Limerick County Council
Comhairle Chontae Luimnigh

GORTADROMA LANDFILL SITE

ANNUAL ENVIRONMENTAL REPORT 2011

Waste Licence Register: No. W0017-04

Prepared By:-

TMS Environment Ltd.
53 Broomhill Drive
Tallaght
Dublin 24

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ANNUAL ENVIRONMENTAL REPORT

FOR THE REPORTING PERIOD
JANUARY 2011 TO DECEMBER 2011

FOR

LIMERICK COUNTY COUNCIL
COUNTY BUILDINGS
DOORADOYLE
LIMERICK

Report Ref 18685
TMS Environment Ltd.
13th March 2012

Approved by: Date:

Tom Ryan
Senior Consultant

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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 Licence Register No. 0017-04 issued by the Environmental Protection Agency on 21st December 2009.

The reporting period for the purposes of the Annual Environmental Report is January 2011 to December 2011. The report has been completed by TMS Environment Ltd 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 Licence, *Content of Annual Environmental Report*, in accordance with the EPA publication *Annual Environmental Report: Standardised Reporting Guidance 2012.*

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 Licence Application (0017-04). 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 millimetres (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.

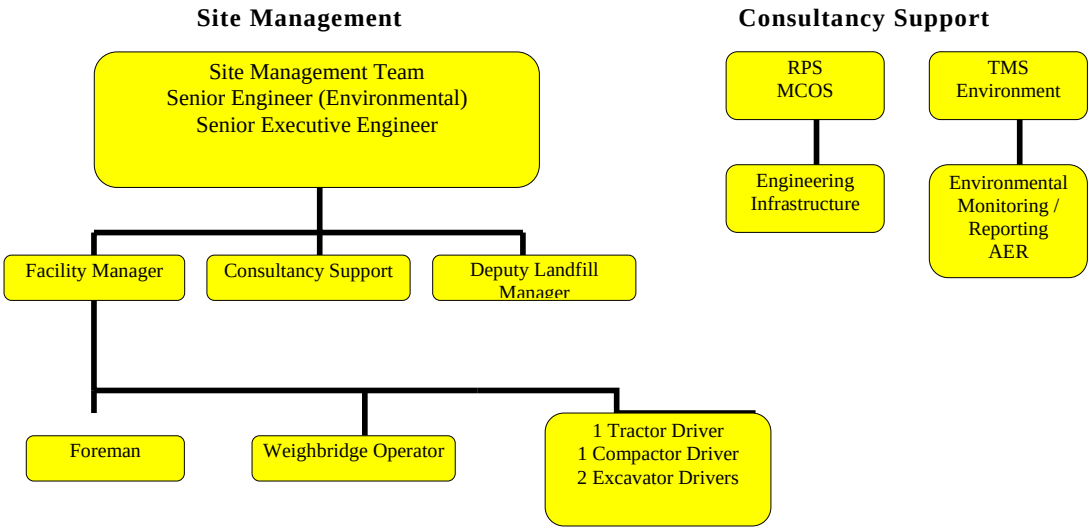
The current landfill facility at Gortadroma including the extension area occupies an area of 76 hectares.

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 January 2012. 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 Licence, the facility manager 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 licence 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 Licence.

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 2012 has been prepared and was submitted separately to the Agency in January 2012.

2.4 Schedule of Environmental Objectives and Targets for 2012

The schedule of Environmental Objectives and Targets for the forthcoming year is described in the EMP for 2012, 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 2011

The 4 objectives and targets established for the EMP of March 2011 were reviewed to assess the progress towards achievement. In total 2 objectives were completed and the remaining 2 are in progress and very close to completion. 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 2011

There were no new procedures developed for use at the landfill facility in 2011.

2.7 Report on programme for Public information

Limerick County Council provide the following documentation for the public to view:

- Waste Licence 17-1 (superseded), WL17-2 (superseded), WL0017-03 (superseded), WL0017-04 (currently in operation)
- Environmental Impact Statement
- Conditioning Plan
- Waste Licence Application form
- Waste Licence 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

There were four notifications of non-compliance issued by the Agency to Limerick County Council during 2011. These were issue on March 7th 2011, April 5th 2001 and September 8th 2011. The details of each non-compliance notification is detailed below in Table 3.1

Table 3.1 Details of Non-Compliances at Gortadroma Landfill Facility during 2011 (with reference to certain conditions of the site waste licence)

Non Compliance No.	Date	Details	Date of Response	Details
1	07/03/2011	Non compliance with Condition 8.7.1. The biodegradable municipal waste (BMW) content of the municipal solid waste (MSW) accepted for disposal for the last 6 months of 2010 exceeded the 47% limit specified in the licence.	24/03/2011	A written notification to all waste customers of LCC was sent detailing that only MSW bin waste that had originated from a 3-bin collection system or waste that had been processed in an MBT plant could be accepted for disposal at Gortadroma from May 1st 2011. Fines residues from MSW bin collections could no longer be accepted at the site.
2	07/03/2011	Non compliance with Condition 6.12.1. The leachate levels in Cell 9 Vent B and Cell 10 Vent A exceeded the level of 1m over the top of the liner at the base of the landfill.	24/03/2011	Leachate levels exceeded the level due to the large open area in Cells 14/15 and part of Cell 16 due to water infiltration through the capping systems of cell 7/9 and 8/10. Cells 14/15 were to be capped in Q3 2011 and cells 7/9 and 8/10 were to be reshaped and surface water drains installed to help shed the water and prevent infiltration.
3	05/04/2011	Non compliance with Condition 5.5. Windblown litter from the facility was causing nuisance to residents close to the facility	11/04/2011	All of the windblown litter was removed on the morning of March 7th 2011.

Table 3.1 Details of Non-Compliances at Gortadroma Landfill Facility during 2011 (with reference to certain conditions of the site waste licence)

Non Compliance No.	Date	Details	Date of Response	Details
4	08/09/2011	Non compliance with Condition 6.12.1. The leachate levels in Cell 9 Vent B and Cell 10 Vent A exceeded the level of 1m over the top of the liner at the base of the landfill.	20/09/2011	Leachate levels exceeded the level due to the large area without capping in Cells 14/15 and part of Cell 16 and due to water infiltration through the capping systems of cell 7/9 and 8/10. A capping contract commenced onsite for the capping of 16.300m2 on cells 14/15 and the contract was extended to include the capping of cell 16 once filled. The capping works when complete should reduce the levels by 40%. Surface water catchment drains were also installed at cells 7/9 and 8/10 which reduced surface water ingress through the cap.

3.2 Reported Incidents and Complaints Summaries

3.2.1 Incidents

During the reporting period a total of 3 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, 2011

Date	Nature of Incident	Corrective actions / Conclusions
10/01/2011	The control valves on the wheel wash were leaking due to frost damage. This had the potential to cause dirt being transferred on to the public road.	New control valves were purchased and installed. Spare valves were also purchased and a heater was placed in the valve control room to prevent re-occurance of the incident.
22/03/2011	A surface fire occurred on the active face of the landfill on the evening of March 22nd 2011. Approximately 3000 gallons of water was sprayed on the affected area and run off was collected in active Cell 16.	Excavator driver pulled lighting waste into rows and smothered fire with subsoil. Fire brigade sprayed affected area for 2.5 hours. Preventative actions included subsoil to be maintained near the active face at all times. Fire hoses and water tanker were inspected and tanker was refilled with water.
21/11/2011	Condition 6.12.3 of WL0017-04 requires that a minimum of 0.75 meter freeboard be maintained at all times in raw leachate holding lagoon. The freeboard level in the raw leachate lagoon at Gortadroma is marked at 1 meter and this level was near approached on the 20th November 2011. In order to maintain this freeboard landfill management decided to switch off the leachate extraction pumps at the collection point of Cells 7/9 and Cells 8/10. The level at both of these collections on the 21st November was at 1.0 and 1.1 meters respectively. The main reason for the increased leachate volumes was due to high rainfall(60 mm) recorded in the previous three days and current open area in cells 14/15.	The following measures were put in place to ensure containment of leachate until weather conditions improved; • Tankering of 90m^3 treated leachate per day to Waste Water Treatment plants in Kerry. •The treatment and discharge of 120 m^3 per day onsite. •The lining works on the capping of Cells 14/15 are to be completed by end of November 2011 •The south west portion of Cell 16 should be filled to capacity before year end and an additional 6,300m^2 will then be capped in this area. • The possibility of tankering additional leachate to Limerick City Councils waste water treatment facility at Bunlicky was being investigated. The combination of the above measures will ensure that all leachate generated will be contained.

3.2.2 Complaints

In summary there were 17 complaints or queries during the reporting period of January 1st to December 31st, 2011. The vast majority of complaints were attributed to odour. Other issues included increased fly numbers at a nearby residence. Complaints were responded to as soon as possible and were recorded in the complaints register. Corrective action, if considered necessary is recorded. Details of all complaints, responses and corrective actions are maintained and available for inspection on-site.

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 2011

No.	Objective	Reason for Undertaking Project	Project Summary	Target in 2010 EMP.	Status January 2012
1	Install final cap on cells 14/15.	Increase gas collection efficiency and reduce leachate production	SEW to be sent to Agency for agreement. Capping contract to be advertised.	Quarter 3 2011	In progress- Lining works 92 % completed
2	Temporary liner to be placed on remaining side slope of cell 14/15.	Reduce landfill gas emissions.	Installation to be arranged when final fill heights are achieved in cells 14/15.	Quarter 1 2011	Completed
3	Horizontal gas collection pipe work to be installed in cell 16.	Reduce landfill gas emissions	Horizontal gas collection pipe work to be installed during landfill in cell 16.	Ongoing	Completed- Temporary flare in operation.
4	Extend Scada control to pumps in extension area.	Increase control and monitoring.	Pumps and hard wiring installed. Radio control & Scada configuration to be completed.	Quarter 2 2011	New software installed- Will be completed during Q1 2012

4.2 Lagoon Structures Inspection Report

The integrity of the geomembrane liners installed on the Slow Sand Filter at the Gortadroma Landfill Development was carried out in accordance with Contract Specifications by Geomembrane Testing Services Limited in February 2011. Further to this a Mobile Electrical Leak Location Survey (MELLS) was carried out using geophysical techniques, to verify the integrity of the system. On completion of the survey, two defects were identified and subsequently repaired and retested and found to be acceptable within the slow sand filter. The HDPE membrane was free from all defects at the time of final inspection.

The integrity of the Storm Water Settling Tank at the Gortadroma Landfill site was tested during October 2011 to the requirements of Section 9 of BS 8007:1987 British Standard Code of Practice of Concrete Structures for Retaining Aqueous Liquids and was found to be within the requirements of the Standard.

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

Cells 14/15 and the west side of cell 16 are now filled to capacity. Approximately 419,100 tonnes of waste have been placed in these cells up to the end of December 2011 at a compaction rate of 1 tonne/m^3. Limerick County Council have received approval from the Agency to extend the base liner to the

south of cell 16 and to the east of cells 14 & 16. Therefore the remaining void capacity is 253,000 m^3 from the 1st January 2012.

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 (including extension)	672,100

4.4 Area Occupied by Waste

The area occupied by waste at Gortadroma Landfill is 148,600$m^{2.}$ Cells 1-4 are unlined and occupy an area of 20,800m^2, while cells 5-16 are lined cells and occupy an area of 127,800m^2.

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 Storm Water Settling Tank and the Slow Sand Filter were tested during 2011.

5.0 WASTE ACCEPTANCE AND HANDLING

5.1 Licenced waste disposal activities carried out at the facility

Part I of the Waste Licence 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 2011 to December 2011 inclusive, and during each previous year, is given in Table 5.1 below.

Table 5.1: Annual waste tonnages to 2011

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
2008	56,070
2009	103,834
2010	112,699
2011	129,994

Waste source and tonnes per month for this reporting period are summarised in Table 5.2 and in Figure 5.1.

5.4 Methods of Waste Deposition

Cells 14/15 are now filled to capacity and capping is complete to subsoil layer. The west side of cell 16 was filled to capacity during December 2011 and final capping of this area is currently in progress. The east side of cell 16 is the current active cell and waste deposition commenced here on the 20th of December 2011.

Table 5.2 Quantities of Waste Types Accepted at Gortadroma during 2011

Month	Commercial / Industrial	Private Domestic	Industrial Waste	Council Waste	City Street Cleaning	Screenings
January	1,235.76	12,992.94	11.80	23.84	34.38	13.70
February	1,091.84	12,433.38	36.12	24.26	21.06	12.60
March	1,465.66	13,146.80	16.86	89.10	47.44	15.46
April	1,368.68	12,322.62	38.14	67.40	34.46	13.88
May	1,569.40	9,106.32	14.46	102.82	34.78	5.84
June	1,652.14	6,636.02	23.54	46.36	34.64	13.88
July	1,871.68	5,786.36	24.34	37.88	33.00	9.90
August	1,825.62	7,672.28	14.12	31.36	32.64	5.46
September	1,441.40	6,948.40	14.00	40.80	45.06	11.84
October	1,240.98	6,668.96	20.46	18.48	45.88	6.22
November	1,765.84	8,587.08	24.48	14.64	34.96	15.24
December	2,058.16	7,799.48	0.00	23.44	20.08	5.56
SUBTOTAL	**18,587.16**	**110,100.64**	**238.32**	**520.38**	**418.38**	**129.58**
GRAND TOTAL		**129,994.46**				

5.5 Recyclables

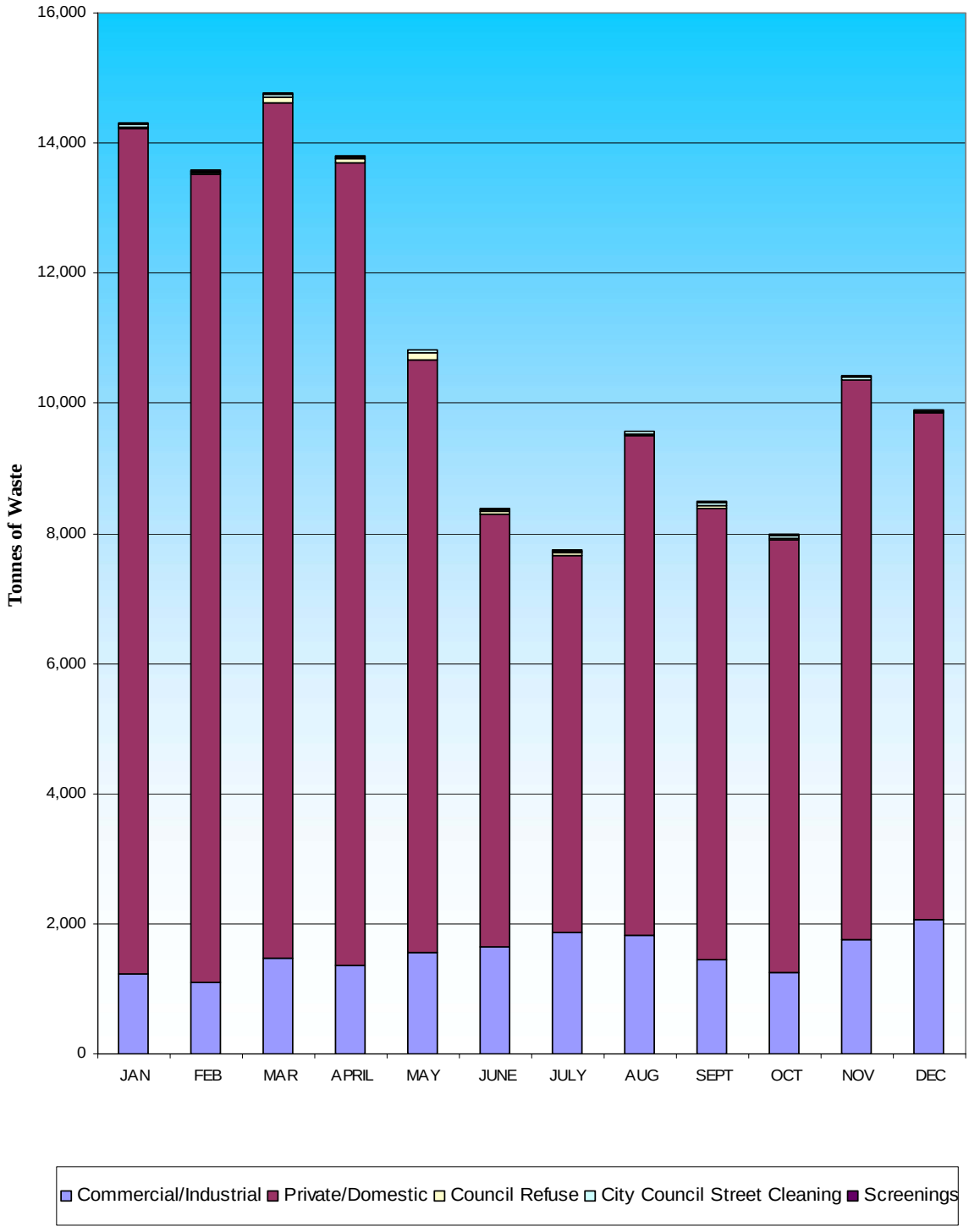
Table 5.3 below outlines the quantity of recyclables transferred from Gortadroma Civic Amenity Site for recovery during 2011. In addition to this the following materials were accepted on site for reuse on site for road making and as land fill cover.

- EWC 17 05 04 Soil & Stones 2,453.6 Tonnes
- EWC 17 01 03 C&D Waste (tile & ceramic) 722.5 Tonnes
- EWC 19 12 12 Mechanically Treated C&D waste 4,283.64 Tonnes
- EWC 03 01 99 Woodchip 488.88 Tonnes

Table 5.3 Recyclables transferred from Civic Amenity Site for recovery during 2011

Waste Type Name	EWC Code	Quantity Tonnes
Plastic Bottles	20 01 39	5.08
Tetrapacks	20 01 01	1.4
Newspapers/Magazines	20 01 01	30.32
Glass	20 01 02	10.29
Food Cans	20 01 05	1.02
Drink Cans	20 01 05	1.18
Cardboard	20 01 01	9.68
Mixed Metals	20 01 40	34.60
Textiles	20 01 11	2.64
LDA Non-Haz	20 01 36	5.64
Fridge Freezers	20 01 35	9.04
Small WEEE	20 01 35	3.06
Tyres	16 01 03	3.96

Figure 5.1 Waste Types and Quantities Received During 2011



6.0 ENVIRONMENTAL NUISANCES

6.1 Report on environmental nuisance control at the facility for 2011

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 wheel wash is in use at the site and all vehicles exiting the tip head pass through the wash. 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.

Cells 1 to 15 are fully capped and landfill gas extracted from this area is utilised in the landfill gas engine. Landfill gas extracted from Cell 16 through a horizontal pipe network is diverted to a temporary 500m3/hr flare.

Limerick County Council employs a full time full time falconer and 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.

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

Emission	Significance
Noise	Noise monitoring during the reporting period indicated daytime L_{Aeq} readings at 6 locations (M3, M4, M5, M7, M9 and M10) in excess of the licence limit of 55dB(A). These were generally due to passing traffic noise and cell capping activities at the site. Night time readings were all below the limit of 45dB(A).
Dust	During the course of the year there were no exceedances of the limit of 350mg/m^2/day as specified in Schedule C.3 of the waste licence
Odour	Odourous compounds measured at the landfill site were all recorded below licence limit of detection.
Landfill Gas	Methane did exceed the trigger level 12 times 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.
Emissions to surface water	In total 23,667m^3 of treated leachate was discharged to the White River during 2011.
Leachate	A volume of 24,827m^3 was tankered off site to waste water treatment plants.

7.2 Resource and Energy Consumption

Resource and energy consumption figures for the site in 2011 is summarised in Table 7.2.

Table 7.2 Energy Consumption Summary

Energy	2006	2007	2008	2009	2010	2011
Diesel fuel (used for council machinery and pumps) / litres	11,947	9,812	27,288	33,793	15,755	10,537
Pesticides: BioKill Pro (fly spray) concentrate / litres	900	750	690	850	500	200
Electricity consumption / kWh	380,405	604,631	469,310	381,936	400,329	391,475

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

At Gortadroma Landfill there are 16 distinct landfill cells. A total of 15 cells have now been filled and fully capped. The landfill is considered to be two separate landforms, cells 1-13 as the main area of landfill to date and cells 14-16 as the extension area which may be extended again in the future. Cells 1-15 are connected to a gas engine (600m^3/hr capacity) and cell 16 is currently connected to a temporary gas flare (500m^3/hr capacity, 16hr/day). Two Gassim models have been created to model this scenario: one for those cells 1-14 and one and one for cells 15-16.

Filling operations ceased in Cells 1-13 at the end of September 2007 and recommenced in the extension area at the beginning of October 2007. Waste operations have continued in Cell 14-16 since then.

There are currently 130 gas wells at Gortadroma Landfill within Cells 1-13. The landfill gas collected by these vertical wells is transported via a manifold system with two mains connecting to a carrier main which connects to the engine. Any excess gas not utilised to generate electricity is combusted in a 1,500m^3/hr enclosed gas flare. The landfill gas compound also houses an ESB substation. Underground electricity transmission cables run from the ESB substation to a point at the western site boundary where they are connected to an overground transmission system on the national grid.

There are currently 19 vertical wells in cells 14-16. As cell 14 -16 were being filled, a series of horizontal gas collection pipe-work was installed and connected to a temporary 500m^3/hr flare. There are currently 7 horizontal gas wells in cells 14-16.

Landfill gas is produced principally in the year after the waste is deposited. Therefore when discussing volumes of gas generated in 2011 it is appropriate to discuss waste quantities and compositions principally from 2010. In 2010 a total of 112,699 tonnes of waste was landfilled at Gortadroma. This was an

increase over the previous year, 2009, 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 2011. A total of 129,994 tonnes of waste was deposited in cell 16 in 2011 which would also have some impact on gas generation for that year.

The landfill gas package GASSIM (1.52) was used to model the gas production at Gortadroma. Figure 7.1 & Figure 7.2, taken from GASSIM, illustrate the total bulk landfill gas generated from the landfill in recent years including 2011.

For 2011 approximately 640m^3/hr of landfill gas was generated from cells 1-14 and approximately 550m^3/hr from cell 15-16, giving a combined volume of 1,190m^3/hr at the 50th percentile for the median for the year.

Of the total bulk gas generated at Gortadroma in 2011 approximately 517m^3/hr was collected from cells 1-14 and used to generate electricity through an engine at the gas compound area. Approximately 150m^3/hr was flared from cell 15-16 (for 16 hours per day on average). This data was obtained from Limerick Co Council.

Figure 7.1 – Total Bulk Landfill Gas Generated 2006-2015 Cells 1 to 14

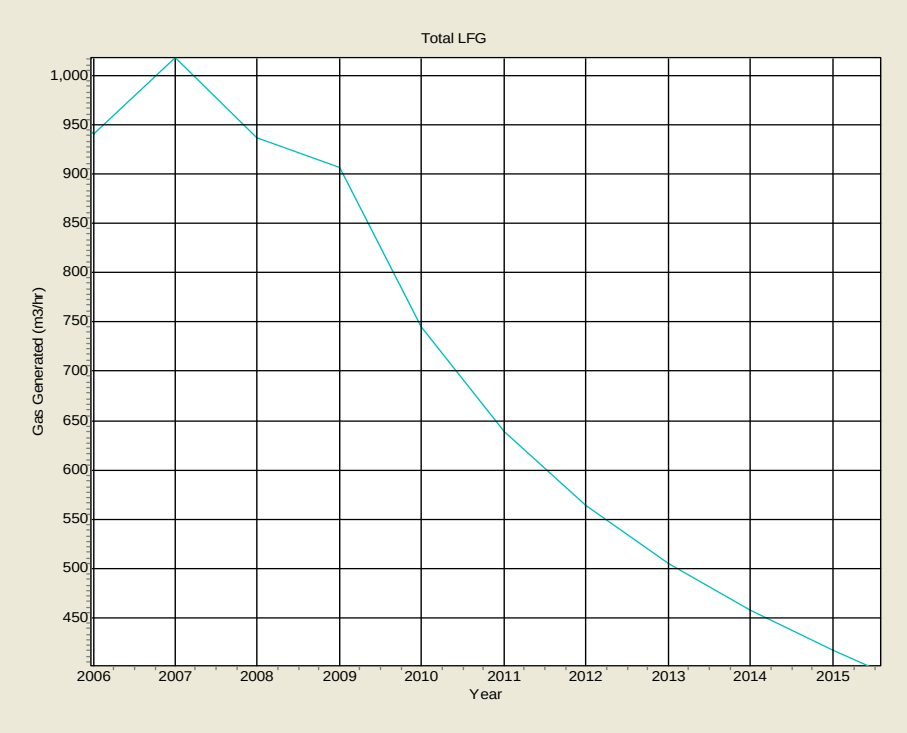
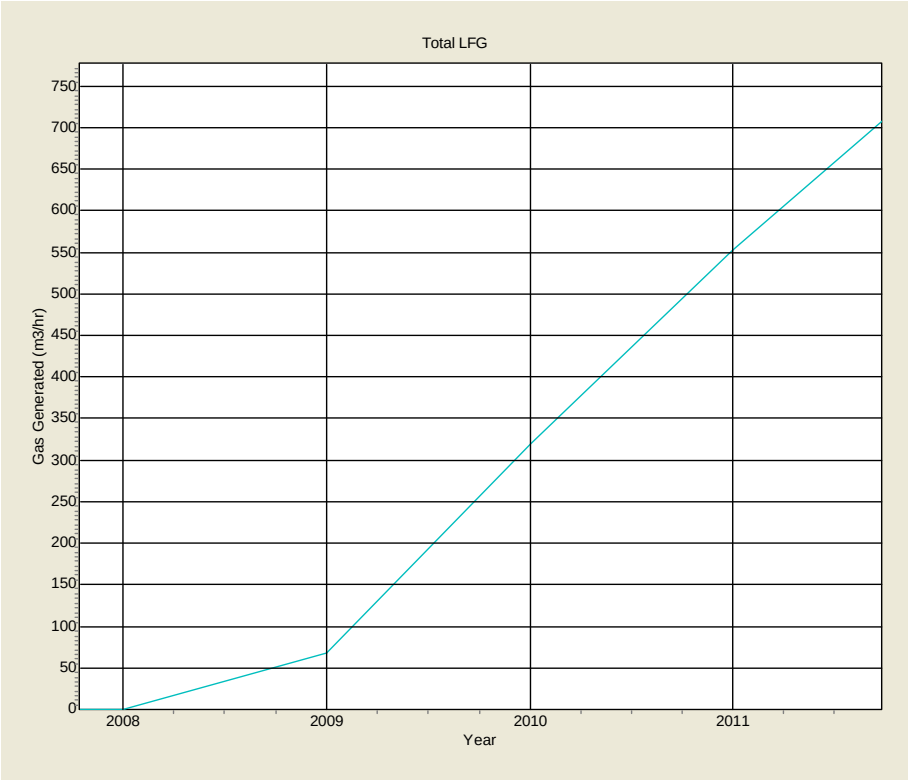


Figure 7.2 – Total Bulk Landfill Gas Generated 2008-2011 Cell 15



720m^3/hr (390 m^3/hr from cells 1-14; 330 m^3/hr from cell 15-16) of the total bulk landfill gas generated was modelled as methane. The majority of this was destructed in the engine and flare.

The total output of methane, post combustion from the temporary flare and engine, was modelled at 4.3m^3/hr (99% destruction efficiency). The majority of this was from the engine and a low volume came from the 500m^3/hr temporary flare.

Figure 7.3 Methane Produced from Cells 1 to 14

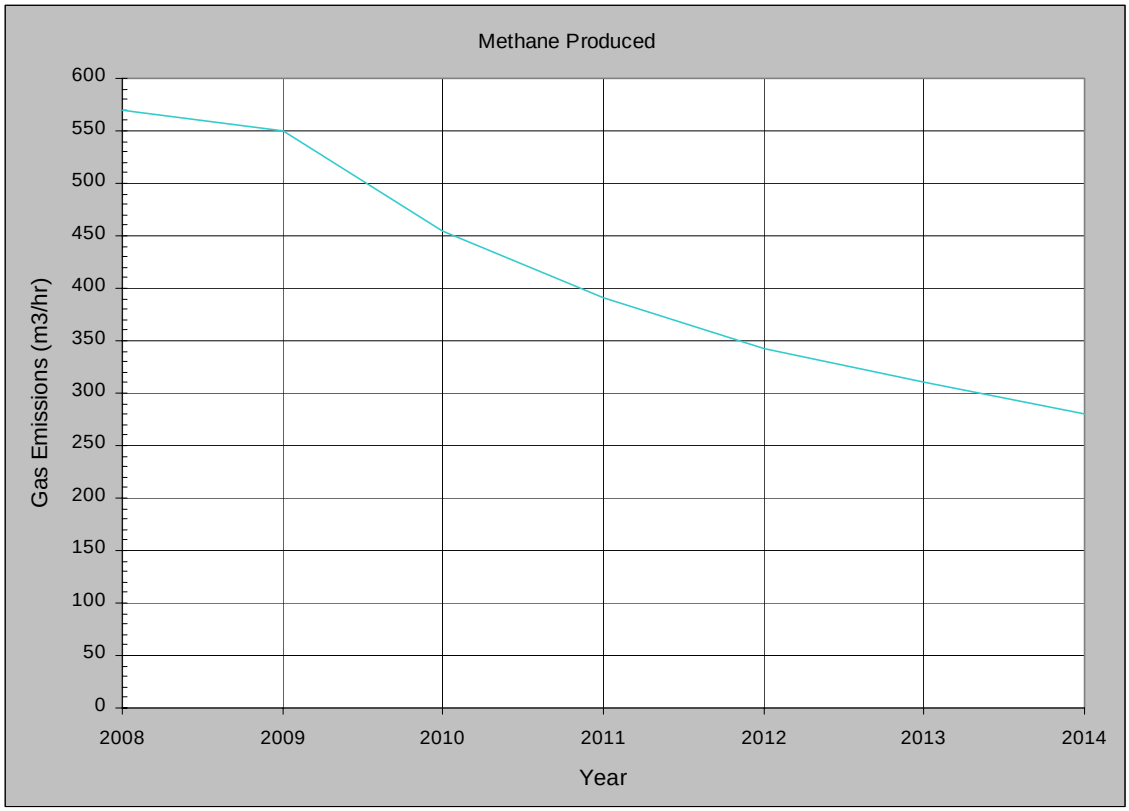
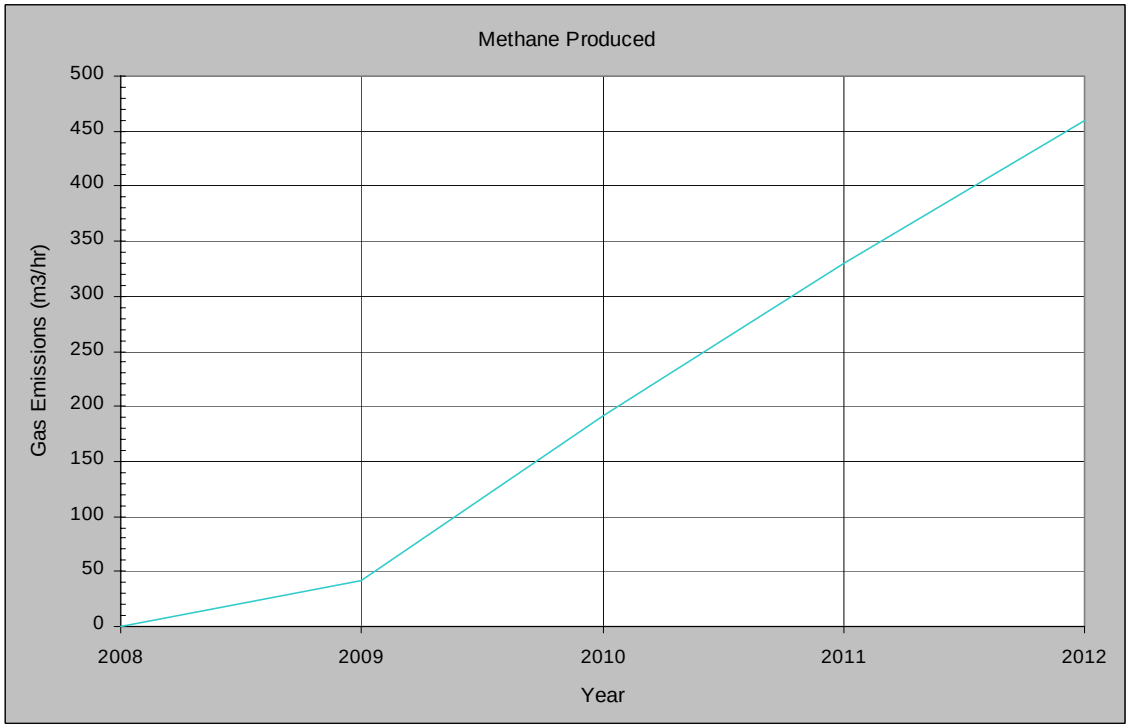


Figure 7.4 Methane Produced from Cell 15-16



414m^3/hr (245 m^3/hr from cells 1-14; 240 m^3/hr from cell 15-16) of the total bulk landfill gas generated was modelled as Carbon Dioxide.

The total engine and flare output of carbon dioxide, post combustion, was estimated at 608m^3/hr (539m^3/hr from the engines and 69m^3/hr from the flare).

Figure 7.5 CO_2 Produced from Cell 1-14

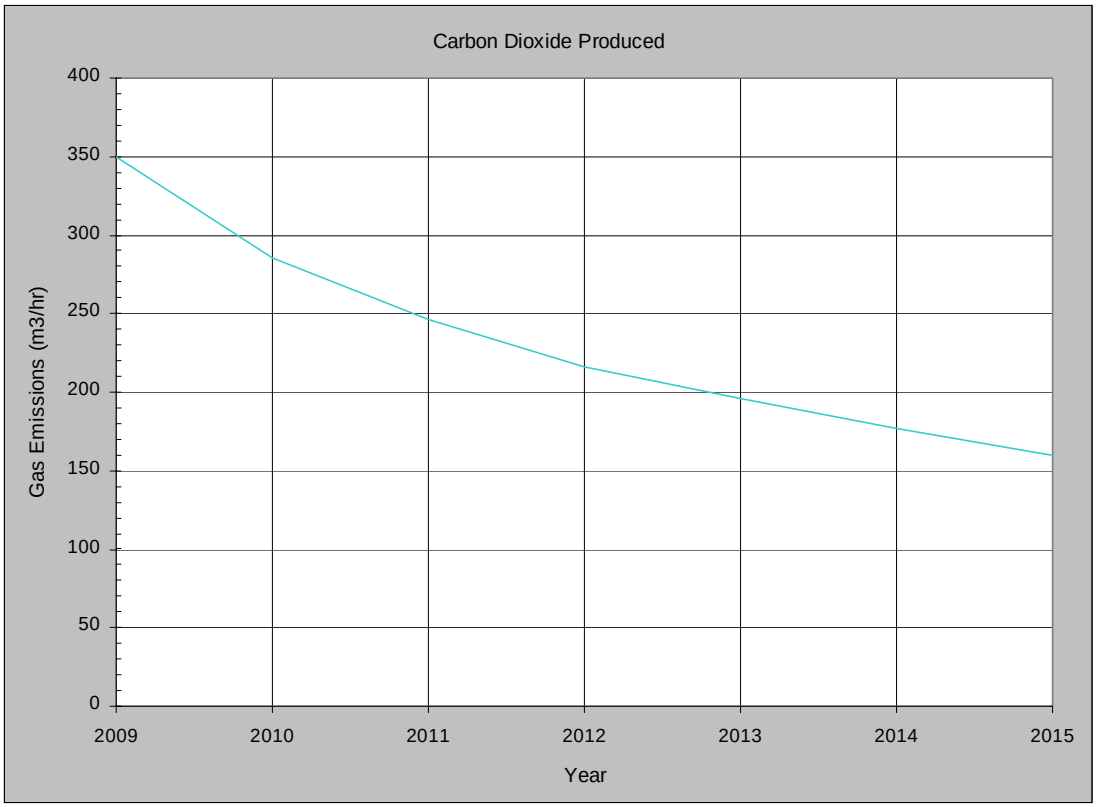
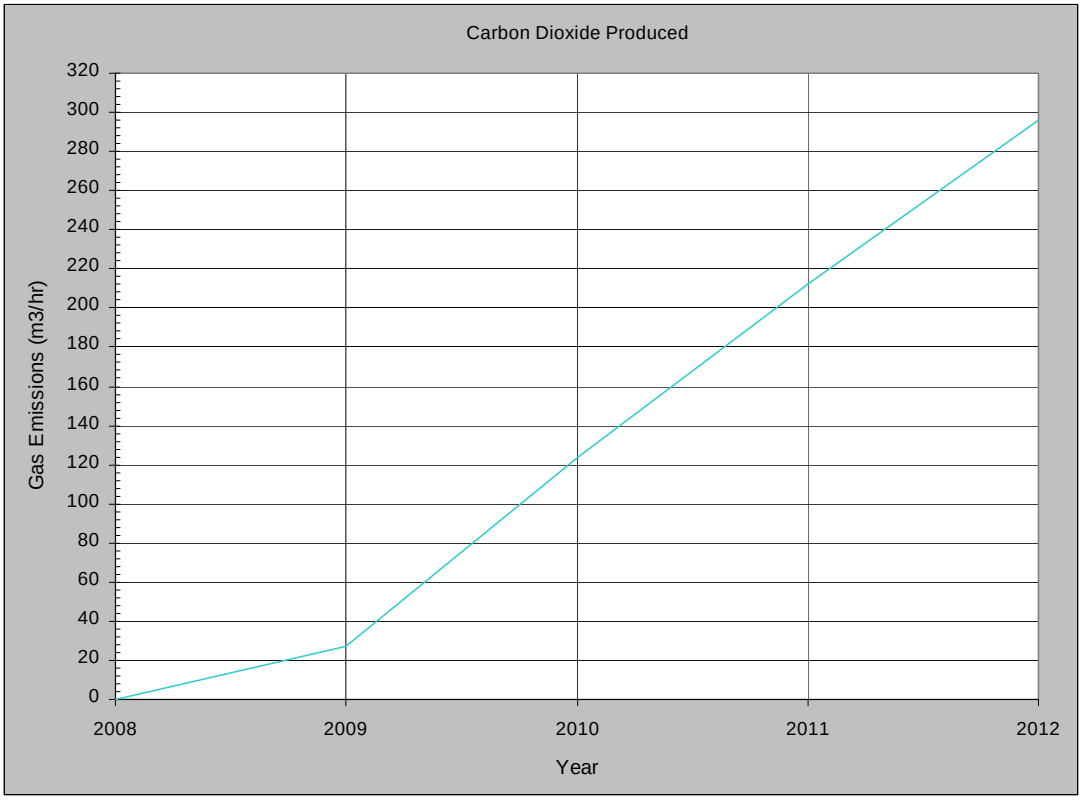


Figure 7.6 CO_2 Produced from Cell 15-16



GASSIM (1.52) estimated the global warming potential of the emissions to air. This is estimated in tonnes of Carbon Dioxide, as CO_2 is used as a baseline constituent by which the global warming can be measured. Emissions of other greenhouse gases are converted to a CO_2 equivalent based on 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_2.

According to GASSIM a total of 434 tonnes of methane was emitted from the cells 1-14 and 1,531 tonnes from cell 15-16 in 2011. This figure includes all landfill emissions to air. Using a GWP factor of 21 these volumes of methane are equivalent to 41,265 (9,114 + 32,151) tonnes of Carbon Dioxide. GASSIM also estimates that 18,734 tonnes of Carbon Dioxide was generated, post engine from cells 1-14 and 2,439 tonnes post flare from cell 15 in 2011. Combining these two results yields a total equivalent Carbon Dioxide emission of 43,020 tonnes for 2011 for Gortadroma Landfill.

9,114 (CO_2 equivalent for CH_4 generated from cells 1-14) + 32,151 (CO_2 equivalent for CH_4 generated from cell 15) + 18,734 (CO_2 generated from cells 1-14) + 2,439 (CO_2 generated from cell 15-16) = 62,438 tonnes of CO_2.

7.4 Estimated Annual and Cumulative Quantity of Indirect Emissions to Groundwater

Gortadroma Landfill consists of 16 individual landfill cells. Cells 5-16 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^2. It is assumed that the waste has an overall moisture content of 25% below this level.

1.5m x 22,000m^2 x 0.25 = 8,250m^3 of leachate within cells 1-4 in 2011. 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 $1x10^{-9}$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 $1x10^{-9}$ 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 22,000m^2.

Therefore the flow (Q) can be calculated to be 3.0 $x10^{-5}$ m^3/s through the clay liner at the base of cells 1-4.

For the one-year period of 2011 the flow rate of leachate emissions to groundwater is calculated to be 930 m^3/year (or 2.5m^3/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 v's tankered

The theoretical leachate generated was calculated for each month of 2011 using the following data.

- Monthly rainfall figures in meters.
- Effective cell area open m^2 for each month and hard standing area m^2 from the composting slab and waste inspection area.
- The effective area open for each of the months January to October 2011 was 29,500 m^2.
- Lining works on the cap of cells 14/15 commenced at the end of October 2011 and landfilling commenced in the eastern section of cell 16 on the 20th of December 2011.

Table 7.4 Theoretical Leachate Volumes and Tankered Volumes

Month 2011	Rainfall m	Effective area open m^2	Theoretical Leachate produced m^3	Volume of Leachate discharged to White River m^3	Volume of Leachate tankered off site / m^3
January	0.0982	29,500	2,896.90	0	4,269.53
February	0.1899	29,500	5,602.05	0	2,952.82
March	0.0506	29,500	1,492.70	991.62	1,167.65
April	0.0576	29,500	1,699.20	2,587.30	435.92
May	0.1676	29,500	4,944.20	1,772.00	1,831.18
June	0.1470	29,500	4,336.50	2,590.00	2,606.88
July	0.0982	29,500	2,896.90	1,584.40	1,776.36
August	0.06542	29,500	1,929.89	1,447.90	1,857.50
September	0.1504	29,500	4,436.80	3,016.30	1,865.64
October	0.1664	29,500	4,908.80	2,900.60	1,717.66
November	0.20836	24,000	5,000.64	3,535.00	1,874.94
December	0.2102	17,500	3,678.50	3,242.50	2,471.00
Annual Total	**1.60988**		**43,823.08**	**23,667.62**	**24,827.08**

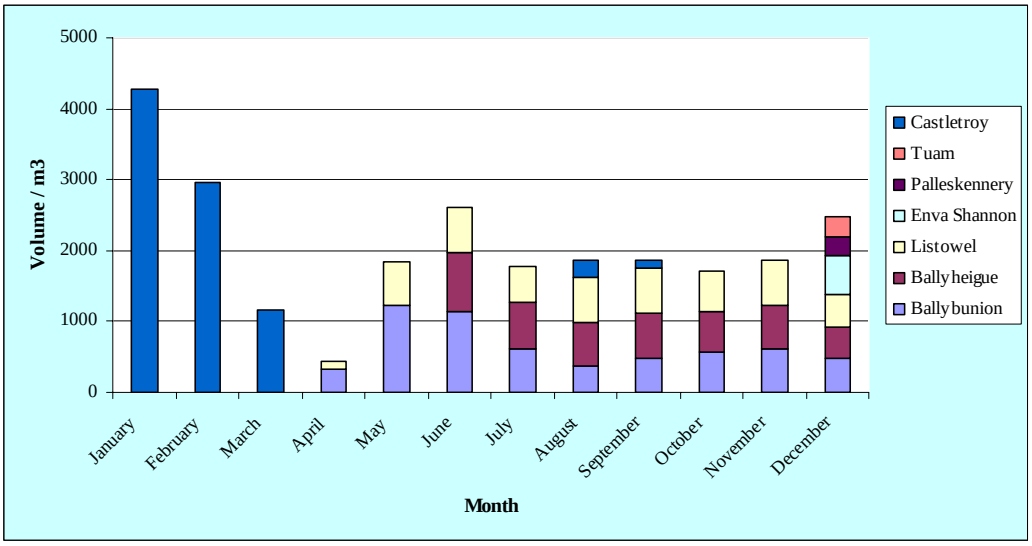
7.6 Volume of leachate produced and volume of leachate transported/discharged off-site

In total 23,668m^3 of treated leachate was discharged to the White River during 2011.

A volume of 24,827m^3 was tankered off site to waste water treatment plants. All tankered leachate was collected and sent to wastewater treatment plants (WWTPs) in Ballybunion, Ballyheigue, Listowel, Shannon, Pallaskenry, Tuam and Castletroy.

Figure 7.7 summarises the monthly volumes of leachate being tankered off-site. The total volume of leachate tankered off-site between January and December 2011 was 24,827 m^3 which was a decrease from 38,542 m^3 the previous year.

Figure 7.7 Monthly Tankered Leachate Details for 2011



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 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

Area	Type	Percentage run-off
55 hectares	Agricultural land	35%
11.6 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 2011) and percentage run offs from Table 7.6. Since the volumes are required monthly a figure for each month has been

generated in Table 7.6, and follows the procedure set out below for an annual figure.

Q = Area (m^2) x Rainfall (m for 2011) x 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^3/year. Since the rainfall data from 2011 is being used the Total Flow is specifically for 2011.

Table 7.6 Surface water flow from each area and total for the site 2011

Area (m^2)	Rainfall (m)	Percentage run-off	Q (m^3/year)
550,000	1.610	0.35	309,901
115,600	1.610	0.75	139,576
33,000	1.610	0.0	0
12,000	1.610	0.90	17,386
228,000	1.610	0.35	128,468
Total Flow (m^3)			**595,334**

Table 7.7 Monthly Surface water balance

Month 2011	Rainfall (m)	Record of discharge from surface water lagoons (m^3)
January	0.0982	36314.35
February	0.1899	70225.02
March	0.0506	18711.88
April	0.0576	21300.48
May	0.1676	61978.48
June	0.1470	54360.60
July	0.0982	36314.36
August	0.06542	24192.31
September	0.1504	55617.92
October	0.1664	61534.74
November	0.20836	77051.53
December	0.2102	77731.95
Annual Total	**1.60988**	**595,333.62**

Volumes of surface water discharge during 2011 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 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 January 2012 filling rates. The restoration dates indicate the period in which the restoration / final capping contract will be carried out. Cells 14/15 are filled to capacity and capped to subsoil layer. Cell 16 was sub-divided in two and the south end is filled to capacity and final capping is currently in progress.

A Closure Restoration & Aftercare Management plan (CRAMP) will be developed and submitted to the Agency in 2012.

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		Restored
12		Restored
13		Restored
14		Restored
15		Restored
16 West	Filled to capacity	Q2 2012
16 East	Current active cell	Q3 2013

9 *ENVIRONMENTAL MONITORING*

Monitoring is carried out according to Schedule C of Waste Licence W0017-04. 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 W0017-04, the following points are monitored on a monthly basis for methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), 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 and 13B, 14A, 15A and 16A.
- 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 location C21, on 12 occasions during the reporting period.

Carbon dioxide

Exceedances of the CO_2 trigger level occurred at several locations during the reporting period and are outlined in Table 9.1.

Table 9.1: Exceedences of CO_2 Trigger levels during 2011

Location	Date
C2	April, July, August, September, October, November, December.
C3	January, February, April, July, August, October, November, December.
C4	January, February, March, April, May, June, July, August, September, October, November, December.
C5	June,
C8	July, August,
C11	August, September, October, November, December.
C14	June
C15	October, November, December.
C17	January, February, March, April, May, June, July, August, September, October, November, December.
C19	June, July, August, September, October, November, December.
C20	September
C21	January, February, March, April, May, June, July, August, September, October, November, December.
C22	January, February, April, May, June, July, September October, November, December.

These exceedances are not accompanied by elevated methane levels. Exceedances of CO_2 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 2011 reporting period.

9.1.3 Gas Vent Monitoring

Gas quality is measured at a total of 16 points. Results for most cells indicate that levels of CH_4 and CO_2 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 Utilisation Plant

TMS Environment Ltd personnel conducted the monitoring surveys for the landfill gas flare on 22nd November 2011. All parameters monitored over the course of the survey complied with the Waste Licence limits.

9.2 Dust

On-site dust monitoring was carried out by TMS Environment Ltd 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 Dustfall, Determination of Dustfall 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^2-day			
	25/01/2011 - 22/02/2011	21/04/2011 – 18/05/2011	25/07/2011 – 08/09/2011	17/11/2011 – 15/12/2011
D-1	126	143	266	186
D-3	30	141	[1]	170
D-4	63	58	212	258
D-5	70	96	280	143
D-6	39	190	243	346
D-7	[1]	103	289	312

Notes:
[1] Not reported due to organic contamination present in the collection vessel.

There were no exceedances of the limit of 350mg/m^2/day as specified in Schedule B.1 of the waste licence.

9.3 Odour

On-site odour monitoring was carried out quarterly by TMS Environment Ltd as per Schedule C.3. Odour monitoring was carried out at six monitoring locations namely Noise Monitoring Locations M1, M2, M4, M5, 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 TMS Environment Ltd personnel on the 21st and 22nd of November 2011 to satisfy condition 6.9 of Waste Licence Register W0017-04. Results are included in Table 9.3 and in Figures 9.1 and 9.2. The two figures also include the relevant license limit.

Table 9.3: Noise Monitoring Results

Monitoring Point	L_{Aeq} 30 mins	
	Daytime	Night time
	21/11/2011	21 & 22/11/2011
M1	46 **51**	34
M3	66*	35
M4	59*	34
M5	59*	33
M6	46 **51**	35
M7	64* **69***	34 **39**
M9	69* **74***	33
M10	67*	44
M11	54	35 **40**

(Exceeds licence limit)*

The report by TMS Environment included the following conclusions:

Daytime noise levels measured during the course of the survey exceeded the licence limit of 55dB(A) at six of the monitoring locations, namely M-3, M-4, M-5, M-7, M-9 and M-10. These exceedances were due to a combination of the noise levels associated with landfill capping activities occurring at the site and also noise interference experienced during the measurements including passing local traffic, wind noise and dogs barking.

Night time noise levels measured during the course of the survey were within the licence limit of 45dB(A) at all monitoring locations.

Monitoring locations M-1, M-6, M-7 and M-9 had tonal components during the daytime survey but were not attributable to activity at the landfill site.

Monitoring locations M-7 and M-11 had tonal components during the night time survey but again were not attributable to activity at the landfill site.

Figure 9.1 2011 Daytime Noise Results

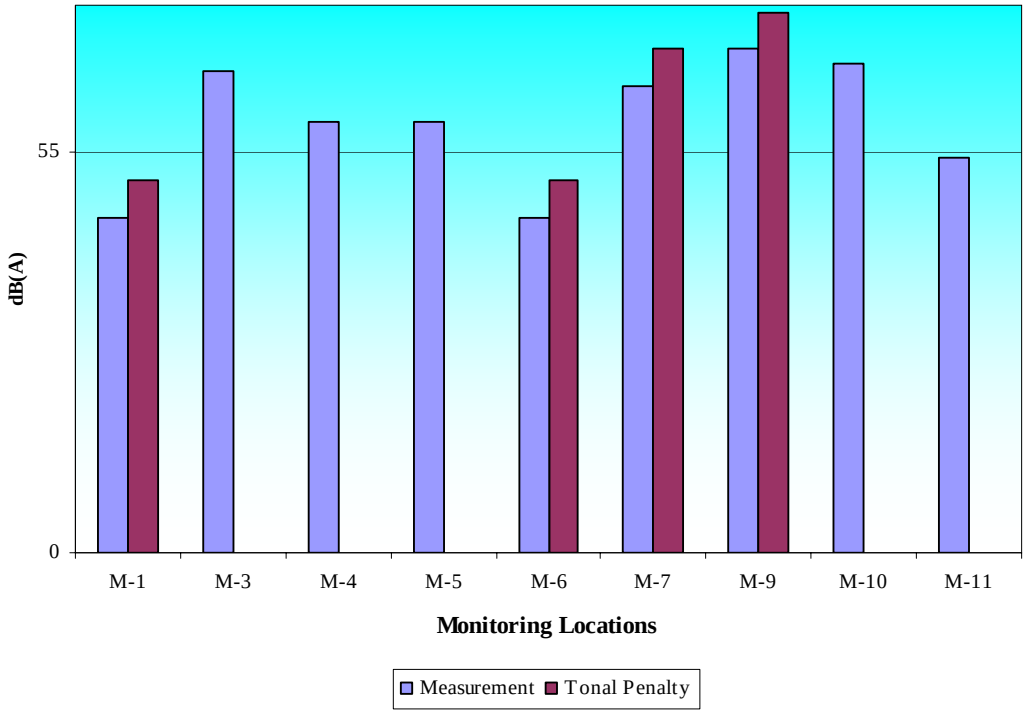
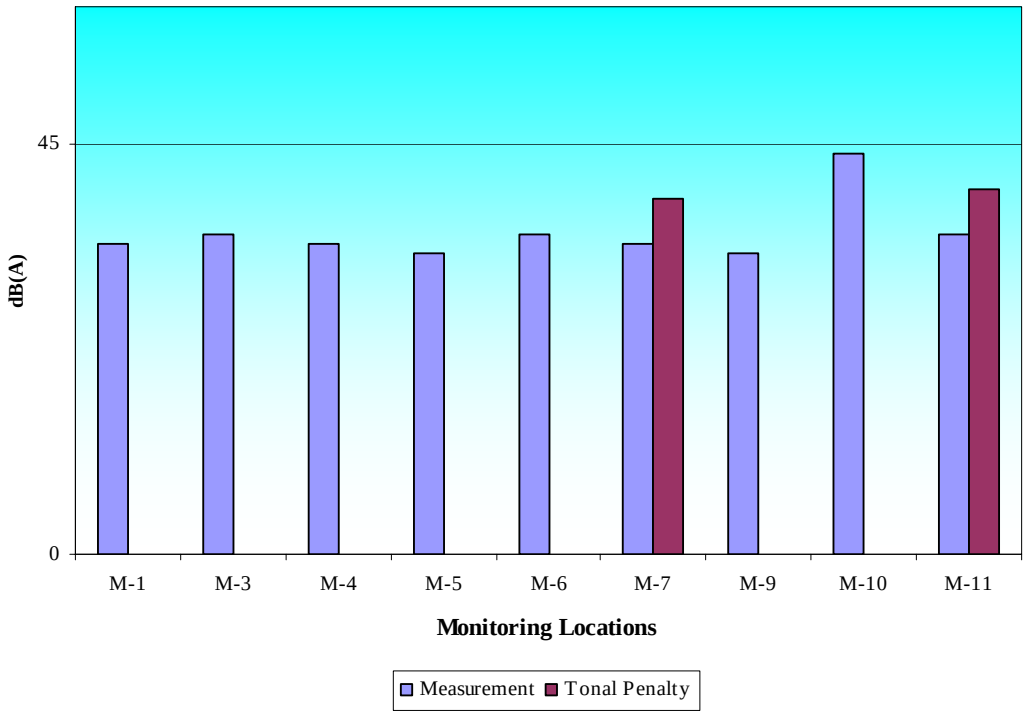


Figure 9.2 2011 Night-time Noise Results



9.5 Surface Water

Under Schedules C.2.3 and C.3 of Waste Licence W0017-04 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 stormwater 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, colour and vegetation growth are recorded. Inspections throughout the reporting period noted that surface water was generally of good quality. Occasionally there was no flow experienced at monitoring locations SW1 and SW2 in 2011.

9.5.2 Chemical Analysis

Quarterly and annual samples from 12 surface water monitoring locations were taken as specified in Waste Licence W0017-04. 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 2011 was from 254 uS/cm at S6 to 710 uS/cm at SW4. 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 SW3 (0.96 mg/l) during Quarter 1 and SW 9 (0.82 mg/) during Quarter 3.

The measured results for BOD ranged from < 1 mg/L to 4.0 mg/L. All monitoring location results are within the MAC A3 limit of the Surface Water Regulations. Results have shown that COD concentrations ranged from 5 mg O_2/L to 81 mg O_2/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 range from 12 mg/l Cl to 62 mg/l Cl at the surface water monitoring locations.

The results for suspended solids for some of the monitoring locations are low at < 5mg/l. The highest concentration of suspended solids of 88 mg/l was detected at monitoring location S8, where the flow of water was very low and disturbance of the bottom sediments may have caused the high suspended solids result. In total, three monitoring results exceeded the A1 quality standard MAC of 50mg/L, S7 during Quarter 1 at 55 mg/L and again in Quarter 3 at 65 mg/l, and SW8 during Quarter 3 at 88 mg/L.

Stormwater 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 stormwater tank were not exceeded for suspended solids, pH and conductivity. The samples collected on the 9th March 2011 and the 15th December 2011 exceeded the trigger limit for Ammonia. Both of these samples were grab samples and did not exceed the 1.2 times the emission limit as per licence condition 4.3.3.

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.

The analysis results for nitrate are within the expected range for surface water and within the A1 Quality Standard (SI 294 of 1989).

Results for sulphate concentrations ranged from < 1.0 mg/l SO_4 at eight of the monitoring locations to 40.6 mg/l at SW3. All sulphate measurement results are within the MAC levels. Sulphate results are generally lower for this monitoring interval than they were for the 2010 annual measurements.

All orthophosphate results were below the laboratory limit of detection at < 0.08 mg/L PO_4 while the total phosphorous results ranged from 0.03 mg/L P at SW3 to 0.198 mg/l P at S7. The orthophosphate results are generally lower this year than they were in 2010 and all results are within the MAC levels for orthophosphate.

The TON results ranged from < 0.29 mg/l N at SW11 to 2.12 mg/l N at S1 and are generally similar in value to the results obtained at the site for the 2010 monitoring.

Table 9.4 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, ^{o}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^{o} C	1000	1000	1000	NS
pH	5.5 – 8.5	5.5 – 9.0	5.5 – 9.0	6 - 9
BOD, mg/L	5	5	7	≤ 5
COD, mg/L	NS	NS	40	NS
Chloride, mg/L	250	250	250	NS
Ammonia, mg N/L	0.16	1.17	3.1	0.77
Suspended solids, mg/L	50	NS	NS	≤ 25
Nitrites, mg/l NO_2	NS	NS	NS	< 0.05
Nitrates, mg/l NO_3	50	50	50	NS
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_4	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

NOTES

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

A total of 23,668m^3 of treated leachate was discharged to surface water in 2011.

9.5.4 White River

As required under ScheduleC.3, a biological survey of the White River was conducted on 15th September 2011.

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

Table 9.5 Biological Water Quality along the White River

Year	Q Rating Result at Monitoring Location (A – D)			
	A	B	C	D
1997	Q4	Q4	Q4	Q4
2000	Q4	Q4	Q4	Q3 - 4
2001	Q4	Q3 - 4	Q4	Q3 - 4
2002	Q4	Q3 - 4	Q3 - 4	Q3 - 4
2003	Q3 - 4	Q4	Q4	Q4
2004	Q4	Q4 - 5	Q4	Q4
2005	Q4	Q4	Q4	Q4
2006	Q4	Q4	Q4	Q4
2007	Q4	Q4	Q4	Q4
2008	Q3-4	Q4	Q4	Q4
2009	Q3	Q3	Q3	Q3
2010	Q4	Q4	Q4	Q4
2011	Q4	Q4	Q4	Q4

These figures show that water quality remained the same at all four locations over the last year. All sites merited a rating of Q4 indicating unpolluted conditions and fair water quality.

The results of the present biological water quality assessment do not indicate any adverse impact on the Owvane River from the landfill at Gortadroma.

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 W0017-04, monthly levels were recorded and quarterly/annual analysis conducted on groundwater monitoring points GW2B, GW2O, GW8O, GWSA2, GW3O, GW5, GW6O, GW6B, GWSA1, GW7B, GW4O, GW7O, GW11B, GW11O, GW10O, GW10B, GW1O and Collins' Well.

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 groundwaters should be potable. Analysis of groundwaters during this reporting period indicates that the overall water quality has generally been satisfactory.

Ammoniacal nitrogen has been found in most wells across the site and a number of wells have consistently elevated levels. GW10B had the highest level of ammonia measured across the site with a high of 1.87 mg/L N being recorded here in Quarter 1. 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 2011.

The measured results for electrical conductivity ranged from 342µS/cm at GWSA1 to 923µS/cm at Collins' Well in 2011. Trigger levels set for Conductivity at SA1 (800 µS/cm), GW5 (800 µS/cm), and Collins Well (1,500 µS/cm) were not exceeded at any time during 2006.

Chloride levels were below the trigger levels set for all of the 2011 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 < 1.0 mg/l to 154 mg/l (recorded at GW7B). 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. Mercury and nickel were the only metals that were detected below the laboratory limit of detection for all monitoring locations while trace levels of cadmium, chromium, copper, lead, manganese and zinc were detected in most of the groundwater monitoring locations.

Results for all metals at all monitoring locations meet the Parametric Limit Values from the Drinking Water Regulations with the exception of iron, lead and manganese. Iron concentrations at GW2O with a measurement result of 0.67 mg/L exceeds the parametric limit value of 0.2 mg/l. Similarly, manganese concentrations measured at GW5 (0.150 mg/l) and Collins Well (0.585 mg/l) also exceed the Parametric Limit Value of 0.05 mg/l. Both iron and manganese are naturally present in the local groundwater and reflect the basic solid geology of the area and these concentrations are of little significance. Lead concentrations exceeded the limit of 0.01 mg/l at all locations monitored but are

within the limit of 0.025 mg/l for the majority of locations. The 0.025 mg/l limit is applicable until December 24th 2013 and will reduce to 0.01mg/l from December 25th 2013. It should be noted that the wells sampled are monitoring wells only and not used for drinking water purposes. Metal results for the 2011 monitoring interval are generally similar to the concentrations found at the site in 2010.

Total Coliforms were detected in all groundwater wells tested except Collins Well. Faecal Coliforms were tested through analysis for E Coli and faecal coliforms were not detected at any wells except GW2O, GW3O, and GW7O.

9.6.2 *Private Wells*

Samples from private boreholes were taken within the 500m boundary of the Gortadroma landfill. There were 14 private wells in total located both up-gradient and down-gradient of the landfill site.

Seven of the private wells were determined to be contaminated with total coliforms while one of the fourteen wells was contaminated with faecal coliforms. One of the wells (PW6) exceeded the Drinking Water Regulations, SI No. 278 of 2007, parametric value for iron and seven of the wells exceed the parametric limit value for manganese. Two of the wells (PW17 and PW18) exceeded the parametric value for nickel.

List I/II substances were not detected at any of the monitoring locations and are reported as below the laboratory limit of detection for all wells.

9.7 Leachate

9.7.1 Leachate Levels

Leachate levels exceeded 1 meter over the base liner at the collection point of cells 7/9 and 8/10 during the periods 01/01/2011 to 08/09/2011 and 21/11/2011 to 31/12/2011.

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 W0017-04. 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 onsite on the day of sampling. Conductivity (888 µS/cm) is significantly lower than that recorded in 2010 (11,090 µS/cm) and the pH result (8.1) is within the expected concentration range.

Ammonia (536 mg/L as N) and Sulphate (< 5 mg/L SO_4) concentrations are similar to those found in the previous annual monitoring. Chloride concentration is slightly lower than last years result with a value of 910 mg/L. Total Oxidised Nitrogen concentration was found to be < 0.29 mg/L as N and is the same as last years result.

Concentrations of metals are generally of similar concentrations to the levels found in 2010 with the exception of copper which is much reduced this year at 0.017 mg/L. Trace concentrations of cadmium (0.0014 mg/L), chromium (0.1308 mg/L), copper (0.017 mg/L), nickel (0.174 mg/L), zinc (0.101 mg/L) and lead (0.029 mg/L) were found. Sodium (937 mg/L), calcium (228 mg/L) and potassium (403 mg/L) were also detected and are similar to the levels found in 2010. There was an decrease in the concentration of total phosphorous from 4.5 mg/l P to 2.88 mg/l P on the previous annual monitoring event. Iron (6.65 mg/L) and manganese (2.09 mg/L) were also detected.

A Fluoride concentration of 0.2 mg/L was recorded while total cyanide was below the laboratory limit of detection (< 0.008 mg/L). Volatile organic compounds (VOCs) and semi volatile organic compounds were below the laboratory limit of detection in all cases except for phenol (1,010 ug/L) and 3 & 4-Methylphenol (1,420 ug/L).

9.7.3 Leachate Treatment Plant

The following volumes were treated leachate was discharged to the White River during 2011.

Month	Volume of Treated Leachate Discharged / m^3
January	0
February	0
March	992
April	2,587
May	1,772
June	2,590
July	1,584
August	1,448
September	3,016
October	2,901
November	3,535
December	3,243

All treated leachate discharged during 2011 complied with the licence limits.

9.8 Meteorological Monitoring

Meteorology is monitored in accordance with Schedule C.3 of Waste Licence W0017-04. 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

The annual rainfall recorded in 2011 was 1609.88mm and the annual evaporation was 766.05mm.

9.9 Ecological Monitoring

The 2010 survey, carried out on the 26th July 2010, concluded that in general, habitats on the Site range from low to moderate local ecological value. Areas of wet grassland to the south of the Site, the coniferous and broadleaved treeline and woodland plantations and the hedgerows in the eastern area of the Site provide good foraging and roosting habitat for a variety of bird species.

Compared to the 2009 survey the only changes relate to continued recolonisation of bare areas, with a small area of soil excavated for capping purposes (involving the removal of a small area of wet grassland directly adjacent to the active landfill cells). Although areas of wet grassland and hedgerow have been lost in the eastern area of the Site as a result of the construction of the landfill cells, continued phased development and ongoing restoration will ensure that significant areas of seminatural habitat remain. Two areas of the Site lie within the 'Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle' SPA. These are the restored grassland area to the east of the drainage ditch which divides the eastern and western sections of the Site, and the spruce plantation along the eastern boundary of the Site. As these areas lie within the SPA boundary, they are considered to be of international importance. Overall the Site is currently of minor local ecological value for mammals, particularly in the active landfill area where a high level of related works are ongoing. The smaller mammals provide a food source for larger mammals such as fox and also for birds of prey such as hen harrier, for which part of the Site is designated as an SPA. Minor negative impacts on

mammals at the Site are anticipated as a result of habitat loss; however restoration of former landfill cells to replace lost habitats is likely to reduce these impacts to neutral. It is likely that mammal use of the overall Site will increase once landfill operations are complete, especially in sections set aside from operational activities including screening, planted woodlands, grasslands and ponds.

The White River is known to provide excellent habitat for the EU Annex II species otter (BES, 2006). No evidence of this species' presence was observed on the Site. Ongoing Site activities do not currently appear to impact on the White River or this species.

The Gortadroma landfill site was surveyed for habitats, birds and mammals at appropriate times of the year in 2011. The results of this survey were compared to a similar exercise undertaken in 2010 (Golder Associates, 2010). It was found that no significant changes to the species composition has occurred in this time. The record of Smooth Newt on the site is new while certain birds were noted in 2010 but not in 2011. These are Wren *Troglodytes troglodytes,* Dunnock *Prunella modularis,* Jackdaw *Corvus monedula,* Song Thrush *Turdus philomelos* and Kestrel *Falco tinnunculus.* Meanwhile Heron, Linnet, Robin, Pied Wagtail, Coal Tit, Blue Tit, Great Tit, Pheasant, Bullfinch, Goldcrest, Collared Dove and Starling were all noted in 2011 but apparently absent in 2010. Birds are inherently dynamic and this may explain these changes, while the 2010 survey was undertaken in July which is marginally past the optimal survey season for breeding birds. There is no apparent change to the level of mammal activity based on the 2010 report.

Based on available information, it is concluded that the Gortadroma landfill is not having any significant adverse impacts on the terrestrial ecological interests of the area.

9.10 Pollution Emissions Register

The pollution emissions register is described in Appendix II.

10 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 FINANCIAL ARRANGEMENTS

Reports on financial provision made under this licence, management and staffing structure of the 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 W0017-04 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.

LCC will issue a financial statement under Section 53A to the Agency in April 2012.

12.0 STAFF TRAINING

All site staff received waste inspection training from RPS Consulting Engineers during 2012.

APPENDIX I

Objectives and Targets for 2012

		Targets & Objective 2012			
	Objective	**Reason for Undertaking Project**	**Project Summary**	**Target in 2012 EMP.**	**Responsibility for Project.**
1	Install final cap on southern end of cell 16.	Increase gas collection efficiency and reduce leachate production	SEW sent to Agency for agreement. Capping contract to be extended.	Quarter 1 2012	Limerick County Council.
2	Area south of cell 16 and east of cells 14/16 to be lined to specification as per condition 3.18 of the waste licence.	To enable slopes to be finished to 1:3 gradient for final capping.	SEW sent to the Agency for approval.	Quarter 2 2012	Limerick County Council
3	Horizontal gas collection pipe work to be installed in the east side of cell 16.	Reduce landfill gas emissions	Horizontal gas collection pipe work to be installed during landfill in the east side cell 16.	Ongoing	Limerick County Council
4	Extend Scada control to pumps in extension area.	Increase control and monitoring.	Pumps and hard wiring installed. New software installed.	Quarter 1 2012	Limerick County Council and Dynamic Automation.

APPENDIX II

Pollution Emissions Register

| PRTR# : W0017 | Facility Name : Gortadroma Landfill Site | Filename : W0017_2011.xls | Return Year : 2011 | 05/03/2012 14:54

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.13

REFERENCE YEAR	2011

1. FACILITY IDENTIFICATION

Parent Company Name	Limerick County Council
Facility Name	Gortadroma Landfill Site
PRTR Identification Number	W0017
Licence Number	W0017-04

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.
3.1	Deposit on, in or under land (including landfill).
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.
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	##########
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.
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.

Address 1	Gortadroma
Address 2	Ballyhahill
Address 3	Co. Limerick
Address 4	
	Limerick
Country	Ireland
Coordinates of Location	-6.45823 53.8084
River Basin District	IEGBNISH
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	JOHN O CARROLL
AER Returns Contact Email Address	jocarroll@limerickcoco.ie
AER Returns Contact Position	LANDFILL MANAGER
AER Returns Contact Telephone Number	069-82355
AER Returns Contact Mobile Phone Number	087-7565449
AER Returns Contact Fax Number	069-82350
Production Volume	0.0
Production Volume Units	
Number of Installations	1
Number of Operating Hours in Year	2210
Number of Employees	9
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

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

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

Is it applicable?	
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	

Is the reduction scheme compliance route being used ?	

4.1 RELEASES TO AIR

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		Landfill gas engine			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	E	ESTIMATE	Gassim Model	0.0	2913256.0	0.0	2913256.0
03	Carbon dioxide (CO2)	E	ESTIMATE	Gassim Model	0.0	21173000.0	0.0	21173000.0
08	Nitrogen oxides (NOx/NO2)	M	OTH	Flue gas analyser	1804.56	1804.56	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	OTH	Flue gas analyser	17.52	17.52	0.0	0.0
02	Carbon monoxide (CO)	M	OTH	Flue gas analyser	2969.64	2969.64	0.0	0.0
86	Particulate matter (PM10)	M	OTH	Isokinetic sampling/gravimetric analysis	8.76	8.76	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

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

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Gortadroma Landfill Site

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	4522262.0	C	OTH	Gassim Model	N/A	
Methane flared	439643.0	M	OTH	Landfill gas survey	2000.0	(Total Flaring Capacity)
Methane utilised in engine/s	1169383.0	M	OTH	Landfill gas survey	600.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	2913256.0	C	OTH	Total estimated methane ge	N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of surface waters or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only includes

RELEASES TO WATERS					Please enter all quantities in this section in KGs				
POLLUTANT			Method Used		QUANTITY				
No Annex II	Name	M/C/E	Method Code	Designation or Description	SW4- Storm Water Discharge Emission Point 1	Treated Leachate Discharge Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
18	Cadmium and compounds (as Cd)	M	ALT	ISO 11885:2007	0.774	0.0	0.774	0.0	0.0
19	Chromium and compounds (as Cr)	M	ALT	ISO 11885:2007	0.417	0.0	0.417	0.0	0.0
20	Copper and compounds (as Cu)	M	CRM	UKAS	6.549	0.0	6.549	0.0	0.0
21	Mercury and compounds (as Hg)	M	CRM	UKAS	0.06	0.0	0.06	0.0	0.0
22	Nickel and compounds (as Ni)	M	ALT	ISO 11885:2007	1.191	0.0	1.191	0.0	0.0
23	Lead and compounds (as Pb)	M	ALT	ISO 11885:2007	12.502	0.0	12.502	0.0	0.0
24	Zinc and compounds (as Zn)	M	ALT	ISO 11885:2007	6.549	0.0	6.549	0.0	0.0
34	1,2-dichloroethane (EDC)	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
61	Anthracene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
62	Benzene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
91	Benzo(g,h,i)perylene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
29	Chlorides (as Cl)	M	OTH	Standard methods for examination of water & wastewater 4500C	19205.0	0.0	19205.0	0.0	0.0
35	Dichloromethane (DCM)	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
79	Total benzene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
82	Fluoranthene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
90	Hexachlorobutadiene (HCBD)	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
93	Naphthalene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
49	Pentachlorophenol (PCP)	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
71	Phenols (as total C)	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
73	Toluene	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
17	Total nitrogen	M	CRM	UKAS	714.4	0.0	714.4	0.0	0.0
43	Total phosphorus	M	CRM	UKAS	27.38	7.327	34.707	0.0	0.0
80	Vinyl chloride	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
78	Xylenes	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0
26	Total organic carbon (TOC) (as total C or COD/3)	M	CRM	UKAS	6350.22	0.0	6350.22	0.0	0.0
42	Hexachlorobenzene (HCB)	M	CRM	UKAS	0.596	0.0	0.596	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT			Method Used		QUANTITY			
No Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

RELEASES TO WATERS					Please enter all quantities in this section in KGs				
POLLUTANT			Method Used		QUANTITY				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	SW4- Storm Water Discharge Emission Point 1	Treated Leachate Discharge Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
238	Ammonia (as N)	M	CRM	UKAS	197.65	11.779	209.429	0.0	0.0
303	BOD	M	CRM	UKAS	893.0	82.453	975.453	0.0	0.0
309	COD	M	OTH	Standard methods for examination of water & wastewater 5220D	19050.67	0.0	19050.67	0.0	0.0
240	Suspended Solids	M	OTH	Standard methods for examination of water & wastewater 2540D	4488.81	251.449	4740.259	0.0	0.0

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 01 39	No	5.08	plastics	R5	M	Weighed	Offsite in Ireland	South West Bins,WFP-10-003-02	KILMORNA,LISTOWEL,COUNTY KERRY,,,Ireland		
Within the Country	20 01 99	No	1.4	Tetra Packs	R5	M	Weighed	Offsite in Ireland	South West Bins,WFP-10-003-02	KILMORNA,LISTOWEL,COUNTY KERRY,,,Ireland		
Within the Country	20 01 01	No	30.32	Newspapers & Magazines	R3	M	Weighed	Offsite in Ireland	South West Bins,WFP-10-003-02	KILMORNA,LISTOWEL,COUNTY KERRY,,,Ireland		
Within the Country	20 01 02	No	10.29	glass	R5	M	Weighed	Offsite in Ireland	MR. BINMAN,W0061-03	LUDDENMORE,GRANGE,KILMALLOCK,COUNTY LIMERICK,Ireland		
Within the Country	20 01 01	No	9.68	Carboard	R3	M	Weighed	Offsite in Ireland	South West Bins,WFP-10-003-02	KILMORNA,LISTOWEL,COUNTY KERRY,,,Ireland		
Within the Country	20 01 99	No	1.02	Food Cans	R4	M	Weighed	Offsite in Ireland	MR. BINMAN,W0061-03	LUDDENMORE,GRANGE,KILMALLOCK,COUNTY LIMERICK,Ireland		
Within the Country	20 01 40	No	1.18	Drink Cans	R4	M	Weighed	Offsite in Ireland	MR. BINMAN,W0061-03	LUDDENMORE,GRANGE,KILMALLOCK,COUNTY LIMERICK,Ireland		
Within the Country	20 01 11	No	2.64	textiles	R5	M	Weighed	Offsite in Ireland	COOKSTOWN TEXTILE RECYCLERS,WMEX 01/11	COOKSTOWN TEXTILE RECYCLERS,36 MAGHERALANE ROAD,RANDALSTOWN,COUNTY ANTRIM,Ireland		
To Other Countries	20 01 35	Yes	9.04	Fridge Freezers	R4	M	Weighed	Abroad	KMK METAL RECYCLERS,W0113-04	KMK METAL RECYCLERS,CAPPINCUR INDUSTRIAL EST.,TULLAMORE,COUNTY OFFALY,Ireland	EUROPEAN METAL RECYCLING L.t.d,EPR/GP3292FT,BENTLEY ROAD SOUTH,DARLASTON,WEST MIDLANDS,WS10 8LW,United Kingdom	BENTLEY ROAD SOUTH,DARLASTON,WEST MIDLANDS,WS10 8LW,United Kingdom
Within the Country	20 01 36	No	5.64	LDA Non-Hazardous	R4	M	Weighed	Offsite in Ireland	KMK METAL RECYCLERS,W0113-04	KMK METAL RECYCLERS,CAPPINCUR INDUSTRIAL EST.,TULLAMORE,COUNTY OFFALY,Ireland		
Within the Country	20 01 36	No	3.06	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	R4	M	Weighed	Offsite in Ireland	TREVOR RATCLIFFE DELIVERIES L.T.D,MULTI REGIONAL PERMIT NO: WCP-DC-08-1130-01	BALLYSTAHAN,ST. MARGARETS,COUNTY DUBLIN,,,Ireland		
Within the Country	20 01 40	No	34.6	Mixed Scrap Metal	R4	M	Weighed	Offsite in Ireland	ERIN RECYCLERS,Facility permit number-SO-11-003-03	ERIN RECYCLERS,DEEPWATER QUAY,FINISKLIN SLIGO HARBOUR,SLIGO,Ireland		
Within the Country	16 01 03	No	3.96	end-of-life tyres	R5	M	Weighed	Offsite in Ireland	CROSSMORE TRANSPORT L.t.d, Facility Permit Number-CK(N)523/08	CARRIGDOWANE UPPER,ROCKMILLS,KILODERRERY,COUNTY CORK,Ireland		
Within the Country	19 07 03	No	4809.04	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	LISTOWEL WASTE WATER TREATMENT PLANT,D0179-01	LISTOWEL WASTE WATER TREATMENT PLANT,LISTOWEL,COUNTY KERRY,,,Ireland		
Within the Country	19 07 03	No	5852.44	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	BALLYBUNION WASTE WATER TREATMENT PLANT,D0183-01	BALLYBUNION WASTE WATER TREATMENT PLANT,BALLYBUNION,COUNTY KERRY,,,Ireland		

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	4359.16	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	BALLYHEIGUE WASTE WATER TREATMENT PLANT,D0186-01	BALLHEIGUE WASTE WATER TREATMENT PLANT,BALLYHEIGUE T,COUNTY KERRY,.,Ireland		
Within the Country	19 07 03	No	544.6	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	ENVA IRELAND ,W0041-01	ENVA IRELAND ,SMITHSTOWN INDISTRIAL EST.,SHANNON,COUNTY CLARE,Ireland		
Within the Country	19 07 03	No	259.83	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	PALLASKENERY WASTE WATER TREATMENT PLANT,D0304-01	PALLASKENERY WASTE WATER TREATMENT PLANT,PALLASKENERY ,COUNTY LIMERICK,.,Ireland		
Within the Country	19 07 03	No	275.86	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	TUAM WASTE WATER TREATMENT PLANT,D0031-01	TUAM WASTE WATER TREATMENT PLANT,TUAM,COUNTY GALWAY,.,Ireland		
Within the Country	19 07 03	No	8726.38	landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	CASTLETROY WASTE WATER TREATMENT PLANT,D0019-01	CASTLETROY WASTE WATER TREATMENT PLANT,CASTLETROY,COUNTY LIMERICK,.,Ireland		

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