BALLEALLY LANDFILL, BALLEALLY, LUSK, CO. DUBLIN

ANNUAL MONITORING REPORT:

Report Period: January 2010 – December 2010

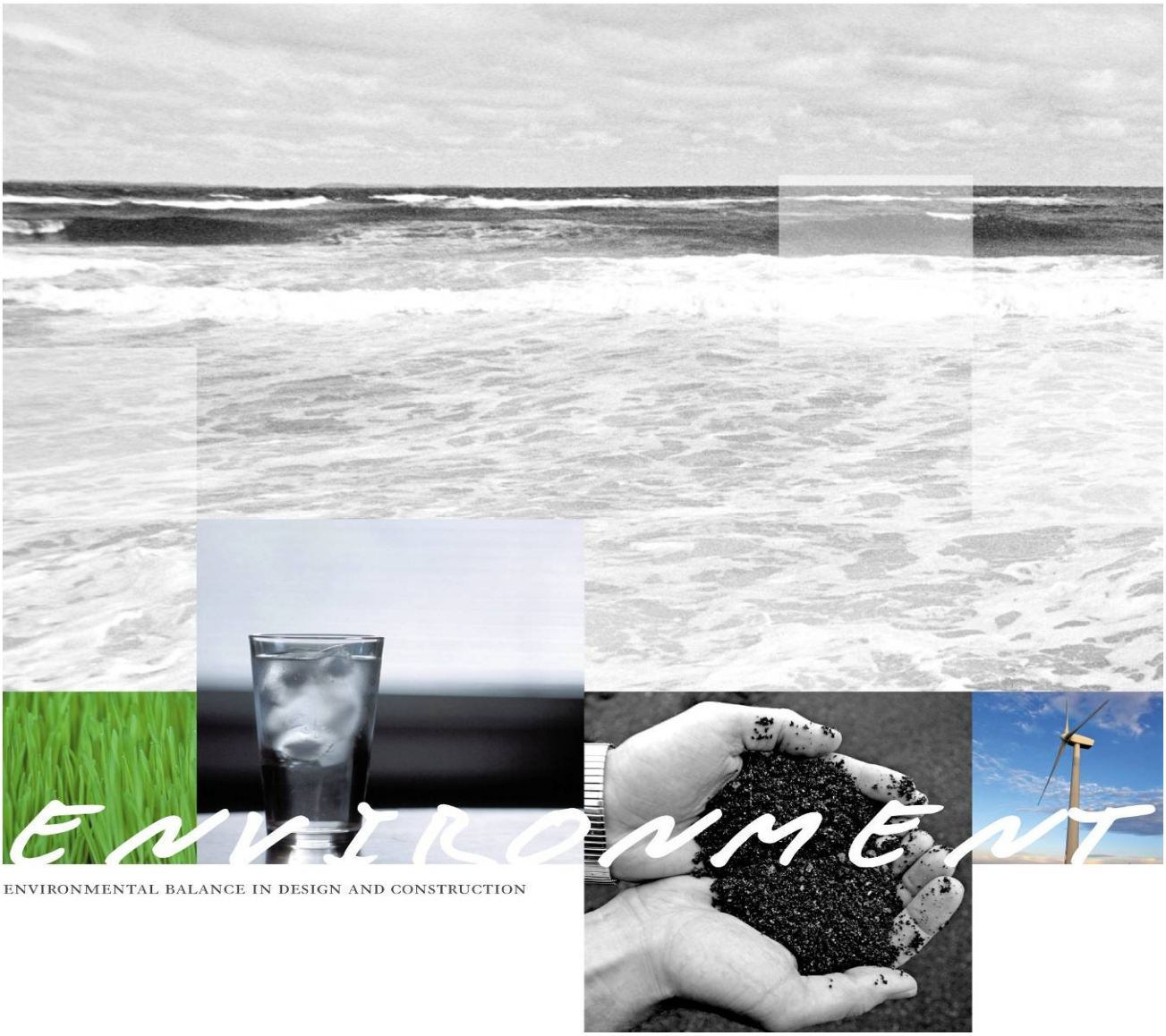
WASTE LICENCE REF. NO. W0009-03

ORIGINAL

March 2011

Fingal County Council
Comhairle Contae Fhine Gall

20 YEARS
FEHILY TIMONEY & COMPANY



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User is Responsible for Checking the Revision Status of This Document

Rev	Description	Prepared	Checked	Approved	Date:
0	Issue to client	DD/MG	DM	BG	28/03/2011

Client: Fingal County Council

Keywords: Annual Environmental Report, landfill environmental monitoring, landfill

Abstract: This report presents the Annual Environmental Report for Balleally landfill, Balleally, Lusk, Co. Dublin to the Environmental Protection Agency. The report covers the annual reporting period of 2010, in accordance with Waste Licence Reg. No. W0009-03.

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Section 1

Introduction

1. INTRODUCTION

In 2000 Fingal County Council (FCC) was granted a Waste Licence, Reg. 9-1 to continue operating Balleally Landfill. In July 2001 FCC applied for a review of this licence. On the 8th January 2003 the Environmental Protection Agency (EPA) issued FCC a second waste licence for Balleally Landfill: Waste Licence W0009-02. This licence supersedes the previous licence 9-1 and it permits the operation of a non-hazardous landfill. Waste licence number W0009-03 came into action on the 21st December 2009. In accordance with the requirements of Condition 11.6 of the Waste Licence, an Annual Environmental Report (AER) for the facility must be submitted to the EPA.

This report was part written by both Fehily Timoney & Company (FTC) and FCC. FTC wrote the environmental monitoring section (sections 3.1 through section 3.6), while FCC wrote all other sections. The report was compiled by FTC on behalf of FCC.

1.1 Reporting Period

The reporting period for the AER is 1st January to 31st December 2010. This is the 10th AER for the facility as required by the waste licence. This AER applies to the licence W0009-03.

1.2 Facility Location

FCC has responsibility for the management and operation of the facility. The facility is located at:

Balleally Landfill,
Balleally Lane,
Lusk,
Co. Dublin
Tel. / Fax. (01) 8431600

National Grid reference: 322500 252200.

Drawing DE07-164-03-001-(B) included in Appendix I presents a map of the facility and the surrounding locations.

1.3 Environmental Policy for Balleally

- Comply with the terms of our waste licence and all other relevant legislation and codes of practice.
- Strive for continuous improvement in the running of the facility, in order to minimise the effects of the landfill on the environment.
- Create better awareness and training for all staff involved in the running of the landfill.
- Develop a good relationship with local residents around Balleally for the betterment of the surrounding area.

Section 2

Site Description, Waste Activities & Records

2. SITE DESCRIPTION, WASTE ACTIVITIES & RECORDS

Balleally Landfill is situated in Lusk, Co. Dublin. It has been in operation since 1971. Waste activities at the facility include landfill, special handling, a construction and demolition (C&D) recycling facility (which ceased in August 2005 due to capping commitments) and a civic amenity site (which ceased in December 2008 due to capping / operational commitments).

Condition 4.2 of W0009-03 restricts waste filling activities to meet Figure 2 of the 'Landscape Master Plan'. The final height of the facility shall be as shown in Figure 2 of the 'Landscape Master Plan'. The final height of the facility peak shall not exceed 40 mOD Malin Head.

On January 8th 2003 FCC was licensed to carry out the following waste activities at Balleally Landfill, Lusk, Co. Dublin subject to twelve conditions.

2.1 Licensed waste activity at the facility

Licensed waste disposal activities, in accordance with the Third Schedule of the Waste Management Act, 1996.

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 10 Release of waste into a water body (including a seabed insertion).

Class 12 Repackaging 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.

Licensed waste recovery activities, in accordance with the *Fourth Schedule* of the Waste Management Act, 1996.

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 metals.

Class 9: Use of any waste principally as a fuel or other means to generate energy.

Class 11: Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.

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

2.2 Total Quantity of Waste Accepted & Deposited

Waste received at Balleally to be disposed of at the landfill is weighed at the weighbridge on entry. Construction and demolition (C&D) material is also weighed and then stockpiled or used immediately for use in Specified Engineering Works (SEW). The quantity and composition of waste received, disposed of and recovered during the reporting period is detailed in Table 2.1.

Table 2.1: Quantity and composition of waste received at the facility 2005 - 2010

Location & Waste Type	Waste Deposited (tonnes) in 2005	Waste Deposited (tonnes) in 2006	Waste Deposited (tonnes) in 2007	Waste Deposited (tonnes) in 2008	Waste Deposited (tonnes) in 2009	Waste Deposited (tonnes) in 2010
Tipface						
Household	66,203	62,056	63,708	50,489	37,789	30,769.86
Commercial/Trade	49,195.57	63,819	61,773	46,248	54,093	56,866.74
Sewage Sludge	3,402.24	4,623	7,466	5,091	315	360.84
Industrial Non-Hazardous Sludge	6,635	6,825	7,061	6,660	6,363	6,690
Civic Amenity					**CLOSED**	**CLOSED**
Household	5,801	4,891	4,867	3,959		
Local Fly Tipped			62	10		
Total	**131,236.81**	**142,214**	**144,937**	**112,457**	**98,560**	**94,687.44**

Note:-Table does not include materials used in SEW.

2.3 Remaining landfill capacity

As part of the Waste Management Strategy for the Dublin Region an extension to the landfill facility was applied for by reviewing the then current licence W0009-01. This was granted on 8th January 2003 (W0009-02) and Priority Construction Ltd. under the supervision RPS-MCOS were appointed to construct 6 No. lined cells at Balleally to provide an additional capacity of 1.29 million m3. Filling of Cell 1 started on 1st April, 2004 – Table 2.2 for information on inputs to date.

Filling of:

- Cell 1 commenced – 1st April, 2004
- Cell 2 commenced – 8th June, 2004
- Cell 3 commenced-22nd June, 2005
- Cell 4 commenced – 6th October, 2006
- Cell 5 commenced – 23rd August, 2007
- Cell 6 commenced – 15th December, 2008
- Cell 5 & 6 Piggybacking – 2009.

The remaining capacity in the landfill was surveyed in September 2010. Remaining capacity at the end of 2010 is estimated as 120,000 tonnes.

Table 2.2: Air Space Reconciliation for the Facility, 2010

Description	Tonnes	Cubic Metres
Waste Inputs Jan – Mar 2004	48,802	61,003
Landfill Extension	**Tonnes**	**Cubic Metres**
Total Inputs Apr-Dec 2004	145,223.10	
Total Inputs Jan-Dec 2005	131,236.81	
Total Inputs Jan-Dec 2006	142,215.75	
Total Inputs Jan-Dec 2007	144,937.00	
Total Inputs Jan-Dec 2008	112,457.00	
Total Inputs Jan-Dec 2009	98,560.00	
Total Inputs Jan-Dec 2010	96,459.28	
TOTAL	871,088.94	**1,088,861**
ORIGINAL LICENCE LIMIT WL0009-02	1,032000	**1,290,000**
Remaining Licence Limit	160,911	**201,139**

Table does not include materials used in SEW.

Waste density of 0.85 tonnes/m^3 used for above calculations

Void Space: Total Filled + Total Remaining
1,290,000 m^3 = 1,088,861 m^3 + 201,139 m^3

2.3.1 Balleally landfill short term extension

The extension to the facility is approximately 98,200 m^2 (surface area) with composite liner system and leachate collection system together leachate collection chambers. It provided for approximately 1.04 million tonnes of waste.

Table 2.3: Void Space at Balleally Landfill Extension

Cell	Plan Area *m^2*	Surface Area *m^2*	Void Space *m^3*	Void Space *(tonnes)*
Cell 1	15000	18000	193,373.00	164,367.05
Cell 2	18200	19000	306,338.00	260,387.30
Cell 3	13600	14300	204,001.00	173,400.85
Cell 4	15300	16500	265,933.00	226,043.05
Cell 5	16200	17300	283,991.00	241,392.35
Cell 6	12200	13100	160,101.00	136,085.85
Total	**90,500**	**98,200**	**1,413,737**	**1,201,676.45**

Assumptions:

- Geosynthetic Capping of 1.06 m.
- 10% Daily cover to be absorbed by settlement
- Waste density of 0.85 tonnes/ m^3

2.4 Local environmental conditions

Balleally landfill site covers 50 ha in total. The east face of the landfill is bordered by the Dublin-Belfast railway line and to the south by Rogerstown Estuary. See Drawing DE07-164-03-001-(B) included in Appendix I.

The former landfill facility was approx. 40ha. The extension to this facility to the north west of the site (OS National Grid Ref. 3225E 2522N) consists of a new engineered lined cell (approx. 10 Ha). The primary objective of its design is to prevent or reduce negative effects on the environment arising from landfilling of waste.

All waste is deposited in a limited working face, covered daily and surrounded by soil bunds. The entire site is surrounded by perimeter berms to reduce the visual impact and to create shelter to minimise the conditions that create windblown litter.

Section 3

Environmental Monitoring

3. ENVIRONMENTAL MONITORING

All original monitoring results certificates issued by Alcontrol Laboratories Ltd., for surface water, groundwater, leachate and outfall monitoring results and from Southern Scientific Services Ltd., for dust and particulate monitoring have been already included and submitted to the EPA in the four quarterly reports submitted during the reporting period. The original results certificates are not included again in this report. This report only presents summary data.

3.1 Groundwater

This section of the Annual Environmental Report presents the groundwater monitoring results.

3.1.1 Monitoring Locations

Groundwater monitoring was carried out at the locations shown on Drawing DE07-164-03-001-(B), Appendix I. As part of a previous extension to the landfill a number of the boreholes stipulated in W0009-02 are no longer accessible. During July 2004 a revised monitoring schedule was agreed with the Environmental Protection Agency (EPA) on which the present monitoring is based. Details of the groundwater locations now monitored are presented in Table 3.1.

Monitoring location MB18 is located up-gradient, approximately 535 m north of the landfill on private agricultural land. Access to the monitoring location was not granted during the monitoring period.

Table 3.1: Groundwater Monitoring Locations

Station	Classification	Easting	Northing
MB18	Eastern Upgradient	323 245	252 783
RC3	Western Upgradient	321 906	252 729
MB35	Southwestern Downgradient	322 029	251 906
CD1	Control Drain N/W of Cell 1	322 008	252 356

3.1.2 Location Description

Borehole MB35
This borehole is situated approximately 190 m south of the landfill on the edge of the Inner Rogerstown Estuary, downgradient of the landfill.

Location CD1
The control drain sampling location CD1 is situated approximately 30 m south of Balleally Lane west of the landfill extension. This drain collects groundwater from underneath the newly constructed lined cells.

MB18
This is an upgradient private well of Rogerstown House which lies to the north east of the landfill site along the estuary.

RC3
This upgradient borehole is situated approximately 535 m north of the landfill on private agricultural land.

3.1.3 Monitoring Parameters

Groundwater levels were monitored and a visual assessment was performed on a monthly basis at all groundwater wells. Groundwater monitoring location CD1 is sampled monthly and analysed for quarterly groundwater parameters, listed in Table D.5.1 of the Waste Licence. MB35 and RC3 are sampled quarterly and analysed for quarterly groundwater parameters, listed in Table D.5.1 of the Waste Licence.

Annual groundwater monitoring was also undertaken for CD1, MB35 and RC3 and the results are presented in Table 3.2

3.1.4 Interpretation of Results

Table 3.2. presents a summary of the groundwater chemical analysis results.

The groundwater results have been compared to the relevant Interim Guideline Value (IGV) set out in the EPA report '*Towards Setting Guideline Values for the Protection of Groundwater in Ireland'.* It should be noted that the groundwater beneath the landfill is likely to be estuarine in nature and would not generally be considered to be potable water.

Monthly monitoring at CD1 shows that chloride results varied through the reporting period. Results were observed higher in quarter 1 and fell during quarter 2 and quarter 3, only to increase again in quarter 4. BOD results remained constant through the reporting period. COD results remained constant apart from a spike in readings during July, which returned to more normal levels during August (Figure 3.1).

Quarterly monitoring at groundwater locations indicates that ammoniacal nitrogen levels are lower up gradient at RC3 than down gradient at MB35, suggesting potential landfill impact downgradient (Figure 3.2).

The quarterly chloride (Figure 3.3) and electrical conductivity (Figure 3.4) plots follow a similar trend to each other. Results from both RC3 and CD1 are similar with elevated chloride and electrical conductivity results found in all samples at MB35.

Both chloride and electrical conductivity levels are lower up-gradient at RC3, increasing slightly on-site at CD1 slightly and then greatly down-gradient at MB35. It is observed that upgradient chloride levels at RC3 are elevated above the IGV level (30 mg/l Cl) during all four quarters with the results for quarter 3 for CD1 the only chloride results below the IGV level during the reporting period.

All electrical conductivity results from RC3 are under the IGV level (1 mS/cm). Apart from quarter 3 and quarter 4 all results for CD1 are elevated above the IGV level. All results for MB35 are elevated above the IGV level.

It is likely that this trend in chloride and electrical conductivity values are indicative of saline water intrusion at location MB35 due to its position in close proximity to the Rogerstown estuary. Saline intrusion may also be influencing CD1 and RC3, to a degree.

Table 3.2: Annual Groundwater Monitoring Results

Sample Identity	Units	IGV	MB35				CD1				RC3			
			Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
pH (Field)	pH units	6.5 - 9.5	7.71	7.44	7.62	7.36	7.55	7.5	8.43	7.85	7.86	8.05	7.82	8.36
Temp (Field)	o C	25	8	9.8	15.9	10.8	8	10.2	15.2	9.8	8.5	8.9	14.8	10
Ammoniacal Nitrogen as N	mg/l	0.12	<0.2	4.29	2.34	5.62	10.5	0.684	0.264	0.752	<0.2	<0.2	0.835	<0.2
Dissolved Oxygen (Field)	mg/l	No abnormal change	1.91	1.27	4.92	3.59	1.48	2.35	4.12	5.06	3.93	4.01	7.63	4.84
Chloride	mg/l	30	6710	826	14000	15600	67.6	37.9	22.9	45.1	42.3	42.1	43	45.2
Electrical Conductivity (Field)	mS/cm		21	40.6	1.916	42.2	1.842	1.743	0.665	1.694	0.869	0.949	0.884	0.926
Electrical Conductivity @ 20C (Laboratory)	mS/cm	1	18.1	35.4	29.9	37.2	1.62	1.56	0.578	7.85	0.765	0.774	0.759	8.36
Total Organic Carbon	mg/l	No abnormal change	<3	<6	7.53	10.4	13.6	7.86	6.45	3.31	<3	<3	9.65	3.44

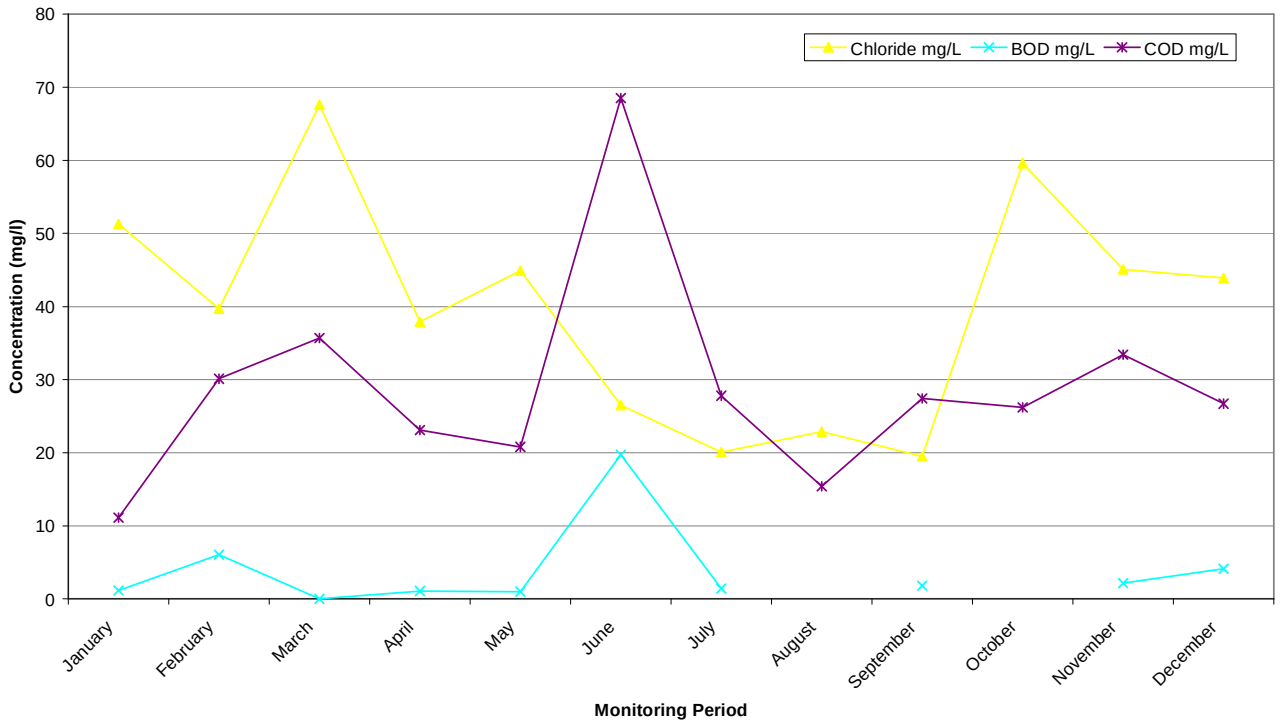


Figure 3.1: CD1 Monthly Monitoring Results

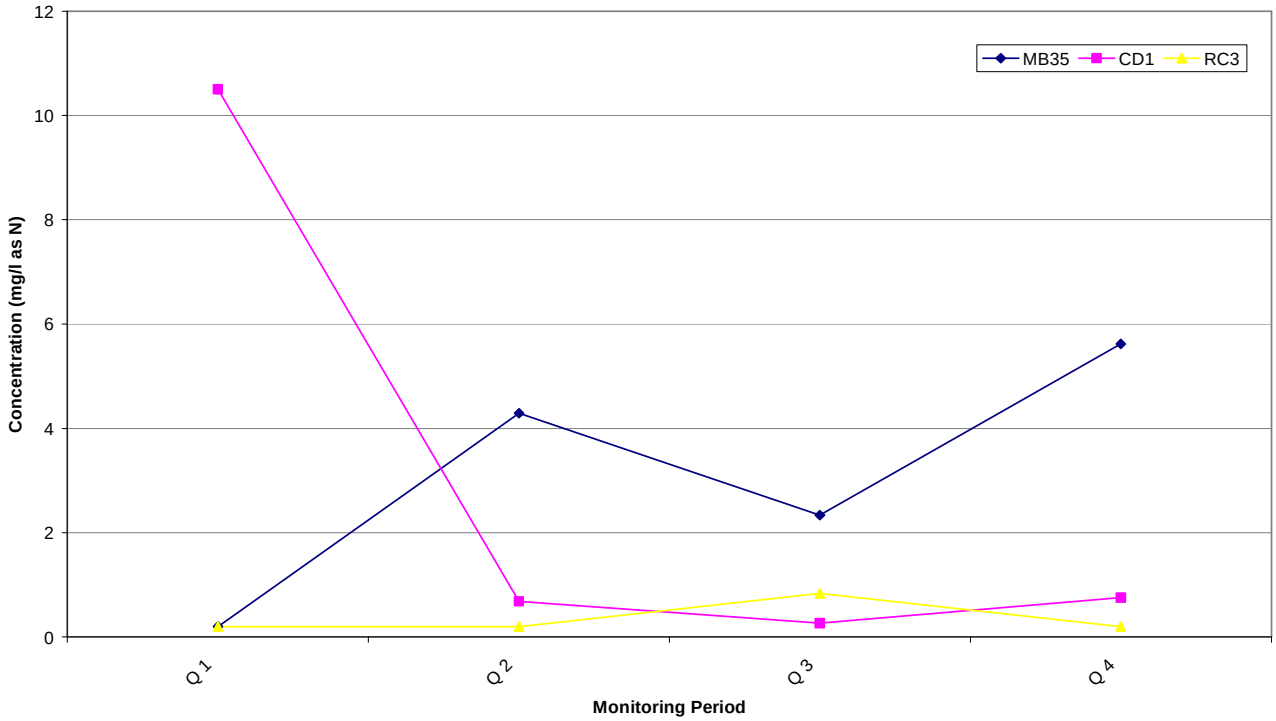


Figure 3.2: Quarterly Ammoniacal Nitrogen Monitoring Results

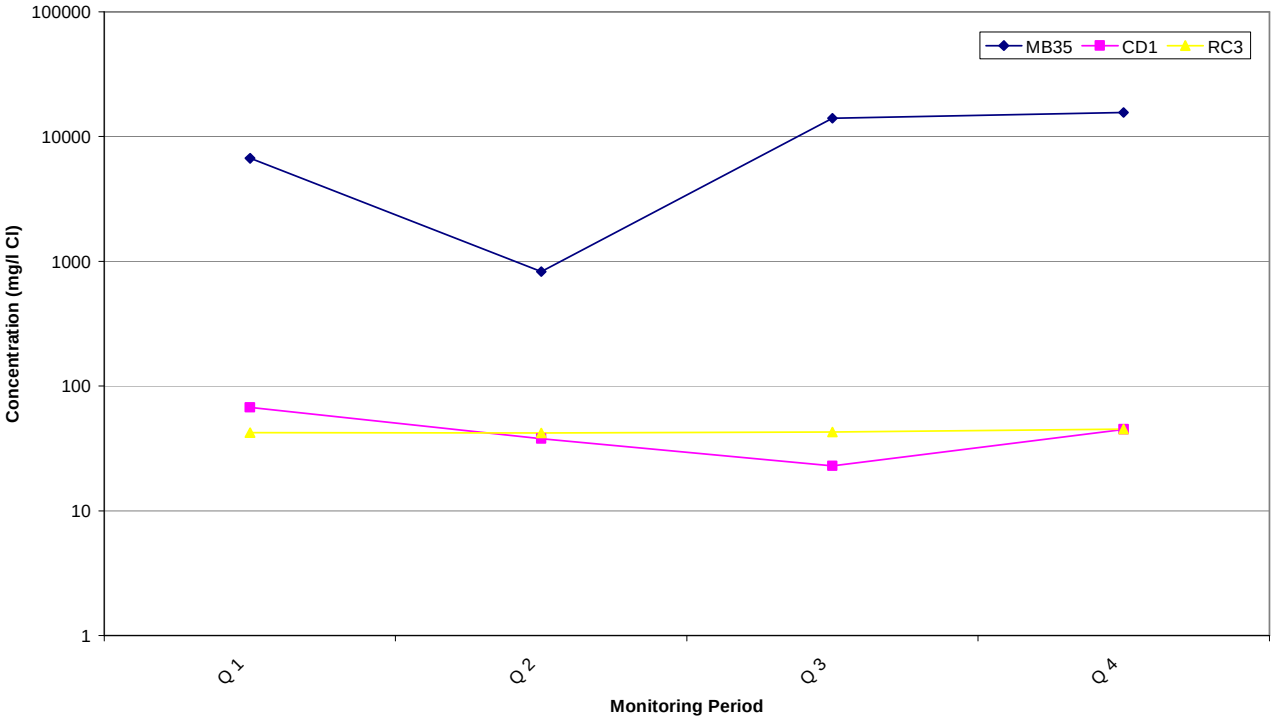


Figure 3.3: Quarterly Chloride Monitoring Results

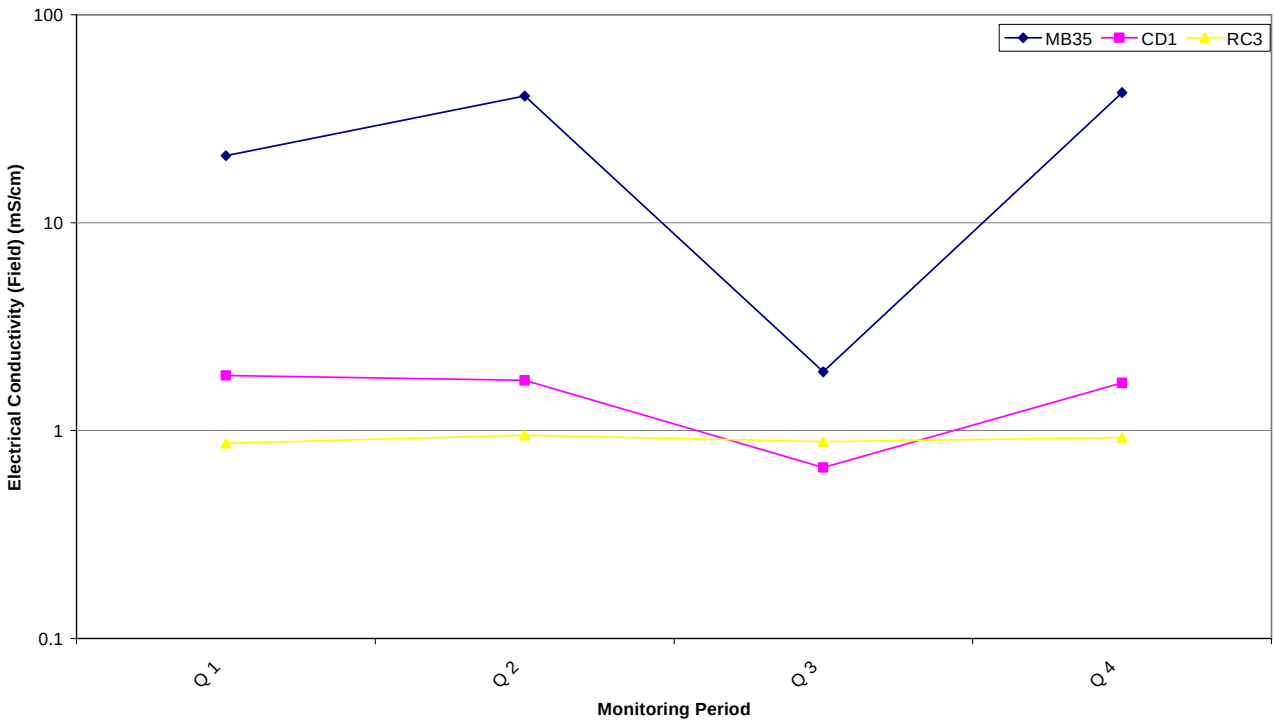


Figure 3.4: Quarterly Electrical Conductivity Monitoring Results

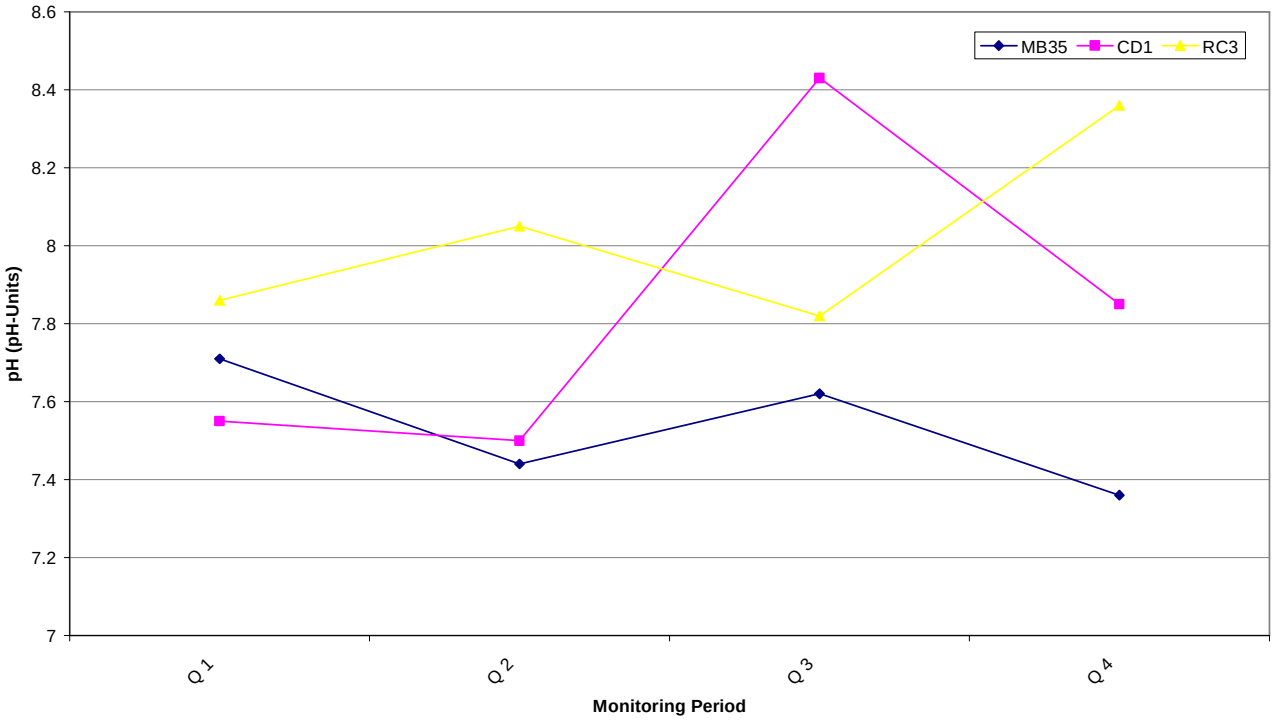


Figure 3.5: Quarterly pH Monitoring Results

3.1.5 Conclusion

Groundwater results indicate that water quality is impacted by both the landfill (which is both a dilute and disperse landfill and an engineered designed landfill) and the nearby estuary, in terms of salinity sources from the estuary. Quarterly monitoring at groundwater locations indicates that ammonical nitrogen levels are lower up gradient at RC3 down gradient at MB35, suggesting potential landfill impact down-gradient.

Groundwater results at MB35 showed impact from saline intrusion in chloride and electrical conductivity results, while saline intrusion may also be influencing CD1 and RC3, to a degree.

3.2 Surface water monitoring

This section of the Annual Environmental Report presents the surface water monitoring results.

3.2.1 Introduction

Schedule D of the waste licence requires the monitoring of surface. The surface water monitoring locations are predominately upstream of the landfill footprint.

3.2.2 Monitoring Locations

The sample locations can be seen in Drawing DE07-164-03-001-(B), Appendix I and are presented in Table 3.3.

Table 3.3: Surface water monitoring locations

Monitoring ID	Easting	Northing
SWFD	322 036	252 412
SWV1	321 980.2	252 187.4
S3	322 985	252 692
S7	322 646	253 213
SW20a	322 897	252 687

SWFD
Discharges to an open drain immediately west of the entrance to the wastewater treatment plant.

SWV1
The surface water discharge at the Western Point Surface Water Outfall – The samples are collected in the open channel immediately upstream of the discharge pipe/cut-off flap.

S3
This sampling point is located on a stream to the north east edge of the landfill site prior to its discharge to the estuary.

S7
This sampling point is located upstream of the site on the stream to the north of the landfill site.

SW20a
This sampling point is located at a drainage ditch to the east of Rogerstown Lane, close to the north-eastern tip of the landfill, currently bunged.

SW1
This sampling location is located on a stream to the west of the landfill. The location is upstream of the landfill.

3.2.3 Monitoring Parameters

Environmental samples taken at the site were submitted for analysis in accordance with Table D.5.1 of Waste Licence W0009-03. As required, a monthly visual assessment of all surface water monitoring locations was undertaken.

Chemical analysis of surface water monitoring point S3 is required monthly. It is analysed monthly for quarterly parameters, so that the surface water chemistry can be characterised. These parameters included pH, temperature, conductivity, Chemical Oxygen Demand (COD), ammoniacal nitrogen, Biochemical Oxygen Demand (BOD), total suspended solids, dissolved oxygen and chloride. Chemical analysis of all surface water sampling points is carried out on a quarterly basis for the parameters listed in Table D.5.1 of Waste Licence W0009-03.

3.2.4 Monitoring Results

The visual assessment results and the full surface water analysis datasets as issued by the Laboratory have been previously submitted in the individual quarterly reports during the reporting period.

A summary of the results is presented in Table 3.4 and continued in Table 3.5. A summary of the monthly chloride, ammoniacal nitrogen, COD and BOD results for samples taken at S3 are shown in Figure 3.5. Quarterly results for all surface water monitoring locations are presented in Figure 3.6 to Figure 3.10.

3.2.5 Interpretation of Results

The surface water results have been compared to maximum admissible concentrations (MAC) as outlined in the Surface Water Regulations, 1989. It can be seen from the results that over the course of the year, several parameters were elevated above the regulations (Table 3.4 & 3.5).

The parameters examined were chosen because they are likely indicators of leachate impact, but they also may demonstrate impact by other sources, such as sewage or the nearby estuary.

For the monthly S3 sample analysis (Figure 3.6), stable COD results are observed with the exception of a spike in levels observed in July. All other COD readings were recorded under the MAC levels (40 mg/l). BOD is also under the MAC (5 mg/l) during the reporting period. There is a slight variability also noted in the Chloride results, but these are still under the MAC (250 mg/l Cl).

Electrical conductivity levels (Figure 3.7) exceeding the MAC (1 mS/cm) were recorded at all surface water monitoring locations during the reporting period. The results for SW20a showed a sustained improvement throughout the reporting period decreasing from a level of 2.09 mS/cm in quarter 1 to 0.71 mS/cm in quarter 4.

While higher chloride levels were recorded in SWV1 (quarter 1 and quarter 3) all other results for the monitoring period are under the MAC (250 mg/l Cl) (Figure 3.8). SWFD, S3 and S7 present the lowest chloride results in all analysed samples.

Results elevated above the COD MAC (40 mg/l) were recorded in SWV1 and SW20a (Figure 3.9). Results for SWFD and S3 were all under the MAC for all samples analysed. A single result for S7 during quarter 4 was elevated above the MAC level.

All BOD samples were under the MAC (5 mg/l) during the monitoring period (Figure 3.10).

Ammonical nitrogen levels (Figure 3.11) are slightly elevated ranging between <0.2 mg/l to 3.86 mg/l during the reporting period, suggesting potential landfill impact. With the exception of S7, which is located circa 700 m north of the site, all other monitoring locations have high ammoniacal nitrogen levels.

Table 3.4: Surface water monitoring Results

Parameter	Units	MAC	S7				SW20a				SW1			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
pH (pH units) (Field)	pH Units	5.5 – 8.5[1]	8.21	8	8.12	8	7.44	7.63	8.02	7.59	8.01	8.19	8.02	8.04
Temperature (°C) (Field)	°C	No abnormal change	6.2	8.2	12.5	7.4	6.1	8.4	14.9	7.7	6	8.8	13.5	8.2
Ammoniacal Nitrogen as N mg/L	mg/l	0.23 [1]	<0.2	<0.2	<0.2	16.9	44.9	16.9	61.6	<0.2	<0.2	<0.2	4.5	<0.2
BOD mg/L	mg/l	5 [1]	<1	1	1.8	2.02	<1	2.24	2.59	1.37	1.05	1.48	5.39	1.75
COD mg/L	mg/l	40 [1]	12.7	16.1	20.4	79.2	69.4	39.5	93.6	22.9	17.9	<7	23	14.8
Total Suspended Solids mg/l	mg/l	50	6	11	<2	26.5	41.5	10.5	6	10.5	8.5	5	4.5	4.5
Dissolved Oxygen mg/l (Field)	mg/l	No abnormal change	5.38	4.63	6.49	8.29	2.73	3.1	4.01	3.06	9.16	4.74	4.55	8.22
Chloride mg/L	mg/l	250 [1]	57.6	52.8	53.2	157	200	116	210	45.7	15.7	38.9	38.7	35.3
Conductivity (at 25 °C) (mS/cm) (Field)		1 [1]	879	0.755	0.84	0.783	2.41	1.57	2.3	1.558		0.768	0.78	0.786
Conductivity (at 25 °C) (mS/cm) (Laboratory)	mS/cm	1 [1]	0.779	0.677	0.726	1.38	2.09	1.39	2	0.71	0.625	0.679	0.671	0.712

Notes:
[1] – Maximum Admissible Concentration, (MAC) for A1 waters, as classified by the Surface Water Regulations (1989)
Shaded cells are those that exceed the relevant MAC

Table 3.5: Surface water monitoring Results, continued

Parameter	Units	MAC	SWV1				SWFD				S3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
pH (pH units) (Field)	pH Units	5.5 – 8.5[1]	7.77	7.56	7.8	7.59	7.72	7.81	7.75	7.52	8.17	8.09	8.11	8.13
Temperature (°C) (Field)	°C	No abnormal change	7	9.7	15.5	9.3	7.5	9.3	15.4	9.6	5.9	9.2	13.5	7.5
Ammoniacal Nitrogen as N mg/L	mg/l	0.23 [1]	8.26	9.81	7.93	15	0.296	<0.2	87.2	0.336	0.577	0.259	2.94	0.357
BOD mg/L	mg/l	5 [1]	1.31	2.44	1.65	3.91		1.5	<1	1.13	1.59	<1	<1	1.45
COD mg/L	mg/l	40 [1]	33.6	26.6	34.7	157	17.6	17	10.4	25.8	2	14.1	18.9	17.3
Total Suspended Solids mg/l	mg/l	50	31.5	6	6.5	220	19.5	3.5	2.5	24.5	4	5	2	<2
Dissolved Oxygen mg/l (Field)	mg/l	No abnormal change	4.6	4	5.59	4.75	2.54	3.47	6.73	5.59	6.31	5.11	5.51	8.86
Chloride mg/L	mg/l	250 [1]	564	174	294	119	57.9	57	60.8	51.6	56.4	53	94.5	46.3
Conductivity (at 25 °C) (mS/cm) (Field)		1 [1]	2.83	1.617	1.916	2.16	1.088	1.31	10.24	1.167	894	0.788	1.178	0.83
Conductivity (at 25 °C) (mS/cm) (Laboratory)	mS/cm	1 [1]	2.48	1.48	0.88	1.91	0.96	1.8	10.3	1.52	0.789	0.721	1.56	0.754

Notes:
[1] – Maximum Admissible Concentration, (MAC) for A1 waters, as classified by the Surface Water Regulations (1989)
Shaded cells are those that exceed the relevant MAC

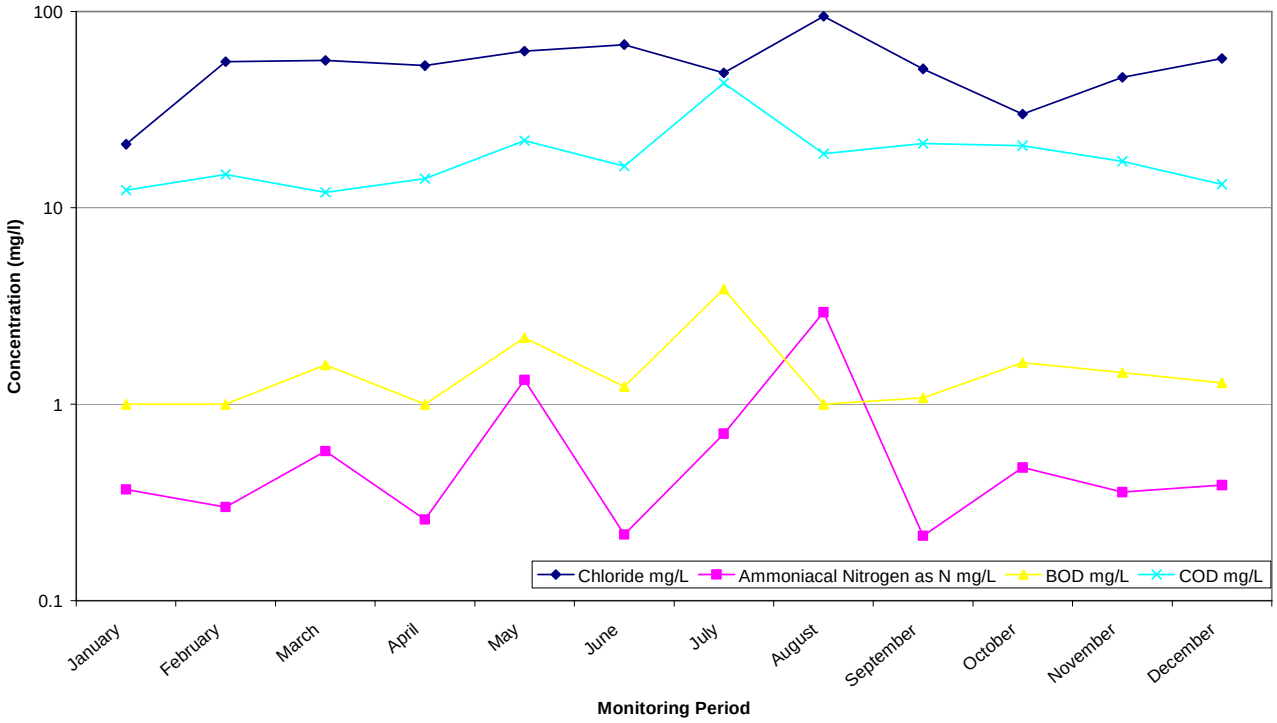


Figure 3.6: Monthly Monitoring Results for S3

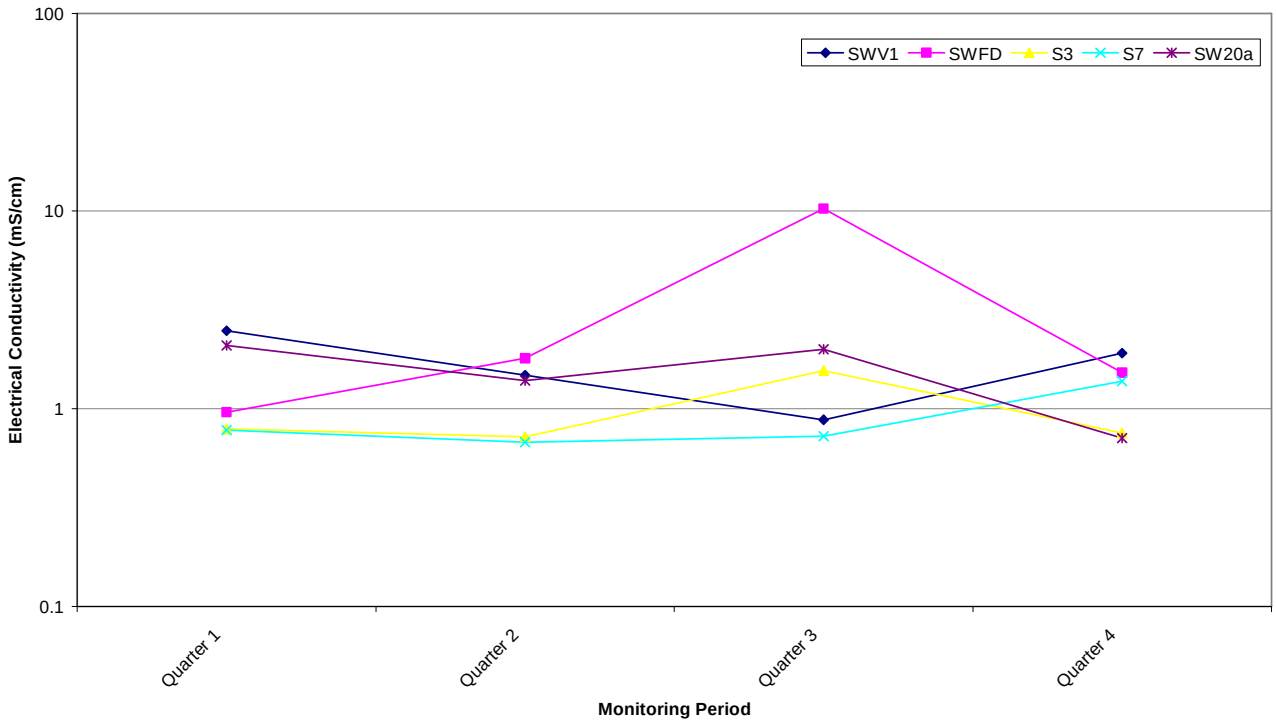


Figure 3.7: Quarterly Surface water Electrical Conductivity Results

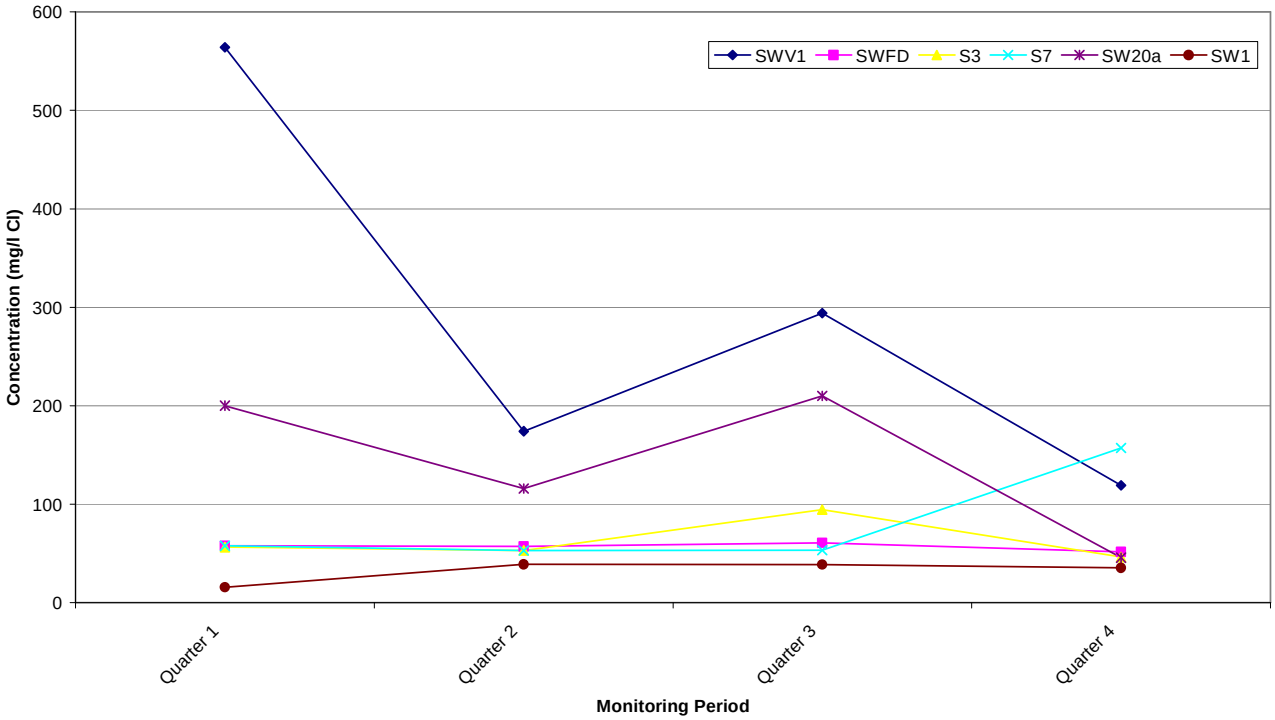


Figure 3.8: Quarterly Surface water Chloride Results

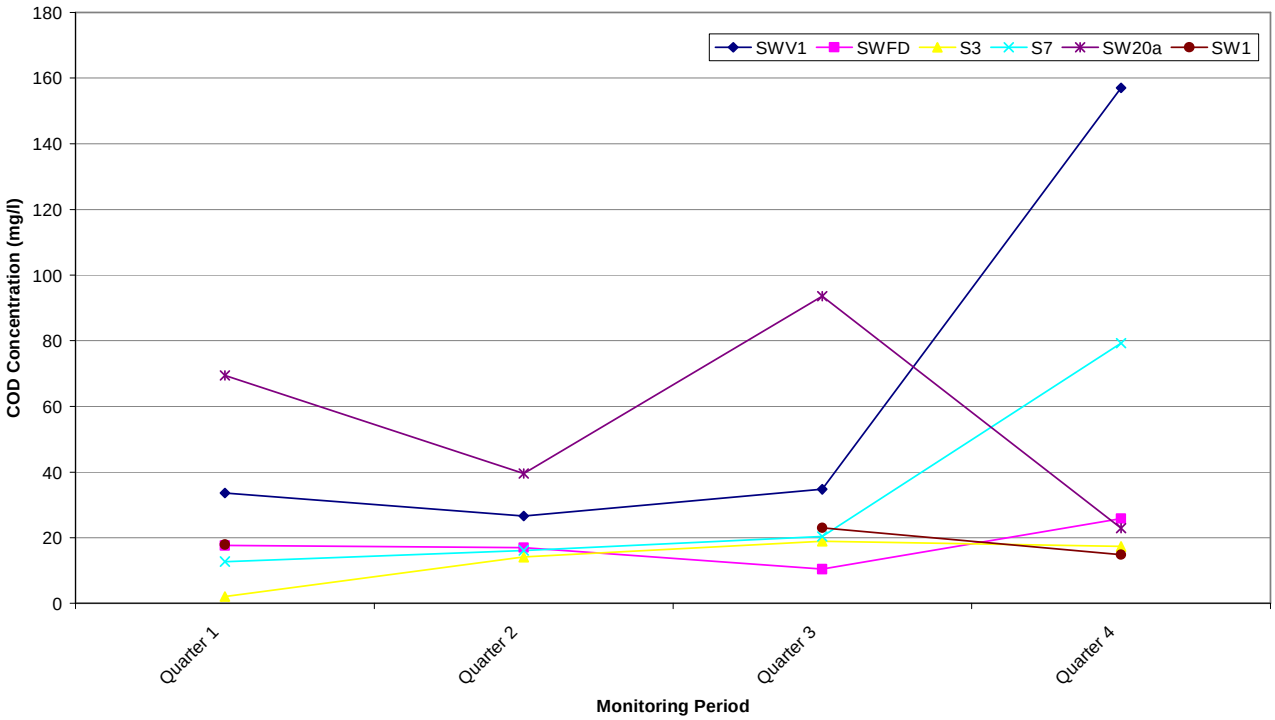


Figure 3.9: Quarterly Surface water COD Results

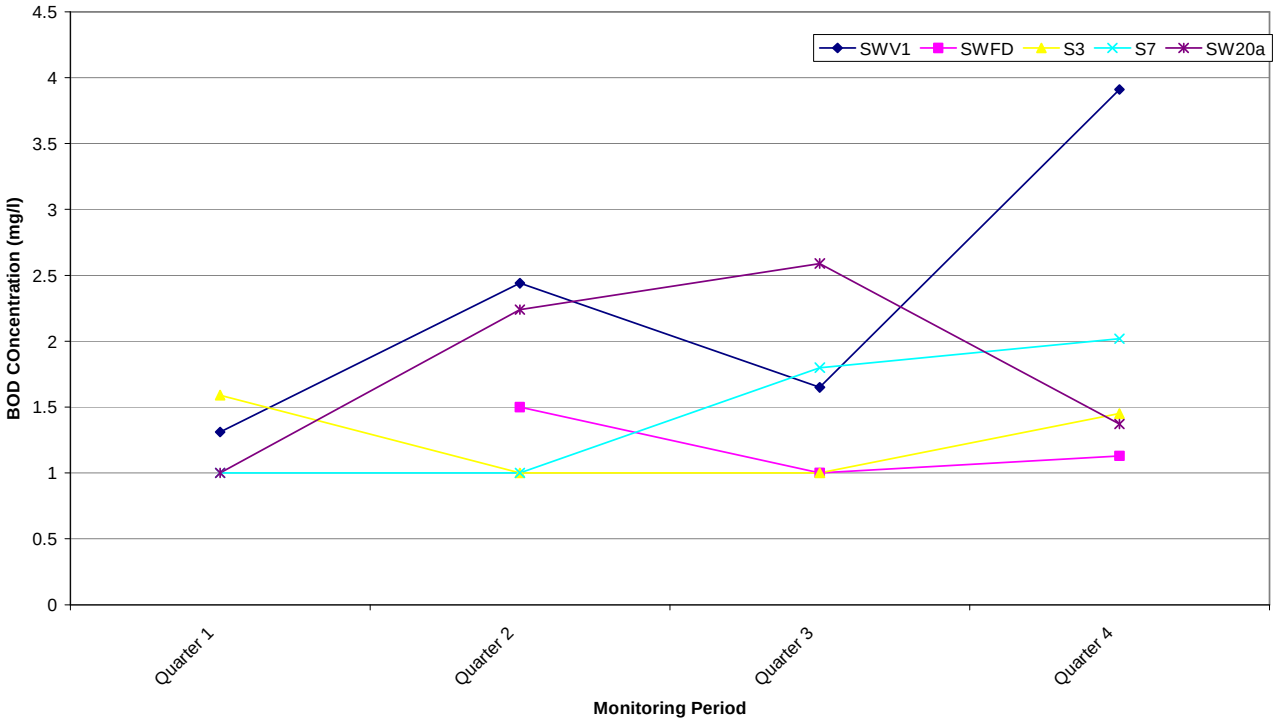


Figure 3.10: Quarterly Surface water BOD results

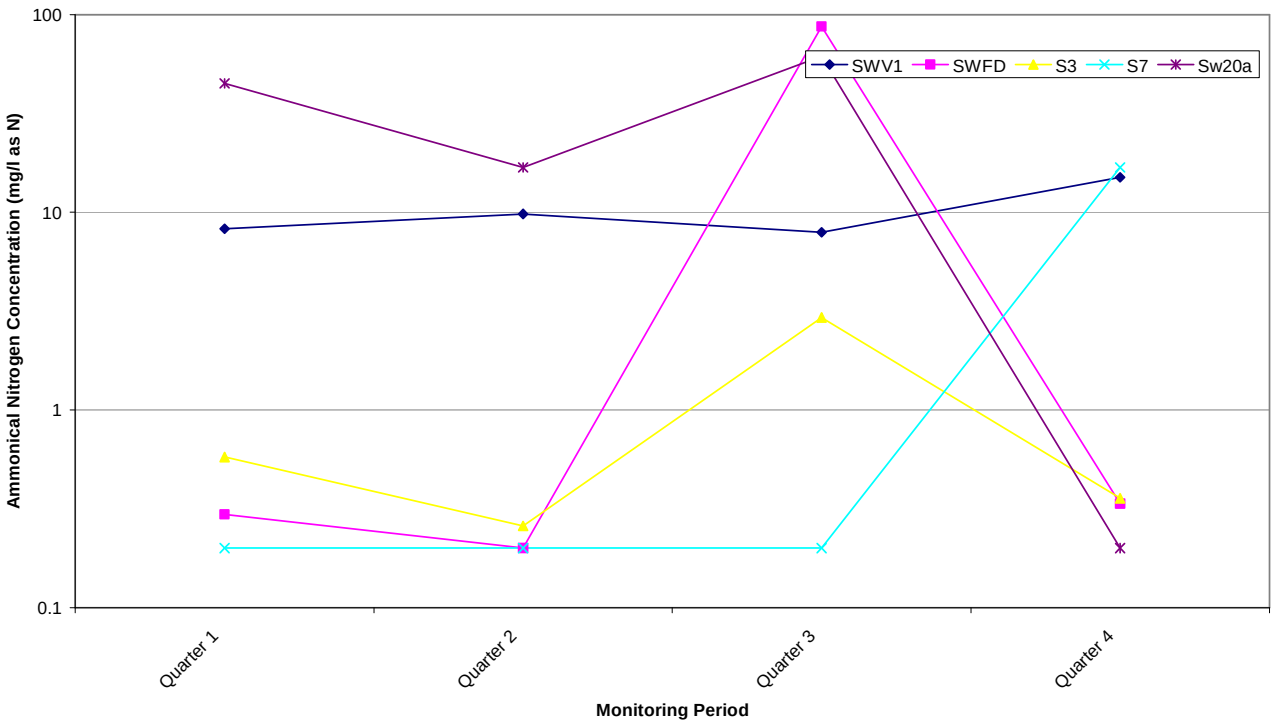


Figure 3.11: Quarterly Surface water Ammoniacal Nitrogen results

3.2.6 Surface Water Improvements

The ongoing capping programme and final restoration of the landfill will control and contain the breakouts which occasionally occur near the entrance. The shallow vertical barrier surrounding the facility will be completed at the entrance as part of the closure plan. This should help contain any contamination of surface water with leachate into the future.

Remedial works were undertaken during quarter 2, 2009 to protect the surface water drain / ditch in the vicinity of SW20A. A 50 m length of the drain/ditch was excavated and cleaned prior to lining with low-permeability clay and a HDPE liner pinned and stabilised to the underlying clay bank. These two layers of impermeable material serve to minimise inputs into the drainage ditch.

The ditch adjacent to SW20a was regraded with stone fill, which allows the movement of water through the gravel. A manhole access point was built to facilitate visuals assessment and the required periodic environmental sampling.

There is no flow into the estuary from SW20a as the outfall point is bunged.

After closure the landfill investigation of the vertical barrier adjacent to SW20a will be undertaken in order to assess if seepage is getting through the barrier and potentially resulting in contamination at SW20a.

3.2.7 Conclusions

Surface water results indicate that water quality is impacted by both the landfill (which is both a dilute and disperse land an engineered designed landfill) and the nearby estuary, in terms of salinity sources from the estuary.

Some improvements in surface water quality have been noted through the monitoring period results over MAC levels are also noted. However, chloride and electrical conductivity levels at SW20a have shown improvements during the reporting period.

3.3 Leachate Monitoring

Leachate monitoring was carried out at the monitoring locations as defined in Schedule D of Waste Licence W0009-03 and shown on Figure DE07-164-03-001-(B), Appendix I.

Leachate monitoring locations L19 - L21 were removed during the on-going capping works occurring during the reporting period. Capping works have also been on-going along the southern boundary of the landfill and as a result a number of wells were noted to be destroyed or were inaccessible with the result that no sample was obtained for analysis, namely:- LMW2 (covered with soil), LMW8 (blocked on one occasion), LMW15 (destroyed), and LMW 16 (inaccessible due to height of casing). The status of leachate monitoring wells is summarised in Table 3.5.

A proposal was submitted to the agency from FCC during 2010 with the intention of upgrading and replacing a number of the leachate wells on-site.

3.3.1 Monitoring Parameters

Waste Licence W0009-03 requires that a visual assessment is undertaken and the leachate level in every second well is monitored and recorded monthly. Chemical analysis of leachate samples is taken annually.

3.3.2 Monitoring Results

Leachate level results since May 2007 are presented in Figure 3.12.

3.3.3 Interpretation of leachate level Results

A trigger level of 5.5 meters above ordnance datum (m AOD) for wells between LMW1 to LMW18 has been established, to indicate when there is too much liquid in the landfill. Leachate was recorded above the trigger level at a number of locations, highlighted in Figure 3.12.

From the results it can be seen that by the end of the reporting period (December 2009) all leachate wells were under the 5.0 m AOD trigger level apart from LMW3, LMW4, LMW5, LMW6 and LMW7. LMW3 was below the trigger level of 5.0 m AOD during most monitoring events of the reporting period.

It is observed by site management that the leachate monitoring wells are set back from the vertical clay barrier by 18-20 m. The hydraulic gradient is likely to fall between the leachate monitoring wells and the vertical clay barrier. Consequently the levels at these wells may not reflect the leachate levels at the vertical clay barrier.

It is further observed by site management that P1a & P1b are fully open and thus the northern and southern leachate lines are fully open. Therefore leachate should not be building up in the body of the landfill.

Nevertheless, in accordance with the ERP trigger levels, visual assessments were conducted on these slopes and there is no evidence of leachate break-out. This would corroborate the comments outlined above.A proposal was sent to EPA to install wells adjacent to the vertical barrier to test this hypothesis.

3.3.4 Leachate Quality

This section presents a summary of the chemical results. The results for leachate monitoring presented in Table 3.8.

The pumping chamber receives leachate from a number of different locations on-site. As it collects leachate from a number of different areas over the site it is representative of general leachate quality over a greater time period than the individual grab samples from each of the leachate wells. The pumping chamber collects leachate from:

- Pipe1A – New cells
- Pipe 1B – Old northern boundary
- Pipe 1C – Southern boundary

The results of leachate sampled from the pumping chamber reflect the results obtained from the individual wells on the landfill.

It is noted that the results for the southern boundary are slightly more concentrated, than the results along the eastern boundary. In general, the reported concentrations for the leachate sample are consistent with the typical composition of leachate sampled from large landfills and in line with the levels presented in the Environmental Protection Agency (EPA) Landfill Manual on Landfill Site Design (2000).

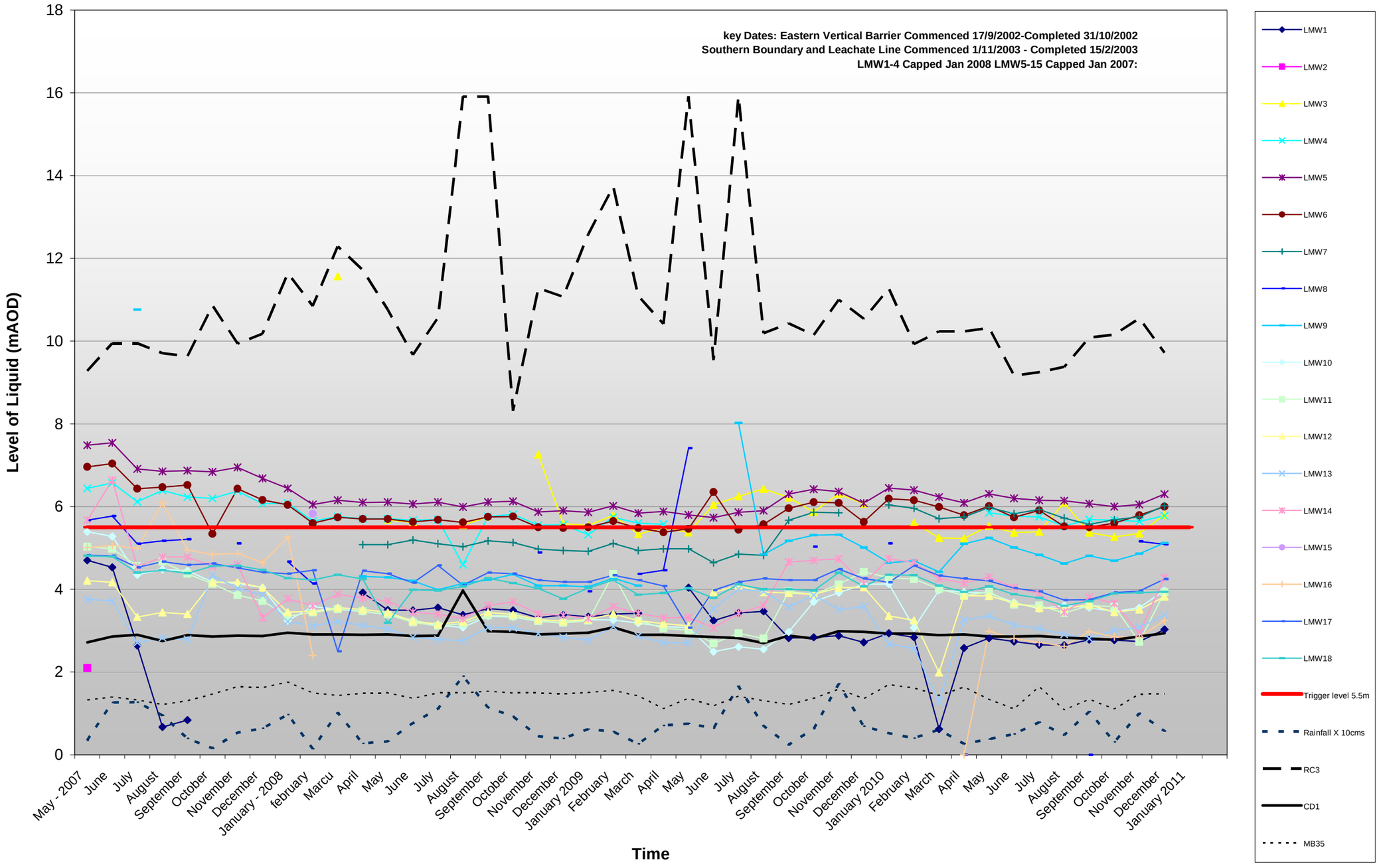


Figure 3.12: Monthly Level of Leachate Recorded in the landfill

Table 3.6: Annual Leachate Monitoring Results

Sample Identity	LMW1	LMW6	LMW7	LMW9	LMW 10	LMW 11	LMW 13	LMW 14	LMW 17	LMW 18	L23	L24	LMW16	PIPE 1A	PIPE 1B	PIPE 1C
Ammoniacal Nitrogen as N (mg/l)	606	222	387	711	584	265	35	284	120	389	56.9	77.4	131	1300	625	625
BOD mg/l O	23.5	22.1	14.7	17.7	37.9	23.9	4.61	8.12	13	12.9	23.1	12.9	12.8	129	63.9	25.5
COD mg/l O	920	443	950	650	770	314	83.5	424	312	394	588	184	280	1770	897	944
Chloride (mg/l)	1130	341	761	1010	1200	303	169	512	160	548	52.7	128	300	1510	976	1150
Electrical Conductivity (Laboratory) (mS/cm)	8.69	2.42	5.59	9.2	9.41	4.31	1.52	5.05	2.67	5.72	1.69	3.65	3.65	14.8	9	9.15
Dissolved Boron low level (µg/l)	2070	737	1320	3720	2940	1430	485	4660	896	1000	850	512	1490	4390	865	1180
Dissolved Cadmium low level (µg/l)	0.088	<0.03	0.063	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.126	<0.03	<0.03
Dissolved Calcium low level (mg/l)	159	158	294	106	137	189	76.1	208	249	270	260	379	374	138	178	150
(total) Chromium (Unfiltered) (µg/l)	32.8	11.7	56.8	18.9	18.5	6.13	<3	6.35	13.1	11.6	6.98	6.97	5.61	183	47.7	22.5
Dissolved copper low levels (µg/l)	<1.6	1.75	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	1.82	<0.85	<0.85	<0.85
Dissolved iron low level (mg/l)	1	0.37	4.21	0.578	0.838	1.08	<0.019	0.215	0.605	0.728	13.3	0.313	0.354	1.2	1.78	1.01
Dissolved lead low level (µg/l)	0.447	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2.61	0.169	<0.02
Dissolved magnesium low level (mg/l)	113	28.8	80.5	137	146	113	23.1	82.9	54.4	84.7	25.4	41.1	85.2	85.4	97.7	114
Dissolved manganese low levels (µg/l)	424	1950	2370	175	180	973	593	562	1740	4280	1180	3200	7080	977	403	346
Dissolved nickel low levels (µg/l)	66.6	31.8	50.2	36.9	33.2	12.8	8.68	56.4	28.7	27.8	8.23	12.9	29.8	133	23.8	24.7
Dissolved Potassium low level (mg/l)	370	117	188	406	412	179	58.8	156	66.3	171	29.2	42.8	107	724	389	413
Dissolved sodium low levels (mg/l)	1010	277	552	926	1400	335	126	498	139	437	53.8	101	291	1580	951	988
Dissolved zinc low levels (µg/l)	8.66	19.8	8.88	<5	8.7	9.24	65.3	<5	6.78	<5	<5	<5	<5	19.9	<0.41	1.53
Total Cyanide (mg/l)	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoride (mg/l)	0.754	<0.5	0.804	0.848	0.981	<0.5	<0.5	<0.5	<0.5	0.517	<0.5	<0.5	<0.5	1.03	0.402	0.954
Mercury Dissolved (µg/l)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate (soluble) (mg/l)	<3	22	<3	<3	<3	98.5	7.9	<3	<3	13.1	<3	9.1	102	<3	4.3	11.1
Phosphorus (Unfiltered) (µg/l)	1740	965	3390	2140	2460	949	330	872	1690	1190	732	567	613	-	-	-
Phosphate (ortho as PO4) (mg/l)	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	7.96	1.23	<0.03
Total Oxidised Nitrogen as N (mg/l)	<0.1	<0.1	<0.1	<0.1	0.121	<0.1	0.736	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.543	<0.1	<0.1

3.3.5 Volume of Leachate transported off-site for treatment:

A water balance for the reporting period has been prepared and is included as Table 3.7. The water balance calculation is derived from EPA Landfill Manuals "Landfill Site Design" (EPA, 2000; p59) and indicates that there was 29,140 m^3 of Leachate produced at the Landfill. Infiltration rate used was 5% for capped areas and 25% for temporary capped areas.

Leachate tankered off-site was recorded at 39,823 m^3. The volume of leachate tankered off-site was greater than estimated in water balance, but some contaminated water pumped may account for this.

3.3.6 Leachate Treatment Plant

Operation of the leachate treatment plant was suspended during quarter 2, 2009. During 2009, FCC applied for a Full Licence Review of the Waste Licence for the site. The Waste licence review was seeking to remove Chemical Oxygen Demand (COD) as a leachate plant Emission Limit Value (ELV) and to raise the ELV levels for some of the other leachate treatment plant parameters.

In the interim period the leachate treatment plant operation will remain suspended and leachate will continue to be tankered off-site from the plant.

Table 3.7: Water Balance Calculation for Balleally Landfill 01/01/2010 – 31/12/2010

Month	Rainfall	Old landfill	Capped	IR	Temporary Cap	IR	New Landfill	Capped	Temporary Cap	Active Area	Sewage Sludges		Waste	Absorptive capacity
	mm	*m2*	*M2*	*%*	*m2*	*%*	*m2*	*m2*	*m2*	*m2*	*tonnes*	*m3*	*Tonnes*	*m3/tonne*
Jan	45.2	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	19.00	14.250	6,850.62	0.025
Feb	36.7	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	19.00	14.250	9,075.82	0.025
Mar	54.8	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	26.90	20.175	10,016.24	0.025
Apr	26.7	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	17.80	13.350	7,548.94	0.025
May	38.0	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	22.68	14.010	8,794.12	0.025
Jun	50.3	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	43.48	32.610	9,172.45	0.025
July	78.5	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	39.88	29.910	8,801.79	0.025
Aug	48.0	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	59.08	44.310	7,550.28	0.025
Sept	104.3	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	38.52	28.890	7,440.59	0.025
Oct	30.8	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	32.02	24.015	6,448.41	0.025
Nov	100.0	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	21.00	15.750	7,880.97	0.025
Dec	57.2	340,028	292,757	5	47,271	25	120,359	71,961	42,398	6,000	21.48	16.110	6,879.04	0.025
Total	**670.5**										**360.84**	**270.63**	**96,459.28**	

Old Landfill Capped + New Landfill Capped + Old Landfill Temp Cap + New Landfill Temp cap + Active Area + Liquid Waste - Liquid Absorbed

Leachate Produced Landfill = {(.6705 * 292757 *.05) + (.6750 * 71961 *.05) + (.6705 * 47271 * .25) + (.6705 * 42398 * .25) + (.6705* 6000) + 270.63}- {96459.28}

Leachate Produced Landfill M3 **29,140.09**

Leachate Tankered Off-Site M3 39,823.00

3.4 Noise Monitoring

Noise surveys were undertaken during every quarter of the monitoring period (2009) in order to assess the existing noise emissions from the site and to establish the existing noise environment at potentially sensitive receptors near the site in accordance with Schedule D of Waste Licence W0009-02. Noise monitoring was carried out during daytime hours. The location of noise monitoring points can be seen in Figure DE07-164-03-001-(B), Appendix I and presented in Table 3.10.

Noise measurements were taken for 30 minutes at each location.

Noise emission limits are given in Table C.1 of the waste licence and are reproduced here in Table 3.11.

Table 3.8: Noise Monitoring Locations

Monitoring Location	Description	Northings	Eastings
NM1	Situated adjacent to the north-eastern boundary of the site.	321 919	252 357
NM2	Situated north east of the site boundary adjacent to Balleally Lane.	321 779	252 415
NM3	Situated East of the landfill 120m along Balleally Lane.	321 459	252 383
NM4	Situated north of the landfill along Rogerstown Lane.	322 604	252 962
NM5	Situated north of the landfill along Rogerstown Lane.	322 970	254 004

Table 3.9: Noise Emission Limits

Day dB(A) L_{Aeq} (30 minutes)	Night dB(A) L_{Aeq} (30 minutes)
55	45

3.4.1 Monitoring Results

A summary of the quarterly monitoring results are presented in Table 3.10 to Table 3.13.

Table 3.10: Quarter 1 Noise Monitoring Results

Location	Date	Time	Tonal	L_{Aeq}	L_{AF90}	L_{AF10}	Comments
NM1	16/03/2010	13.19.40	-	**65**	45	69	The results were most influenced by passing vehicles recorded during the monitoring period on the Balleally Lane. Intermittent bird-scare bangers were also recorded during the monitoring period. The sound of the breeze rustling in the trees contributed to background levels.
NM2	16/03/2010	15.23.05	-	**62**	45	63	Monitoring at this location was dominated by 14 No. passing vehicles recorded during the monitoring period (banging over the speed bumps on Balleally Lane). Background noise was influenced by rustling leaves (though low) and loud persistent birdsong from trees adjacent to the monitoring location. Bird-scare bangers and 2 No. overhead planes also contributed to the noise levels.
NM3	16/03/2010	15.59.09	-	**67**	51	70	Monitoring results at this location was dominated by 8 No. passing vehicles during the monitoring period (banging over the speed bumps on the road). Background noise was influenced by rustling leaves, persistent birdsong and intermittent bird-scare bangers. A constant sound of a digger was present during the monitoring period, but this was not from the direction of the site. No. 1 overhead plane was recorded during the monitoring period.
NM4	16/03/2010	14.45.35	-	**65**	48	69	Rural background sounds, with wind rustling leaves. Passing vehicles on Rogerstown Lane were recorded during the monitoring period. Intermittent bird scare bangers were also present during monitoring. 1 No. overhead airplane was recorded during the monitoring period. Persistent birdsong and intermittent bird-scare bangers contributed to background noise levels.
NM5	16/03/2010	14.15.03	-	**57**	44	60	Rural background sounds, with intermittent traffic on adjacent roads. Background noise levels were dominated by rustling of leaves in trees and birdsong. Background noise was dominated by bird scare bangers. One train and one overhead plane passed during the monitoring period, contributing to noise levels.

Table 3.11: Quarter 2 Noise Monitoring Results

Location	Date	Time	Tonal	L_{Aeq}	L_{AF90}	L_{AF10}	Comments
NM1	2010 Apr 07	11:37:32	-	49	39	51	The results were most influenced by passing vehicles recorded during the monitoring period on the Balleally Lane. Intermittent bird-scare bangers were also recorded during the monitoring period. The sound of the breeze rustling in the trees contributed to background noise levels.
NM2	2010 Apr 07	14:21:34	-	**61**	43	55	Monitoring at this location was dominated by passing vehicles recorded during the monitoring period (banging over the speed bumps on the road). Background noise was influenced by rustling leaves (though low) and loud persistent birdsong from trees adjacent to the monitoring location. Birds-scare devices also contributing to the noise levels.
NM3	2010 Apr 07	13:34:51	-	**56**	43	56	Monitoring results at this location was dominated by passing vehicles during the monitoring period (banging over the speed bumps on the road). Background noise was influenced by rustling leaves, persistent birdsong and intermittent bird-scare devices. A constant sound of a digger was present during the monitoring period, but this was not from the direction of the site.
NM4	2010 Apr 07	12:59:12	-	**55**	39	51	Rural background sounds, with wind rustling leaves. Passing vehicles on Rogerstown Lane were recorded during the monitoring period. Intermittent bird scare bangers were also present during monitoring. 1 No. overhead airplane was recorded during the monitoring period. Persistent birdsong and intermittent bid-scare bangers contributed to background noise levels.
NM5	2010 Apr 07	12:22:25	-	50	40	46	Rural background sounds, with intermittent traffic on adjacent roads. Background noise levels were dominated by rustling of leaves in trees and birdsong. Background noise was dominated by bird-scare devices. One train passed during the monitoring period.

Table 3.12: Quarter 3 Noise Monitoring Results

Location	Date	Time	Tonal	L_{Aeq}	L_{AF90}	L_{AF10}	Comments
NM1	2010 Aug 30	13:36:28		**55**	34	56	The results were most influenced by passing vehicles recorded during the monitoring period on the Balleally Lane. Intermittent bird-scare bangers were also recorded during the monitoring period. Birdsong contributed to the background noise levels.
NM2	2010 Aug 30	16:06:41		51	32	49	Monitoring at this location was dominated by passing vehicles recorded during the monitoring period (banging over the speed bumps on the road). . Birds-scare devices also contributing to the noise levels. Birdsong contributed to the background noise levels. Very faint reversing beacons evident from site.
NM3	2010 Aug 30	12:51:42		**60**	34	59	Monitoring results at this location was dominated by passing vehicles during the monitoring period (banging over the speed bumps on the road). A vehicle was also working in a field adjacent to the noise monitoring location throughout the entire monitoring period. Intermittent bird-scare bangers were also recorded during the monitoring period. Birdsong contributed to the background noise levels.
NM4	2010 Aug 30	15:26:13		**56**	35	45	Distant sounds from sewer line construction works were dominant throughout the monitoring period. Vehicles from site and reversing sirens audible but distant. Intermittent bird-scare bangers were also recorded during the monitoring period. 1 no train passed and 1 no tractor passed on Rogerstown Lane during monitoring. Intermittent bird scare bangers were also present during monitoring. Birdsong and insects contributed to the background noise levels.
NM5	2010 Aug 30	14:52:31		**67**	38	62	The dominant noise at this location was passing traffic and works on the sewer construction line nearby. This included passing dumpers and reversing beacons. Digger starts excavation, completely dominating the noise environment of the area. The monitoring location is not considered to be representative of the local noise environment or noise emissions from the site. Reversing sirens from the landfill are audible. Low background consisted of birdsong and intermittent bird-scare bangers.

Table 3.13: Quarter 4 Noise Monitoring Results

Location	Date	Time	Tonal	L_{Aeq}	L_{AF90}	L_{AF10}	Comments
NM1	2010 Nov 05	09:49:24	0	52	44	53	The results were most influenced by 10 no. passing vehicles recorded during the monitoring period on the Balleally Lane. Additionally a leachate tanker entered the site adjacent to the noise monitoring location during the monitoring period. 4 no. overhead planes were also recorded during monitoring. Birdsong, distant voices and a barking dog contributed to the background noise levels.
NM2	2010 Nov 05	12:48:15	0	**63**	46	60	Monitoring at this location was dominated by the 18 no. passing vehicles (banging over the speed bumps on the road) and 3 no overhead planes recorded during the monitoring period. Some birdsong contributed to the background noise levels.
NM3	2010 Nov 05	13:22:39	0	**60**	47	59	Monitoring results at this location was dominated by the 27 no. passing vehicles (banging over the speed bumps on the road) and 4 no. overhead planes recorded during the monitoring period. Birdsong and distant traffic movements contributed to the background noise levels.
NM4	2010 Nov 05	11:49:40	0	**55**	45	50	Distant sounds from sewer line construction works were dominant throughout the monitoring period. 1 no train, 8 no. vehicles passing on Rogerstown Lane and 1 no. over head planes were recorded during the monitoring period. Intermittent birdsong was also present during monitoring, contributing to background noise levels.
NM5	2010 Nov 05	10:42:30	0	48	43	50	The dominant noise at this location was passing traffic and works on the sewer construction line nearby. This consisted mainly of reversing beacons. 4 no. passing vehicles, 3 no. overhead planes and 3 no. trains were recorded during the monitoring periods. Low background consisted of birdsong and a slight rustling of leaves.

3.4.2 Assessment of Tonal Components

All measurements were subject to a one-third octave band analysis to identify tonal components within the noise measured. The raw results of this analysis have been presented in the quarterly reports submitted during the reporting period. Tonal noise was identified on a number of occasions and the reported L_{Aeq} was adjusted by 5 dB in accordance with the EPA (2006) *Guidance Note for Noise in Relation to Scheduled Activities, 2nd Edition.*

3.4.3 Interpretation of Results

Noise emission limits are presented in Table 3.11 above. There were only five instances during the year during noise monitoring periods which complied with the EPA limit of 55 dB (A) for daytime noise.

Traffic movements on Balleally and Rogerstown lane are the main contributors to noise levels in the area, which includes noise from trucks travelling to and from the site. Noise from site does not have as much impact as traffic movements; however a great number of the traffic movements are related to vehicle movements to the site.

During quarter 3 NM5 noise monitoring was dominated by noise from the sewer extension works occurring adjacent to the noise monitoring location. To a lesser degree these works also influenced monitoring results at NM4, though it was also influenced by traffic movements on Rogerstown lane. The sewer extension works were still a contributing noise influence on monitoring during quarter 4.

The influence of vehicle movements (on the noise results can be seen from the correlation between the L_{Aeq} and the L_{AF10} results. In all cases the L_{Aeg} is closer to the L_{AF10} results than the L_{AF90} results. The L_{AF90} results for all locations are under 55 dB licence limits, while the L_{AF10} results range from 45 to 70 dB(A). This suggests that sound occurring for 10% of the monitoring period, which is greatly influenced by traffic, train, overhead airplane movements (and for this site this would also include bird-scare devices) had a large influence over the final L_{Aeg} levels recorded over the monitoring period and that the background noise, represented by the L_{AF90} is less noisy.

At all locations the L_{AF90}, representing background noise levels, are under the trigger level of 55 dB.

3.5 Dust and PM_{10} Monitoring

3.5.1 Dust Monitoring

Dust monitoring was carried out at 4 locations in accordance with Schedule D of the licence. The locations of these monitoring points are shown on Figure DE07-164-03-001-(B), Appendix I and presented in Table 3.16

Bergerhoff style gauges were used to determine total dust deposition levels at the site. Four gauges were set up so that the dust jars were at a height of at least 1.5 m above the ground and the jars were set in place during the monthly monitoring events. The samples were submitted to Southern Scientific Ltd. for analysis of total dust contents.

Table 3.14: Dust Monitoring Locations

Location	Easting	Northing
DM1 (PM1)	321 874	252 321
DM2	321 927	252 482
DM3 (PM2)	322 038	252 484
DM4 (PM3)	322 728	252 671

Note = (PM Labels = PM10 monitoring locations)

3.5.2 Monitoring Results

Dust monitoring was undertaken three times during quarter 3. As D1 was knocked over during sampling in July 2010, monitoring at this point was repeated in October. The annual results for total dust deposition are presented in Table 3.15.

Table 3.15: Dust Deposition Results (mg/m^2/day)

Monitoring Locations	Jul-10			Aug-10			Sep-10			Oct-10		
	Organic Dust	Inorganic Dust	Total Dust	Organic Dust	Inorganic Dust	Total Dust	Organic Dust	Inorganic Dust	Total Dust	Organic Dust	Inorganic Dust	Total Dust
D1	Knocked over *			129	65	194	101	42	143	28	21	49
D2	88	93	118	93	12	105	59	<10	68	/	/	/
D3	467	78	720	78	455	533	139	<10	140	/	/	/
D4	76	45	103	45	40	85	82	35	117	/	/	/

* = Sample D1 was knocked over during the sampling period and was re-sampled.

3.5.3 Interpretation of Results

An organic and inorganic analysis of dust was performed in addition to the total dust deposition analysis to give a greater understanding of the results.

D1 is located off-site in a field adjacent to the landfill. The dust stand was knocked down during the July monitoring period, possibly due to the presence of horses in the field.

It is noted that the results during July and August at monitoring location D4, the closest dust monitoring location to the active face of the landfill, was below the licence limit of 350 mg/m3/day. Additionally D1, located immediately adjacent to the site was under licence limit during August.

The results indicate that during both the July and August monitoring period the results at D2 were over the licence limit of 350 mg/m^3/day. This monitoring location is off-site in a field. The laboratory identified a layer of visible brown particles on analysis. Market-gardening type harvesting and re-seeding was taking place in the field during the monitoring period. When the results of D1 and D4 are considered it is likely that off-site sources contributed most to the elevated results at D2 rather than landfill sources.

3.5.4 PM_{10} Monitoring

Monitoring of particulate matter (PM_{10}) levels was undertaken once for a 24 hour sampling period at 3 monitoring locations, namely PM1, PM2 and PM3 in accordance with Schedule D of the licence during the 2009 monitoring period. The locations of these monitoring points are shown on Figure DE07-164-03-001-(B), Appendix I and presented in Table 3.18.

3.5.5 Monitoring Results

The PM_{10} monitoring results for the 2009 monitoring period are presented in Table 3.18.

Table 3.16: PM_{10} Results 2009

Sampling Point	Average Concentration Value ($\mu G/M^3$)
PM1	65.5
PM2	52.3
PM3	11.9

3.5.6 Interpretation of Results

There is no emission limit set for PM_{10} in Schedule C of the licence but Condition 6.7 sets a trigger level of 50 µg/m3 for a daily sample.

The results in Table 3.18 show that the air quality is good at PM3 and the results are under the trigger level of 50 µg/m3 for a daily sample, while the sample results at PM1 and PM2 are marginally over the trigger level.

3.6 Landfill gas monitoring

The licence requires that the licensee conducts monthly monitoring in the gas boreholes/vents/wells in order to detect off-site gas migration. The location of the monitoring positions is shown on Figure DE07-164-03-001-(B), Appendix I.

The locations are presented in Table 3.19. In addition to the perimeter Landfill Gas Monitoring locations two leachate monitoring wells (chosen at random) from each of the southern and eastern boundaries LMW1-LMW18 and two manholes MHL33 and MHL40 (Table 3.20) along Balleally Lane were also monitored. LMW1 – LMW18 boreholes are located in front of the vertical barrier installed along these boundaries and are in the leachate that is collected at these points.

It should be noted that boreholes LMW1-18 are leachate sampling wells and not specifically designed for monitoring landfill gas. See Table 3.19, 3.20 and 3.21 for grid references.

Table 3.17: Gas Monitoring Locations

Borehole ID	Borehole Description	Easting	Northing	Depth of Borehole *(m)*	Top of casing level	Ground Level *(m O.D.)*	Sample
GA1	Northern corner of Cell 1	321 767	252 159	6	4.155	4.0	Perimeter Borehole
GA2	Western corner of Cell 1	321 986	252 383	6	4.314	3.3	Perimeter Borehole
GA3	Northern boundary of Cell 2	322 070	252 414	10	7.076	7.5	Perimeter Borehole
GA4	Northern boundary of Cell 3	322 170	252 415	10	7.370	7.66	Perimeter Borehole
GA5	Northern boundary of Cell 4	322 291	252 440	15	12.287	14.3	Perimeter Borehole
GA6	Northern boundary of Cell 5	322 389	252 467	15	11.864	13.3	Perimeter Borehole
GA7	Northern boundary of Cell 6	322 490	252 498	10	10.749	9.57	Perimeter Borehole
GA8	Northern boundary beside exit to landfill	322 614	252 542	6	5.503	4.981	Perimeter Borehole
GA9	North of cell 1 beside gate	321 942	252 547	-	-	-	Perimeter Borehole
GA10	Residents land opposite gate	321 942	252 393	-	-	-	Outside Perimeter Borehole
GA11	Lands opposite entrance/exit between cell 6 and LMW18	322 039	252 433	-	-	-	Outside Perimeter Borehole
GA12	Lands opposite entrance/exit	322 669	252 575	-	-	-	Outside Perimeter Borehole
GA13	Lands opposite entrance/exit adjacent to SW20a	322 848	252 666	-	-	-	Outside Perimeter Borehole

Table 3.18: Gas Monitoring Locations (outside waste)

Manhole ID	Manhole ID	Easting	Northing
MH L33	Across from Cell 1	322 001	252 416
MH L40	Across from Cell 6	322 654	252 566

Table 3.19: Leachate/Gas Monitoring Locations

Borehole ID	Easting	Northing	Sample
LMW1	322 006	252 143	Leachate/Gas
LMW2	322 077	252 115	Leachate/Gas
LMW3	322 169	252 084	Leachate/Gas
LMW4	322 271	252 053	Leachate/Gas
LMW5	322 368	252 022	Leachate/Gas
LMW6	322 461	251 991	Leachate/Gas
LMW7	322 559	251 958	Leachate/Gas
LMW8	322 651	251 933	Leachate/Gas
LMW9	322 749	251 903	Leachate/Gas
LMW10	322 844	251 877	Leachate/Gas
LMW11	322 846	251 974	Leachate/Gas
LMW12	322 853	252 074	Leachate/Gas
LMW13	322 859	252 175	Leachate/Gas
LMW14	322 863	252 274	Leachate/Gas
LMW15	322 873	252 375	Leachate/Gas
LMW16	322 880	252 473	Leachate/Gas
LMW17	322 885	252 572	Leachate/Gas
LMW18	322 890	252 657	Leachate/Gas

3.6.1 Monitoring Parameters

In accordance with Table D.2.1 of the Waste Licence, gas wells were monitored for Methane (CH_4), Carbon dioxide (CO_2), Oxygen (O^2) and atmospheric pressure. It should be noted that the boreholes along the estuary were designed and constructed to sample leachate and groundwater and not specifically landfill gas.

3.6.2 Research initiative

During December 2010 the EPA placed gas analyser in-situ GA5. The purpose was to investigate the levels of methane observed in the well. It seeks to examine if there is any relationship between atmospheric pressure, tides and landfill gas field.

Results can be reviewed remotely by the EPA and following the duration of the research FCC will analyse the results in 2011.

3.6.3 Monitoring Results

The Landfill Gas (LFG) monitoring results are summarised in Figure 3.12 and Figure 3.13.

3.6.4 Interpretation of Results

CH_4 results for the 2010 monitoring period were generally below the 1% trigger level (Figure 3.12). However, results elevated above the trigger level at locations GA3 and GA5 and also at GA13 are noted. These locations are situated along the north and north-eastern corners of the landfill.

Early in the monitoring period the levels of CH_4 recorded at GA5 decreased compared to the levels in the fourth quarter of the 2009 reporting period (Figure 3.13). The levels remained low until September 2010 when the levels of methane were observed to increase dramatically. The increased levels observed were maintained throughout quarter 3 and quarter 4. Occasional elevated levels were also observed in GA13 during quarter 3 and quarter 4.

Occasional CO_2 results elevated above the 1.5% trigger level at sampling locations GA2, GA3, GA4, GA5, GA7, GA9, GA11 and GA13 through 2010 (Figure 3.14 and Figure 3.15). CO_2 levels illustrate a similar trend to the results found last year. High concentrations of CO_2 can occur naturally at shallow depths of up to 2 m due to microbial activity associated with the roots of many types of vegetation.

No CH_4 was recorded above the trigger levels at gas wells adjacent to offsite receptors, GA10 or GA 11 during the reporting period.

3.6.5 Conclusion

In general, gas levels appear to be at their highest values during the third and fourth quarters of the monitoring period. This trend is similar to observations made on the previous monitoring periods.

During the monitoring period FCC took the proactive approach of monitoring LFG at on-site and off-site locations weekly and they are also monitoring GA5 more frequently. The results of this additional monitoring are retained by FCC on-site and any changes in the trends will be noted. This monitoring is in addition to the licence compliance monitoring being undertaken by FTC.

Additionally FCC are working with Bioverda who manage the landfill gas on-site to effectively balance the gas field and reduce the levels of methane noted in GA5. A number of additional in-waste landfill gas extraction wells have been drilled in the landfill body during the reporting period and have become operational in order to increase the LFG abstraction for energy from the area of the landfill adjacent to GA5.

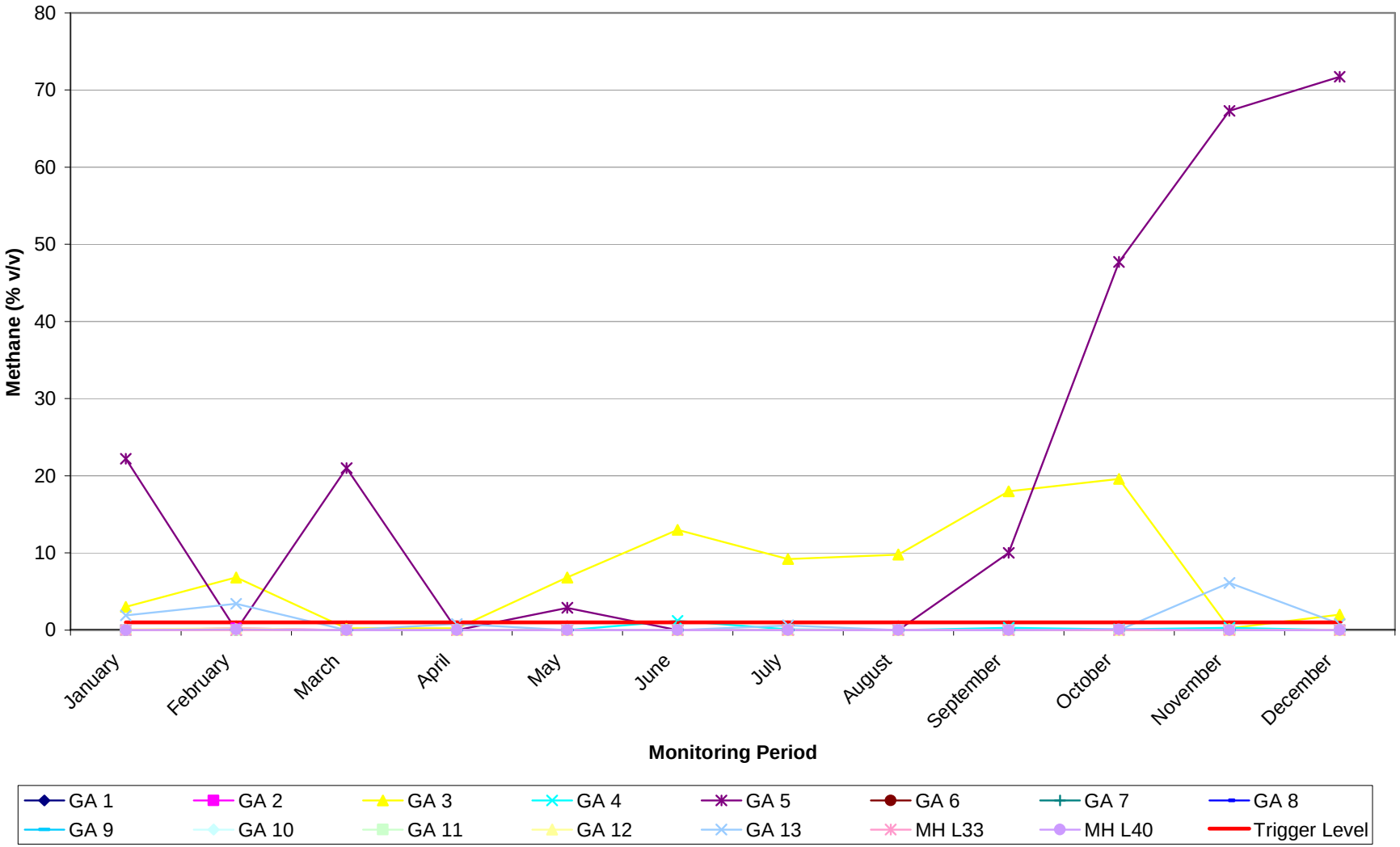


Figure 3.13: Methane Readings at Perimeter Gas Wells

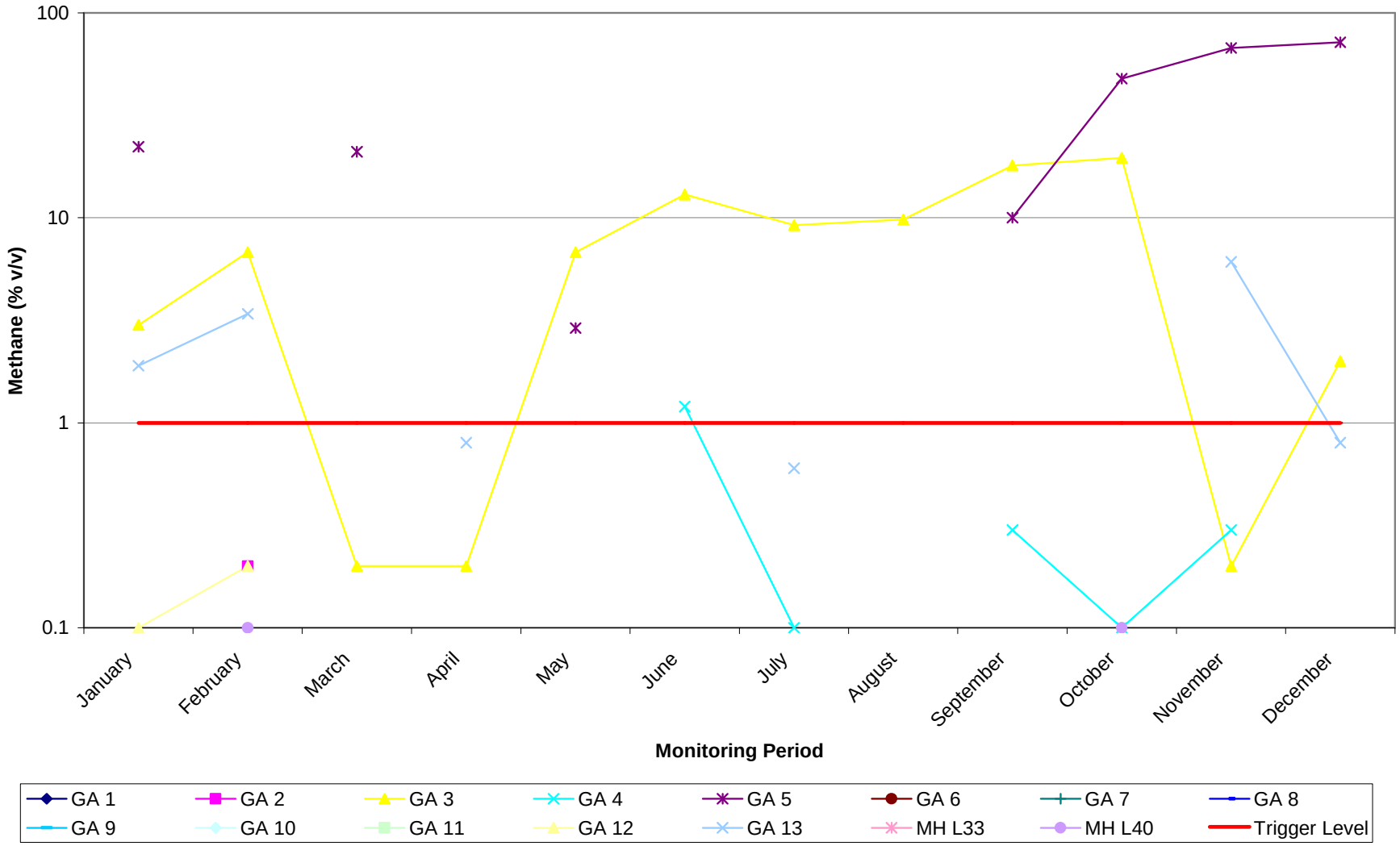


Figure 3.14: Logarithmic graph of Methane Readings at Perimeter Gas Wells

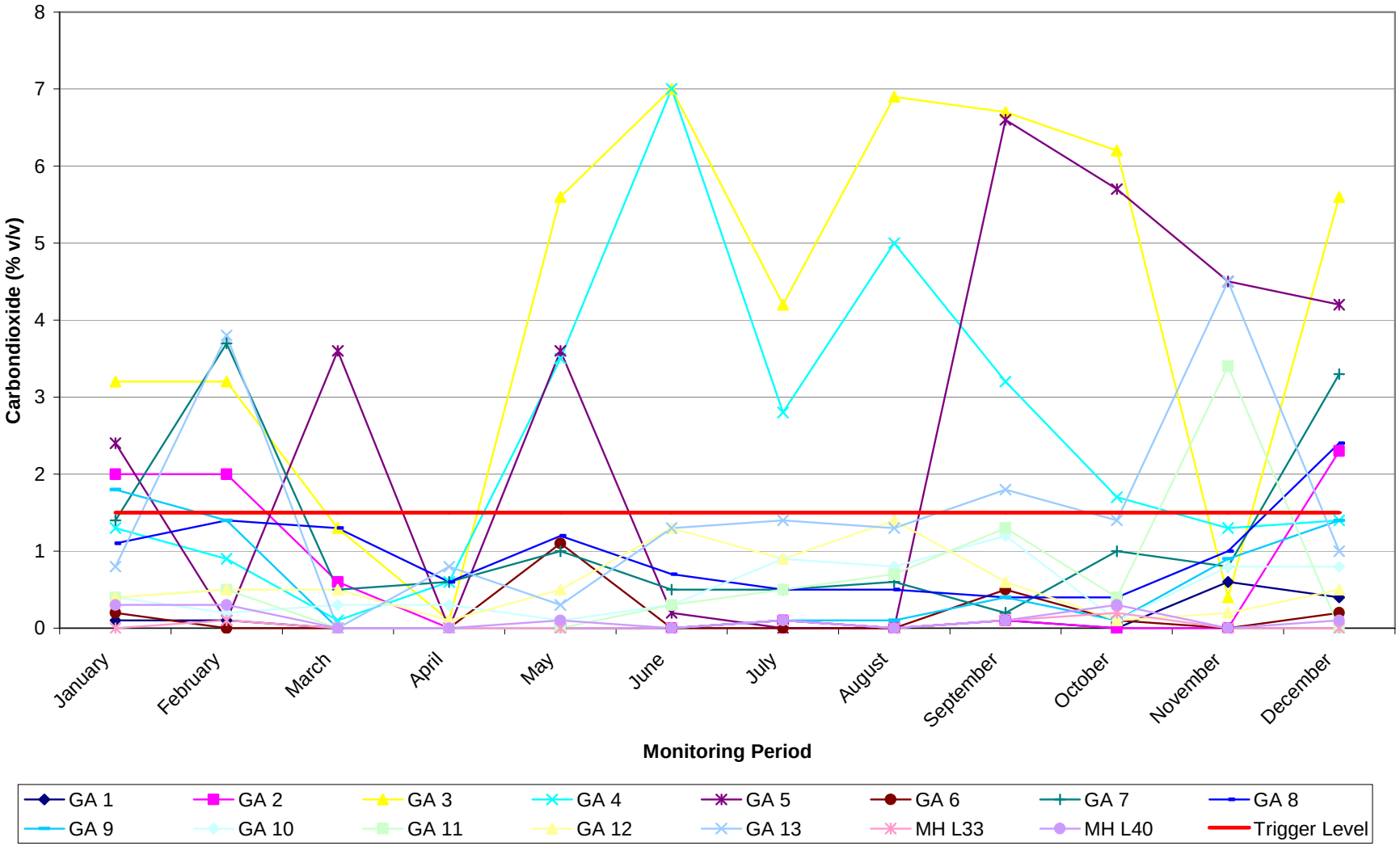


Figure 3.15: Carbon Dioxide Readings at Perimeter Gas Wells

3.6.6 Summary report on emissions

As per Schedule D.7.1 of Waste Licence W0009-03 the licensee is required to carry out annual environmental monitoring of the Gas Combustion Plant/Enclosed Flare. Odour monitoring Ireland personnel conducted the survey.

The monitoring included the gas composition in the flue outlets from the four generators and flare in order to meet the requirements of the waste licence. The monitoring for CO, SO_2, NO_x, and O_2 was carried out *in-situ* using an electrochemical analyser. Temperature, velocity and flow rate were also monitored *in-situ* using a thermocouple and a pilot tube and manometer respectively. Samples were collected for analysis to determine TA Luft Class I, II, III organic substances. In addition, samples were collected for the landfill gas delivery system and determined for chlorine, fluorine and sulphur content.

The compliance status of emissions from the five generators with respect to the Waste Licence Limit is summarised in Table 3.20.

NO_x as NO_2, particulates, Total Non Methane Volatile Organic Compounds, Hydrochloric acid and Hydrogen fluoride were low in the gas utilisation engines and within Emission Limit Values set out in Schedule C.5 of the Waste Licence.

CO emission concentration values were above the 650 mg/Nm^3 Emission Limit Value established for Waste Licence W0009-02 at BY02, 03 & 05. These gas utilisation engines were below the Emission Limit Value (1400mg/$m^{3)}$ set for Carbon monoxide in other licences, e.g. W0127-01.

Table 3.20: Result of emissions testing of landfill gas plant 2010

Engine Number	Parameter	Compliance Status
BY 01.	FLOW	COMPLIES
	CO	COMPLIES
	NOx	COMPLIES
	TA LUFT CLASS I ORGANICS	COMPLIES
	TA LUFT CLASS II ORGANICS	COMPLIES
	TA LUFT CLASS III ORGANICS	COMPLIES
	HCl	COMPLIES
	HF	COMPLIES
	PARTICULATES	COMPLIES
2.	FLOW	COMPLIES
	CO	NON COMPLIANCE
	NOx	COMPLIES
	TA LUFT CLASS I ORGANICS	COMPLIES
	TA LUFT CLASS II ORGANICS	COMPLIES
	TA LUFT CLASS III ORGANICS	COMPLIES
	HCl	COMPLIES
	HF	COMPLIES
	PARTICULATES	COMPLIES
3.	FLOW	COMPLIES
	CO	NON COMPLIANCE
	NOx	COMPLIES
	TA LUFT CLASS I ORGANICS	COMPLIES
	TA LUFT CLASS II ORGANICS	COMPLIES
	TA LUFT CLASS III ORGANICS	COMPLIES
	HCl	COMPLIES
	HF	COMPLIES
	PARTICULATES	COMPLIES
5.	FLOW	COMPLIES

Engine Number	Parameter	Compliance Status
	CO	NON COMPLIANCE
	NOx	COMPLIES
	TA LUFT CLASS I ORGANICS	COMPLIES
	TA LUFT CLASS II ORGANICS	COMPLIES
	TA LUFT CLASS III ORGANICS	COMPLIES
	HCl	COMPLIES
	HF	COMPLIES
	PARTICULATES	COMPLIES
FLARE	FLOW	COMPLIES
	CO	COMPLIES
	NOx	COMPLIES
	TA LUFT CLASS I ORGANICS	COMPLIES
	TA LUFT CLASS II ORGANICS	COMPLIES
	TA LUFT CLASS III ORGANICS	COMPLIES
	HCl	COMPLIES
	HF	COMPLIES

3.7 Meteorological Monitoring

Condition 8 and Schedule D.6 of Waste Licence W0009-03 require daily monitoring of precipitation volume, temperature (max. /min.), wind force and direction, and atmospheric pressure.

June and July had the highest maximum mean monthly temperatures. Monthly Rainfall was highest during September and November when highest volumes of rainfall were registered. The site was predominantly affected by south westerly winds. Evaporation and potential evapotranspiration were highest in June and July.

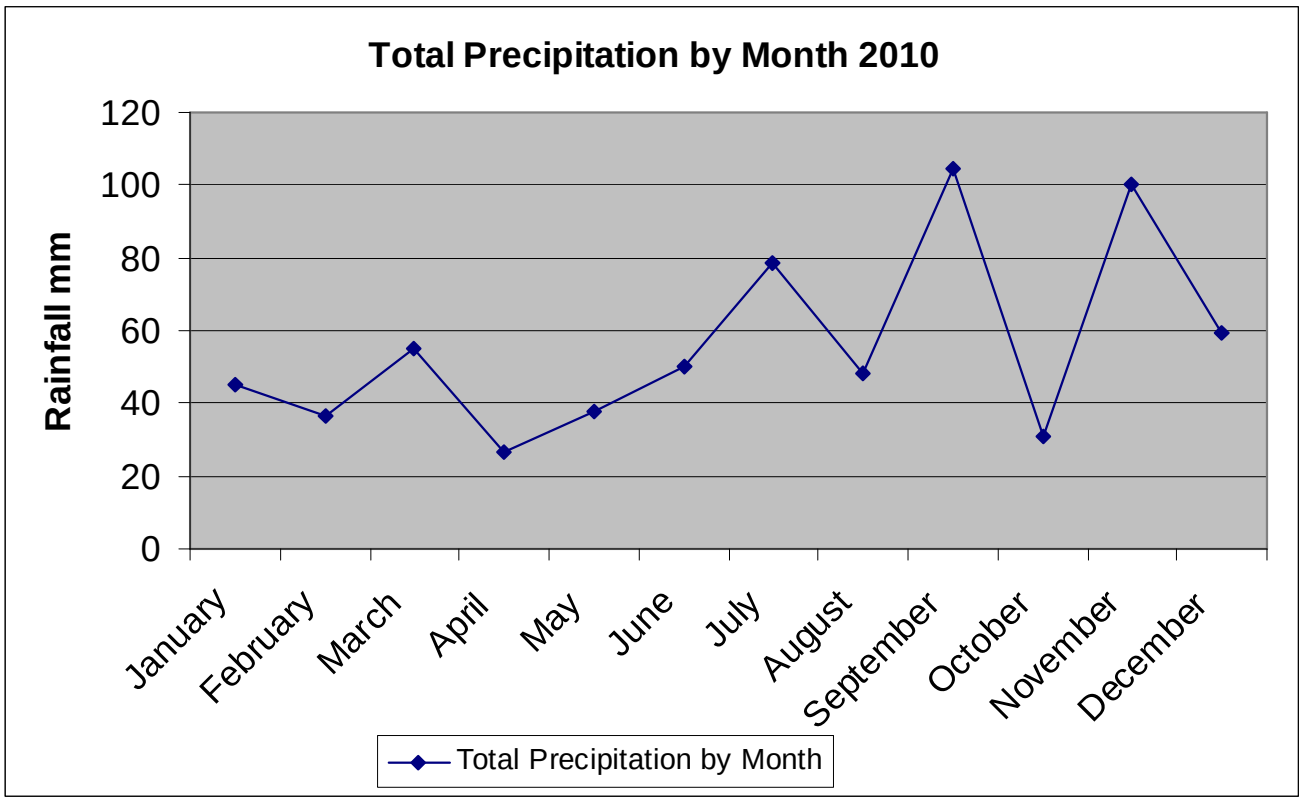


Figure 3.16: Total Precipitation Volume by Month 2010

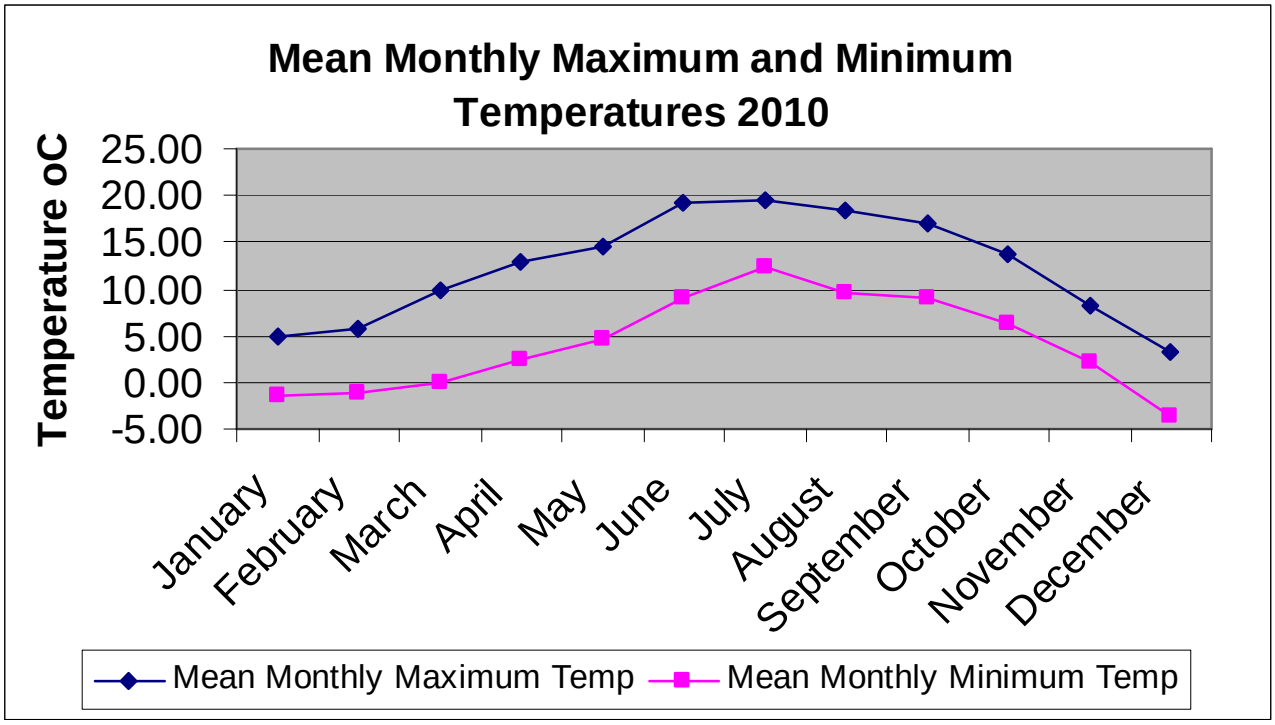


Figure 3.17: Mean Minimum & Maximum Temperatures by Month 2010

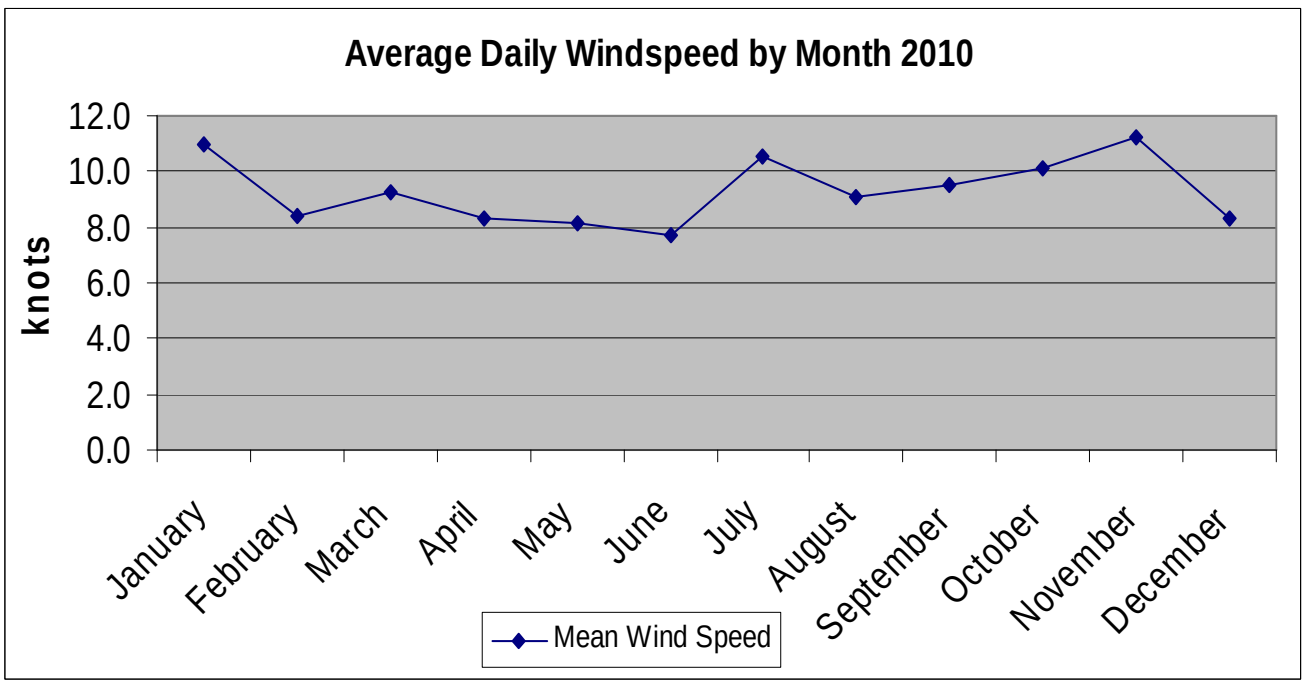


Figure 3.18: Average Daily Wind Speed by Month, 2010

The winds are predominantly West, South Westerly in direction, as illustrated in the Roas Digram, Figure 3.19.

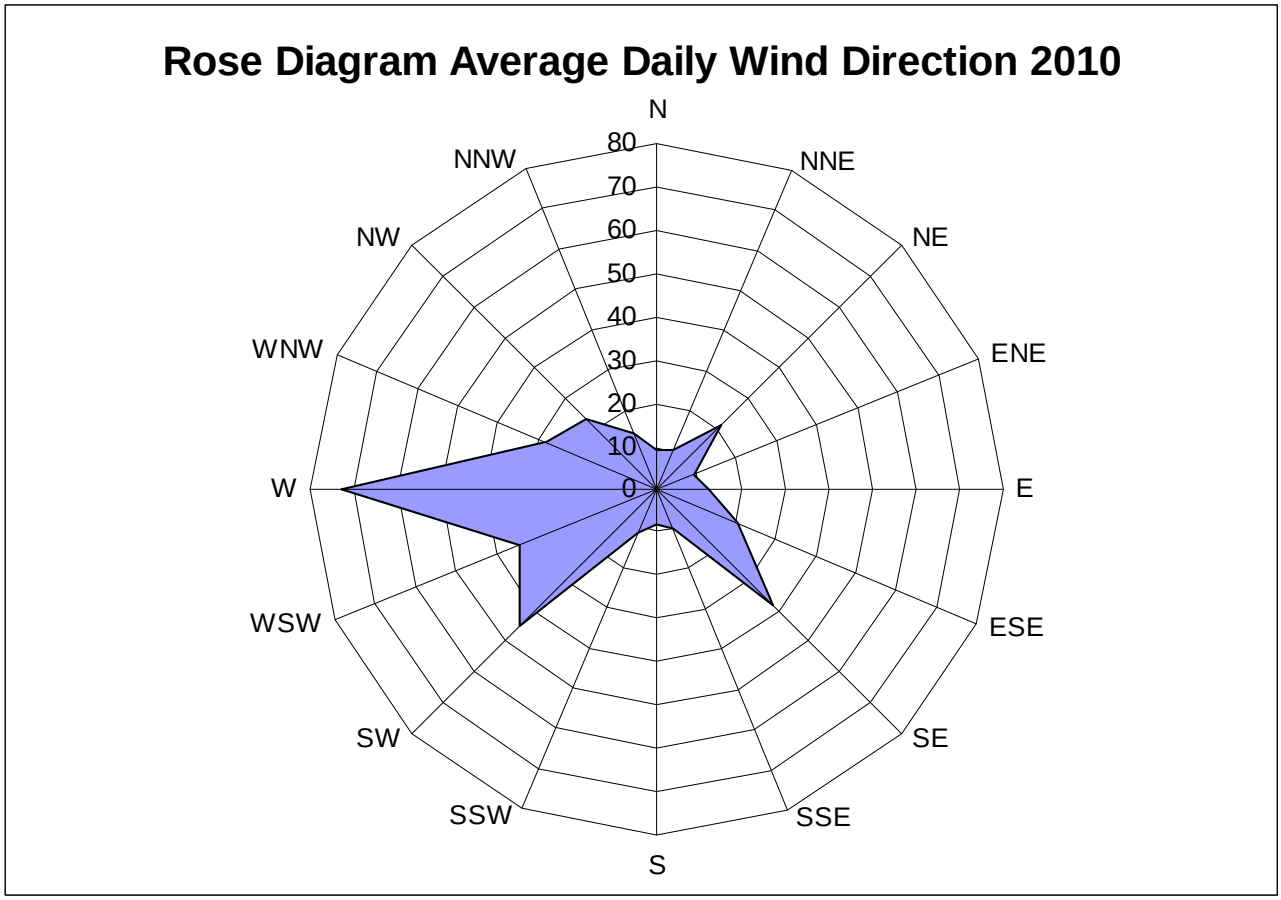


Figure 3.19: Rose Diagram of Average Wind Direction at Dublin Airport

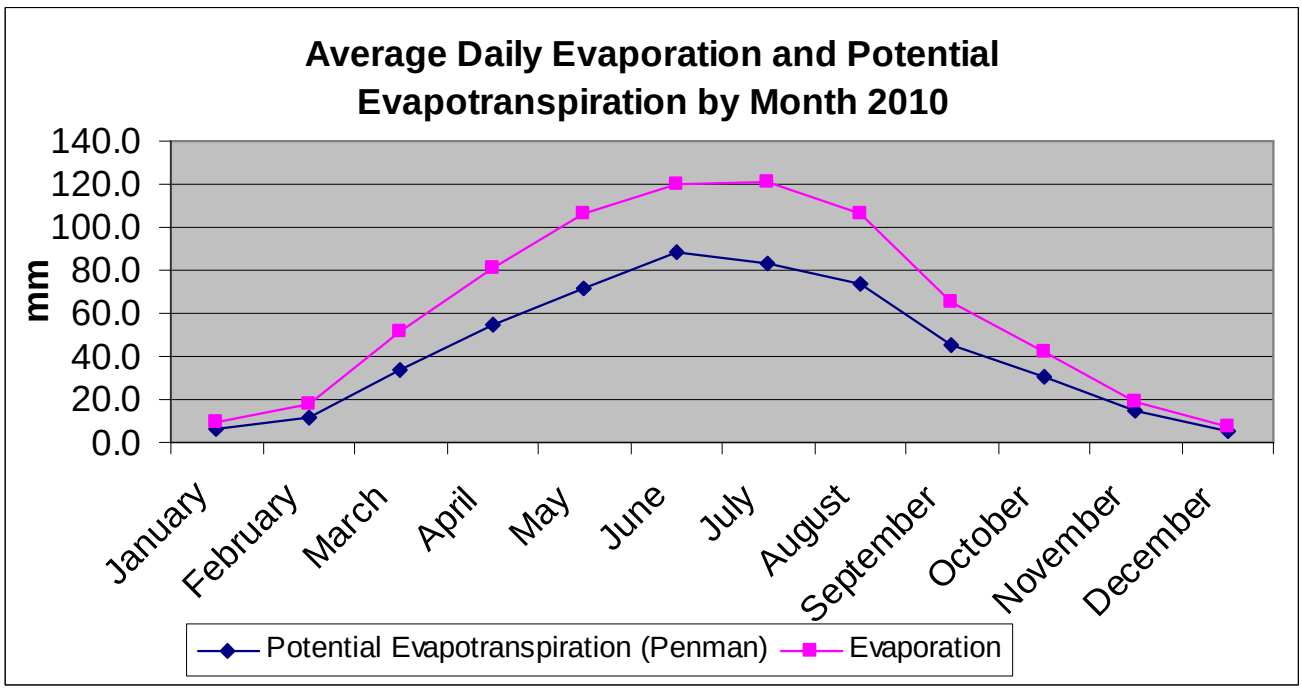


Figure 3.20: Average Daily Evaporation and Potential Evapotranspiration by Month, 2010

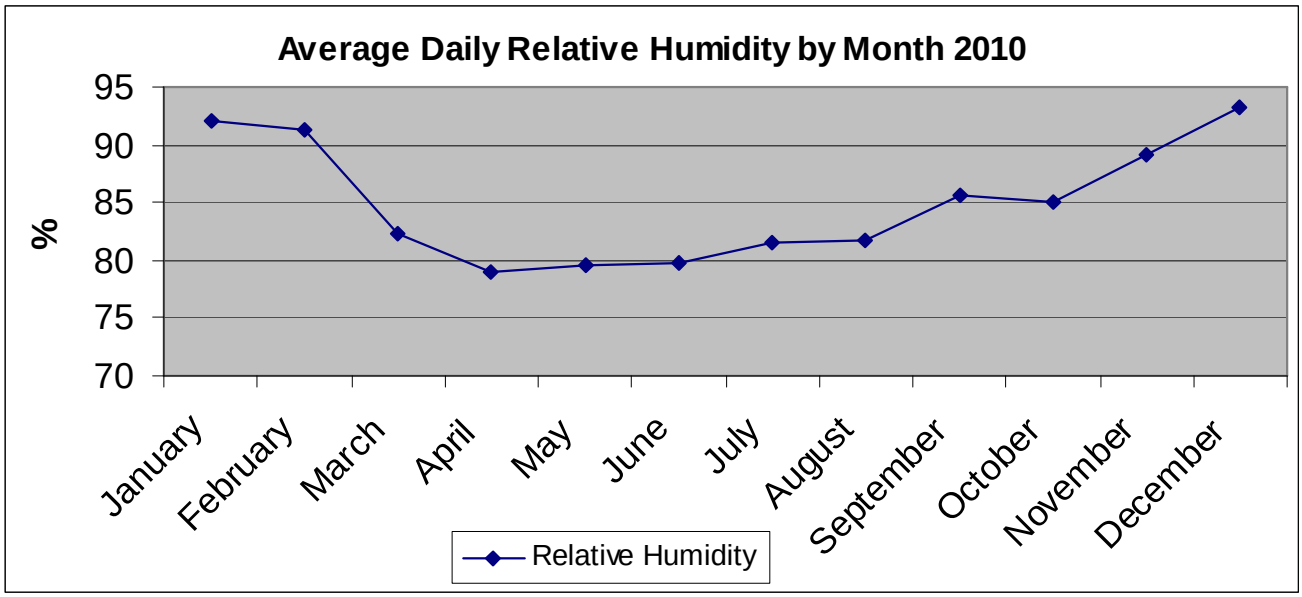


Figure 3.21: Average Daily Relative Humidity by Month, 2010

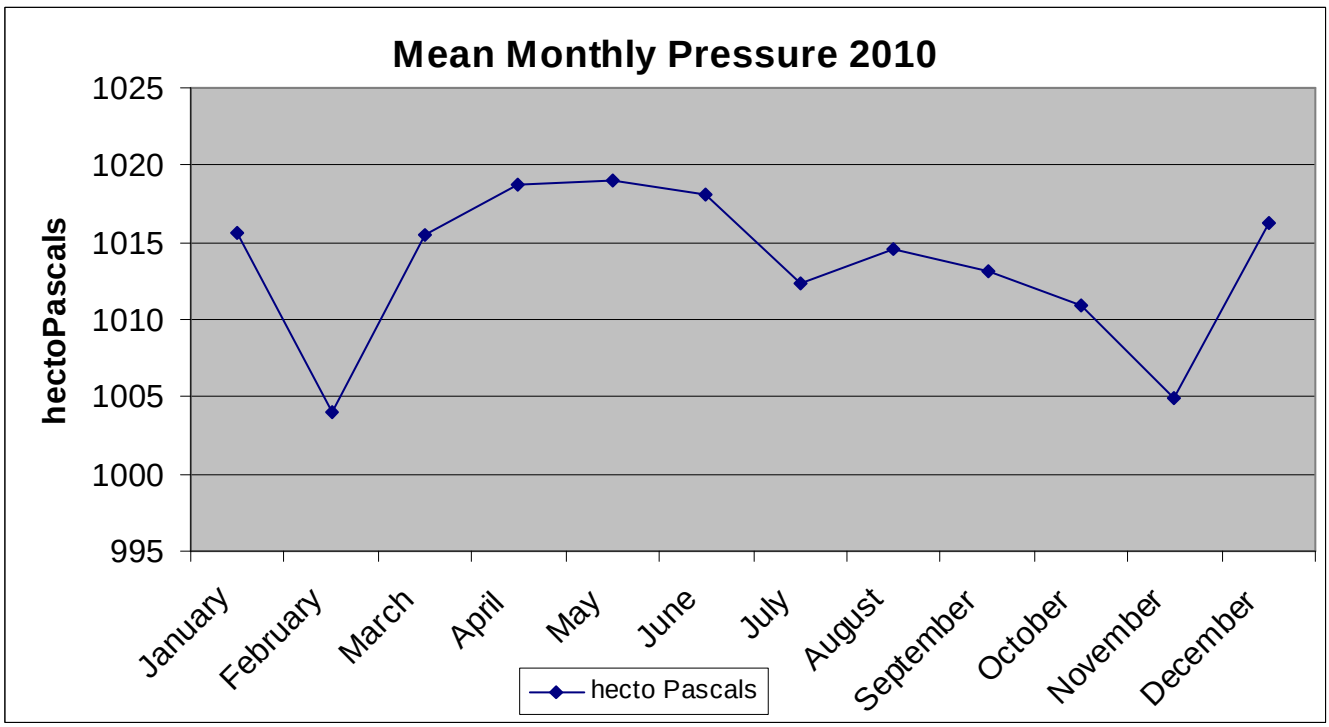


Figure 3.22: Average Daily Atmospheric Pressure by Month, 2010

3.8 Resource Consumption

Resources consumed at Balleally Landfill include diesel fuel, electricity, hydraulic oil and lubricating oil. Table 3.25 presents a summary of the quantities of each used on-site for the period of this report. Electricity consumed on-site (Table 3.26) was used for the purpose of heating, lighting, the operation of office equipment and the leachate treatment plant. The largest consumer of electricity is the leachate treatment plant which was not in operation during 2009 – which accounts for the drop in electricity consumption in 2009.

Diesel consumption in 2010 was similar to 2010.

Water Consumption in 2010 was higher than 2009 by about 1,000m3.

Table 3.21: Summary of resources used On-site 2010

Resource	FCC	BPS
Electricity	78,035 KWh	3,320 KWh
Diesel	191,951 litres	0 litres
Petrol	5,199litres	0 litres
Lube Oil	1000 litres (Estimate)	23,730 litres
Water	9566 m3	

Table 3.22: Electricity consumption on-site for January - December 2000 - 2010

Year	Site 900109623	Site 901532286	Leachate Treatment Plant 902446909	KWHr Total
2010	Ceased	71,575*	6,460*	78,035*
2009	Ceased	82,950*	101,367*	184,317*
2008	1,832*	91,350*	202,739*	295,921*
2007	1,726*	84,900*	202,669*	289,295*
2006	2,109*	97,600*	73,420*	173,129*
2005	1,033*	115,050*	N/R	115,050*
2004	NR	66,250*	N/R	66,250*
2003	NR	NR	N/R	89,155 @
2002	NR	NR	N/R	76,529 @
2001	NR	NR	N/R	55,453 @
2000	NR	NR	N/R	49,016 @

* Data derived from ESB Energy Extra Website for three accounts registered to Balleally.
N/R: Accounts not set up at these times.
@ Data sourced from AER 2006.

Note:

1) There was a significant increase in electricity consumption in the period 2006 – 2008, from previous years as can be observed from Table 3.25. This is attributable to the operation of the new on-site leachate treatment plant, which has the capacity to treat 150m^3/day. The decrease in 2009 is attributable to the fact the leachate treatment plant was not in operation.

2) The electricity consumption has increased consecutively since the year 2000 (exception 2004) and has decreased since 2009, continuing to decrease through 2010.

3.8.1 Resource Use and Energy Efficiency Audit

On 28th October, 2005 the EPA issued a technical amendment (B) inserting a new Condition 2.5. This condition requires FCC to carry out an energy efficiency audit. The audit must:

i) identify all opportunities for energy use reduction and efficiency;
ii) be carried out in accordance with the guidance published by the EPA – "Guidance Note on Energy Efficiency Auditing", and
iii) be repeated at intervals required by the Agency.

The recommendations from this audit should be incorporated in the Schedule of Environmental Objectives and Targets under Condition 2.3. Opportunities for reducing water consumption and identifying recycling and reuse initiatives will be investigated and an assessment of the efficiency of use of raw materials in all processes will be carried out.

3.8.2 Energy Efficiency Audit

The best practice Specific Energy Consumption (SEC) sometimes called the Energy Performance Indicator (EPI), of the sector and of any significant processes is determined where possible. The site SEC's are then compared to the best and the average practice. Any discrepancies were investigated during the 2006 energy audit.

The energy audit identified the site SEC. This may be used as a benchmark to identify the success or otherwise of the implementation of the recommendations.

3.8.3 Implication of Audit Findings

No SEC data could be found for comparable industry sectors and thus no comparison of the site's SEC with others could be made.

The energy audit identified a number of recommendations that could be implemented. Implementation of these will result in a reduction of energy cost and green house gas emissions. However in comparison to other industrial sites the energy consumed at Balleally Landfill is very low, especially when it is considered that FCC do not directly control the diesel used by the hired heavy plant vehicles. As the energy consumption at Balleally is so low, it is proposed that it may not be necessary for FCC to have further energy audits conducted at the site.

3.9 Landfill Gas Utilisation

Landfill gas is actively extracted by means of a series of wells and a collection pipe network in the waste body. The gas is pumped through two main lines to the site utilisation plant. The utilisation plant comprises of five generators grouped into two operating units AER1 and AER3 as shown in the schematic diagram of the plant in Appendix I. To achieve maximum design power output from the station the inlet gas must contain 50% methane and the minimum available gas volume must be 3,340 m^3/hr. At present the 50% methane gas concentration is achieved, but the gas volume is not measured at the landfill.

The power station/utilisation plant operators, Bioverda Power Systems Limited, regulate the inflow of gas to the station in order to achieve the 50% Methane target. The total power output from the station for the period is shown in Tables 3.23 & 3.24.

Currently sufficient gas is being extracted to run 3 engines.

Table 3.23: Electricity Output (MWhr) from the On-site Power Station at Balleally Landfill per year 2003-2010

YEAR	ELECTRICITY OUTPUT (MWhr)
2003	30,194
2004	21,636
2005	21,234*
2006	20,529*
2007	23,762
2008	27,117
2009	25,429
2010	21,909

* Corrected data for 2005-2006 reported by Bioverda Power Systems.

Table 3.24: Electricity Output (MW) from the On-site Power Station at Balleally Landfill 2010

Month	Combined AER1 & AER3 (MWhrs)
January	1,919
February	1,789
March	1,887
April	1,736
May	1,800
June	1,802
July	1,755
August	1,717
September	1,615
October	1,964
November	1,930
December	1,987
Total	**21,901**

3.10 Review of Nuisance Controls

Condition 7 of Waste Licence W0009-03 requires that vermin, birds, flies, mud, dust, litter and odours do not give rise to nuisance at the facility or in the immediate area of the facility. To this end a review of the nuisance controls was initiated.

The nuisance which gave rise to greatest number of complaints up to 2008 was odour when fourteen such complaints were recorded. However, these complaints are significantly down since then and only one odour complaint was recorded in 2010.

All complaints were responded to as soon as possible after the time they were reported. Odour monitoring Ireland visited the site twice during 2008 and once during 2009 and they made many recommendations for odour / surface emission control (EPA Refs. W0009-02/gen43mh & W0009-02 / ak60em). Many of these recommendations have been implemented to date in an effort to further improve odour control and may have contributed to the reduction in odour complaints.

Where these complaints or weekly nuisance inspections reveal odours associated with landfill activities landfill management take corrective action. Expert advice was sought previously on the installation of effective odour control. Mist-Air, based in the United Kingdom were retained.

Mist Air odour neutraliser is an alternative gas cleaning technology that achieves the transfer from odorous gases to a non-odorous liquid. This is achieved by mixing the contaminated air efficiently with the absorbent mist at the optimum ratio of volume to surface area causing a rapid transfer of the odorous gases into the liquid phase, thereby preventing a smell. The neutraliser is totally biodegradable, together with the many odorous causing pollutants and is safe for animals, humans and plants life. It absorbs Ammonia, Alcohol's, Hydrogen Sulphides, Sulphur Dioxide, Ethyl Mercaptans, Amines and many more gases.

The misting system is a base unit housed in a free-standing lockable steel cabinet that provides all the power for the system. A reinforced circulation hose is then fed from the base unit to the various circuits required from around the site.

The static manifolds are fitted with stainless steel atomising jets. These are mounted around the site at 7 meter centres. The system is currently installed around the active Cell 5. The static manifolds were attached to their own independent poles during late 2005. This is a change in practice based on the idea that if they have their own fixed position then they do not have to be continually moved with the litter netting as the active cell changes levels as filling progresses. This should mean less maintenance and air blocks, which will improve the effectiveness of the system's performance.

Since the construction of the speed ramps along Balleally Lane, there has been an increase in the amount of mud deposited on the road. FCC reviewed the road-sweeping programme and had a few trial runs with a footpath-cleansing vehicle and various roadsweepers. FCC send a roadsweeper up Balleally Lane daily which sweeps Balleally Lane and the within the Landfill from exit point to wheelwash. Additionally FCC have a tractor mounted sweeper on loan which is used on site and at site entrance/exit.

3.10.1 Review of Bird Control January to December 2010

Bird Control Ireland Ltd visited Balleally Landfill site for the purpose of Bird Control between January 2010 and December 2010.

During this time site was visited once/twice per month on some occasions and a jointly operated programme was run. The objective of the programme at Balleally was to reduce the amount of scavenging birds on-site to a minimum.

During each visit to site Bird Control Ireland staff undertook efforts to reinforce the daily bird control activities. These included:

- Flying of Falcons and Hawks
- Use of species specific distress calls
- Use of shotgun and Bird scaring pistol
- Flying of various kites (visual deterrents)

Site staff at Balleally Landfill were responsible for the daily deployment of equipment daily and for keeping record of activities on-site. These record sheets (*visit logs*) were retained in the Bird Control Manual.

Corvids and Gulls were the most common pest bird on-site throughout 2010. These pest birds were moved off site with distress calls and visual deterrents. No gulls were harmed.

Hard and cold weather in January showed increased numbers of scavenging birds on-site. Birds were not permitted to land and were pushed off on each occasion using distress calls, visual deterrents and pyrotechnics. Harassment proved successful as birds numbers reduced on-site. New distress call system (*one shot*) was delivered to site in June.

August and September saw a reduction in the number of birds due to agricultural activities in the area.

Throughout the year Bird Control Ireland Ltd undertook management activities

- Liaison with site management
- Variation of bird control activities on-site to achieve best results
- Equipment maintenance and report faults etc.
- Maintenance of site bird control manual and visit log

The Balleally project has achieved a measure of success for a low level programme. Using site equipment birds can be moved on easily.

Bird distress calls were noted to be effective at moving pest birds off site however the one shot system was moved on-site during the year. The benefit of this move is to represent a "new" call in respect of birds. This proved successful

In conclusion:

- Birds did attempt raids each month but were cleared using the range of techniques and equipment available.
- Corvids and Gulls are the most persistent bird that attempt to raid Balleally Landfill on occasions, usually during times of inclement weather.

Bird Control Ireland Ltd are pleased with the results achieved at Balleally Landfill Site during 2010 and this level of control is to be expected to remain as the current programme continues.

Section 4

Site Development Works

4. SITE DEVELOPMENT WORKS

Details of the equipment and plant on-site in Balleally are presented in Table 4.1.

Table 4.1: Equipment and Plant list at Balleally Landfill 2010

Type of Item	Item	Quantity	Resource Used
Transport	05 D 82315 Isuzu 4X4*	1	Diesel
	02 D 76790 Isuzu 4X4 *	1	Diesel
	04 D 68456 Ford Fiesta Van*	1	Diesel
	01 D 72074 Renault Twin Cab Pick Up*	1	Diesel
	97 DD 40957 Toyota Hilux	1	Diesel
Plant	02 D 5577 Renault 4 axle skip lifter*	1	Diesel
	04 D 64948 John Deere 4X4 Tractor*	1	Diesel
	07 D 7332 Same Tractor*	1	Diesel
Heavy Plant	Hanimag Compactor	1	Diesel
	Kamatsu 65px dozer*	1	Diesel
	Cat 130 mini Excavator*	1	Diesel
	Cat excavator 330*	1	Diesel
	30 Ton Vibrating Roller*	1	Diesel
	Diesel H/P power washer and Bowser*	1	Diesel
	10 KVA 3 Phase Generator*	1	Petrol
Auxiliary Plant	Wacker Plate*	1	
	CONSAW*	1	Petrol
	6 inch pump*	1	Diesel
	6.5 KVA diesel generator*	1	Petrol
Equipment	Extrusion welder*	1	
	Ingersoll-Rand mobile lighting set*	1	
	Wedger Seam Welder*	1	
	Lyster heater / welder*	1	
Survey	Sokkisna level and tripod*	1	
	Sokkisna theodolite & Tripod*	1	
	NIKON auto level*	1	
	Garmen GPS*	1	
	GMI gas monitor*	1	
	Multi 340I meter*	1	
	GMI FI 2000*	1	
	30 Metre steel Tape*	1	
	Solinist 30m dip meter*	1	
	Psion organiser*	1	
	Various P.C.s and printers*	1	

GCL – Geosynthetic Clay Liner

4.1 Works carried out during the Reporting period, 2010

The ongoing capping programme and final restoration of the landfill will control and contain the breakouts which occasionally occur near the entrance. The shallow vertical barrier surrounding the facility will be completed at the entrance as part of the closure plan. This should help contain any contamination of surface water with leachate into the future.

4.1.1 Installation of New Landfill Gas Management Infrastructure

10 No. 125mm diameter temporary gas extraction wells were drilled during 2010 across Cells 5 & 6. The areas were selected after careful consultation with the staff at Balleally Landfill, in ascertaining the precise locations, which would reap the most gas based on what waste was landfilled. The spacing of the gas extraction system is approximately 45 m between each well on each line. The depth of each of the extraction wells is no deeper that 2 m above the base of the lined landfill at the point of each gas well. The wells were connected to the utilisation plant. The CQA document for these wells is available for inspection at the facility offices.

Table 4.2: Work carried out during 2010

Objective/ Target	Description	Timescale
Objective 1	**To minimise environmental impact on the immediate environment**	
Target 1	**To remediate banks around existing and new boreholes and up update TOC readings** Some TOC's resurveyed and all relabelled *in-situ*	Ongoing
Target 2	**To review and extend gas abstraction network in newly capped areas** Significant new areas harnessed, Ten new rising wells in cells 5 & 6	Ongoing
Target 3	**Complete capping of phase 12 and 8.** Phase 12, Cell 6 partially capped. Phase 8 largely capped.	Ongoing
Objective 2	**Restoration of the facility**	
Target 1	**Prepare Landscaping Plan for implementation in 2009-2010 to include planting of northern boundary adjacent to gas plant area, Balleally Lane / Landfill northern boundary (after final capping installed) and capped southern and eastern boundaries up to 27m contour line.** Grass seeding of capped areas ongoing; Northern flank of cell 6 completed. Grass seeding on south western upper lobe of site completed. Proposal sent to EPA re Planting Programme along Southern, Western and Northern Slopes. Agreement Secured with NPWS for these proposals and planting completed by end of Q1 2010.	Ongoing
Target 2	**Examine the completion of a shallow vertical barrier at the northern boundary for implementation during restoration of site.** No Progress to report.	Ongoing
Target 3	**To provide for Leachate Recirculation in Cells 5 & 6.**	Ongoing.
Target 4	**To Prepare grade and place liner for second lift Piggybacking above the haul road Cells 4-6.**	Ongoing

Table 4.3: Works to be carried out during 2011

Objective/ Target	Description	Timescale
Objective 1	**To minimise environmental impact on the immediate environment**	
Target 1	Repair or replace leachate monitoring boreholes around landfill perimeter.	Feb-Dec 2011.
Target 2	To review and extend gas abstraction network during 2011 in recently capped areas of new cells (5-6) & Second Lift Piggybacking.	Feb-Dec 2011.
Target 3	To provide for Leachate Recirculation in Cells 5 & 6.	Feb-Dec 2011.
Target 4	To progress the installation of concrete paving around Leachate Treatment Plant (LTP).	Feb-Sept 2011.
Target 5	Complete Licence Review / Technical Amendment for leachate treatment plant	Feb-Sept 2011.
Target 6	To commence capping of former Civic Amenity Area.	Ongoing.
Target 7	To Prepare grade and place liner for phase 3 of second lift Piggybacking above the haul road Cell 6.	Ongoing
Target 8	To complete mitigation measures to deal with surface water contamination at SW20a.	March-Dec 2011.
Target 9	To continue to investigate mitigation measures for the prevention of leachate breakout along the southern boundary of the landfill.	March – Dec 2011.
Objective 3	**Restoration of the facility.**	
Target 1	Examine the completion of a shallow vertical barrier at the northern boundary for implementation during restoration of site.	March – Dec 2011.
Target 2	To Prepare Plan for the demobilisation of existing facility offices to a new location.	March – Dec 2011.
Target 3	Address Flooding Issue at Entrance.	March – Dec 2011.
Target 4	Address Contamination Issue at SWV1	March – Dec 2011.
Target 5	Repair Leachate Monitoring Levels SCADA system	March – Dec 2011.

4.2 Progress on-site restoration

The Restoration and Aftercare Plan for the landfill was submitted in July 2003 as per condition 4.1. This plan sets out a framework to successfully restore Balleally Landfill to a condition suitable for use as an amenity for the general public. The plan has been prepared in accordance with the EPA Landfill manual 'Landfill Restoration and Aftercare' (1999), the Council Directive (1999/31/EC) on the Landfill of Waste and Waste Licence W0009-02 & -03. Restoration is being undertaken at Balleally Landfill using a phased approach due to the size of the site and seasonal constraints. On completion of restoration in each phase, the aftercare plan to establish and maintain the after use of the site shall be implemented.

Capping of the site is as per Condition 4.3. The geotextile alternative was investigated and agreed in early 2004 with the EPA. This decreased the number of vehicle movements required for importing soil for the final cap.

Figure 3, Appendix 1, indicates the agreed phases for the capping and restoration of Balleally Landfill. The phasing provides for the restoration of the original landfill initially, and then the landfill extension area.

The total area for capping is 46 Hectares approx.

Between 2004 and December 2009, 34.9 Hectares were capped. During 2010, an additional 1.85 Hectares (1.4 LLDPE / .45 GCL) were capped. Which means that, along with the majority "Old Landfill", Cells 1, 2, 3, 4 and the majority of 5 and some of cell 6 of the new landfill, are now capped, see Figure 4 Appendix 1. A total of 36.75 Hectares is now capped. This equates to 79.89% of the entire landfill area to be capped. The remaining capping areas are the new cells 5&6 (1.25ha approx.), Piggybacking (3.58) and Old Landfill (4.37ha approx).

A proposal was sent to The Agency (Ref: FCC-W0009-02-020) on 22/9/2008 to provide for a second lift "piggybacking" between "new cells" and Top Lobe of the old landfill. This proposal would give a void space of 176,000 tonnes. This proposal was agreed to, subject to conditions, by The Agency, (Ref: W0009-02 / ak61em) and an additional 1.6ha of the landfill was lined for the reception of waste.

4.2.1 Inert waste to be used for cover/restoration material at the facility

An estimate of soils required for the final capping of the landfill is as follows:

Expected subsoil tonnages for restoration = 1,180,000 tonnes
Expected topsoil tonnages for restoration = 580,000 tonnes

This estimate does not take into account any soil requirements for levelling off the contours prior to the placement of the final capping. However, it is expected that material on the landfill site (berms etc.) will be used which will limit the importation of soil/clay.

Onion skin method of filling takes place at the tipface at Balleally Landfill as described in the EPA Landfill Operational Practices manual. As a result of this method at the end of each day the tipface is completely covered with clay and other such inert material. This reduces the possibility of windblown litter and provides reasonable surface quality for vehicle access the next day for tipping.
This mixed cover material provides drainage, shape and surface stability to the landfill, which is essential, when the final restoration measures above are initiated.

A filling plan has been prepared for the extension area in 2006 to ensure the integration of waste filling activities with the phased restoration of the site under condition 5.2 of the Waste Licence W0009-02.

A revised filling plan was submitted to and approved by the EPA before entering Cell 5; the revised plan took into consideration the EPA Circular Letter to all landfills, dated 20th June 2007.

The total area of the site is 124 Acres. The Licence area is 124 Acres (50.18Hectares). The total area for capping is 45.9Hectares.

See below statistics of capping programmed:

Start Date of Capping Programme: May 2004
Progress as of 31st December 2010: 36.75ha

The final capping profile is made up of:

1. Topsoil layer of 300 mm thickness.
2. Subsoil layer of 700 mm thickness.
3. Geocomposite Drainage Layer (GDL).
4. Geosynthetic Clay Liner (GCL) / LLDPE membrane liner on New Cells.
5. Geocomposite Gas Collection (GGCL).

4.3 Annual topographic survey

In accordance with Condition 8.5.1 of WL W0009-03 a Topographical Survey was undertaken in Balleally Landfill in September 20010 and submitted to The Agency 9/12/2010 (Ref: FCC-W0009-03-2010-018).

4.4 Slope stability

As required under Licence Condition 8.8.1 a slope stability survey was undertaken in Balleally Landfill during December 2010 and submitted to The Agency 6/1/2010 (Ref: FCC-W0009-03-2011-002).

The conclusions and recommendations in the survey report are cited below [quote].

> *"The slopes accessed during this survey at Balleally Landfill are considered by BMA to be, in general, in good condition. Permanent slopes are being or have been prepared to presumed final design level over a significant portion of the site and no signs of slope instability or distress were noted on these slopes. Temporary slopes visit, pending re-grading, within the site at relatively step angles with minor evidence of slope instability or distress of these slopes noted during this site visit. Monitoring should be undertaken regularly in these areas and the slopes re-profiled as soon as possible.*
>
> *In general all slopes should be monitored and inspected for signs of slope instability or distress at regular intervals and especially after exceptional rainfall events.*
>
> *Vegetation of an un-vegetated, permanent slopes should be carried out as soon as practical.*
>
> *No tracking over final slopes should be permitted unless grass takes and crusts forms. These newly seeded slopes should be monitored for signs of erosion due to surface water flows, especially after heavy rainfall events.*
>
> *Cutting of grass should be restricted to dry periods and care should be taken to avoid rutting and this exercise only carried out when the surface is suitably firm.*
>
> *Specific bench marks should be established along the base of each slope for measurements during the annual topographical survey and a comparative table of coordinates produced on a yearly basis as part of the annual topographical survey.*
>
> *The minor slope stability issues identified in this report should be assessed as soon as possible."*

These recommendations are noted and will be implemented.

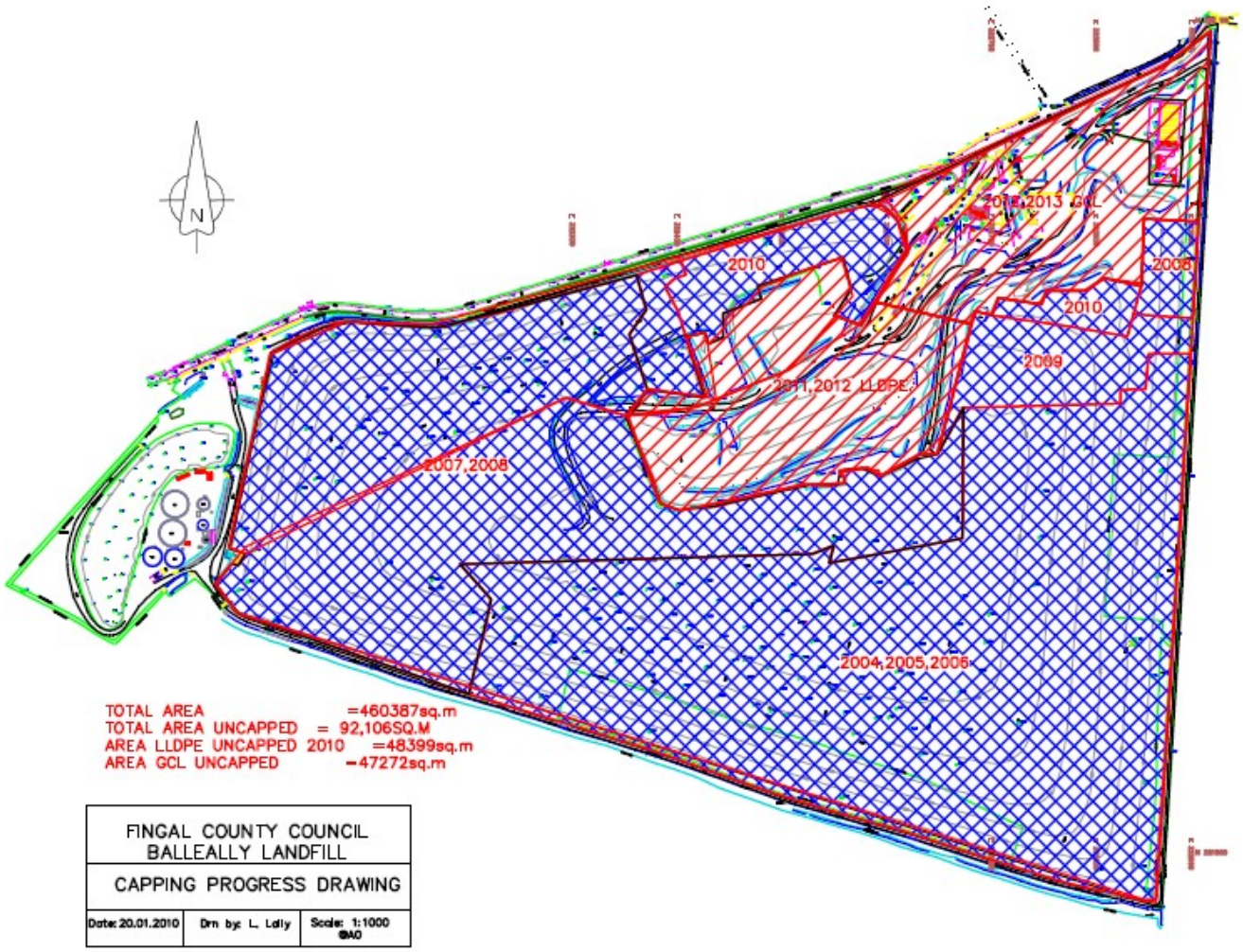


Figure 4.1: Balleally Landfill Capping Program December 2010

Section 5

Waste Received & Consigned from the Facility

5. WASTE RECEIVED & CONSIGNED FROM THE FACILITY

5.1 Waste acceptance and handling

5.1.1 Waste reception

During operational hours, a qualified person in charge of the landfill is always present on-site. A new weighbridge system was installed at Balleally Landfill by Precia Molen Irl. Limited. It consists of two Precia Molen VS300CS surface Mounted Weighbridges linked to a GeneSYS PC-based Weighbridge Management System. The GeneSYS Windows – based software, which forms the basis of the PC based system stores all relevant data in database form from which cross-referenced reports can be generated as required by landfill management and the accounts department.

The system has been in operation since the 25th of May 2005 and consists of two weighbridges, one "in" and one "out". These are linked to a computerised system. An automatic barrier system is proposed to be linked to the computerised system. This will consist of one barrier to prevent the lorry being driven off the weighbridge prematurely and another to prevent the ensuing lorry from getting too close to the weighbridge. The capacity of both weighbridges is 50,000/60,000Kg and the deck size is 18m x 3.6m.

Extensive protection against lightening is included as standard, this includes earthing bonds for each loadcell and a central earth for the entire weighbridge.

Written records of loads arriving on-site are maintained. These include the date, weight (tonnes), origin (producer/collector), description of waste (EWC code), the carriers name, vehicle registration and special handling/pre-approval permit number (where applicable) is recorded. The initial point of inspection is the weighbridge and the name of the operator is recorded electronically by the GeneSYS system as the person checking the load in the first instance. Written operational procedures for waste acceptance are available and used for training staff on-site.

The weighbridge is located a few hundreds yards north of the administration building where a service hatch permits communication with the driver and inspection of documentation accompanying the waste consignment (Waste Acceptance Form A, B or C, Permit (if applicable). The site reception area is laid out in a one-way system, which assists the through flow of vehicles. No vehicles deemed unfit to use the site roads are allowed access. Rejected loads are recorded as per Condition 10.2 (i) of the Waste Licence 9-2 detailing the date and type of waste rejected and the facility to which they were directed.

All vehicles arriving on-site must be appropriately covered to ensure the transport of the waste does not adversely affect the environment. Warnings will be given to the driver where necessary and if the instruction is ignored the company involved will be contacted and the load rejected.

Acceptance of waste is as per Schedule A of the Waste Licence Reg. No. W0009-03 Waste Acceptance policy agreed by EPA as per condition 1.6 and condition 5.2.3 of the licence.

Wastes not acceptable are liquid wastes, animal wastes, construction and demolition wastes, whole used tyres and hazardous wastes. Difficult wastes that require special handling can only be accepted if the Environmental Services Department of the Council has given prior authorisation at County Hall, Swords. Authorisation is by means of a valid permit (which expires one month after the date of stamping by the Environmental Services Department) and details the waste type, quantity and any special instructions required by site personnel.

Following acceptance of the load the weighbridge operator directs traffic to the relevant working area for the waste type where a banksman in charge of traffic will give further instructions to drivers.

5.1.2 Waste inspection

If the weighbridge operator is unhappy with the documentation, nature and/or source of a load presented for disposal or if the carrier's permit is invalid, he will contact the Site Manager and may instruct the vehicle to park (in a holding area) while the legal status of the permit, or the origin, description and nature of the load is confirmed.

A visual inspection can be performed at the weighbridge, if possible. Alternatively, the load can be tipped adjacent to the relevant tipping face and inspected by the designated waste inspector. Where a breach of the law is suspected, the EPA and the Gardaí will be informed.

Where a breach of the waste acceptance policy is suspected the load can be diverted to the Waste Inspection Area/Quarantine Area for further inspection.

In addition to these inspections, checking and confirmation of suspect loads, random checks are also carried out on regular site traffic.

Non-municipal type waste is not accepted on-site unless the Environmental Services Department has given prior approval at County Hall, Swords by means of a pre-approval permit.

FCC personnel responsible for checking the documentation accompanying vehicles must be capable of:

- understanding the waste acceptance criteria for the site in terms of licence requirements, and site management policies,
- understanding the basic underlying reasons for the acceptance criteria for the site,
- understanding the information which should be provided on the documentation accompanying loads,
- identifying non-conformity,
- Following specific procedures in the event that either the documentation is incorrect or the load does not comply with the relevant acceptance criteria.

Where inspection of a load is not possible at the site reception area (e.g. sealed containers), then the waste is deposited on the ground close to the working face. This permits inspection of the load prior to blading and burial. If a non-conformity is discovered or suspected, the waste is isolated and placed back in the transporting container or suitable alternative and removed to the Quarantine area pending management investigation. If the non-compliance is confirmed and deposit on the site not possible, then the load is returned to the carrier, and the producer and authorities informed. Written records of the incident are recorded at the Weighbridge in the Rejects Book. Loads held on-site overnight are recorded in the Quarantine Register.

5.1.3 Inspection/Quarantine Area

An inspection area is provided as per condition 3.7 of the Waste Licence W0009-03. Any waste not conforming with Schedule A and/or agreed Waste Acceptance Policy as per condition 5.2.3 will be rejected and removed off-site or placed in the quarantine area. Random loads and suspect loads will be diverted to the Inspection area for spot checks.

Waste received at Balleally to be disposed of at the landfill is weighed at the weighbridge on entry. A waste acceptance policy has been prepared as per condition 5.2. This enables the recording of waste into and out of the facility as per condition 10.2 and 10.5.

Table 5.1: Quantity & Type of Waste Deposited in Balleally Landfill in 2003-2010 & Waste Licence Limit for Waste Licence W0009-03

Waste Type	Licence Limit *(tonnes)*	Deposited in 2003 *(tonnes)*	Deposited in 2004 *(tonnes)*	Deposited in 2005 *(tonnes)*	Deposited in 2006 *(tonnes)*	Deposited in 2007 *(tonnes)*	Deposited in 2008 *(tonnes)*	Deposited in 2009 *(tonnes)*	Deposited in 2010 *(tonnes)*
Household	152,500	61,201.52	65,814.99 (+ 6,099.56 C.A) 71,914.55	66,203 (+ 5,801 C.A) 72,004	62056 (+4,891 C.A.) 66,947	63,708 (+4,867 C.A.) +62 F.T. 68,637	50,489 (+ 3,959 C.A.) +10 F.T. 54,458	37,789	30,769.86
Commercial	200,000	150,454.96	119,890.35	49,195.57	63,819	61,773	46,248	54,093	56,866.74
Sewage Sludge	30,000	4,494	5,104.58	3,402.24	4,623	7,466	5,091	315	360.84
Industrial Non-Hazardous Sludge	6,000	5,749	5,992.8	6,635	6,825	7,061	6,660	6,363	6,690
Total	**388,500**	**221,899.48**	**202,902.28**	**131,236.81**	**142,214**	**144,937**	**112,457**	**98,560**	**94,687.44**

C.A – Civic Amenity

Note: As can be seen from the above figures during 2005-2010, the industrial non-hazardous sludge from Leixlip waste water treatment plant exceeded the licence limit of 6,000 tonnes. This is attributable to the expansion of the plant due to an increase in demand for potable water and subsequently an increase in production. Tonnages of Sewage sludge have dropped off considerably from 2008-Present.

5.2 Quarantine Register

Vehicles are taken into quarantine at Balleally Landfill for inspection under the Operation Bruscar Scheme.

5.2.1 Operation Bruscar Introduction:

On Saturday, 16th November 2002 a joint operation between guards and authorised persons under the Waste Management Act, 1996 commenced. This operation was codenamed "Operation Bruscar".

The authorised persons involved identified vehicles that were transporting waste and requested the guard to stop the identified vehicle. The waste on the vehicle was examined and the driver was questioned with regards to the origin and eventual destination of the waste. If, in the opinion of the authorised person, it was necessary to prevent environmental pollution, the vehicle containing the waste was impounded.

All impounded vehicles were taken to the quarantine area at Balleally landfill, where they were detained. This made it possible to further inspect and in detail examine the waste on the impounded vehicles.

Examination of waste is necessary to gather evidence for possible prosecution and to classify and identify the waste to safely dispose of it at a facility that is licensed to accept it.

Three operations were done during November and December 2002 and 41 were executed in 2003. 39 of these vehicles have been impounded to date, 25 of them in 2003.

There were only 7 vehicles impounded in 2004 and 3 vehicles impounded during the reporting period of 2005. This was owing to the temporary closure of the quarantine area in order to facilitate the excavation of the new cell number 6 in July 2004. A replacement quarantine area was built in 2005 but utilisation of this area has not been possible due to outstanding construction issues. All vehicles impounded are recorded in the Balleally Landfill Quarantine Register. Fingal County Council has also agreed to accept vehicles from similar operations from Meath County Council waste officials when required.

2006

There were seven vehicles impounded in the quarantine area during 2006. All vehicles impounded are recorded in the Balleally Landfill Quarantine Register. FCC has also agreed to accept vehicles from similar operations from Meath County Council waste officials when required.

2007

There were six vehicles impounded in the quarantine area during 2007. All vehicles impounded are recorded in the Balleally Landfill Quarantine Register. FCC has also agreed to accept vehicles from similar operations from Meath County Council waste officials when required.

2008

No vehicles were impounded in the quarantine area during 2008.

2009

No vehicles were impounded in the quarantine area during 2009.

2010

No vehicles were impounded in the quarantine area during 2009.

5.3 Discussion of Fingal County Council's waste consigned to Balleally Landfill

- **Domestic Waste:** Domestic waste is household refuse that was collected by FCC refuse freighters from the doorstep of private households. The waste is presented to the Council in a wheelie bin.
- **Road Sweepers:** Road sweepers are lorry type machines that are employed by the Council to sweep channels and kerbing and to remove grit and litter from the road surface.
- **Roads:** The Roads Department carry out repairs to footpaths and roads in the county. The waste material arising from these activities is used in the landfill for berk and internal road construction.
- **Parks:** The Parks Department not only tend to trees, shrubs and plants but also conduct repairs to buildings and structures of a historical nature and clear litter and rubbish from open spaces. Residual materials from these activities were deposited to the landfill. Waste from road cleansing and landscaping also arise from this department. It should be noted that no green waste was disposed of to the facility by this department.
- **Drainage:** Sewage sludge consigned to the facility for the period was classified as drainage as it originated in the Drainage Department. This was the only sewage sludge consigned to the facility.
- **Environment:** Material from the Environment Department originates from activities such as beach cleaning, cemetery management and clean-ups.
- **Cleansing:** The Litter Management Section collects material such as litter bin contents and fly-tipped waste which is consigned to the landfill.
- **Leixlip Waterworks:** Leixlip Waterworks is a potable water treatment plant. A by-product of the treatment process is a non-hazardous sludge cake as well as some screenings.
- **Waterworks:** Waste generated by the operation of the Water and Drainage Division that would include cleanings and inert material arising from the laying of pipes.
- **HQ:** A small quantity of waste produced in the headquarters of FCC was disposed of at the facility.

Section 6

Environmental Incidents & Complaints

6. ENVIRONMENTAL INCIDENTS & COMPLAINTS

6.1 Reported incidents

Table 6.1 gives a summary of reported incidents during 2010. More details are available at the facility office.

More Details are available on the Landfill Managers Complaint Register.

Table 6.1: Reported Incidents during the Reporting Period 2010

Incident Number	Date of Incident	Nature of Incident
1	4/1/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5, 7 & 13.
2	11/1/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5.
3	1/2/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5.
4	8/2/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5.
5	16/2/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5.
6	23/2/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well- GA2,3,7,13.
7	18/3/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells-GA5.
8	23/3/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well- GA5.
9	10/5/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well GA5.
10	17/5/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well- GA5.
11	25/5/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3,4 & 5.
12	17/6/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3 & GA4.
13	21/6/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells GA3.
14	28/6/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3&4.
15	17/8/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3,4&5.
16	25/8/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA3,4.
17	7/9/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3,4&5.
18	13/9/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3,4,5&13.
19	21/9/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA5.
20	28/09/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well- GA5.

Incident Number	Date of Incident	Nature of Incident
21	6/10/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5.
22	14/10/2011	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA3,4&5.
23	19/10/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA5.
24	27/10/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA3,4 &5.
25	2/11/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA3,4&5.
26	16/11/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA5.
27	23/11/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Wells- GA5.
28	30/11/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well- GA5.
29	7/12/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA5.
30	16/12/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA2,3,5,7&8.
31	22/12/2010	Landfill Gas: Emission Limit Value Exceeded at Monitoring Well-GA2,3,5,7&8.

6.2 Complaints Summary

A summary of complaints for the reporting period is shown in Table 6.1. The complaints register is available for further inspection at the site office. There were a total of 2 complaints received at the facility for the reporting period-compared similar to complaints in 2009. One related to odour while the other related to dust. All complaints were responded to as soon as possible after the time they were reported. Odour monitoring Ireland visited the site twice during 2008 and once during 2009 & 2010 and made many recommendations for odour / surface emission control (EPA Refs. W0009-02/gen43mh & W0009-02 / ak60em). Many of these recommendations have been implemented to date which may account for the reduction in the number of complaints received.

Table 6.2: Complaints received for the reporting period 2010

Date of Complaint	Nature of Complaint	Complaint	Corrective Action
26/2/2010	Odour	Odour at Dwelling – Balleally Lane / Lusk Road Junction.	Investigation
28/5/2010	Dust	Dust on cabbage crop in neighbouring field.	Investigation

More details are available on the Landfill Managers Complaint Register.

Section 7

Environmental Management Program

7. ENVIRONMENTAL MANAGEMENT PROGRAM

7.1 Environmental Objectives and Targets for 2011

See section 4.2 for environmental objectives and targets.

7.2 Summary of Written Procedures

There were no new written procedures during the reporting period. The waste acceptance forms were revised to allow for the recording of pre-treatment applied to and biodegradable content of wastes consigned to Balleally.

7.3 Communications program for public information

The Communications Programme for Fingal County Council contains information on Balleally Landfill. The information can roughly be divided into two areas. Background information prior to granting of waste licence, and information concerning the waste licence (W009-02 & 03). There is also a register of correspondence to and from the Agency, along with the various correspondences relevant to the Licence. This information is updated on a continuous basis.

Environmental Information can be viewed at the following locations:

- At the **Council's Headquarters** between 9.30 a.m. and 12.45 p.m. and 2.00 p.m. and 4.00 p.m. Monday to Friday (excluding public holidays), unless otherwise arranged by prior appointment.
- Permanent facilities for viewing information including a computer to be provided at Balleally Landfill.
- At **Balleally Landfill** by prior appointment with the Landfill Manager.
- A register of information will be made available on www.fingalcoco.ie. A Link to the EPA's website will also be added to the site.

7.3.1 Site Visits

- Site visits to **Balleally Landfill** can be arranged by writing to the Senior Landfill Manager requesting the date and time of the proposed visit and indicating the number of visitors and the purpose of such a visit and whether any presentation is required. The use of cameras and video equipment during the visit must be agreed in advance with FCC.
- Such requests will be accommodated where possible.

7.3.2 Balleally Landfill Liaison Committee

- Sadly, Mr. Aidan Murphy passed away in July 2010 and Ms. Rena Condrot passed away in December 2010. May they Rest in Peace. Their work on the committee was very much appreciated.
- All information relating to the restoration and aftercare of Balleally Landfill is presented to the Liaison Committee for comment and adoption.
- Members of the committee are:

Mr. Brian Arnold - REACT

Mr. John Barrett and Ms. Rena Condrot (R.I.P.) - Balleally Residents and Farmers Association.

Mr. Des Martin, and Mr. Ben Colgan - RAGE

Cllr. May McKeon (Chairperson), Cllr. Anne Devitt, Cllr Ken Farrell and Cllr. Gerry McGuire.

Mr. John Daly, Mr Martin Kiely, Ms. Linda Lally, Mr. Fergus O' Carroll and Mr. Mortimer Loftus. - Fingal County Council.

The Committee met six times during 2010. Agenda were set and minutes kept.

Table 7.1: Reports & Information Available for Public Inspection 1993-2010

Information Available	Report Date
Balleally Landfill Preliminary Technical Report & Scoping Study	September 1993
Balleally Landfill Study, Improvement of Balleally Landfill Site & Lusk Sewage Outfall, Inception Report	October 1996
Balleally Landfill Study, Improvement of Balleally Landfill Site & Lusk Sewage Outfall, Safety & Environment Assessment Report	January 1997
Balleally Landfill Study, Improvement of Balleally Landfill Site & Lusk Sewage Outfall, Preliminary Report on Recycling of Construction/ Demolition Waste	January 1997
Environmental Impact Statement for Balleally Landfill and Rush/Lusk Wastewater Treatment Plant, Volumes 1 - 8	September 1997
Waste Licence Application, Application Form	October 1997
Waste Licence Application, Monitoring Data	October 1997
Balleally Landfill Report on Interpretation of Baseline Monitoring Programme	November 1998
Waste Licence Request for Additional Information Waste Licence Request for Additional Information Article 6(1)	February 1998 September 1998
Waste Licence 9 – 1, Issued by the EPA	16th February 1996
Report on Short Term Options at Balleally Landfill	July 1999
Waste Management Plan for the Dublin Region, Accepted by FCC	10th May 1999
Dublin Landfill Site Selection, Phase 1 Report Report on Short Term Options at Balleally Landfill Report on Short Term Options (capacity) at Balleally Landfill	July 1999 July 1999 Aug. 2000
Construction & Demolition Waste Recycling Project, Contracts Documents	
Hydrology Study at Balleally Landfill	March 1993
Groundwater Quality at Balleally Landfill	June 2000
Groundwater Quality at Balleally Landfill	December 2000
Construction & Demolition Waste Recycling Project, Contract Documents	April 2001
Ground & Surface Water Quality at Balleally Landfill	April 2001
Proposal for Leachate Management at Balleally Landfill in Response to Condition 4.17 of Waste Licence 9-1	July 2001
Environmental Monitoring at Balleally Landfill	July 2001
Noise Monitoring at Balleally Landfill	August 2001
Environmental Monitoring at Balleally Landfill	October 2001
Environmental Monitoring at Balleally Landfill	Jan 2002
Bird counts from Rogerstown Estuary	1995 2001
Environmental Monitoring at Balleally Landfill	April 2002
Balleally Landfill Vertical Barrier - Specified Engineering Works/ Tenders	May 2002
Environmental Monitoring at Balleally Landfill	July 2002
Annual Environmental Report 2000	
Annual Environmental Report 2001	Nov 2002
Balleally Landfill/ Short Term Extension Program - updated tender Jan 2003	Jan 2003
Annual Environmental Report 2002 / 9-1	February 2003
Environmental Monitoring at Balleally Landfill Nov - Dec 2002 Environmental Monitoring at Balleally Landfill Jan 2003	February 2003
Ecological Monitoring of Rogerstown Estuary May & July 2002	February 2003
Study of Scavenging Birds at Balleally Landfill December 2002	February 2003
Ecological Monitoring of Rogerstown Estuary Oct & Nov 2002	February 2003
Dust Monitoring Locations April 2003	July 2003
Environmental Monitoring April 2003	July 2003

Information Available	Report Date
Revised Restoration and Aftercare Plan Balleally landfill July 2003	July 2003
Slope Stability Assessment for Balleally Landfill July 2003	July 2003
Environmental Monitoring at Balleally July 2003	July 2003
Environmental Monitoring at Balleally July 2003 C001983/4	July 2003
Rogerstown Estuary Final Report June 2003	June 2003
Environmental Monitoring at Balleally July 2003 C002631/1	October 2003
Construction Quality Assurance Report/Schedule B	September 2003
Environmental Monitoring Report Balleally Dec 2003 (including Appendices)	December 2003
Balleally Landfill AER 2003	February 2004
Environmental Monitoring Report January 2004	April 2004
Environmental Monitoring Report March 2004	March 2004
December '03 Environmental Noise Report	July 2004
Quarterly Monitoring Report Q2 June 2004	August 2004
Construction Quality Assurance Report/Schedule B	August 2004
Quarterly Monitoring Report Q3 October 2004	October 2004
Quarterly Monitoring Report Q4 December 2004	January 2005
Annual Environmental Report 2004	February 2005
Quarterly Monitoring Report Q1 January 2005	April 2005
Quarterly Monitoring Report Q2 & Noise monitoring report Q2 April 2005	July 2005
Quarterly Monitoring Report Q3 July 2005	October 2005
Quarterly Monitoring Report Q4 October 2005	January 2006
Annual Environmental Report 2005	January 2006
Environmental Management Plan 2005	February 2006
Quarterly Monitoring Report and Noise Survey Q1 2006	April 2006
Quarterly Monitoring Report and Noise Survey Q2 2006	July 2006
Quarterly Monitoring Report and Noise Survey Q3 2006	September 2006
Resource Use and Energy Efficiency Audit	October 2006
Quarterly Monitoring Report Q4 2006	January 2007
Noise Survey Q4 2006	January 2007
2006 Annual Emissions Survey IPS Gas Plant	January 2007
Annual Environmental Report 2006	January 2007
Quarterly Monitoring Report and Noise Survey Q1 2007	April 2007
Quarterly Monitoring Report Q2 2007	July 2007
Noise Survey Q2 2007	July 2007
Quarterly Monitoring Report and Noise Survey Q3 2007	October 2007
Flooding Report	November 2007
Slope Stability Survey Report	December 2007
Quarterly Monitoring Report and Noise Survey Q4 2007	January 2008
Annual Environmental Report 2007	January 2008
Quarterly Monitoring Report Q1 2008	April 2008
Quarterly Monitoring Report Q2 2008	July 2008
Rogerstown Estuary Treated Leachate Discharge Modelling Report.	October 2008
Slope Stability Survey	November 2008
Landfill Gas Trace Element Analysis Report	November 2008
Biological Monitoring Report	November 2008
2008 Annual Emissions Survey IPS Gas Plant	January 2009
Quarterly Monitoring Report and Noise Survey Q4 2008	January 2009

Information Available	Report Date
Annual Environmental Report 2008	January 2009
Quarterly Monitoring Report Q1 2009	April 2009
Quarterly Monitoring Report Q2 2009	July 2009
Slope Stability Survey	November 2009
2009 Annual Emissions Survey IPS Gas Plant	January 2010
Quarterly Monitoring Report and Noise Survey Q4 2009	January 2010
Annual Environmental Report 2009	March 2010
Quarterly Monitoring Report Q1 2010	April 2010
Quarterly Monitoring Report Q2 2010	July 2010
Quarterly Monitoring Report Q3 2010	October 2010
Quarterly Monitoring Report Q4 2010	January 2011
Slope Stability Survey	January 2011
2010 Annual Emissions Survey IPS Gas Plant	January 2011
Map Information Available	**Report Date**
Re-location C&D at Balleally	March 2003
Wall & Railing along landfill at Balleally	April 2003
C&D Waste Recovery Area, Balleally	June 2003
Topographical Survey for Balleally June 2003	June 2003
Re-location of Gas Compound at Balleally / 4 Drawings	July 2003
Proposed gas extraction pipe to new gas plant	November 2003
Monitoring Map (J1/DG0008) For Balleally	December 2003
Balleally Leachate Treatment Plant Process & Instrumentation Drawing	July 2004
Balleally Leachate Treatment Plant Site Plan Layout	July 2004
Topographical Survey for Balleally Landfill June 2004	August 2004
Revised Monitoring Drawing	October 2004
Installation of new landfill gas management infrastructure.	February 2005
Topographical Survey	October2005
Topographical Survey	August 2006
Provision of Public Car Park and Walkway	February 2007
New IPS Gas Wells	February 2007
Phase 2 Piggybacking	April &July 2007
Joining of existing two vertical barrier walls	June 2007
Installation of New Landfill Gas Management Infrastructure	July 2007
Topographical Survey	December 2007
Updated as built drawings for surface water / leachate infrastructure	October 2008
Topographic Survey	October 2008
Topographic Survey	October 2009
Landfill Gas Infrastructure	October 2009
Topographic Survey	October 2010

7.4 Finical provision

Condition 12.2 of the licence requires the establishment of a fund to implement the Restoration and Aftercare Plan (submitted as per Condition 4.1 in July 2003).

Details of Financial Provision were furnished to The Agency on 25/1/2010 in correspondence Ref: FCC-W0009-02-2010-03 & amended on 11/6/2010 in correspondence Ref: FCC-W0009-02-2010-14.

7.5 Management Structure

The facility is owned and operated by Fingal County Council. The Environmental Services Department of Fingal County Council manage the landfill facility. Some changes in the management structure occurred during 2010. A description of the current management structure is detailed in Table 7.2.

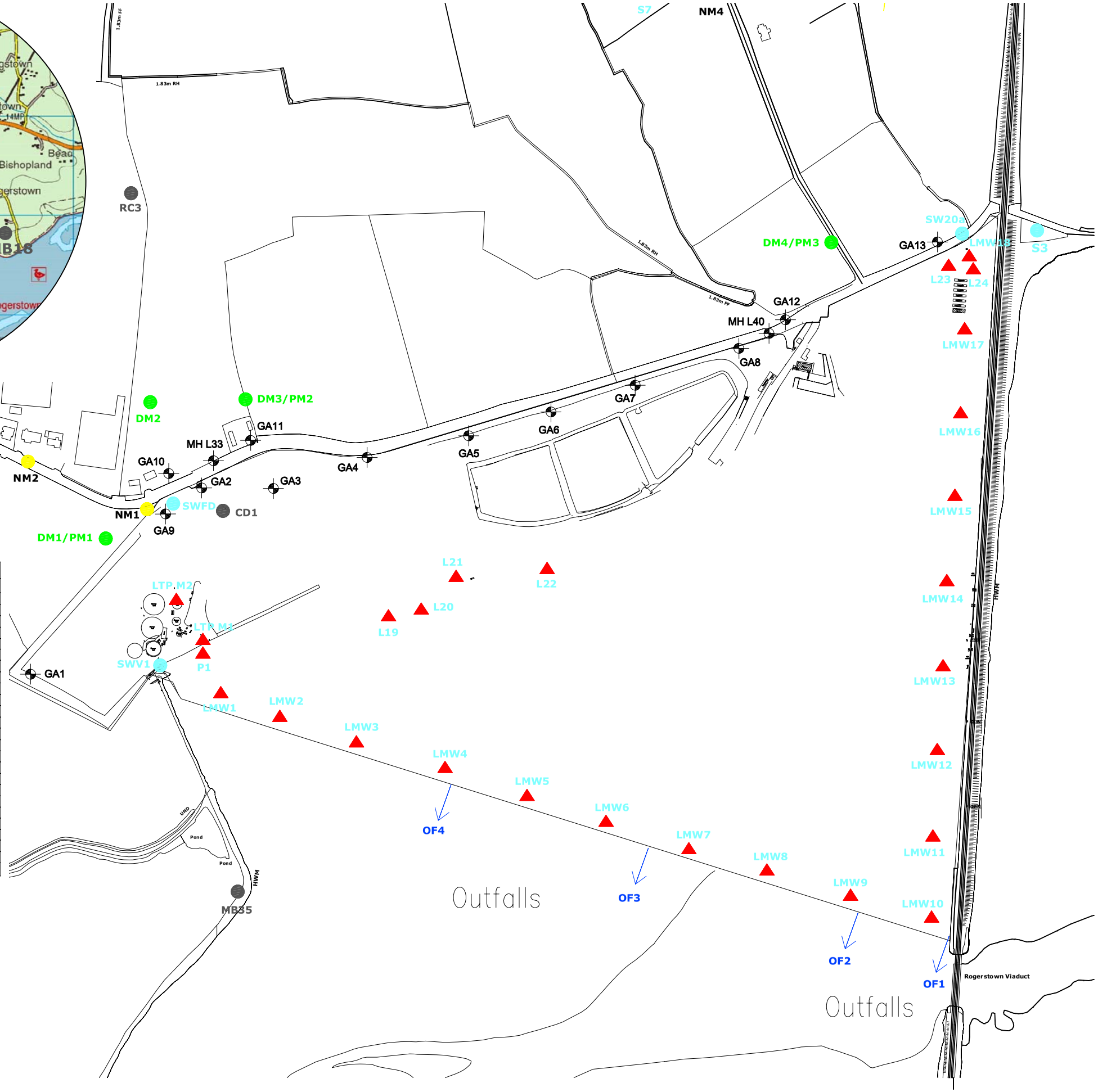
Table 7.2: Balleally Landfill (Waste Licence W0009-03, Condition 2.2.1) Management Structure, 2010

TITLE	NAME	BASE	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS	EXPERIENCE
Senior Engineer, Environment	Mr. J. Daly	HQ	Responsible for Waste Management Enforcement and Waste Infrastructure.	B.E. (Civil Engineering), 1986. M.Sc. Environmental Engineering, 1993. MIEI.	15 years Water Service and Waste Management experience. 14 years LA experience.
Senior Executive Engineer, Environment	Mr. M. Kiely	HQ	Responsible for Waste Infrastructure within the Environment Department.	B.E. (Civil Engineering) 1977, F.Á.S. Waste Management Training Course.	Approx.30 years LA experience including 18 years Waste Management experience. Joined the Environmental Services Department of FCC in Jul 2001.
Landfill Management, Executive Engineer,	Ms Linda Lally	HQ & Balleally Landfill	Landfill Management. Supervision of external contracts. Liaison with consultants and contractors for development works and capping program.	BSc(Eng) Dip(Eng) CEng MIEI, Chartered Engineer. F.Á.S. Waste Management Training Course. F.Á.S. Managing Safely in Construction Training Course.	9 years Consultant Structural Engineer with Kavanagh Mansfield & Partners. Joined the Environmental Services Department inJanuary 2008.
Landfill Management, A/ Executive Scientist,	Dr. Mortimer Loftus	Balleally Landfill & HQ	Landfill Management. Management of Waste Licence Compliance. Supervision of scientific monitoring, reporting and liaison with the Environmental Protection Agency.	Ph.D. Ecology, B.Sc. Environmental Science, Dip Environmental Impact Assessment Management, Dip Environmental Management, F.Á.S. Waste Management Training Course. F.Á.S. Managing Safely in Construction Training Course.	1996-2004 Soil Research and Mapping in Teagasc. Joined the Environmental Services Department in July 2004.

TITLE	NAME	BASE	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS	EXPERIENCE
Landfill Management, Executive Engineer	Mr. David Devine	HQ & Balleally Landfill	Leachate Treatment Plant	BSc Civil Engineering, MIEI, Chartered Engineer, F.Á.S. Waste Management Training Course. F.Á.S. Managing Safely in Construction Training Course.	13 years Civil Engineering and Project Management experience, 5 Years local authority experience.
Landfill Foreman	Mr. John Lacey	Balleally Landfill	Deputy in the absence of the Landfill Manager, Waste Acceptance Manager, safety inspections and day to day supervision of staff.	Completed courses in Health and Safety (NIFAST), Manual Handling, Evasive Driving & Trenching. Also Fire Warden and Supervisors courses.	Over 30 years Local Authority Service. Assistant Foreman in Dunsink Landfill for 12 years before being appointed Foreman for Balleally Landfill in 1998.
A/Assistant Foreman	Mr. Mick Harford	Balleally Landfill	Assistant to Landfill Foreman, task management of site operatives for general works and capping program.	A/Assistant Foreman.	Working at Balleally Landfill Site since 1986.

Appendix I

Drawings



ID	Easting	Northing
GA1	321767	252159
GA2	321986	252383
GA3	322070	252383
GA4	322170	252415
GA5	322291	252440
GA6	322389	252467
GA7	322490	252498
GA8	322614	252542
GA9	321942	252347
GA10	321942	252393
GA11	322039	252433
GA12	322669	252575
GA13	322848	252666
MH L33	322001	252416
MH L40	322654	252566
P1	321983	252190
LMW1	322006	252143
LMW2	322077	252115
LMW3	322169	252084
LMW4	322271	252053
LMW5	322368	252022
LMW6	322461	251991
LMW7	322559	251958
LMW8	322651	251933
LMW9	322749	251903
LMW10	322844	251877
LMW11	322846	251974
LMW12	322853	252074
LMW13	322859	252175
LMW14	322863	252274
LMW15	322873	252375
LMW16	322880	252473
LMW17	322885	252572
LMW18	322890	252657
L19	322203	252227
L20	322240	252235
L21	322281	252272
L22	322388	252283
L23	322862	252640
L24	322887	252648
LTP M1	321984	252199
LTP M2	321952	252247

ID	Easting	Northing
NM1	321919	252357
NM2	321779	252415
NM3	321459	252383
NM4	322604	252962
NM5	322970	254004
OF1	322862	251849
OF2	322755	251876
OF3	322506	251953
OF4	322276	252028
MB 18	323344	252832
MB 35	322029	251906
RC 3	321906	252729
CD 1	322006	252356
SWV 1	321980	252187
SWFD	321952	252366
S3	322966	252678
S7	322607	253279
SW20a	322878	252676
DM1/PM1	321874	252321
DM2	321927	252482
DM3/PM2	322038	252484
DM4/PM3	322728	252671

KEY

NSL1	Noise Monitoring Location
AD1	Dust Monitoring Location
OF1	Outfall Location
3d	Groundwater Monitoring Location
SW1	Surface Water Monitoring
MG1	Gas Well Monitoring Locations
LM1	Leachate Monitoring Locations

Rev.	Drawn	Chkd	Appd	Date	Description
B	MMcC	DD	BG	10.01.08	ISSUE FOR INFORMATION
A	TM	DD	BG	05.07.07	ISSUE FOR INFORMATION

Name of Client
Fingal County Council

Name of Job
ENVIRONMENTAL MONITORING BALLEALLY

Title of Drawing
ENVIRONMENTAL MONITORING LOCATIONS

Scales Used
1:2500 A1 / 1:5000 A3

Dwg. No. DE07-164-03-001 Rev. B
J:\Dublin-CAD\2007\DE-7\164-03\DE07_164_03_001 Dublin

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ORIGINAL DRAWING SIZE A1 - (841 x 594)
NATURAL SCALE

Appendix II

ePRTR

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.11

REFERENCE YEAR	2010

1. FACILITY IDENTIFICATION

Parent Company Name	Fingal County Council
Facility Name	Balleally Landfill
PRTR Identification Number	W0009
Licence Number	W0009-03

Waste or IPPC Classes of Activity

No.	class_name
	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the
3.5	environment.
3.1	Deposit on, in or under land (including landfill).
3.10	Release of waste into a water body (including a seabed insertion).
3.12	Repackaging 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.
3.2	Land treatment, including biodegradation of liquid or sludge discards in soils.
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
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	Balleally
Address 2	Lusk
Address 3	Co. Dublin
Address 4	
Country	Ireland
Coordinates of Location	-7.26329 55.2542
River Basin District	GBNIIENW
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	John Daly
AER Returns Contact Email Address	mortimer.loftus@fingalcoco.ie
AER Returns Contact Position	Senior Engineer
AER Returns Contact Telephone Number	01 8906261/ 01 8731415
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	0
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 ?	

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs							
POLLUTANT		METHOD								QUANTITY		
			Method Used		Flare 1	Engine BY01	Engine BY02	Engine BY03	Engine 4			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	C	EN 13649:2001		9.0	136456.107	126918.819	84.25428	0.0	263468.18028	0.0	0.0
03	Carbon dioxide (CO2)	C	EN 13649:2001		193093.8	11488546.707	10506150.45	7798.07484	0.0	22195589.03184	0.0	0.0
02	Carbon monoxide (CO)	C	ALT	Testo 350/454 MXL Flue Gas Analyser	33.0	158464.758	138698.358	101.72028	0.0	297297.83628	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	C	ALT	Testo 350/454 MXL Flue Gas Analyser	284.4	79763.601	67977.885	48.68328	0.0	148074.56928	0.0	0.0
07	Non-methane volatile organic compounds (NMVOC)	C	ALT	Portable Signal 3030PM FID calibrated with Propane in accordance with EN1526:2002 non-methane hydrocarbon cutter	0.0	574.461	1099.506	1.14168	0.0	1675.10868	0.0	0.0
11	Sulphur oxides (SOx/SO2)	C	ALT	Testo 350/454 MXL Flue Gas Analyser	76.8	3786.501	2378.145	0.99684	0.0	6242.44284	0.0	0.0
86	**Particulate matter (PM10)**	C	ALT	Particulate Matter Measured in accordance with EN13284-1	0.0	8728.101	9456.987	8.11104	0.0	18193.19904	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		Flare 1	Engine BY01	Engine BY02	Engine BY03				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	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

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		Flare 1	Engine BY01	Engine BY02	Engine BY03			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	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

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: Balleally Landfill

Please enter summary data on the quantities of methane flared and / or utilised	**T (Total) kg/Year**	**M/C/E**	**Method Used**		**Facility Total Capacity m3 per hour**	
			Method Code	**Designation or Description**		
Total estimated methane generation (as per site model)	7851150.0	C	GasSim	GasSim model	N/A	
Methane flared	143161.300450418	M	Calculated based on flare flow and recorded run-time	Calculated based on flare flow and recorded run-time	2500.0	(Total Flaring Capacity)
Methane utilised in engine/s	5082226.16598983	M	Calculated based on engine flow and recorded run-time	Calculated based on engine flow and recorded run-time	2500.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	2625762.53355975	C	Calculation	Calculation	N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

0

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

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

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT						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 WATERS					Please enter all quantities in this section in KGs			
POLLUTANT						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

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used		Leachate tankered off site			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					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

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					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
					0.0	0.0	0.0

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

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

RELEASES TO LAND					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
					0.0	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

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	39823.0	landfill leachate other than those mentioned in 19 07 02	D9	M	Weighed	Offsite in Ireland	Ringsend Wastewater Treatment Plant,"."	Ringsend Wastewater Treatment Plant,".",Dublin,".",ireland		

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

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