.82	64.70	37.52	97.46	89.78	56.66	79.32	902.10														
WHITES SKIPS	66.86	111.78	93.02	102.44	106.16	90.18	138.28	168.92	131.04	104.40	127.98	119.86	1,360.92														
Fitzgeralds Skip Hire	70.82	76.46	95.68	87.58	156.64	9.56	131.32	205.26	173.50	32.84	155.60	155.32	1,350.58														
Ashgrove Recycling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	412.10	501.08														
Killarney Waste Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	316.98	316.98														
<b>SUB-TOTAL</b>	<b>1,101.28</b>	<b>2,082.54</b>	<b>1,988.50</b>	<b>3,106.56</b>	<b>2,912.32</b>	<b>2,526.74</b>	<b>2,942.68</b>	<b>2,775.30</b>	<b>2,568.80</b>	<b>465.78</b>	<b>823.36</b>	<b>1,363.30</b>	<b>24,657.16</b>														
<b>PRIVATE DOMESTIC</b>																											
MR. BIN MAN (Domestic)	3,392.76	683.94	726.38	825.52	96.84	0.00	171.90	277.16	85.10	163.02	0.00	2,734.90	9,157.52														
Mr. BIN MAN(Organic Fines)	0.00	0.00	38.96	2,205.40	1,491.68	1,303.16	1,886.18	1,052.20	1,141.90	835.20	50.88	1,134.16	11,139.72														
VEOLIA	10.06	8.28	9.38	0.00	29.48	0.00	28.78	0.00	0.00	11.30	0.00	0.00	97.28														
SOUTHWEST BINS	283.26	274.32	249.62	245.56	243.34	226.22	196.22	225.26	147.58	191.42	197.74	270.02	2,750.56														
F.R ROHU L.T.D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	187.28	599.38	149.64	122.40	49.94	1,108.64														
Clean Ireland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	267.98	267.98														
Country Clean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	745.46	793.68														
Local Residents	9.72	10.68	10.36	10.84	11.62	10.48	11.24	10.34	12.28	10.56	11.54	11.62	131.28														
Cash	222.18	203.08	208.68	207.78	238.30	201.54	230.68	329.48	203.32	235.48	185.98	250.64	2,717.14														
<b>SUB-TOTAL</b>	<b>3,917.98</b>	<b>1,180.30</b>	<b>1,243.38</b>	<b>3,495.10</b>	<b>2,111.26</b>	<b>1,741.40</b>	<b>2,525.00</b>	<b>2,081.72</b>	<b>2,189.56</b>	<b>1,596.62</b>	<b>616.76</b>	<b>5,464.72</b>	<b>28,163.80</b>														
<b>INDUSTRIAL WASTE</b>																											
BUCKLEY (Anderson IRL)	0.00	0.00	9.60	7.68	8.74	9.72	9.90	9.76	0.00	19.70	8.86	0.00	83.96														
<b>Limerick County Council</b>																											
Housing/Roads/Sanitary	55.46	376.60	99.58	33.04	58.10	32.98	41.88	29.04	35.80	30.66	11.70	22.14	826.98														
ENVIROMENT SECTION	25.96	30.70	21.94	26.88	21.42	31.06	40.94	793.12	112.68	64.60	8.58	46.58	1,224.46														
BRING Banks	0.00	2.48	6.64	5.56	8.02	4.76	9.24	6.82	7.70	11.22	5.18	10.62	78.24														
Civic Ammenity Sites	0.00	0.00	0.00	0.00	0.00	0.00	92.86	0.00	0.00	0.00	0.00	0.00	92.86														
Street Cleaning	8.30	12.92	7.18	7.30	6.68	8.18	6.96	3.48	6.50	15.50	14.26	11.28	108.54														
<b>SUB-TOTAL</b>	<b>89.72</b>	<b>422.70</b>	<b>135.34</b>	<b>72.78</b>	<b>94.22</b>	<b>76.98</b>	<b>191.88</b>	<b>832.46</b>	<b>162.68</b>	<b>121.98</b>	<b>39.72</b>	<b>90.62</b>	<b>2,331.08</b>														
<b>City Council Street Cleaning</b>																											
	70.94	89.34	48.10	73.70	57.82	55.76	59.46	51.50	70.28	49.28	60.08	54.34	740.60														
<b>SLUDGE</b>																											
L.C.C. WASTEWATER	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	6.78	0.00	35.00	47.70	89.86														
IPODEC (WYETHS)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.78	0.00	0.00	0.00	0.00	10.78														
<b>SUB-TOTAL</b>	<b>0.00</b>	<b>0.00</b>	<b>0.38</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>10.78</b>	<b>0.00</b>	<b>0.00</b>	<b>35.00</b>	<b>47.70</b>	<b>93.86</b>														
<b>GRAND TOTAL</b>	<b>5,179.92</b>	<b>3,774.88</b>	<b>3,425.30</b>	<b>6,755.82</b>	<b>5,184.36</b>	<b>4,410.60</b>	<b>5,728.92</b>	<b>5,761.52</b>	<b>4,991.32</b>	<b>2,253.36</b>	<b>1,583.78</b>	<b>7,020.68</b>	<b>56,070.46</b>														

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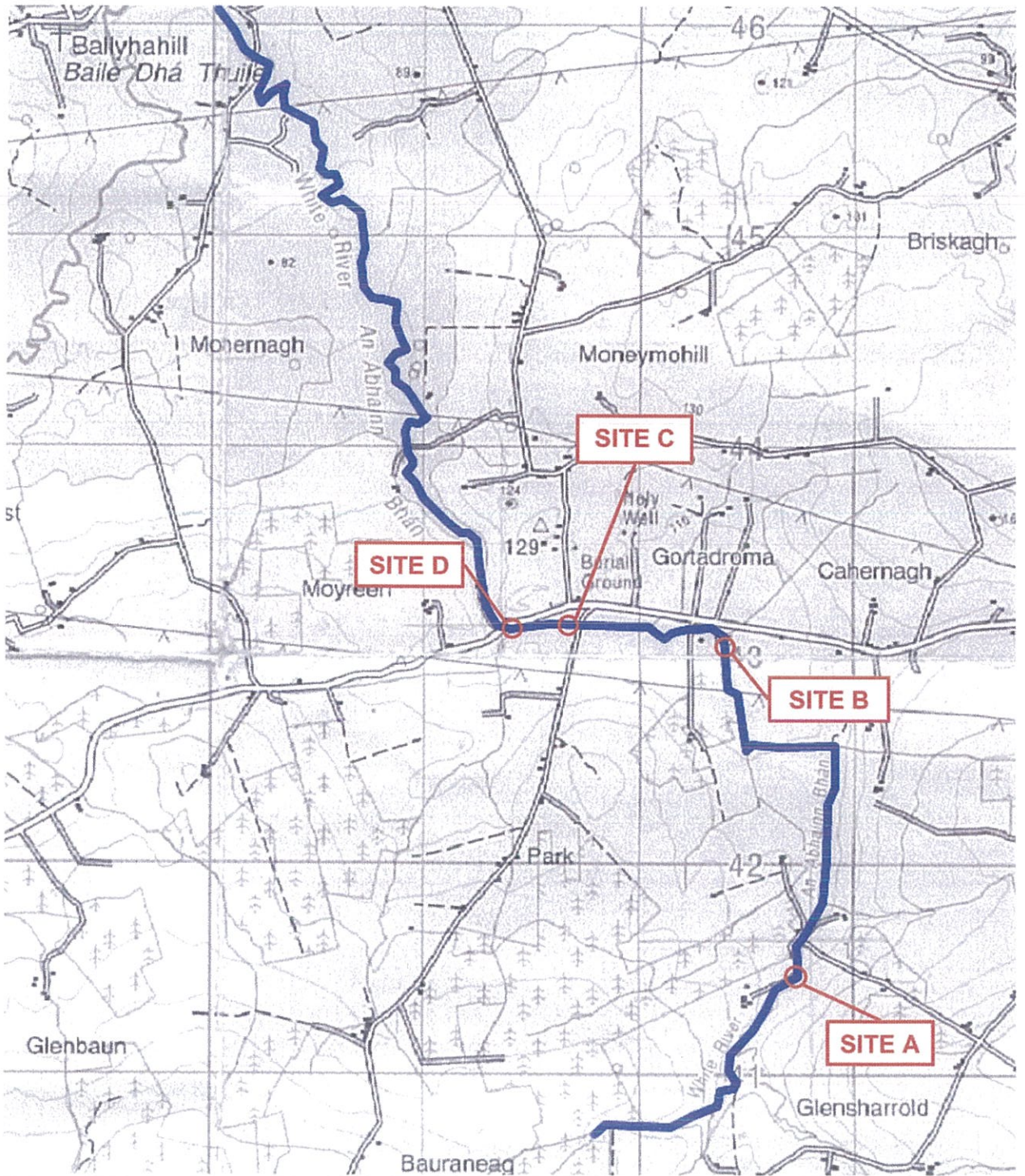
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**APPENDIX IV – Map of Biological Monitoring Locations**

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# MAP 1 BIOLOGICAL MONITORING SITES



## **APPENDIX V – Meteorological Data**

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# **Annual Meteorological Report**

**2008**

**Gortadroma Landfill Site**

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**Waste Licence 0017-03**

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**Limerick County Council**

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## 1.0 Introduction

The meteorological station was installed at the Gortadroma landfill in June 2000. The system records hourly and daily values for the various parameters. Data is normally downloaded on a daily basis. However the system is capable of holding eleven days logged files and this ensures that data is recorded when the site is closed at weekends. Precipitation values are recorded automatically and a vat at the rear of the reception building is measured every day to calculate evaporation.

## 2.0 Attached graphs and data

A number of graphs are attached which summarise the data over the course of the year. These graphs include temperature (24 hour average), Atmospheric pressure (24 hour average), wind speed (24 hour average) and monthly rainfall values. Figure 1 shows the average temperature variation over the course of the year, the range of average temperature was in the order of 0.2 to 17.8 °C. Figure 2 shows the average atmospheric pressure variation over the course of the year, which was in the order of 953 to 1025 hPa. Figure 3 shows that the average wind speed was in the order of 0 m/s to 13.1 m/s. Figure 4 shows the monthly rainfall values. January was the wettest month and April was the driest month.

The annual rainfall recorded was 1932.99 mm and the annual evaporation was 594.62 mm.

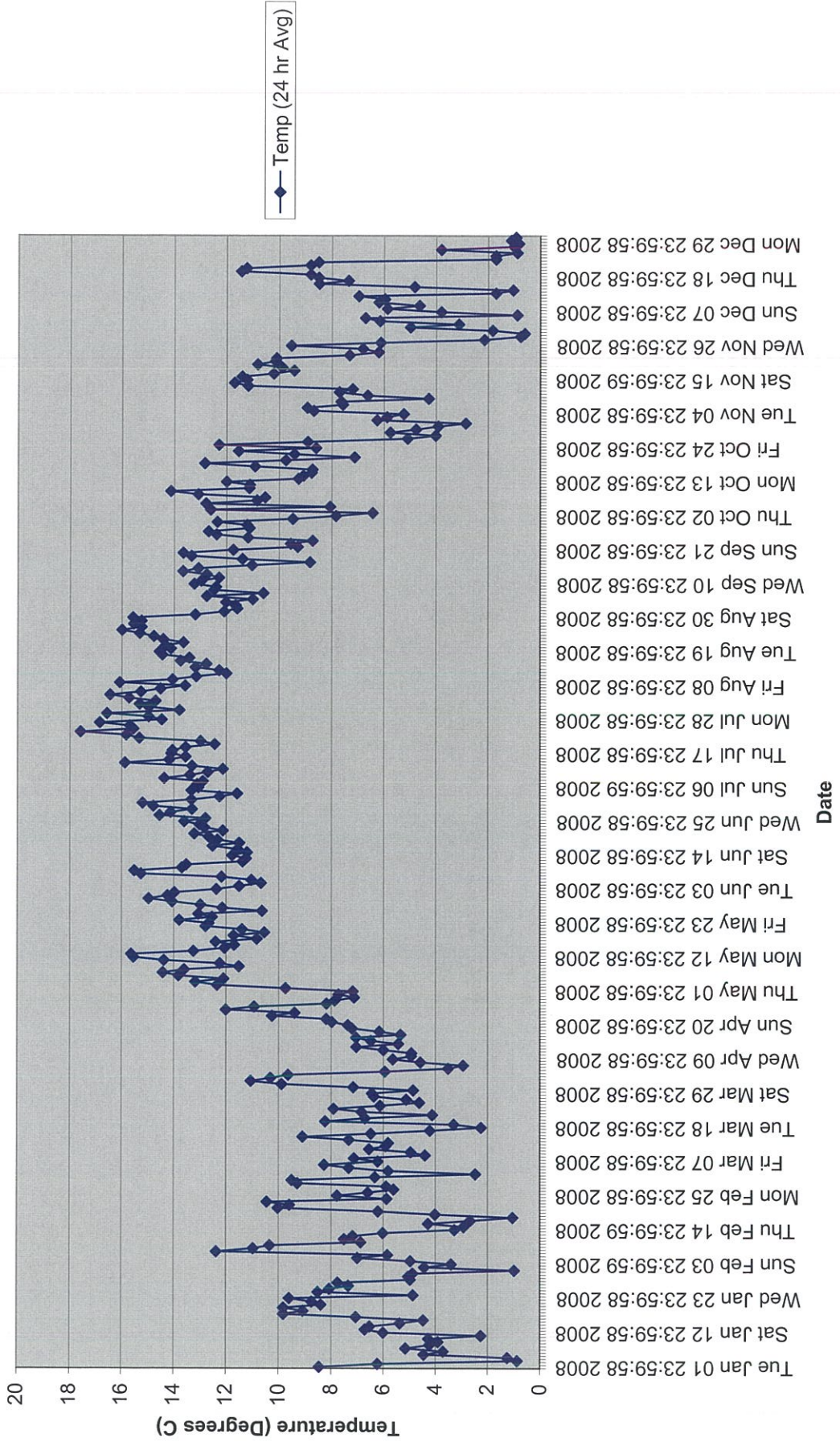
A complete copy of all data is attached for your information and includes the following:

- ◆ Precipitation
- ◆ Evaporation
- ◆ Evapotranspiration
- ◆ Pressure
- ◆ Temperature
- ◆ Wind speed
- ◆ Wind direction
- ◆ Humidity

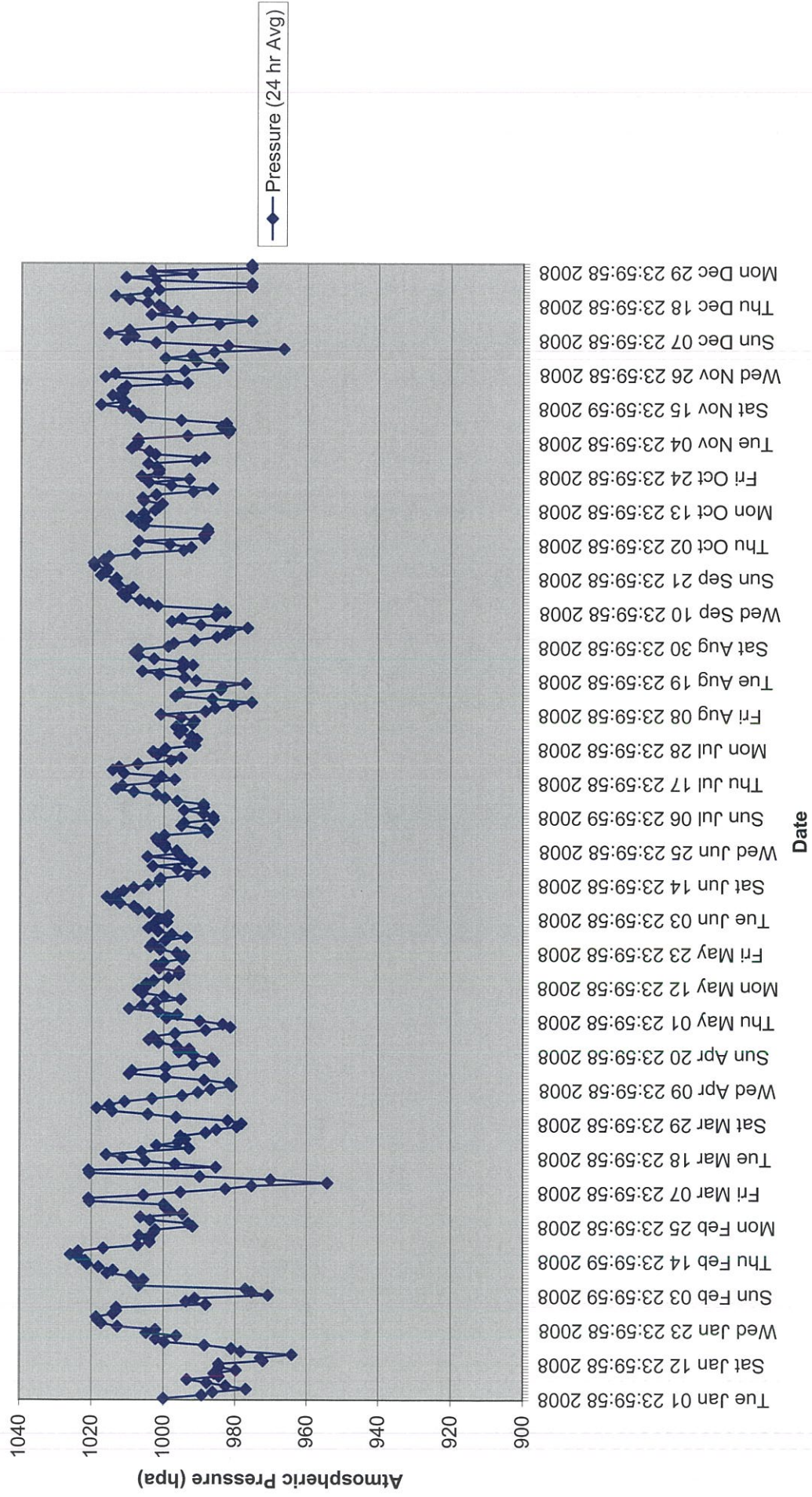
## 3.0 Conclusion

The meteorological station was a vital component in the operation of our high winds procedure at the site over the course of the year. The precipitation value of 1932.99 mm was the highest ever recorded at the site. The evaporation value of 594.62 mm was 66.06 mm less than the previous year.

Temp (24 hr Avg)- Figure 1

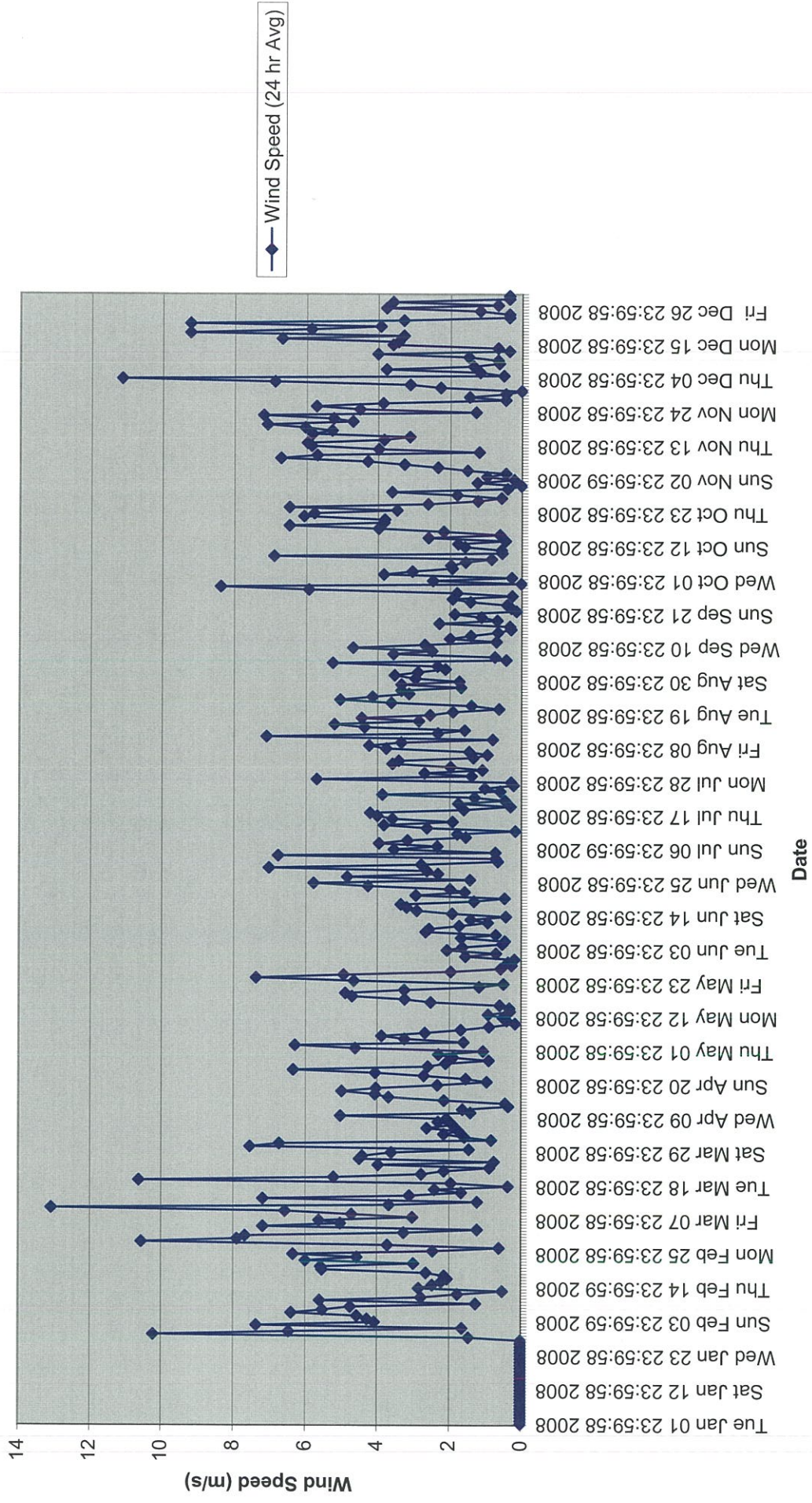


Pressure (24 hr Avg)-Figure 2

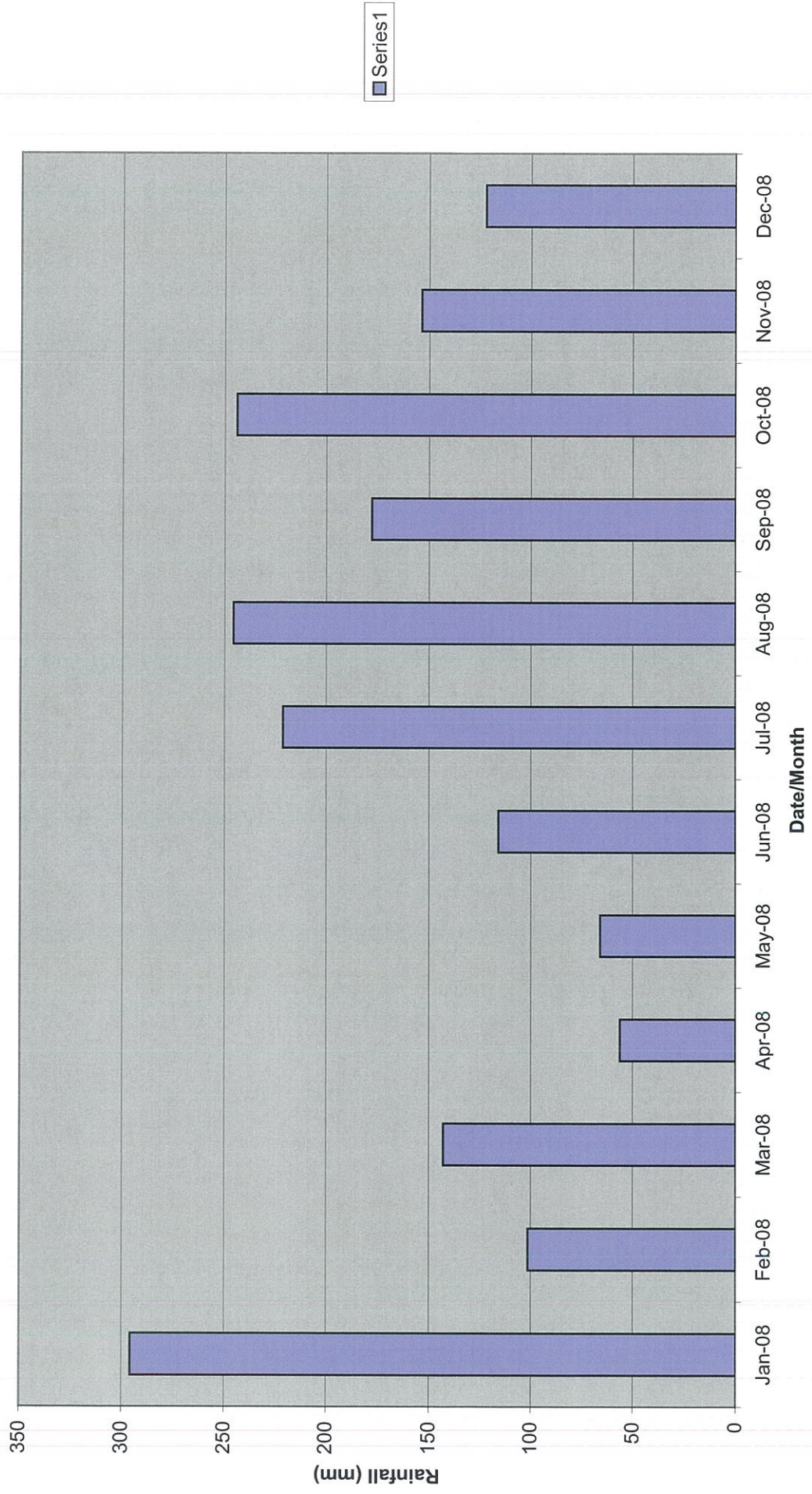




Wind Speed (24 hr Avg)-Figure 3



Precipitation 2008- Figure 4



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**APPENDIX VI – Pollution Emissions Register**

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Environmental Protection Agency

# AER Returns Worksheet

Version 1.1.01

<b>REFERENCE YEAR</b>	2008
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## 1. FACILITY IDENTIFICATION

Parent Company Name	Limerick County Council
Facility Name	Gortadroma Landfill Site
PRTR Identification Number	W0017
Licence Number	W0017-03

### Waste or IPPC Classes of Activity

No.	class_name
3.5	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.
3.6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
3.7	Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of t...
3.11	Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
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.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.3	Recycling or reclamation of metals and metal compounds.
4.4	Recycling or reclamation of other inorganic materials.
4.9	Use of any waste principally as a fuel or other means to generate energy.
4.10	The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.12	Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
3.1	Deposit on, in or under land (including landfill).
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.

Address 1	Gortadroma
Address 2	Ballyhahill
Address 3	Co. Limerick
Address 4	
Country	Ireland
Coordinates of Location	0.000
River Basin District	IE-Shannon
NACE Code	382
Main Economic Activity	Waste treatment and disposal
<b>AER Returns Contact Name</b>	John OCarroll
<b>AER Returns Contact Email Address</b>	jocarroll@limerickcoco.ie
<b>AER Returns Contact Position</b>	Facility Manager
<b>AER Returns Contact Telephone Number</b>	069 82355
<b>AER Returns Contact Mobile Phone Number</b>	087-7565449
<b>AER Returns Contact Fax Number</b>	069-82350
<b>Production Volume</b>	0.0
<b>Production Volume Units</b>	0
<b>Number of Installations</b>	1
<b>Number of Operating Hours in Year</b>	2210
<b>Number of Employees</b>	10
<b>User Feedback/Comments</b>	Release to Wastewater or Sewer, Section B: There was no option for BOD and Suspended Solids in drop down menu. The total BOD value was 7,479 Kgs/year and the total Suspended solids value was 3,703.23 Kgs/Year.
<b>Web Address</b>	

## 2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5d	Landfills
5c	Installations for the disposal of non-hazardous waste

**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 ?	

4.1 RELEASES TO AIR

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT	Name	M/C/E	Method Code	Method Used	Designation or Description	QUANTITY		
						T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	E	Estimate	Gas/sim	Flare	20188.32	524000.0	484811.68
03	Carbon dioxide (CO2)	E	Estimate	Gas/sim		0.0	14887000.0	14887000.0
05	Nitrogen oxides (NOx/NO2)	M	BS EN: 14792	International Standard		1051.2	1051.2	0.0
11	Sulphur oxides (SOx/SO2)	M	BS EN: 14791	International Standard		1489.2	1489.2	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	Name	M/C/E	Method Code	Method Used	Designation or Description	QUANTITY		
						T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
No. Annex II					Emission Point 1	0.0	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)

POLLUTANT	Name	M/C/E	Method Code	Method Used	Designation or Description	QUANTITY		
						T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
Pollutant No.					Emission Point 1	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 purpose 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 'Total' (kg/y) for Section A. Sector specific PRTR pollutants above. Please complete the table below:

T (Total) kg/Year	Method Used		Facility Total Capacity m3 per hour
	M/C/E	Method Code	
3574080.0	E	Actual Flow m3/hr	N/A
3050080.0	M	1020	
0.0			0.0 (Total Flaring Capacity)
524000.0	E	Estimate	0.0 (Total Utilising Capacity)
			N/A

Gortadroma Landfill Site

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

Total estimated methane generation (as per site model)  
 Methane flared in tonnes  
 Methane utilised in tonnes  
 Net methane emission (as reported in Section A above)

4.2 RELEASES TO WATERS

SECTION A : SECTOR SPECIFIC PRRTR POLLUTANTS

POLLUTANT		RELEASES TO WATERS				QUANTITY			
No. Annex II	Name	M/C/E	Method Used		Storm Water (SW4) Emission Point 1	Treated leachate discharge - Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Description or Description					
18	Cadmium and compounds (as Cd)	M	CRM	Sid. Methods 21st Edition.	0.0643	0.0	0.0643	0.0	0.0
19	Chromium and compounds (as Cr)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
20	Copper and compounds (as Cu)	M	CRM	Sid. Methods 21st Edition.	1.4296	0.0	1.4296	0.0	0.0
21	Mercury and compounds (as Hg)	M	CRM	Sid. Methods 21st Edition.	0.1429	0.0	0.1429	0.0	0.0
22	Nickel and compounds (as Ni)	M	CRM	Sid. Methods 21st Edition.	2.8592	0.0	2.8592	0.0	0.0
23	Lead and compounds (as Pb)	M	CRM	Sid. Methods 21st Edition.	0.2716	0.0	0.2716	0.0	0.0
24	Zinc and compounds (as Zn)	M	CRM	Sid. Methods 21st Edition.	3.2881	0.0	3.2881	0.0	0.0
26	Aldrin	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
27	Atrazine	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
28	Chlordane	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
33	DDT	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
34	1,2-dichloroethane (EDC)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
35	Dichloromethane (DCM)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
36	Dieldrin	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
41	Heptachlor	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
42	Hexachlorobenzene (HCB)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
43	Hexachlorobutadiene (HCBDD)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
49	Pentachlorophenol (PCPP)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
51	Sevuzene	M	CRM	Sid. Methods 21st Edition.	0.0714	0.0	0.0714	0.0	0.0
54	Trichlorobenzenes (TCBs)(all isomers)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
57	Trichloroethylene	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
58	Trichloromethane	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
60	Vinyl chloride	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
61	Anthracene	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
62	Benzene	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
65	Ethyl benzene	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
68	Naphthalene	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
71	Phenols (as total C)	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
73	Toluene	M	CRM	Sid. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
76	Total organic carbon (TOC) (as total C or COD(3))	M	CRM	Sid. Methods 21st Edition.	7863.0	0.0	7863.0	0.0	0.0
79	Chlorides (as Cl)	M	CRM	Sid. Methods 21st Edition.	19251.0	0.0	19251.0	0.0	0.0

PRTR No. 00017 Facility Name: Occidental Landfill Site (Permit No. 00017, 2008) Last Update: 2008

25/12/2009 09:40

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

88	Fluoranthene	M	CRM	Std. Methods 21st Edition.	0.7148	0.0	0.7148	0.0	0.0
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\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION B : REMAINING PRTR POLLUTANTS**

No. Annex II	POLLUTANT	M/C/E	Method Code	Method Used Designation or Description	QUANTITY			
					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 C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)**

Pollutant No.	POLLUTANT	M/C/E	Method Code	Method Used Designation or Description	QUANTITY				
					Storm Water SW4 Emission Point 1	Treated Leachate Discharge	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year
238	Ammonia (air N)	M	CRM	Std. Methods 21st Edition.	86,494	2,371	88,865	0.0	0.0
303	BOD	M	CRM	Std. Methods 21st Edition.	1430.0	42.9	1472.9	0.0	0.0
306	COD	M	CRM	Std. Methods 21st Edition.	25589.0	0.0	25589.0	0.0	0.0
240	Suspended Solids	M	CRM	Std. Methods 21st Edition.	8207.28	385.4	8592.68	0.0	0.0

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



4.3 RELEASES TO WASTEWATER OR SEWER

SECTION A : PRTR POLLUTANTS

No. Annex II	Name	M/C/E	METHOD		Waste Water Treatment Emission Point 1			QUANTITY		
			Method Code	Designation or Description	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
06	Ammonia (NH3)	M	CRM	Sid Methods 21st Edition.	9642.12	9642.12	0.0	9642.12	0.0	0.0
12	Total nitrogen	M	CRM	Sid Methods 21st Edition.	51.215	51.215	0.0	51.215	0.0	0.0
13	Total phosphorus	M	CRM	Sid Methods 21st Edition.	12388.4	12388.4	0.0	12388.4	0.0	0.0

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

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

Pollutant No.	Name	M/C/E	METHOD		Emission Point 1			QUANTITY		
			Method Code	Designation or Description	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0	0.0	0.0

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

4.4 RELEASES TO LAND

| PRTR#: W0017 | Facility Name: Gortadroma Landfill Site | Filename: W0017\_2008(1).xls | Return Year: 2008

25/03/2009 08:40

SECTION A : PRTR POLLUTANTS

POLLUTANT		METHOD		QUANTITY			
No. Annex II	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) Kg/Year	A (Accidental) Kg/Year
						0.0	0.0

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

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

POLLUTANT		METHOD		QUANTITY			
Pollutant No.	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) Kg/Year	A (Accidental) Kg/Year
						0.0	0.0

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

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

FRTRF: W00171 Facility Name: Gortadroma Landfill Site | Filename: W0017\_2008(1).xls | Return Year: 2009 |

25/03/2009 08:49  
17

Transfer Destination	European Waste Code	Hazardous	Quantity T/Year	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Name and Licence / Permit No. of Recoverer / Disposer / Broker	Address of Recoverer / Disposer / Broker	Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)	Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 01 39	No	5.2 Plastic Bottles		R5	M	Weighted	Onsite in Ireland	South West Bins WCPLK/080/07d	Kilmoma, Listowel		
Within the Country	20 01 99	No	1.6 Tetra Packs		R5	M	Weighted	Onsite in Ireland	South West Bins WCPLK/080/07d	Kilmoma, Listowel		
Within the Country	20 01 01	No	37.84 Newspapers and Magazines		R5	M	Weighted	Onsite in Ireland	South West Bins WCPLK/080/07D	Kilmoma, Listowel.		
Within the Country	20 01 01	No	13.4 Cardboard		R5	M	Weighted	Onsite in Ireland	South West Bin. WCPLK/080/07d.	Kilmoma, Listowel.		
Within the Country	20 01 02	No	6.49 Glass Bottles and Jars		R5	M	Weighted	Onsite in Ireland	Mr. Binman WCPLK/069/07d	Grange, Kilmallock, County Limerick		
Within the Country	20 01 99	No	4.3 Food Cans		R4	M	Weighted	Onsite in Ireland	Mr. Binman WCPLK/069/07d	Grange, Kilmallock, County Limerick.		
Within the Country	20 01 40	No	5.07 Drink Cans		R4	M	Weighted	Onsite in Ireland	Mr. Binman WCPLK/069/07d	Grange, Kilmallock, County Limerick.		
Within the Country	20 01 40	No	98.28 Mixed Scrap Metal		R4	M	Weighted	Offsite in Ireland	Erin Recyclers WCPLK/386/06B	Ballysimon Road, Limerick.		
Within the Country	20 01 11	No	9.0 Textiles		R5	M	Weighted	Offsite in Ireland	Cookstown Textile Recyclers WCPLK/234/07C	36 Magherlane Rd., Randaistown, Co. Antrim.		
Within the Country	16 02 11	Yes	23.05 Fridge Freezers		R5	M	Weighted	Offsite in Ireland	KMK Metals, WCPLK/078/05C	Cappincur Indst. Est., Tullamore, Co. Offaly.	M. Baker Recycling Ltd, Pair Indst. Est. St. Helens, Merseyside, Uk	Licence Ref No: EAWML 5C133
Within the Country	16 02 14	No	13.09 LDA Non-Hazardous		R4	M	Weighted	Offsite in Ireland	KMK Metals, WCPLK/078/05C	Cappincur Indst. Est., Tullamore, Co. Offaly.		
Within the Country	20 01 36	No	29.4 Small WEE		R5	M	Weighted	Offsite in Ireland	KMK Metals WCPLK/078/05C	Cappincur Indst. Est., Tullamore, Co. Offaly.		
Within the Country	19 10 04	No	5089.34 Automobile Shredder Residue		R5	M	Weighted	Onsite in Ireland	WL0017-03 WCPLK/078/05C	Tullamore, Co. Offaly.		
Within the Country	17 05 04	No	5645.54 Soil & Stones.		R5	M	Weighted	Onsite in Ireland	WL0017-03	Gortadroma Landfill		
Within the Country	03 01 99	No	390.16 Shredded Wood Pallets		R3	M	Weighted	Onsite in Ireland	WL0017-03	Gortadroma Landfill		

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

**APPENDIX VII – Industrial Sludge Test Results**



**EURO**  
environmental  
services

Environmental Science & Management  
Water, Soil & Air Testing

Unit 35,  
Boyne Business Park,  
Drogheda,  
Co. Louth  
Ireland  
Tel: +353 41 9845440  
Fax: +353 41 9846171  
Web: www.euroenv.ie  
email: info@euroenv.ie

A copy of this certificate is available on [www.euroenv.ie](http://www.euroenv.ie)

<b>Customer</b>	Fiona Doyle Mc Gill Environmental Ballinvohar Castletownroche Co Cork Ireland	<b>Lab Report Ref. No.</b>	0350/066/04
<b>Customer PO</b>	2088	<b>Date of Receipt</b>	25/04/2008
<b>Customer Ref</b>	Molalein Wyeth Feb 08	<b>Date Testing Commenced</b>	25/04/2008
		<b>Received or Collected</b>	Courier: Interlink
		<b>Condition on Receipt</b>	Acceptable
		<b>Date of Report</b>	01/05/2008
		<b>Sample Type</b>	Other

## CERTIFICATE OF ANALYSIS

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
% Dry Matter	302	Drying @ 104 C	12.37	%	
Cadmium Solid (OES)	224	ICP-OES	14.00	ug/Kg	
Chromium Solid (OES)	224	ICP-OES	1164	ug/Kg	
Copper Solid (OES)	224	ICP-OES	3834	ug/Kg	
Lead Solid (OES)	224	ICP-OES	818	ug/Kg	
Mercury Solid (OES)	0	ICP-OES	<2.5	ug/Kg	
Nickel Solid (OES)	177	ICP-OES	412	ug/Kg	
pH (Solid)	110	Electrometry	5.8	pH Units	
Zinc Solid (OES)	224	ICP-OES	26653	ug/Kg	

Signed: Donna Heslin

Donna Heslin - Laboratory Manager

Date: 01/05/08

Acc. : Accredited Parameters by ISO 17025:2005

All organic results are analysed as received and all results are corrected for dry weight at 104 C  
Results shall not be reproduced, except in full, without the approval of EURO environmental services  
Results contained in this report relate only to the samples tested

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**APPENDIX VIII – Financial Provision**

Projected income and expenditure for Limerick County Council environment section for 2009, is shown below. The calculation for the determination of charges is also shown.

<b>EXPENDITURE</b>	
<b>Gortadroma Landfill</b>	<b>Euro's (€)</b>
Operational Costs	1,775,398
Gortadroma Aftercare	171,000
Landfill Levy	1,445,440
Local Development Fund/Salary/Internal Costs/Loan Charges	2,267,149
<b>All other Environmental Costs</b>	
Recovery & Recycling Costs	945,334
Provision of Waste Collection Service	244,840
Waste Reg. Monitoring & Enforcement	834,382
Waste Management Plan	725,780
Litter Management	699,490
Water Quality & Air, Noise Pollution	3,646,121
<b>Total Expenditure</b>	<b>12,754,934</b>
<b>INCOME</b>	
Landfill Gate Fee	7,950,000
Landfill Levy	1,445,440
Other Income( Fines, Waste Collection Permits)	558,094
Environment, Heritage & Local Government	2,801,400
<b>Total Income</b>	<b>12,754,934</b>

**Gate Fee Calculation:**

Projected tonnage (2009) = 78,295 x 120 = € 9,395,400  
 Charge per tonne = € 100 + € 20 per tonne landfill levy.