ANNUAL ENVIRONMENTAL REPORT (2008)

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME (2009)

FOR

BALLYDONAGH LANDFILL

2008

WASTE LICENCE NO. W0028-02

Prepared By: -

Environment Section,
Westmeath County Council,
County Buildings,
Mullingar,
Co. Westmeath.

April 2009

ANNUAL ENVIRONMENTAL REPORT

FOR

BALLYDONAGH LANDFILL

(1st January 2008 to December 31st 2008)

WASTE LICENCE NO. W0028-02

Prepared By: -

Environment Section,
Westmeath County Council,
Bishopgate Street,
Mullingar,
Co. Westmeath.

March 2009

TABLE OF CONTENTS

PAGE

1. INTRODUCTION 1

2. SITE DESCRIPTION 2

2.1 WASTE MANAGEMENT ACTIVITIES 2
2.2 TOTAL QUANTITY OF WASTES ACCEPTED 2
2.3 CALCULATED REMAINING CAPACITY OF THE SITE 5
2.3.1 Area Occupied By Waste 5
2.3.2 Waste Deposition 5
2.4 LOCAL ENVIRONMENTAL CONDITIONS 5
2.4.1 Meteorological Report 5

3. EMISSION MONITORING 6

3.1 GROUNDWATER MONITORING 6
3.1.1 Groundwater Quality 8
3.1.2 Estimated Annual and Cumulative Quantity of Emissions to Groundwater 13
3.2 SURFACE WATER QUALITY MONITORING 14
3.3 LEACHATE 18
3.3.1 Leachate Levels 18
3.3.2 Leachate Volumes 21
3.3.3 Leachate Quality 24
3.4 LANDFILL GAS 27
3.4.1 Landfill Gas Monitoring 27
3.4.2 Landfill Gas Volumes 29
3.4.3 Landfill Gas Control 30
3.5 NOISE SURVEY 32
3.6 DUST MONITORING 34

4. SITE DEVELOPMENT WORKS 36

4.1 ENGINEERING WORKS UNDERTAKEN DURING THE REPORTING PERIOD 36
4.2 SITE RESTORATION 36
4.3 SITE SURVEY 36
4.4 FUTURE DEVELOPMENTS 37
4.5 RESOURCE CONSUMPTION 37

5. WASTE RECEIVED AND CONSIGNED FROM THE FACILITY 38

6. ENVIRONMENTAL INCIDENTS AND COMPLAINTS 40

6.1 INCIDENTS 40
6.2 REGISTER OF COMPLAINTS 41

7. ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT 42

7.1 REPORT ON PROGRESS TOWARDS ACHIEVING OBJECTIVES & TARGETS IN THE EMP FOR 2008. 42
7.1.1 Project 1 &2– Recovery & Recycling of Waste 42
7.1.2 Project 3-Packaging Waste Reduction 42
7.1.3 Project 4 – Design of Permanent Cap for Phase 1 and Phase 2and Cell 9 of phase 3 43
7.1.4 Project 5 – Construct Permanent Landfill Cap for Phase 1 and Phase 2 & cell 9 of phase 3 43
7.1.5 Project 6 – Landfill Gas Recovery 43
7.1.6 Project 7 – Resources use and Energy Efficiency. 44
7.2.1 Schedule of Objectives and Targets for 2009 45
7.2.2 Projects Relating to the Objectives and Targets 46
7.2.2.1 Project 1 & 2 – Recovery & Recycling of Waste 46
7.2.2.2 Project 3 – Packaging Waste Reduction 47

7.2.2.3 Project 4 –Construct Permanent Landfill Cap for Phase 1 and Phase II and cell 9 of Phase 3. 48
7.2.2.4 Project 5 – Landfill Gas Recovery. 49
7.2.2.5 Project 6 – Install additional Gas Extraction Wells in the Active Cells. 50
7.2.2.6 Project 7 - Resources use and Energy Efficiency 51
7.2.2.7 Project 8 – Put in place a Landfill Closure Strategy for 2010. 52

8. OTHER REPORTS 53

8.1 MANAGEMENT AND STAFFING OF THE FACILITY 53
8.1.1 Responsibilities 53
8.1.2 Contingency Arrangements 54
8.2 SUMMARY OF NEW/AMENDED PROCEDURES FOR THE FACILITY 54
8.3 BUND TESTING 54
8.4 FINANCIAL PROVISION 55

APPENDIX 1 - Meteorological Report

APPENDIX 2 - Monitoring Results

APPENDIX 3 - Detailed Site Survey

APPENDIX 4 - Electronic AER Returns Worksheet

1. INTRODUCTION

This is the tenth Annual Environmental Report (AER) for Ballydonagh Landfill, Athlone, County Westmeath, and the fifth AER under the revised Waste Licence Number W0028-02. The AER was prepared in response to Schedule E of the Waste Licence (Waste Licence Register Number W0028-02).

The contents of the report are based on Schedule G of the Waste Licence. The report format follows guidelines set in the "Draft Guidance on Environmental Management Systems and Reporting to the Agency" issued by the Environmental Protection Agency (EPA) and recommendations made by the EPA on the previous AER's.

This AER details the Site Activities for the period from 1st January to 31st December 2008.

The addressees of the facility and the operator are as follows: -

Landfill

Ballydonagh Landfill,
Ballydonagh,
Dublin Road,
Athlone,
County Westmeath.

Operator

Westmeath County Council,
County Buildings,
Mullingar,
County Westmeath.

2. SITE DESCRIPTION

2.1 Waste Management Activities

Both Waste Disposal and Waste Recovery Activities are carried out at the site, in accordance with the Third and Fourth Schedules of the Waste Management Act, 1996. The site is licensed to accept the following categories of non-hazardous waste; household waste, commercial waste, construction & demolition waste, and industrial waste for disposal in lined engineered landfill cells. The site also has recycling Bring Banks for the recovery of Glass bottles and aluminium cans.

2.2 Total Quantity of Wastes Accepted

A summary of the total quantity of each type of waste accepted at the facility for the reporting period 1st January 2008 to 31st December 2008 is presented in Table 2.1 below. Figure 2.1 shows the trend in waste acceptance since the waste license was issued.

Table 2.1 Total Quantity of Each Waste Type Accepted

WASTE TYPE	TONNES PER REPORTING PERIOD
Household	17417.86
Commercial	27761.14
Sewage Sludge	0
Construction & Demolition	0
Industrial Non-Hazardous Sludges	0
Industrial Non-Hazardous Solids	1327.03*Note 1*
Total	46,506.03

Notes
Note 1: Tonnage for Industrial Non-Hazardous Solids includes Street Sweeping Tonnage of 712.14 tonnes.

In addition to the total quantity of waste accepted at the facility during the reporting period 7,760.49 tonnes of cover and bunding materials were brought onto the site. Only virgin road making materials were brought onto site. This brings the total quantity of materials placed in the landfill to 54,266.52 tonnes.

Table 2.2 below shows a breakdown of waste accepted into Ballydonagh for 2008.

Table 2.2 Quantity Waste Accepted (1st January 2008 to December 2008).

	Household	Commercial	Sewage Sludge	C&D Waste	Industrial Non-Hazardous Sludges	Industrial Non-Hazardous Solids
Tonnes 2008	17,417.86	27,761.14	0	0.0	0	1327.03

Figure 2.1 below shows the trend in the quantities of each material placed in the landfill over the last six years.

Figure 2.1: Quantities of each material places in landfill

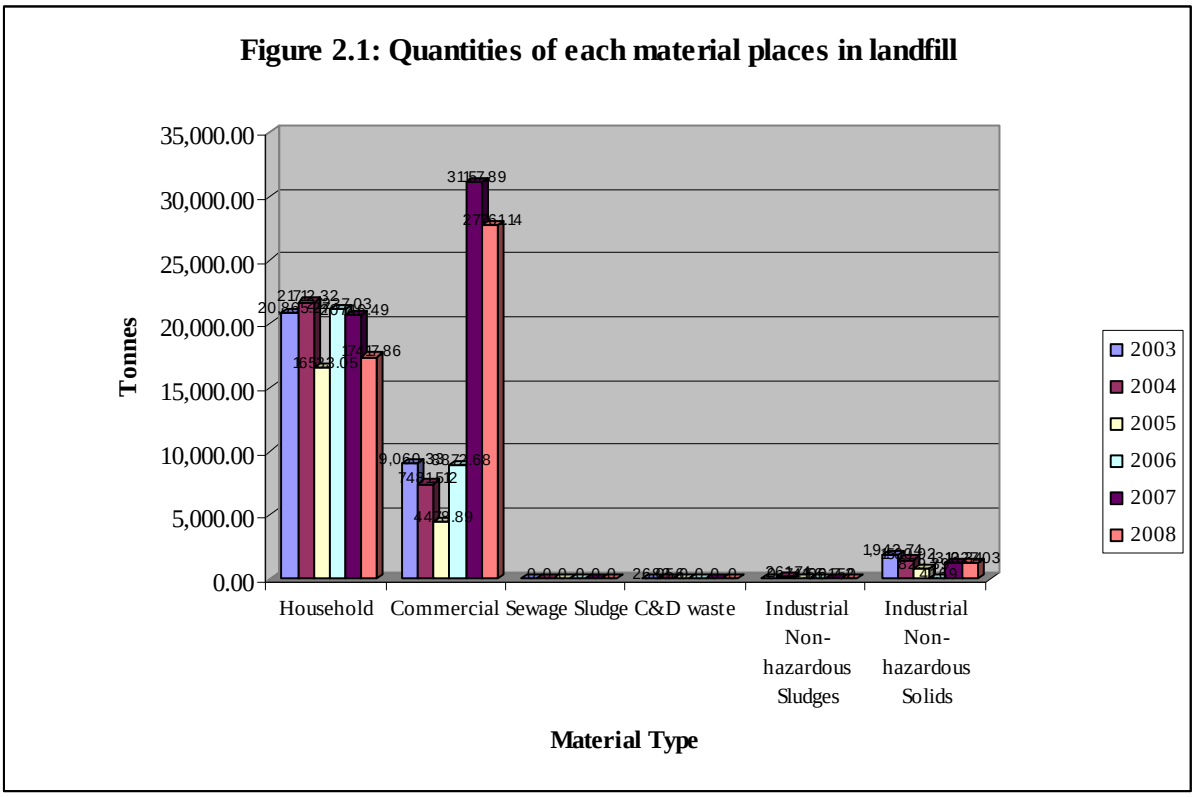


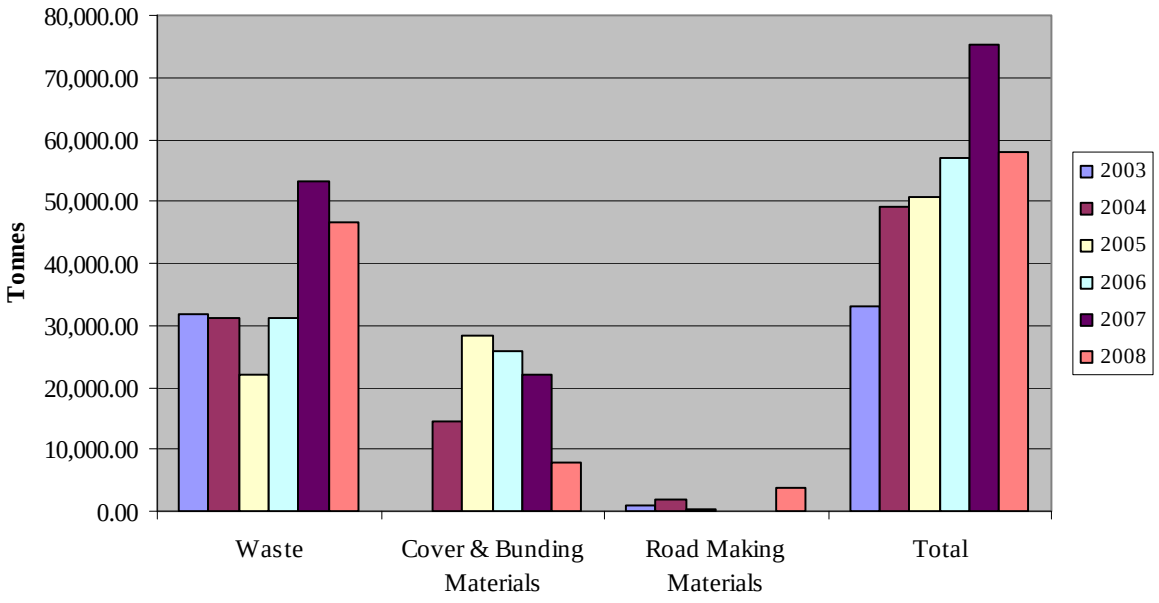
Table 2.3 Waste Breakdown for January 2008 to December 2008.

The following table shows the breakdown of the waste accepted into Ballydonagh Landfill for 2008.

	Waste	Cover & Bunding Materials	Road Making Materials	Total
Tonnes 2008	46,506.03	7,760.49	3,730	57,996.03

Figure 2.2 below, graphs the trends of the waste types accepted into the landfill over the last six monitoring years.

Figure 2.2: Camparison of Waste Trends



2.3 Calculated Remaining Capacity of the Site

The site was originally designed with a capacity for 400,000 tonnes of waste. Based on the waste acceptance records, approximately 420,603.25 tonnes of waste has been landfilled in Phase 1 and Phase 2. This is greater than the designed capacity of 400,000 tonnes for Phase 1 and Phase 2. Prior approval was given for a further 10% increase in height from the EPA for phase II. The volume of waste is also greater than the designed capacity because of using greater compaction on the waste.

The extension to the landfill was granted on 12th November 2004 and this allows for a further 300,000 tonnes of waste, at a maximum filling rate of 60,000 tonnes per year. This could extend the lifetime of Ballydonagh Landfill to 2011. However, planning permission has only been received for the construction of three new cells with a capacity of 180,000 tonnes of waste. 46,506.03 tonnes of waste was placed in phase 3 during 2008, therefore 99,782.27 tonnes of waste was placed in Cells 8 & 9 of the new extension, Phase 3, during 2007 and 2008. In total, 520,385.52 tonnes of waste has been placed in Ballydonagh landfill from 1991 to 2008 inclusive.

2.3.1 Area Occupied By Waste

Approximately 39,000 m^2 of the landfill has been filled with waste. This consists of Cells 1 & 2 (14,250 m^2), Cells 3 & 4 (10,000 m^2), Cells 5 & 6 (10,000 m^2) and cell 9 (4,750 m^2). We moved into phase 3 on 20th March 2007 and have completed filling cell 9 during 2008. We starting filling cell 7 during January 2009 and are currently filling in Cell 8 & Cell 7.

2.3.2 Waste Deposition

Waste is brought to the active tipping face by refuse transport vehicles. The vehicles reverse to the tipping face and tip the loads out. The waste is spread out and compacted into the active tip face by a Bomag Compactor. This usually takes 3 to 4 passes to fully compact the waste into the active fill face.

Only one working face is operated at any time. The working face is maintained at less than 25 metres wide and 2.5 metres in height after compaction with a slope of no greater than 1.3. Cover material is placed over the working face at the end of each working day.

2.4 Local Environmental Conditions

2.4.1 Meteorological Report

A meteorological report for the period 1st January 2008 to 31st December 2008 from the meteorological station at Mullingar is included in Appendix 1. The report includes daily rainfall, air temperature, wind (speed and direction), relative humidity, barometric pressure, monthly evaporation and potential evapotranspiration totals.

3. EMISSION MONITORING

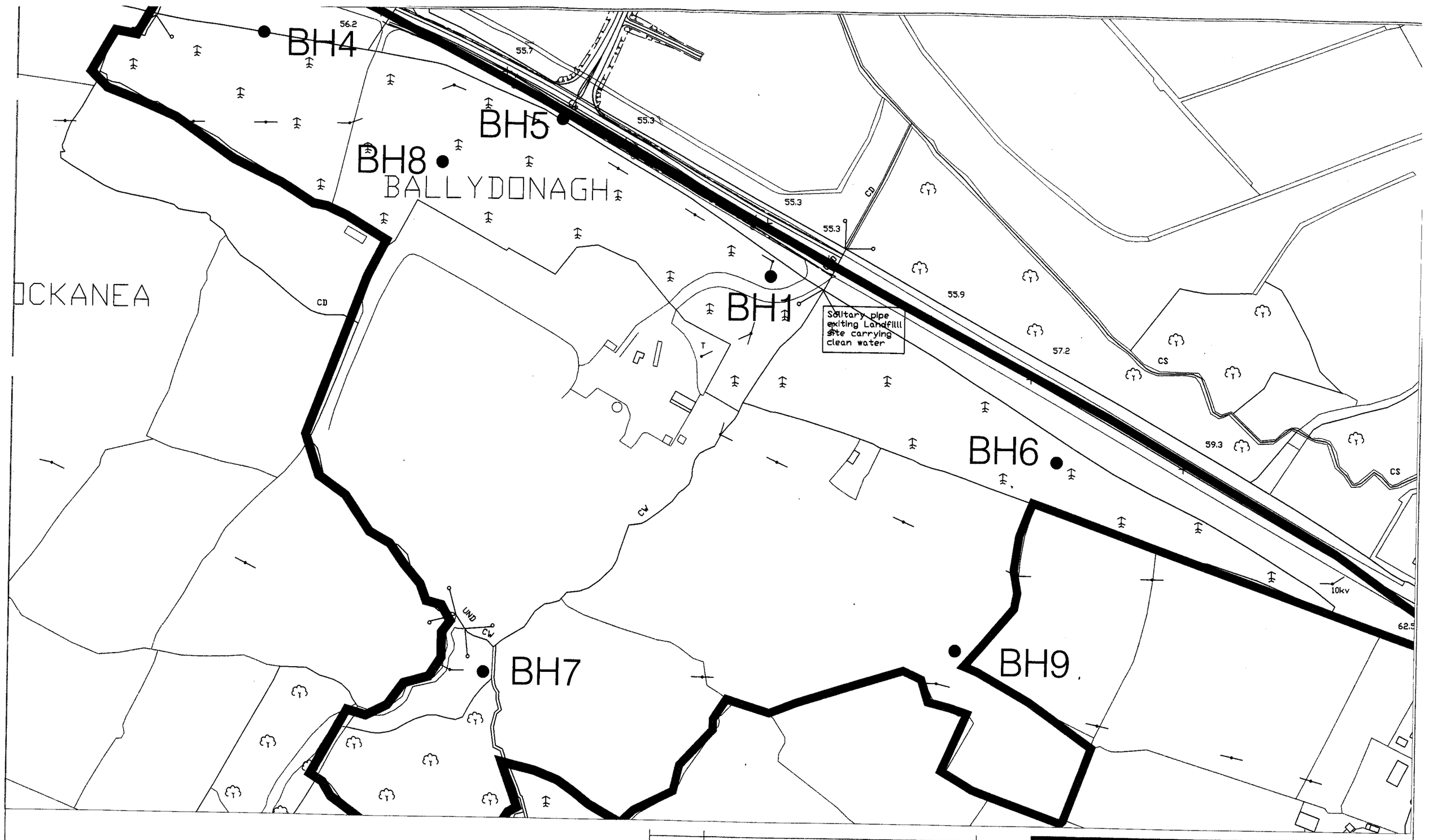
The Council carries out a comprehensive environmental monitoring programme in compliance with licence conditions to assess the significance of emissions. The monitoring programme includes odour, surface water, groundwater, landfill gas, leachate level and quality, noise and dust.

Each element of the monitoring programme requires a range of different techniques and sampling and testing frequencies. The results of all monitoring carried out in the reporting period have already been submitted to the EPA. This report discusses the findings of all the monitoring events completed during the year 2008.

An overview of the monitoring results for the reporting period, and comparisons with previous monitoring results, are presented in this Section. The results are discussed in the context of the impact of the emissions on the environment and compared with available data on background and or ambient conditions.

3.1 Groundwater Monitoring

The Council monitor groundwater quality in 7 monitoring boreholes (BH-1, BH-3, BH-4, BH-5, BH-6, BH-7, BH-8 and BH9) located around the landfill. Boreholes BH-1, BH-3, BH-4, BH-5 and BH-6 were installed before 1998. Boreholes BH-7 and BH-8 were installed in June 1999. Borehole locations are shown on Figure No. J.1 and on detailed site survey drawing no. 08214-S1-R1-00 in Appendix 3. Grid references for borehole locations are contained in Table 3.1. BH-3 was removed during construction works in 2006 for the extension of the landfill. Borehole 9 (BH-9) was installed in November 2007 (Easting 209641 Northing 238472).



REVISION	DESCRIPTION	DATE

DRAWING T/TLE

Borehole Locations
Ballydonagh

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh
Landfill

SURVEYED: _____
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : 1:2,500 (A3)
DATE : 26/03/09
DATUM : _____

DRAWING NO.
Fig. No. J1

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
Borehole Locations09.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings

Table 3.1 Ground water Monitoring Locations

Station	Easting	Northing
BH1	209525	238745
BH3	209529	238475
BH4	209116	238891
BH5	209373	238825
BH6	209864	238607
BH7	209288	238435
BH8	209122	238893
BH9	209641	238472

The boreholes are positioned up and down hydraulic gradient of the landfill cells. Monitoring boreholes BH-3, BH-7 and BH-9 are upgradient of the landfill cells and monitor background groundwater quality. Boreholes BH-1, BH-5 and BH-8 are down gradient of the landfill cells. Boreholes BH-4 and BH-6 are located downgradient, to the west and east of the landfill cells respectively. BH-3 was removed during construction works in 2006 for the extension of the landfill.

The Council also monitor groundwater quality in 8 wells (1, 3, 5, 6, 7, 8, 9 and 11) used for domestic water supply in residences located within 500 m of the landfill. PW4 is no longer monitored as the occupant of the house died during 2004. The locations of these wells are shown on Figure C.6.8. Well 1 is located down hydraulic gradient of the landfill cells. The remaining wells are to the north east of the landfill and not directly downgradient of the fill area.

3.1.1 Groundwater Quality

Groundwater quality is monitored in the 7 on-site boreholes and the 8 off-site domestic wells on a monthly and quarterly basis in accordance with Waste Licence conditions and includes in-situ and laboratory testing. The range of analysis is as specified in Schedule D5 of the Waste Licence and includes pH, electrical conductivity, and organic, inorganic and microbiological parameters. The sampling and analysis is carried out in accordance with recognised quality assurance and control procedure.

Full details of all the monitoring results are included in the quarterly monitoring reports, prepared by TMS Environment Ltd. and Westmeath County Council, Environment Section. The discussion on water quality presented in this AER is based on the monitoring reports. Tables 3.3 and 3.4 summarise the results of the more significant quality indicator parameters.

Total coliforms were detected throughout the year in borehole 1 (BH-1) with the exception of the first quarter when no total coliforms were detected. The highest number of total coliforms detected was >100 cfu/100ml in the 4th quarter. Faecal coliforms were present in Quarters 1 and 3 with the highest number, 19 cfu/100ml being detected in July. Ammonia results remained good throughout the year, being <0.01

mg/l N throughout the majority of the year. An increase in TOC was recorded at the end of the year, fluctuating throughout the year of values between 2.7mg/L and 10.8 mg /L.

Borehole 3 (BH-3) was removed during the construction of phase III, the extension of the landfill in 2006.

For Borehole 4 (BH-4), total coliforms exceeded 100cfu/ml during the first quarter and values of between 5cfu/100ml and 27cfu/100ml were recorded for the remainder of the year. Ammonia remained at very low levels throughout the year but increased to 0.23mg/L during quarter 4 monitoring. Chloride levels remained stable throughout the year.

Borehole 5 (BH-5) exceeds the recommended drinking water limit value of 0.23 mg/l N Ammonia (set out in SI No. 439 of 2000) for the first three quarters of 2008. Total coliforms were >100cfu/100ml during the first three quarters of 2008, but decreased to 16cfu/100ml in the last quarter. Borehole 5 shows elevated level of chloride throughout 2008 compared to all other groundwater monitoring locations. Levels detected all remain well below the drinking water limit of 250 mg/L Cl as per SI No. 278 of 2007.

For Borehole 6 (BH-6) total coliforms were not present during the first and last monitoring quarters in 2008, but were present at >100cfu/100mg during the third quarter. Ammonia values all remained below the drinking water limits throughout 2008.

Borehole 7 (BH-7) is located up-gradient of the landfill active cells. It is located in the field at the back of the landfill in agricultural land. This well showed small concentrations of Total Coliforms during each monitoring event in 2008 apart from the first quarter where levels of >100 cfu/100ml were present. Ammonia levels remained below the detectable level <0.01mg/ L

Borehole 8 (BH-8) exceeds the recommended drinking water limit value of 0.23 mg/l N Ammonia (set out in SI No. 439 of 2000) during the first and third monitoring quarters of 2008. Total coliforms are present in between the values 10 - 58 cfu/100ml throughout 2008.

Borehole 9 (BH-9) was installed to the east of the landfill at the perimeter fence to the back of Phase III in November 2007. Monitoring commenced during the second quarter monitoring in 2008. Total coliforms were present at concentrations >100cfu/100ml during the second and third quarter, but decreased to 18cfu/100ml in the last quarter. Chloride and Ammonia were well below the drinking water standard for all monitoring occasions.

The monitoring confirmed that background quality upgradient of the landfill cells (BH-7 & BH9) remained generally good throughout the monitoring period. No elevated levels as compared with SI No. 439 of 2000 for ammonia, chloride and conductivity. Elevated levels of Total coliforms were detected twice in BH9 and once in BH7.

Boreholes BH-1, BH-4, BH-5, BH-6 and BH-8, which are located down gradient of the landfill cells, all parameters remain relatively as previous indicating that the landfill site and associated activities have no impact on the surrounding groundwater.

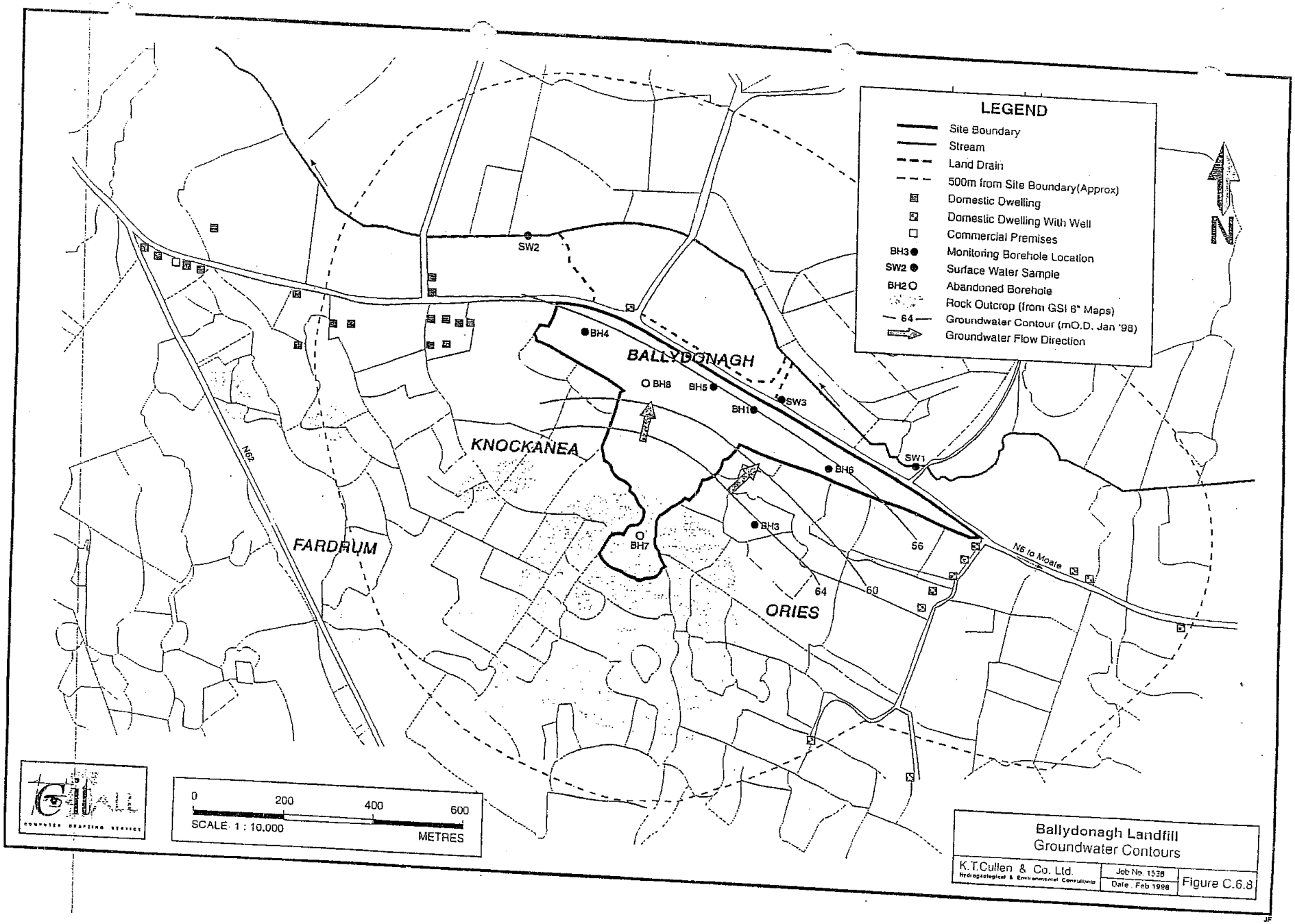

LEGEND
Site Boundary
Stream
Land Drain
500m from Site Boundary(Approx)
Domestic Dwelling
Domestic Dwelling With Well
Commercial Premises
BH3 Monitoring Borehole Location
SW2 Surface Water Sample
BH2 Abandoned Borehole
Rock Outcrop (from GSI 6" Maps)
64 Groundwater Contour (mO.D. Jan '98)
Groundwater Flow Direction
BALLYDONAGH
KNOCKANEA
FARDRUM
ORIES
N62
N6 to Moate
SW1
SW2
SW3
BH1
BH3
BH4
BH5
BH6
BH7
BH8
56
60
64
0 200 400 600
SCALE 1 : 10,000
METRES
Ballydonagh Landfill
Groundwater Contours
K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants
Job No. 1538
Date Feb 1998
Figure C.6.8

Table 3.3: Summary of Groundwater Monitoring Results 2008

Sampling	Monitoring	Parameter				
Location	Period	Conductivity mScm-1	TOC mg/L C	Chloride (mg/l)	Ammonia (mg/L)	Total Coliforms (cfu/100ml)
BH1	1st Quarter 08	521	2.7	20	0.061	0
	2nd Quarter 08	721	6.30	28	0.017	1
	3rd Quarter 08	721	4.7	20.5	<0.01	24
	4th Quarter 08	691	10.8	24	<0.01	>100
	1st Quarter 08	362	8.1	26	<0.05	>100
BH4	2nd Quarter 08	553	<0.3	22	0.121	7
	3rd Quarter 08	496	48	34	<0.01	5
	4th Quarter 08	495	3.20	17	0.23	27
	1st Quarter 08	712	2.00	82	0.57	>100
BH5	2nd Quarter 08	1099	8.300	82	1.77	>100
	3rd Quarter 08	1024	3.40	71	0.30	>100
	4th Quarter 08	864	14.90	65	0.06	16
	1st Quarter 08	423	1.4	18	<0.05	0
BH6	2nd Quarter 08	586	4.1	18	<0.01	3
	3rd Quarter 08	585	1.1	21	0.120	>100
	4th Quarter 08	546	7.700	17	0.08	0
	1st Quarter 08	432	1.8	21	<0.05	>100
BH7	2nd Quarter 08	589	3.10	35	<0.01	3
	3rd Quarter 08	577	0.3	23	0.01	3
	4th Quarter 08	524	7.000	19	<0.01	20
	1st Quarter 08	389	8.4	19	1.5	10
BH8	2nd Quarter 08	587	3.1	28	<0.01	58
	3rd Quarter 08	480	2.5	19	0.330	36
	4th Quarter 08	477	2.300	23	<0.01	31
	1st Quarter 08	*	*	*	*	*
BH9	2nd Quarter 08	778	<0.3	22	<0.09	>100
	3rd Quarter 08	824	3.1	15	0.040	>100
	4th Quarter 08	748	6.500	19	<0.01	18

* Not sampled

Table 3.4: Domestic Well Monitoring Results 2008

Sampling	Monitoring	Parameter				
Location (PW)	Period	Conductivity μScm^{-1}	Chloride (mg/l CL)	Ammonia (mg N/L)	TOC (mg/L C	Total Coliforms (cfu/100ml)
No.1	1st Quarter '08	564	25	<0.02	1	23
	2nd Quarter '08	568	23	0.021	0.7	0
	3rd Quarter '08	626	25	<0.01	<0.3	18
	4th Quarter '08	471	21	<0.01	2.9	0
No.3	1st Quarter '08	*	*	*	*	*
	2nd Quarter '08	698	19	0.031	2.1	0
	3rd Quarter '08	797	13	<0.01	4.2	>100
	4th Quarter '08	573	13	<0.01	12.4	>100
No.5	1st Quarter '08	**	**	**	**	**
	2nd Quarter '08	**	**	**	**	**
	3rd Quarter '08	**	**	**	**	**
	4th Quarter '08	**	**	**	**	**
No.6	1st Quarter '08	540	18	<0.02	0.7	32
	2nd Quarter '08	562	14	<0.02	4.1	0
	3rd Quarter '08	640	17	<0.01	2.8	0
	4th Quarter '08	457	11	<0.01	1.1	21
No.7	1st Quarter '08	571	21	<0.02	0.4	0
	2nd Quarter '08	615	16	<0.02	1	0
	3rd Quarter '08	652	21	<0.01	1.4	6
	4th Quarter '08	488	15	<0.01	7.1	2
No.8	1st Quarter '08	952	75	<0.02	3.7	>100
	2nd Quarter '08	993	70	0.028	14.7	>100
	3rd Quarter '08	975	73	<0.01	13.2	>100
	4th Quarter '08	726	68	0.074	3.4	>100
No.9	1st Quarter '08	800	46	<0.02	3.1	40
	2nd Quarter '08	815	45	0.025	14.2	31
	3rd Quarter '08	835	40	<0.01	4.3	14
	4th Quarter '08	610	38	<0.01	14.5	7
No.11	1st Quarter '08	673	19	<0.02	1	0
	2nd Quarter '08	652	15	0.023	9.1	0
	3rd Quarter '08	749	170	<0.01	4.7	0
	4th Quarter '08	533	15	0.034	3	0

* No water sampled due to a power cut

** No sample due to no access

The monitoring of the domestic wells established that only PW11 complied with the EU drinking water directive standards on all sampling events during the reporting period. This is an improvement on last years monitoring as it failed during one of the quarterly monitoring occasions. PW1, PW6 and PW7 complied on two quarterly occasions during 2008 and this is similar to 2007 monitoring results, where PW1 and PW5 also complied on two monitoring occasions to EU drinking water directive standards.
PW8 and PW9 failed on all monitoring occasions during 2008 for Total coliforms.
PW5 was not tested during 2008 because there was no access to take the samples on the monitoring days. Prior notice was given for each monitoring occasion by letter to the occupants of the house.

Ammonia concentrations in all private wells were below the EU drinking water standards for ammonia over the year 2008.

No elevated levels above the parametric limits for conductivity or TOC were detected during any monitoring event in 2008 in any of the domestic wells.
Chloride levels in PW8 and PW9 were above the drinking water limit value of 30mg/L Cl as per EPA Interim Guideline value.

It is considered that the landfill is not the source of the elevated levels of contaminants measured in the domestic wells because: -

- The location of the wells with respect to both the general groundwater flow and the location of the landfill,

- An assessment of the chemical results obtained for both the potentiometrically upgradient and downgradient monitoring boreholes at the landfill.

3.1.2 Estimated Annual and Cumulative Quantity of Emissions to Groundwater

With the exception of the septic tank percolation area there are no direct emissions to groundwater at the facility. Indirect emissions to groundwater may potentially occur as a result of leaks from the landfill liner, leachate collection system or from contaminated surface water.

The landfill cell design comprises a double HDPE liner incorporating a leakage detection system. The council have installed an upgraded monitoring system on the leachate detection system to monitor for leaks. The top liner is overlain by a leachate drainage blanket and pipe work that collects and drains the leachate to the leachate storage tank from where it is removed off-site. There is an automated alarm leachate detection system installed in the site office so collection and storage of leachate levels are available at all times. All 4 manholes in phase 2 have recently been lined with HDPE liner applied to the shaft of the manholes to eliminate any possible leak from the manholes should they surcharge in times of heavy rainfall alarm sensors will notify the caretaker if such a surcharge happens and steps can be taken to lower the leachate levels by tankering away leachate from the site.

The groundwater monitoring boreholes installed around the site monitor groundwater quality to determine if the lining system is operating satisfactorily.

Surface water is a potential source of groundwater recharge and as such provides a possible pathway for indirect discharge to groundwater. All rainfall on the active fill areas is contained within the landfill cells. This prevents contaminated surface water runoff from entering the surface water drains and eliminates this indirect discharge pathway. Pending the completion of the capping of Phase 1 there is the potential for surface water from the temporary restored area to runoff along the access road and onto the paved area.

The Council has installed drains at the toe of Phase I in the vicinity of the access road to intercept the runoff and direct it into the leachate collection system via the wheel wash. This wheel wash has been integrity tested by the Council and found to be watertight; therefore there are no direct emissions to groundwater from this source.

3.2 Surface Water Quality Monitoring

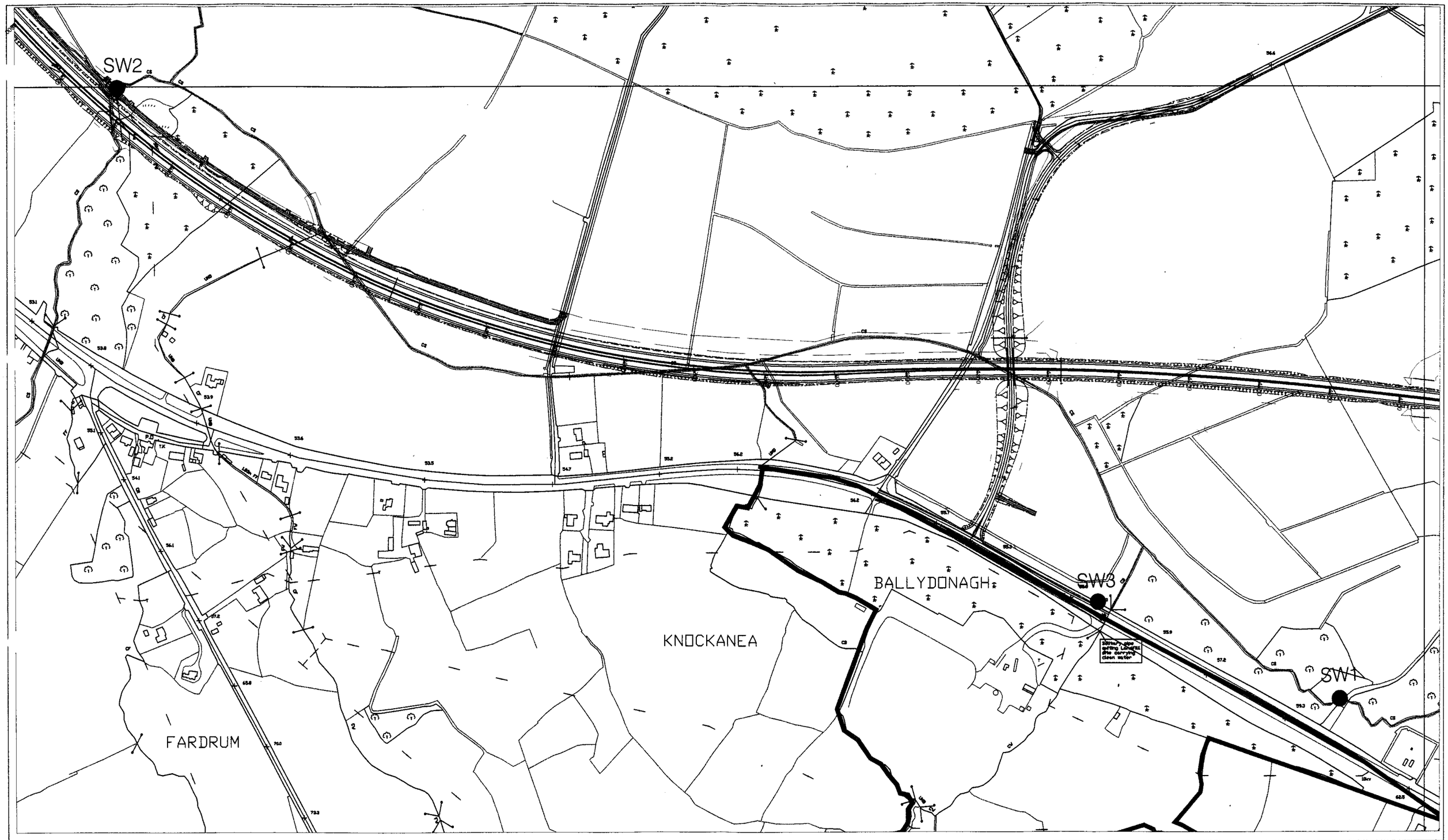
The Council monitors surface water quality in 3 locations (SW-1, SW-2 and SW-3) shown on Figure C.9.1 and described in Table 3.5. SW-1 is upstream of the site, SW-2 - downstream of the site, the stream to the north of the (N6) Dublin to Galway road, and SW-3 is located on a drainage channel close to the entrance of the landfill. This drainage channel enters the stream downstream of SW-1. Due to major road works in the vicinity of Ballydonagh landfill site, sampling location SW-2 is no longer accessible. Therefore an alternative location namely SW-2 has been used as a sampling point from approx. mid 2007. This sample is taken after the confluence of a new diverted channel and the original stream bed for SW-2.

Table 3.5 Surface Water Monitoring Locations

Station	Easting	Northing
SW1	209860	238373
SW2	208151	239501
SW3	209551	238765

Weekly visual surface water inspections are carried out by Westmeath County Council. Quarterly and annual monitoring is carried out by our consultants in accordance with Licence conditions and includes in-situ and laboratory testing. The range of analysis is as specified in Schedule D5 of the Waste Licence and includes dissolved oxygen, pH, electrical conductivity, and organic and inorganic parameters.

The sampling and analysis is carried out in accordance with recognised quality assurance and control procedures. The detailed monitoring results are presented in the quarterly monitoring reports submitted to the Agency in the reporting period.



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Surface Water Monitoring Locations
Ballydonagh

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh
Landfill

SURVEYED:
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : 1:5,000 (A3)
DATE : 26/03/09
DATUM :

DRAWING NO. SWM_09

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
SW Locations2009.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings

The monitoring reports prepared by TMS Consultants Ltd. contain an evaluation of the results, which is summarised below. Table 3.6 summarises some of the significant quality indicator parameters recorded during the reporting period.

Results for SW1, located upstream of the landfill and SW2, located downstream of the landfill, during the monitoring period, remained broadly the same since the previous monitoring results.

SW1, located upstream meets the quality standard for category A1 water quality which is the highest category of raw water for all parameters tested throughout 2008, except in quarter 1 where the suspended solids and ammonia were above the surface water regulations.

SW-2 located downstream of the landfill meets the quality standard for category A1 water quality which is the highest category of raw water for all parameters tested throughout 2008 except for suspended solids for Q1 which was just marginally above the recommended limit. .

SW-3 was only sampled once during Quarter 1, 2008. Results complied with category A1 water quality. SW-3 location was dry for Quarters 2, 3 & 4 monitoring. The volume of water in the drain, SW-3, is weather dependent and at times the drain is not discharging water.

Consistent with previous monitoring events, the general quality of the surface water both upstream and downstream is considered good. SW2, located downstream of SW1 and of the landfill, showed very similar conditions to those upstream. It is apparent that the landfill activities do not have affect on the local surface water.

Table 3.6: Summary of Surface Water Monitoring Results 2008

Sampling Location	Monitoring Period	Parameter					
		Conductivity ($\mu Scm^{-1)}$	Suspended Solids mg/L	Chloride (mg/l)	Ammonia (mg N/L)	BOD (mg/l)	COD (mg/l)
SW-1	1st Quarter 2008	546	289	175	0.86	5.8	34
	2nd Quarter 2008	667	<5	23	0.037	<2	7
	3rd Quarter 2008	545	17	20	0.012	<2	34
	4th Quarter 2008	689	<5	19	0.019	<2	14
SW-2	1st Quarter 2008	424	76	25	0.097	<2	45
	2nd Quarter 2008	640	<5	24	0.027	<2	19
SW2A*	3rd Quarter 2008	586	12	17	0.015	<2	43
	4th Quarter 2008	581	<5	18	<0.01	<2	66
SW-3	1st Quarter 2008	466	18	22	<0.01	<2	30
	2nd Quarter 2008	*	*	*	*	*	*
	3rd Quarter 2008	*	*	*	*	*	*
	4th Quarter 2008	*	*	*	*	*	*

3.3 Leachate

Leachate is generated by incident rainfall in the active and completed landfill cells. Other potential sources of leachate such as groundwater and surface water run-off are prevented from entering the waste fill areas through a combination of the landfill lining system and site engineering works.

Leachate is collected in the leachate collection system installed in each landfill cell and directed to the leachate-holding tank located in the northern area of the landfill. The location of the storage tank is shown on Figure J.3 and on detailed site survey drawing no. Surv_08. A new storage tank for leachate has been built for Phase 3 (see drawing no. Surv_08). This leachate tank collects leachate only from the new Phase of the landfill, Phase 3. Leachate is removed from the tanks on a routine basis and transported to either Athlone or Moate wastewater treatment plants for treatment in accordance with Licence Condition 5.11 and the permission granted by the Agency on the 29th January 2000. Table 3.8 below shows the grid references of the leachate monitoring locations.

Table 3.8 Location of Leachate Monitoring Locations

Leachate Inspection Manhole	Easting	Northing
1	209437	238600
2	209420	238612
3	209403	238625
4	209391	238623
MH2A	209381	238682
MH3A	209348	238691
MH4A	209317	238705
NH5A	209287	238714

The Council monitors leachate levels at weekly intervals and leachate quality at quarterly intervals and annually.

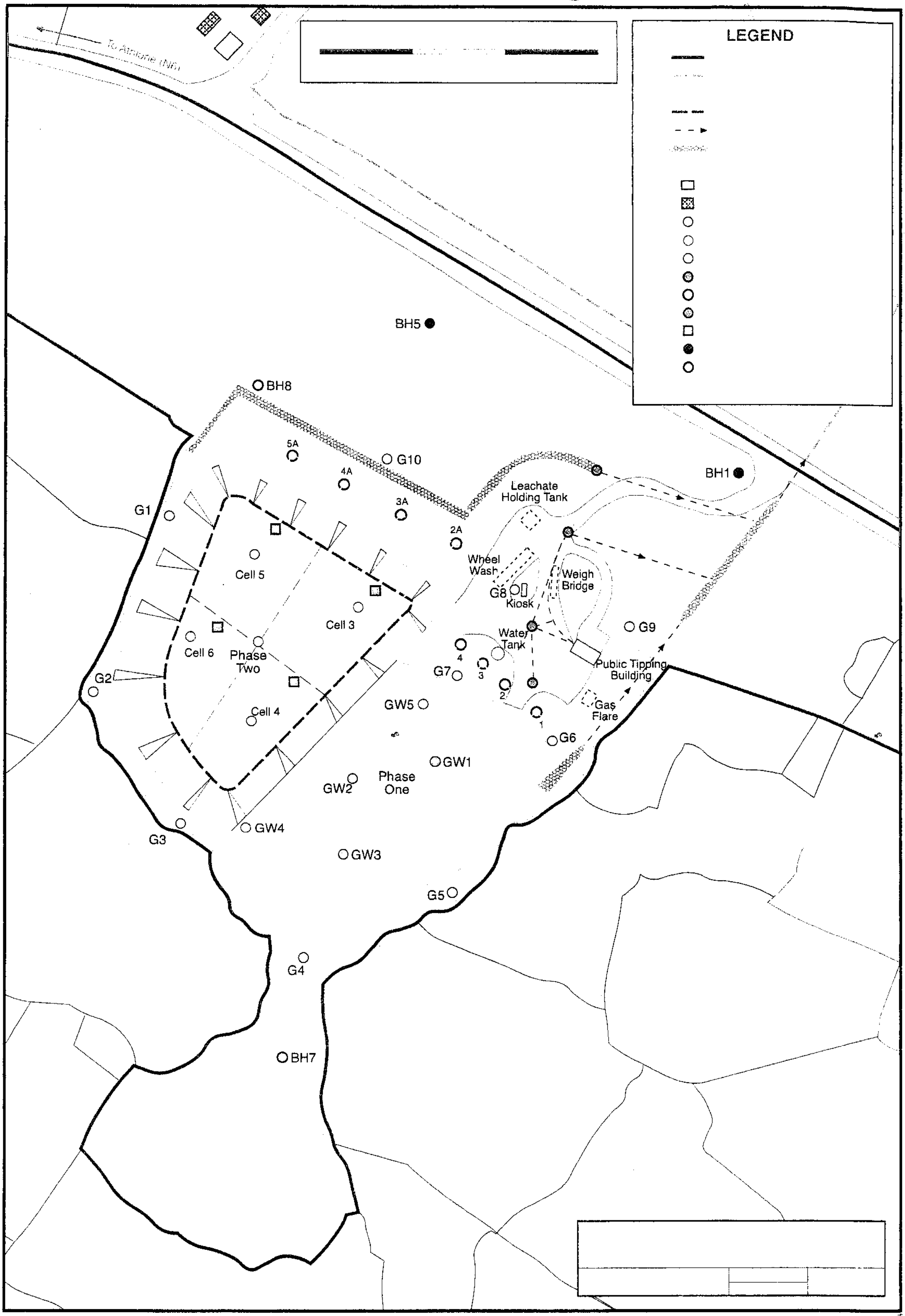
3.3.1 Leachate Levels

Leachate levels are measured in eight inspection chambers (1, 2, 3, 4, MH2A, MH3A, MH4A and MH5A) located on the leachate collection pipe-work running from Phases 1 and 2.

The leachate level is monitored in Phase 3 of the landfill at two leachate monitoring points, one in cell 9 and one in cell 8 through the telemetry system. The three new cells of Phase 3 each contain one leachate sump and one leachate monitoring well. The leachate level varies in the inspection chambers and in the landfill depending on the rate of removal from the holding tanks.

The Council has adopted a leachate management plan designed to maintain leachate levels at acceptable levels by routine removal of the leachate from the holding tanks in accordance with Operational Practice Sheet No. 2. Also a Leachate Appraisal report undertaken by Westmeath County Council Consultants, Malachi Cullen & Partners, have put forward measures to improve the efficiency of the collection detection system, these measures have been accepted by the agency and implemented on site. New leachate level sensors have been fitted to leachate manholes in phase 1, phase 2 and the leachate holding tank which have been connected to an alarm system in the caretakers office.

A leachate telemetry system has also been installed in Phase III which is connected back to the caretakers office. It shows the levels of leachate in each of the cells and also in the leachate holding lagoon. .


LEGEND
To Athlone (N6)
BH5
BH8
5A
G10
4A
3A
2A
BH1
G1
Leachate
Holding Tank
Cell 5
Wheel
Wash
Weigh
Bridge
G8
Kiosk
Cell 3
Water
Tank
G9
Cell 6
Phase
Two
4
3
Public Tipping
Building
G2
G7
2
Gas
Flare
Cell 4
GW5
1
G6
GW1
GW2
Phase
One
GW4
G3
GW3
G5
G4
BH7

3.3.2 Leachate Volumes

Water balance calculations have been prepared for 2008. The calculations include a cumulative total for the twelve-month period.

The water balance addressed the volume of leachate generated at the site on a monthly basis including the estimated annual infiltration of rainfall through the capping layer. The water balance methodology is described below and the calculations shown on Table 3.10.

The water balance calculations are based on the methodology specified in the EPA's Landfill Site Design Manual. The calculation used is as follows: -

Lo = [ER(A) + LW + IRCA +ER(l)] – [aw]

Lo = leachate produced (m^3)
ER = effective rainfall (m) (Use actual rainfall (R) for active cells)
A = area of cell (m^2)
LW = liquid waste (also includes excess water from sludges) (m^3)
IRCA = infiltration through restored and capped areas (m)
l = surface area of lagoon (m^2)
a = absorptive capacity of waste (m^3/t)
W = weight of waste deposited (t/a)

The data used was from the meteorological station at Mullingar. The landfill areas included in the calculations were the active fill areas Cells 8 and 9, the temporary capped fill areas in Phase 1 and Phase 2.
Meteorological data is presented in Appendix 1.

Actual (Total) rainfall rates were used for the active fill area, in cells 8 and 9. Conservative estimates of 25% of the annual rainfall figure was used to calculate the infiltration through cells 1, 2, 3, 4, 5 & 6 which are temporary capped, this is in accordance with the EPA Landfill Site Design Manual.

An absorptive capacity of 0.06 m^3 per tonne was assumed based on a compacted waste density of 0.85 tonnes/m^3.

Liquid wastes and sludges with less than 20% solids are not accepted in the landfill.

The landfill accepts any industrial sludge with solids content of 55% or greater.

Table 3.10: Annual Leachate Volume Calculations

Month	[1]Active Fill Area	Total Area of Active Fill (m^2)	Actual Rainfall (m) ER	[2]Infiltration through Active Areas (m^3) A	Restored Area	Restored Area (m^2) A	[2]Infiltration Through Restored Area (m^3) IRCA	Weight of Waste Deposited (Tonnes) W	Absorbtive Capacity of the Waste (m^3/t) a	Volume of Water Absorbed (m^3)	[3]Liquid Waste (m^3) LW	Leachate Produced (m^3) Lo
January	Cells 8+9	9,500	0.1343	1275.85	Cells 1+2+3+4+5+6	34500	1158.34	4622	0.06	277.32	0	2156.87
February	Cells 8+9	9,500	0.0543	515.85	Cells 1+2+3+4+5+6	34500	468.34	4276	0.06	256.56	0	727.63
March	Cells 8+9	9,500	0.0923	876.85	Cells 1+2+3+4+5+6	34500	796.09	3866	0.06	231.96	0	1440.98
April	Cells 8+9	9,500	0.0591	561.45	Cells 1+2+3+4+5+6	34500	509.74	4174	0.06	250.44	0	820.75
May	Cells 8+9	9,500	0.0234	222.3	Cells 1+2+3+4+5+6	34500	201.83	4850	0.06	291.00	0	133.13
June	Cells 8+9	9,500	0.0847	804.65	Cells 1+2+3+4+5+6	34500	730.54	3876	0.06	232.56	0	1302.63
July	Cells 8+9	9,500	0.1089	1034.55	Cells 1+2+3+4+5+6	34500	939.26	4253	0.06	255.18	0	1718.63
August	Cells 8+9	9,500	0.1544	1466.8	Cells 1+2+3+4+5+6	34500	1331.70	4184	0.06	251.04	0	2547.46
September	Cells 8+9	9,500	0.1047	994.65	Cells 1+2+3+4+5+6	34500	903.04	3083	0.06	184.98	0	1712.71
October	Cells 8+9	9,500	0.1242	1179.9	Cells 1+2+3+4+5+6	34500	1071.23	2914	0.06	174.84	0	2076.29
November	Cells 8+9	9,500	0.0756	718.2	Cells 1+2+3+4+5+6	34500	652.05	2160	0.06	129.60	0	1240.65
December	Cells 8+9	9,500	0.0613	582.35	Cells 1+2+3+4+5+6	34500	528.71	4248	0.06	254.88	0	856.18
											Total	**16733.89**

Notes:

(1) The actual rainfall figures were used to calculate the infiltration through the active fill areas, a 25% infiltration rate was used for restored areas.

(2) Liquid waste is not accepted on-site.

(3) An absorbtive capacity of 0.06m3/t was used based on a waste density of 0.85t/m3.

Phase 1 and Phase 2 (Cells 1 to 6) have been filled to their final level and a temporary cap has been placed on them. The capping system comprises a minimum thickness of 600 mm of good quality topsoil compacted to a slope of 1:3. This area is domed with side slopes of between 1:4 and 1:8 to encourage surface water runoff and reduce the potential for infiltration.

The provision of leachate level monitoring in Phase 2 will allow an assessment of the actual storage capacity used in Phase 2. This can be factored into the water balance calculations to allow a more accurate evaluation of overall balance including infiltration rates in restored areas.

The estimated volume of leachate generated for the period 1st January to 31st December 2008 is 16,733.89m^3. During the same period the Council removed 25,720.34m^3 of leachate from the site for treatment in the wastewater treatment plants. A monthly breakdown of the volumes removed is presented in Table 3.11.

Table 3.11 Leachate Volumes Removed from Site 2007

Month	Volume of Leachate Removed (m^3)
January	3,870.54
February	2,687.86
March	1,715.27
April	1,037.67
May	279.45
June	593.03
July	1,509.66
August	1,685.54
September	2,972.23
October	3,055.12
November	3,729.72
December	2,584.25
Total	**25,720.34**

There is a significant difference between the estimated volumes generated and the volumes removed. The leachate removed includes the rainwater run-off from Phase 1 and 2 which flows into the wheel wash and goes directly into the leachate holding tank.

Estimates of the cumulative volumes generated at the site since the start of landfilling in 1991 were prepared based on information provided in the Waste Licence application and the water balance calculations. These are presented in Table 3.12 below.

The weighbridge was not installed at the site until January 1999 and the waste figures used in the calculations for the previous years are estimates. Annual average actual rainfall figures are used. Before the issue of the Waste Licence the facility accepted industrial and municipal sewage sludges.

The estimated volume is less than the recorded volume of leachate removed from the site over the same period. However, given that the surface water runoff from phases 1 and 2 are directed into the leachate holding tank and considering the rainfall for 2008, the difference is within expected ranges as described in the EPA's Landfill Site Design Manual.

3.3.3 Leachate Quality

Leachate analysis is carried out quarterly and annually from the eight inspection chambers (1, 2, 3, 4, MH2A, MH3A, MH4A and MH5A) during the reporting period. Quarterly monitoring includes a visual inspection / odour and temperature check. Annual monitoring includes a range of monitoring parameters as indicated in Schedule D5 of Waste Licence.

The results of the leachate quality analysis for indicator parameters only, are presented in Table 3.13. The results in general are indicative of a landfill at various stages within its waste degradation lifecycle.

Table 3.12 - Cumulative Leachate Volume Calculations

Year	Active Cell	Active Area (m^2)	Active area infiltration (m^3)	Waste inputs tonnes	Restored area (m^2)	Rest. area infiltration (m^3)	Total Water (m^3)	Cumulative water (m^3)	Absorptive Capacity input (m^3)	Cumulative Absorptive Capacity (m^3)	Cumulative Leachate (m^3)	Annual Leachate (m^3)
1991	1	7250	4771		0	0	4771	4771	0	0	4771	4771
1992	1	7250	4771	12000	0	0	4771	9541	720	720	8821	4051
1993	1	7250	4771	15000	0	0	4771	14312	900	1620	12692	3871
1994	1+2	14500	9541	15000	0	0	9541	23853	900	2520	21333	8641
1995	1+2	14500	9541	15500	0	0	9541	33394	930	3450	29944	8611
1996	1+2	14500	9541	17250	0	0	9541	42935	1035	4485	38450	8506
1997	1+2	14500	9541	19000	0	0	9541	52476	1140	5625	46851	8401
1998	3+5	10000	6580	15000	14500	66	6646	59121	900	6525	52596	5746
1999	3+5+(4+6)	20000	13160	15000	14500	270	13430	72551	900	7425	65126	12530
2000	3+5+(4+6)	20000	18820	18438	14500	3411	22231	94782	1106	8531	86251	21125
2001	3+5+(4+6)	20000	19828	25165	14500	3594	23422	118204	1510	10041	108163	21912
2002	4+6 +(3+5)	20000	17016	20465	14500	3084	20100	138304	1228	11269	127035	18872
2003	4+6 +(3+5)	20000	17016	31894	14500	3084	20100	158405	1914	13183	145222	18187
2004	4+6 +(3+5)	20000	17016	31040.09	14500	3594	20610	179014	1862	15045	163969	18747
2005 (Jan to Aug)	4+6 +(3+5)	20000	12906	14610.59	14500	2339.2125	15245	194260	877	15922	178338	14369
2005(Sept to Dec)	4+6 +(3+5)	200	62	7305.3	34300	2641.1	2703	196962	438	16360	180602	2264
2006	4+6 +(3+5)	5000	5023	31054.06	29500	7408.1875	12431	209393	1863	18223	191170	10567
07 Jan to March	4+6 +(3+5)	3000	762	8037	31500	2001.04	2763	212156	482.22	18706	193450	2281
07 April to July	3+9	5800	1998	23328	33700	2902.42	4901	217057	1400	20105	196951	3501
07 Aug to Dec	8+9	9500	3606	21911	34500	3274.06	6880	223937	1315	21420	202517	5566
2008	8+9	9500	10233	46506.03	34500	9290.85	19524	243461	2790	24210	219251	16734

(1)Actual rainfall used to calcutate infiltration through active areas.
(2)25% infiltration rate was used for restored areas.

Table 3.13: Summary of Annual Leachate Monitoring Results 2008

Monitoring Well	Sampling Date	Parameters							
		Conductivity μScm^{-1}	Ammonia (mg/l)	Sulphate (mg/l)	Chloride (mg/l)	TON (mg/l)	BOD (mg/l)	COD (mg/l)	BOD:COD Ratio
Phase 1 & 2 MW2A	6th October 2008	6.2	308	119	825	48.6	168	500	3:1
Phase 3 Holding tanks 2	6th October 2008	10.66	958	57	1070	8.7	15	1460	97:1

3.4 Landfill Gas

Landfill gas is produced during the breakdown of waste within the landfill. It is a by-product of the digestion, by anaerobic bacteria, of the organic component of the waste. Landfill gas comprises a mixture of different gases. Methane and carbon dioxide (in the ratio of 3:2) are the main components, with small concentrations of a wide variety of compounds. The number and ratio of gases at any one time depends on the breakdown process which occurs in stages and which is subject to controlling factors. These factors include: -

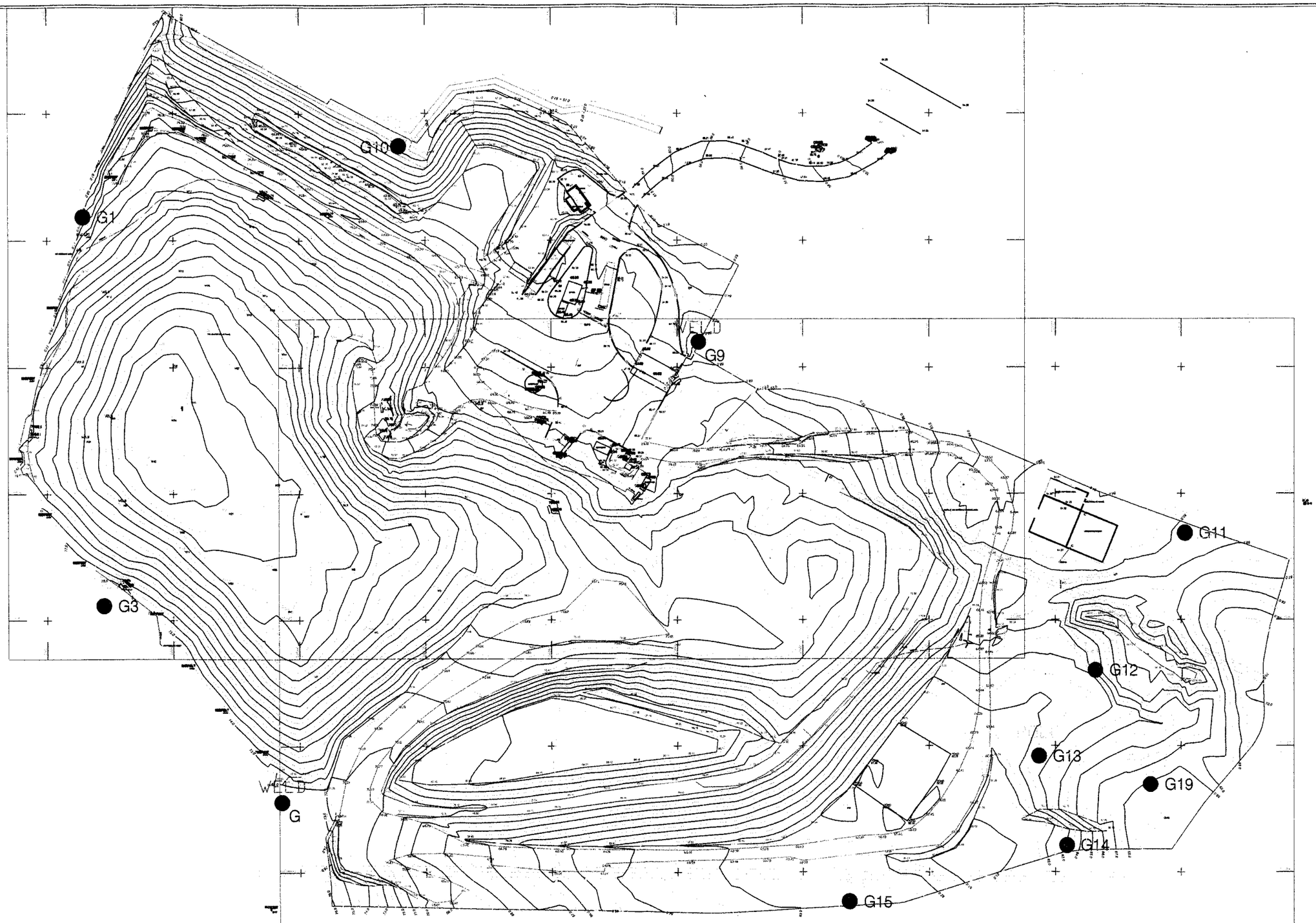
- Physical dimension of the site,
- Type and input rate of waste deposited,
- Waste age,
- Moisture content, pH, temperature and density of wastes,
- Application of cover, compaction and capping.

3.4.1 Landfill Gas Monitoring

The Council monitors landfill gas at 19 monitoring locations (G1 to G19) around the landfill, at the landfill flare stack and in the site offices. The monitoring locations are positioned outside the landfill cell to establish if the migration of landfill gas away from the fill area is occurring. The locations are shown on detailed site survey drawing no. PGW_09. OS co-ordinates are presented in Table 3.15.

Table 3.15 Perimeter Monitoring Locations

Station	Easting	Northing
G1	238675	209192
G2	238620	209170
G3	238553	209226
G4	238490	209290
G5	238527	209370
G6	238602	209400
G7	238643	209328
G8	238789	209348
G9	238628	209427
G10	238742	209280
G11	209652	238585
G12	209617	238531
G13	209592	238497
G14	209605	238462
G15	209518	238440
G16	209564	238545
G17	209555	238526
G18	209515	238467
G19	209636	238486
Flare Stack	238612	209469



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Perimeter Gas Wells

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh Landfill

SURVEYED: Murphy Surveys
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : NTS
DATE : 31/03/09
DATUM :

DRAWING NO. PGW_09

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
Perimeter Gas Wells 09.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings

Monitoring is carried out at the monitoring locations on the perimeter of the landfill at monthly intervals, and perimeter monitoring wells G11 to G19 is monitored on a weekly basis. The six manifolds, flare and the site office is monitored on a weekly basis. The monitoring includes methane, carbon dioxide, oxygen, atmospheric pressure, flow rate and temperature. The monitoring has never identified the presence of elevated levels of gases in the offices.

Graphs 1 to 19 in Appendix 2 show the monthly methane and carbon dioxide monitoring results from G1 to G19 from January 2008 to December 2008. The monthly monitoring has identified the presence of elevated carbon dioxide concentrations (greater than 1.5% by volume) at monitoring locations G2, G3, G4, G6, G10, G11, G12, G13, G14, G15, G16, G17, G18 & G19 during different monitoring events.

Monitoring did identify the presence of Methane at G12 and G13 perimeter gas wells during 2008. An investigation was carried out by our consultants TMS Environment. A report was issued to the agency, and our consultants concluded that the elevated methane and carbon dioxide levels recorded were due to naturally occurring gas and was not from migrating gas from the landfill.

Monitoring locations G1, G2, G3, G4, G5, G6, G7 and G8 are located around Phase I and Phase II. Monitoring locations G11-G19 are located around Phase III. G16-G18 were installed at the toe of the landfill as part of the investigation into the gas migration problem. G19 was installed at the top of the landfill on the Dublin side i.e. the east side of the landfill also as part of the investigation onto the gas migration problem identified at G12 and G13. The nearest building to Phase I and Phase II is the site office and the public tipping area. The public tipping area is an above ground fully vented structure. Monitoring in the site offices, which are to the north of the public tipping area has not identified the presence of methane or elevated concentrations of carbon dioxide.

3.4.2 Landfill Gas Volumes

Estimates of potential gas volumes generated are based on predictions of potential recoverable gas yields. Estimates of gas yields were included in the application for a waste licence. The predictions were based on assumptions on waste type and volume. The estimates were based on calculations developed by landfill gas flaring and utilisation equipment and were based on practical experience of a wide range of landfills.

Further estimates of annual and cumulative gas yields have been prepared for this Annual Environmental Report. The estimates are based on calculations used in previous AERs, taking into consideration up-dated data on waste types and volumes.

The site accepts non-hazardous domestic, commercial and industrial wastes. Commercial waste has the same characteristics as domestic waste. Hazardous waste and liquid waste are not accepted at the facility. The biodegradable content of the waste stream, including the organic and paper fraction is estimated at approximately 62%.

The landfill has been in operation since 1991. The estimated volume of waste already placed is 520,385.52 tonnes. This consists of 420,603.25 tonnes of waste placed in Phase 1 and Phase 2 and 99,782.27 tonnes of waste placed in Cell 8 and Cell 9 of the new extension, Phase 3, during 2007 and 2008. In total, 520,385.52 tonnes of waste has been placed in Ballydonagh landfill from 1991 to 2008 inclusive.

Gas predictions were based on the following assumptions of waste inputs and landfill gas characteristics: -

Time to reach steady stage production	0.75 years
Potential future gas production per annum	8.76 m^3/tonne of waste;years 1-10
Potential future gas production per annum	1.33m^3/tonne of waste;years10-40

For predictive purposes Year 1 is taken as 1991. It is assumed that waste is generating gas at 8.76m^3 / tonne for the first ten years it is placed in the landfill, and after ten years, it produces gas at 1.33m^3 / tonne.

The annual and cumulative years are presented in Table 3.16. It is assumed that the annual waste inputs will reach steady state conditions within 9 months. Therefore, only waste deposited prior to March 2008 is used in the calculation. The estimated annual volume of LFG generated for 2008 is 2,514 x $10^{\mathbf{3}}$ m^3. The cumulative volume for the period from start of the landfill to the start of this reporting period is 21,632 x $10^{\mathbf{3}}$ m^3.

There is an active gas abstraction and flaring system operational on site. This includes a 1000m3/hr enclosed gas flare system which extracts gas from all three phases of the landfill Six new gas extraction wells are now operational in Phase III of the landfill. A total of nine gas extraction wells are in Phase III, three in each of cells 7, 8 and 9.

There are currently fifty - one active gas wells between phases 1,2 and 3.

3.4.3 Landfill Gas Control

Westmeath County Council has installed a comprehensive LFG management system at the landfill to: -

- Minimise the risk of migration of LFG beyond the perimeter of the site,
- Minimise the risk of migration of LFG into services and buildings on site,
- Minimise the impact on air quality and the effect of greenhouse gases on the global climate.

Table 3.16: Landfill Gas Volumes

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Cumulative Total ($m^3 \times 10^3$)
Annual Waste Input 1×10^3 tonne/year	16.25	15	15	15	15.5	17.25	19	19	15	18.44	22.07	14.2	31.9	31.04	21.92	31.05	53.58	46.5	
Cumulative Waste Input 1×10^3 tonne/year	16.25	31.25	46.25	61.25	76.75	94	113	132	147	165.44	187.51	201.71	233.61	264.65	286.57	317.62	371.2	417.7	
Waste producing Gas at 8.76 m^3 / tonne (NOTE 1)	3	20.0	35.0	50.0	65.1	81.1	98.8	117.8	135.8	151.6	171.0	184.5	178.4	195.1	208.9	202.1	237.0	269.8	
Waste producing Gas at 1.33 m^3 / tonne (NOTE 2)	0	0	0	0	0	0	0	0	0	0	0	3	31.25	46.3	61.3	76.8	94.0	113.0	
Gas Yield m^3/yr x $10^{3(NOTE 3)}$	26	175	307	438	570	710	865	1031	1189	1328	1498	1620	1605	1771	1911	1872	2201	2514	21632

NOTE 1: Total quantity of waste placed in the landfill (up until 9 months prior to end of the Reporting Period) that is generating LFG at the rate of 8.76m^3/tonne/year.
NOTE 2: Total quantity of waste placed in the landfill that is generating LFG at the rate of 1.33m3/tonne/year.
NOTE 3: Total volume of LFG produced during each year.

3.5 Noise Survey

The location of the noise monitoring locations is shown on Figure 10.2 and further described in Table 3.17 below.

Table 3.17 Noise Monitoring Locations

Station	Easting	Northing
N1	209167	238655
N2	209277	238500
N3	209185	238615
N4	209200	238728
N5	209980	238400
N6	209879	237935
N7	209260	239000
N8	208905	238920
N9	208805	238873
N10	210517	238315

The noise survey was carried out in the third quarter of the reporting period, during July 2008. The limits set out by the licence are 55 Db(A) L_{Aeq}(15 minutes) for the daytime and 45 Db(A) L_{Aeq}(15 minutes) for the night-time.

Noise in the general area of the landfill is dominated by the N6 road which was noted to carry heavy volumes of traffic throughout the day. Measured noise levels which were in excess of 55Db(A) at 7 out of 10 monitoring locations. N4 to N10 excluding N6 were all above the licence limit and are directly related to noise generated by road traffic on the N6.

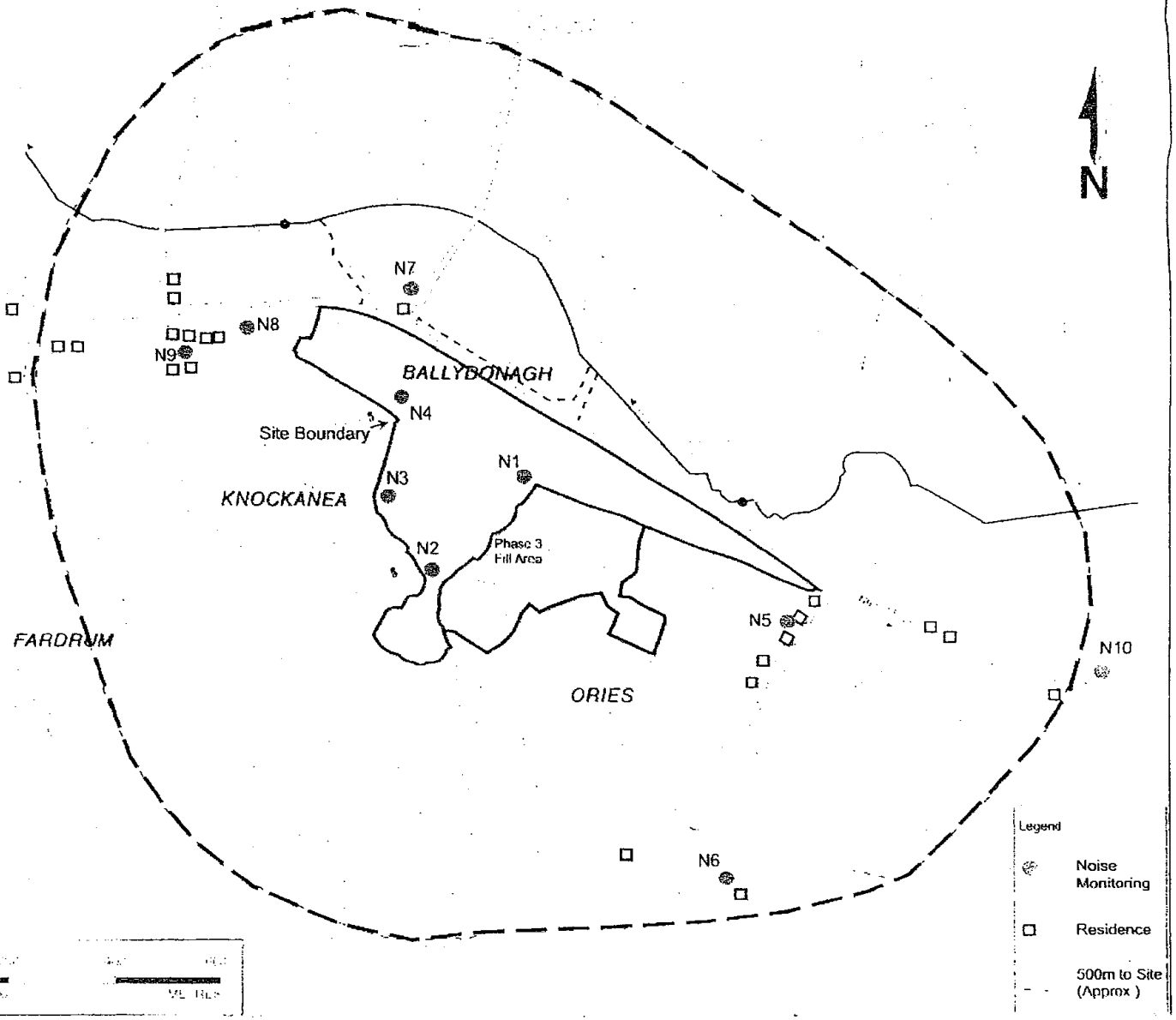
The two lowest noise levels were recorded at locations N2 and N3 (50.5 and 47.2 dB(A) respectively). Both locations are furthest removed from the N6 road which verifies the dominant impact that noise from the road traffic on the N6 has.

Monitoring points N1 to N4 are located within the perimeter of the site boundary. Locations N5 and N6 are located to the east of the site. Monitoring location N7 is north of the site. Monitoring locations N8 and N9 are west of the site and monitoring location N10 is east of the site.

Landfill activity was only discernible at the locations within the site boundary, and only the two locations closest to the N6 were in excess of the 55 dB(A) guideline limit value.

The results of the noise monitoring survey suggest that the activities at Ballydonagh Landfill site do not generate unacceptable noise levels above the daytime limit, but that the main source of noise is the heavy traffic movement on the N6 roadway.

Station	Grid Ref:
N1	E209167 N238655
N2	E209277 N238500
N3	E209185 N238615
N4	E209200 N238728
N5	E209980 N238400
N6	E209879 N237935
N7	E209260 N239000
N8	E208905 N238920
N9	E208805 N238873
N10	E210517 N238315



O'Callaghan Moran & Associates
Granary House, Rutland Street
Cork Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email ocm@indigo.ie

Client: Westmeath County Council

Title: Noise Monitoring Locations

Details: O.S Licence Agreement Number AR 0038702

Ordance Survey Ireland. Government of Ireland

Figure Number: Noise '09

Scale: As Shown

3.6 Dust Monitoring

The locations of the Dust monitoring locations are shown on Figure 10.1 and further described in Table 3.18 below.

Table 3.18 Dust Monitoring Locations

Station	Easting	Northing
D1	209420	238605
D2	209304	238483
D3	209177	238622
D4	209210	238710
D5	209620	238806
D6	209465	238725
D7	209683	238507

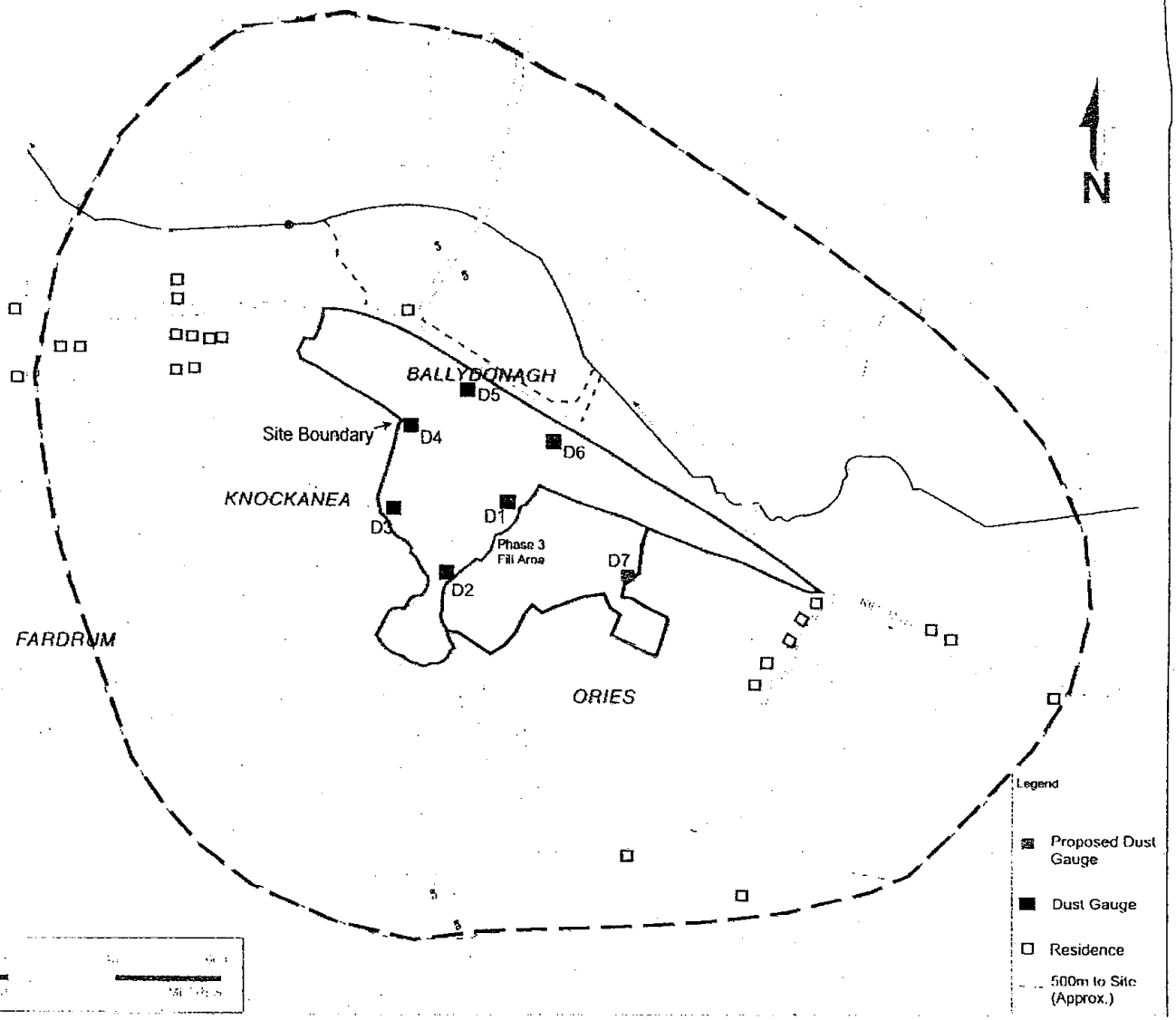
The Licence specifies that dust monitoring is carried out three times a year with a dust deposition limit of 350 mg/m^2-day at the site boundaries.

The results showed that the Licence Limit Value was exceeded at two monitoring locations during the January – February monitoring period at locations D3 and D5.
D3 is located at the southwest side of phase 11, and high readings may be attributed to the importing of cover material to cover the active area on a daily basis. D5 is located close to the N6, and readings are dependant on passing traffic along the N6.

No exceedences were reported during the second monitoring term for dust at Ballydonagh landfill during April – May. Two dust gauges were missing at the end of the monitoring period, and the remaining results were below the licence limit of 350 mg/m^2 per day.

The results showed that the Licence Limit Value was exceeded at two monitoring locations during the September-October monitoring period at locations D5 and D7. D5 is located along the main N6 and some dust may be attributed to passing traffic along the N6. D7 is located at the south of the landfill and elevated results are possible due to dust off the stockpile of cover material that was stockpiled close to dust monitoring location D7.

Station	Grid Ref:
D1	E209420 N238605
D2	E209304 N238483
D3	E209177 N238622
D4	E209210 N238710
D5	E209620 N238806
D6	E209465 N238725
D7	E209683 N238507



O'Callaghan Moran & Associates
Granary House, Rutland Street
Cork Ireland
Tel: (021) 4321521 Fax (021) 4321522
email : ocm@indigo.ie

Client: Westmeath County Council

Title: Dust Monitoring Locations

Details: O.S Licence Agreement Number AR 0038702
Ordance Survey Ireland.
Government of Ireland

Figure Number: Dust '09

Scale: As Shown

4. SITE DEVELOPMENT WORKS

4.1 Engineering Works Undertaken During the Reporting Period

The following engineering works were carried out during the reporting period: -

- Commenced the final capping of phases 1 & 2 and Cell 9 of phase 3.
- Instillation of three layers of horziontal gas extraction wells in cell 9 and cell 8 in Phase 3.
- Instillation of one layer of horziontal gas extraction wells in cell 7 access road in Phase 3.
- Continued balancing the gas field to optimise the complete gas network

4.2 Site Restoration

The first phase of restoration took place in the autumn of 1997 when the eastern, northern and southern sections of Cells 1 & 2 (Phase 1) were restored with a temporary cap of 600mm to 1m of soil. Landfilling commenced in Cells 4 & 6 since 22nd October 2001. A cap of 300mm to 600mm of puddle clay has been placed over the entire area of phase 2.

Filling of the old haul road between Phase 1 and Phase 2 also took place in 2007. This involved filling the haul road with waste and covering with 600mm of soil. The permanent restoration plan is currently being carried out by our consultants Priority Construction. It consists of a seeded cap with HDPE liner a drainage blanket, a gas collection blanket and a further metre of soil. Further details of site restoration are described in the Report on Phasing and Restoration submitted to the EPA.

4.3 Site Survey

The filled area and levels are shown on the site survey Drawing No. Surv_08 completed in accordance with Schedule G of the Licence.
Drawing No. Surv_08 is contained in Appendix 3.

4.4 Future Developments

Future developments on-site will include the following: -

- Continue to balance the gas field to obtain the maximum extraction of gas.
- Determine the feasibility of using the landfill gas as a source of energy.
- Continue to reduce packaging waste intake and divert to the local civic amenity site
- Setup an inspection system for all waste hauliers using the site ensuring they are carrying the most up to date collection permits
- Setup a log of all downtime or faults with the gas collection system
- Complete the final capping by end of June 2009 on Phase 1 and Phase 2 and Cell 9 of Phase 3.

A more detailed description of future developments is included in the Schedule of Objectives and Targets in the revised Environmental Management Programme (EMP) for 2009. A copy of the schedule of objectives and targets for the forthcoming year is included in Section 7.2.

4.5 Resource Consumption

The following resources were used on-site during the reporting period: -

- Electricity (32,852 kWhr),
- Gas (3 Standard bottles),
- Water (5,200 litres of drinking water),
- Bird scaring cartridges (1700).

5. WASTE RECEIVED AND CONSIGNED FROM THE FACILITY

Table 5.1 below shows the total waste quantities accepted at the Ballydonagh landfill site from 1st January 2007 to 31st December 2008.

Table 5.1 Non-Hazardous Waste Received by the Landfill Facility

Waste Description	EWC Code	Non-Hazardous Waste Received			
		On-Site Disposal		On-Site Recovery	
		Method	Tonnes	Method	Tonnes
Household	20 01 01 20 01 02 20 0103 20 01 04 20 01 05 20 01 06 20 01 07 20 01 08 20 01 10 20 01 11 20 01 20 20 01 22 20 01 24 20 05 25 20 01 26 20 02 00 20 03 00	Landfill	17,417.86		0
Commercial	20 01 01 20 01 02 20 01 03 20 01 04 20 01 05 20 01 06 20 01 07 20 01 08	Landfill	27,761.14		0
Sewage Sludge	---	Landfill	0		0
Construction & Demolition	17 05 01 17 07 01	Landfill	0		0
Industrial Non-Hazardous Sludges	---	Landfill	0		0
Industrial Non-Hazardous Solids	20 01 01 20 01 02 20 01 03 20 01 04 20 01 05	Landfill	1327.03		0
Total			**46,506.03**	**Total**	**0**

The quantity for Industrial non-hazardous solids includes street sweeping of 712.14 tonnes. In addition to the total quantity of waste accepted at the facility during the reporting period 7,760.49 tonnes of cover and bunding materials were was brought onto site. This brings the total quantity of materials placed in the landfill to 54,266.52 tonnes.

Table 5.2 shows the total waste quantities accepted at the Ballydonagh Civic Amenity Site for recovery from 1st January to 31st December 2008.

Table 5.2 Non-Hazardous Waste received & Consigned from Ballydonagh Landfill Site for Recovery 2007

Waste Description	EWC Code	Tonnes	Details of Haulage Contractor	Recovery/ Disposal	Name & Address of Recovery/ Disposal Site
Glass Bottles & Aluminium Cans	20 01 02 20 01 05	13.90	Glassco Recycling Ltd.	Recovery	Glassco Recycling Ltd, Naas, Co.Kildare (WP247-2006)
Total		**13.90**			

6. ENVIRONMENTAL INCIDENTS AND COMPLAINTS

6.1 Incidents

There were fifty-six notifiable incidents as defined under condition 3.1 of the Waste Licence at the facility during the reporting period.

There were twelve incidents reported to the EPA for Carbon Dioxide levels above the Licence Limit of 1.5%, and methane levels above 1% at the perimeter gas monitoring wells during the monthly gas monitoring of the perimeter wells. There was also another thirty two incidents reported to the EPA for the methane and carbon dioxide levels above the licence limits of 1% and 1.5% during the weekly gas perimeter monitoring for G11 to G19.
An investigation was carried out by our consultants TMS Environment during 2008. They compared the methane and carbon dioxide found at the monitoring locations to the east of the landfill to gas from each of the different phases within the landfill, and they concluded that the methane and carbon dioxide detected is a naturally occurring gas and not migrating gas from the landfill.

Four incidents occurred throughout the year when the flare was out due to an ESB power failure. Each time the flare was restated upon arrival to the site.

One incident occurred due to high oxygen, where GW7 has become disconnected. This was reconnected and the flare was restarted almost immediately. One incident occurred when there was a malfunction in the knock out at the old haul road at the base of phase.

There were four incidents of mechanical failure of the flare, either due to the thermocouple burning out or flare/compressor mechanical problems. The back up flare was used in place of the main flare while the mechanical problems were being resolved.

One incident was reported due to an error in the leachate telemetry system which was repaired by our consultants AFS Ltd., and one incident during February for odour on the Ories road, Ballydonagh. The odour detected, was that of compost, a sweet smell. This matched the odour of compost waste which was being deposited at Ballydonagh landfill at the time. The compost waste was covered as soon as it was discovered it was causing the odour and has not been accepted at the landfill since.

6.2 Register of Complaints

The Council maintains a register of complaints received in accordance with Condition 3.14 of the waste licence. Five complaints were received in relation to the operation of the facility for the reporting period.

Three of the five complaints received were relating to the odour from Ballydonagh Landfill at the entrance of the facility during the last week of January to the first week of February. Immature compost had been accepted prior to the complaints and once we became aware that the immature compost was causing an undesirable odour, we stopped accepting it into our facility.

The fourth complaint was relating to a piece of timber falling off the open skip as it was been moved to be emptied and slightly dinted the back side panel of a customer's car. The procedure for the emptying of the open skips now includes waiting until the area is free from customers and their cars before proceeding to empty the open skips.

The last complaint was made on the 30th December and related to odours emanating from the landfill over the Christmas period. Our contractor have been on site since November 2008 and is carrying out the final capping works on phases 1 and 11, and this involved digging trenches through the waste at that time.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

7.1 Report on Progress Towards Achieving Objectives & Targets in the EMP for 2008.

The Environmental Management Programme (EMP) prepared in 2008 contained a schedule of objectives and targets and the means for their implementation. The EMP report was submitted to the Agency in accordance with Waste Licence Condition 2.3.1.

The means of achieving the objectives and targets was by establishing a number of projects to be completed within a specified timeframe. A total of 7 projects were established, the status of each of these is outlined in Sections 7.1.1 to 7.1.6 below.

7.1.1 Project 1 &2– Recovery & Recycling of Waste

Task 1: Continue the public information campaign e.g. newspaper advertisements, postal drops, site notices and radio advertisements aimed at encouraging the public to recycle materials. This task is ongoing over the entire lifetime of the landfill.

Task 2: This task is ongoing to increase the awareness of the Recycling Centre in Athlone as a facility for the collection of green waste for composting. This task is ongoing.

7.1.2 Project 3-Packaging Waste Reduction

Task 1: Continue to communicate with the producers of packaging waste, small as well as large producers including small retailers within the county, with a view to ensuring compliance with the Packaging Regulations. This task is ongoing over the lifetime of the landfill.

Task 2: Implement the Packaging Regulations 2001 to 2004. This task is ongoing over the lifetime of the landfill.

Task 3: Promote the awareness of Mullingar and Athlone Recycling Centres. This task is ongoing.

7.1.3 Project 4 – Design of Permanent Cap for Phase 1 and Phase 2and Cell 9 of Phase 3.

Task 1: Produce SEW for Agency approval.
This task has been completed.

Task 2: Advertise Tender for the procurement of Contractor.
This task has been completed.

Task 3: Complete detailed design and produce contract documents for Contract.
This task has been completed.

7.1.4 Project 5 – Construct Permanent Landfill Cap for Phase 1 and Phase 2 and Cell 9 of Phase 3

Task 1: Procurement of Contractor for the Works.
This task has been completed.

Task 2: Supervision of contract construction quality assurance (CQA) and contract management on site.
This task is ongoing.

Task 3: Produce CQA validation report for Agency approval.
This task is ongoing.

7.1.5 Project 6 – Landfill Gas Recovery

Task 1: Carry out a detailed assessment for designing a system of using landfill gas as a source of energy.
This task is ongoing.

Task 2: Design a small on site Combined Heat and Power (CHP) generating plant by the 30/09/08 if deemed feasible.
This task is not completed but will be incorporated in the list of Objectives and Targets for 2009.

7.1.6 Project 7 – Resources use and Energy Efficiency.

Task 1: Carry out an Audit of processes that use energy on the site by 20 /11/2008.
This task has not been completed and will be incorporated into the schedule of Objectives and Targets for 2009.

Task 2 : Identify reductions in water usage on the site by 20/11/2008.
This task has not been completed and will be incorporated into the schedule of Objectives and Targets for 2009.

Task 3: Carry out an assessment of use of raw materials used in various processes and obtain a reduction in waste generated from the various processes and identify any improvements made.

This task has not been completed and will be incorporated into the schedule of Objectives and Targets for 2009.

7.2.1 Schedule of Objectives and Targets for 2009

The following list of objectives and targets has been prepared for Ballydonagh Landfill in compliance with condition 2.3.2.1 of the Waste Licence WL0028-02.

Table 7.2 Schedule of Objectives and Targets for 2009

OBJECTIVE	TARGET
1.Encourage the public to increase waste recovery and recycling in accordance with the Waste Management Plan for the Midland Region.	Continue and extend the public information campaign to encourage recycling.
2. Reduce the quantities of green waste landfilled on-site.	Continue to increase awareness of the Recycling Centre in Athlone as a facility for the collection of green waste from households for composting.
3. Reduce the quantities of packaging waste accepted on-site.	Continue to communicate with the producers of packaging waste to ensure compliance with the Packaging Regulations. Continue implementation of Packaging Regulations 2001 to 2004. Continue to promote awareness of the new Civic Recycling Centre Mullingar. Continue the pilot scheme for brown bin collection of organic waste.
4. Construction of permanent Landfill cap for Phase 1 and Phase 2 and cell 9 of Phase 3	Permanent capping of Phase 1 and Phase 2 and cell 9 of Phase 3 by 30/05/09.
5. Carry out detail assessment for designing a system for using landfill gas as a source of energy.	Design a specification for a small on site CHP generating plant by 30/09/2009 if deemed feasible.
6. Provide additional gas extraction wells in active cells.	To install 4 number additional gas extraction wells, 2 in cell 8 and 2 in the east side of cell 1 by May 09.
7. Resources use and Energy Efficiency	Carry out an Audit of energy efficiency of the site by 20/11/2009. Identify reductions in water usage on the site by 20/11/2009. Carry out an assessment of use of raw materials and reduction in waste generated and identify any improvements made.
8. Put in place a landfill closure strategy for 2010	Draw up a closure strategy by August 2009 for the landfill closing in 2010. The strategy will deal with the landfilling of public waste post closure.

7.2.2 Projects Relating to the Objectives and Targets

7.2.2.1 Project 1 & 2 – Recovery & Recycling of Waste

Relationship to Objectives and Targets

In line with Westmeath County Council's objective to encourage the public to increase waste recovery and recycling the following project is planned. This project implements both objectives one and two given in Table 7.2 above.

Reason for Undertaking the Project

Encourage the Public to increase recovery and recycling of waste with a view to reducing the quantities of waste entering the landfill.

Targets

Continue the public information campaign to encourage recycling.
Increase awareness of the Recycling Centre in Athlone as a facility for the collection of green waste for composting.

Project Summary

Task 1: Continue the public information campaign e.g. newspaper advertisements, postal drops, site notices and radio advertisements aimed at encouraging the public to recycle materials. This task will be ongoing over the entire lifetime of the landfill.

Task 2: Increase awareness of the Recycling Centre in Athlone as a facility for the collection of green waste for composting. This will entail the Environmental Awareness Office running publicity campaigns to increase the numbers of users of the facility.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project.

Capital Cost and Returns

The cost of the project is estimated at €60,000. A dedicated Environmental Awareness Officer will carry out Task 1 and Task 2.

Time-frame
Task 1 will be ongoing over the entire lifetime of the landfill.
Task 2 will be ongoing during the year.

7.2.2.2 Project 3 – Packaging Waste Reduction

Relationship to Objectives and Targets

In line with Westmeath County Councils objective to reduce the quantities of packaging waste accepted on-site the following project is planned. This project implements objective 3 in Table 7.2.

Reason for Undertaking the Project

To reduce the quantities of waste entering the landfill and therefore, save landfill space , in line with the Regional WM Plan objectives.

Targets

Continue to communicate with the major producers of packaging waste in the County with a view to ensuring compliance with the Packaging Regulations and to extend this to all smaller producers of packaging waste, including retailers under the new Packaging Regulations.

Project Summary

Task 1: Continue to communicate with the producers of packaging waste, small as well as large producers including small retailers in the county with a view to ensuring compliance with the Packaging Regulations. This will be ongoing over the lifetime of the landfill.

Task 2: Implement Packaging Regulations 2001 to 2004 in relation to major producers and producers of packaging waste in conjunction with REPAK. Continue auditing of all producers and take enforcement proceeding if necessary to ensure compliance.

Task 3. Promote the awareness of Mullingar Recycling Centre.

Task 4. Continue the pilot scheme for the introduction of the Brown bin collection of organic waste. 1000 brown bins have been distributed to Council Refuse collection customers.

Designation of Responsibility

The Landfill manager is responsible for the implementation of this project. Three environmental enforcement officers have been employed by Westmeath County Council to enforce waste legislation including the Packaging Regulations. The Environmental Awareness Officer will carry out the promotion work.

Capital Cost and Returns

The cost of the Task1 to 5 is estimated at €160,000. There is no direct financial payback from this investment.

Time-frame

Task 1 is ongoing.
Task 2 is ongoing .
Task 3 is ongoing .
Task 4 is ongoing .

7.2.2.3 Project 4 – Project 4 – Construct Permanent Landfill Cap for Phase 1 and Phase II and cell 9 of Phase 3.

Relationship to Objectives & Targets

In line with Westmeath County Councils objective to reduce Greenhouse gas emissions the following project is planned. This project implements objective 4 in Table 7.2.

Reason for Undertaking the Project

To reduce Greenhouse gas emissions and odours from the Landfill.

Targets

To construct a permanent cap on Phase 1 and Phase 2 and cell 9 of Phase 3.

Project Summary

Task 1 Construct new cap and gas extraction system as per SEW submitted to the Agency.

Task 2. Supervision of contract construction quality assurance (CQA) and contract management on site.

Task 3. Produce CQA validation report for Agency approval.

Capital Cost

The cost of the project is estimated at €2,000,000.

Time-frame
It is proposed to have this project completed before end of June of 2009.

7.2.2.4 Project 5 – Landfill Gas Recovery.

Relationship to Objectives and Targets

In line with Westmeath County Councils objective to utilise the gas as a source of energy the following project is planned. This project implements objective 5 in Table 7.2.

Reason for undertaking this project

To utilise landfill gas as a source of energy.

Targets

To investigate the design and install the necessary equipment on site with a view to utilising the gas as a source of energy.

Project Summary

Task 1: Carry out a detail assessment for designing a system for using landfill gas as a source of energy.

Task 2 : Design a small on site Combined Heat and Power (CHP) generating plant by the 30/09/2009 if deemed feasible.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project. Specialist contractors will be used as required.

Capital Cost and Returns

The cost of the project is estimated at €6,000 (Design Cost)

Time-frame

It is proposed to implement Task 1 and Task 2 by the 30/09/2009.

7.2.2.5 Project 6 – Install additional Gas Extraction Wells in the Active Cells.

Relationship to Objectives & Targets

In line with Westmeath County Councils objective to reduce Greenhouse gas emissions the following project is planned. This project implements objective 6 in Table 7.2.

Reason for Undertaking the Project

To reduce Greenhouse gas emissions and odours from the Landfill.

Targets

To construct 4 No. additional gas extraction wells in the active area of cell 8 and cell 9 of Phase 3.

Project Summary

Task 1 As part of the present capping work install an additional 2 No. gas extraction wells in each of cell 8 and cell 9 of Phase 3 .

Capital Cost

The cost of the project is estimated at €16,000.

Time-frame
It is proposed to have this project completed before end of June of 2009.

7.2.2.6 Project 7 - Resources use and Energy Efficiency

Relationship to Objectives and Targets

In line with the Council's objective to comply with the amendment to the waste licence and manage the resources of the site efficiently. This project implements objective 7 in Table 7.2.

Reason for Undertaking the Project

To manage resources efficiently and effect a reduction in the waste generated from various processes used on the site.

Targets

Carry out an Audit of processes that use energy and identify reductions in water usage and waste generated.

Project Summary & Timeframe

Task 1: Carry out an Audit of energy efficiency of the site by 20/11/2009.

Task 2: Identify reductions in water usage on the site by 20/11/2009.

Task 3: Carry out an assessment of use of raw materials used in various processes and obtain a reduction in waste generated from the various processes and identify any improvements made.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project. Specialist contractors will be used as required.

Capital Cost

The cost of the project is estimated at €2000

7.2.2.7 Project 8 – Put in place a Landfill Closure Strategy for 2010.

Relationship to Objectives & Targets

In line with Westmeath County Councils objective to close the landfill in 2010 a strategy to deal with the disposal of household waste post closure will be put in place.

Reason for Undertaking the Project

To put in place a closure strategy which will deal with the disposal of household waste post landfill closure.

Targets

Complete landfill closure strategy by August 2009.

Project Summary

Task 1:- Draw up a strategy for the disposal of household waste post the landfill closure in 2010.

Time-frame
It is proposed to have this project completed by August 2009.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project.

8. OTHER REPORTS

8.1 Management and Staffing of the Facility

The day-to-day management of the facility and supervision of waste activities are the responsibility of the Landfill Manager and the site operatives.

The names of the persons who provide management and supervision and their positions are set out below

Landfill Manager:	Mr. P.J.Carey, Senior Executive Engineer.
Deputy Manager:	Ms Geraldine Glennon, Env. Technician Grade 1.
Deputy Manager / Caretaker.	Mr. Peter Buckley,
Assistant Caretaker:	Mr. Pat Conlon
General Operative:	Mr. Michael Browne
General Operative:	Mr. Jim Allen

8.1.1 Responsibilities

Westmeath County Council, as the licensee, is responsible for ensuring the requisite resources are provided to operate the facility in accordance with the conditions of Waste Licence Registration No. 28-2.

The Landfill Manager or nominated Deputy is responsible for ensuring that the day to day operation of the facility is carried out in accordance with waste licence conditions and any procedures or operational work practice sheets prepared on foot of licence conditions.

The Landfill Manager or nominated Deputy is responsible for ensuring that the environmental monitoring programme is carried out and report submitted to the EPA in accordance with licence conditions.

The Landfill Manager or nominated Deputy is responsible for arranging that the specified engineering works, the leachate and landfill gas management programmes and the restoration programmes are properly implemented.

The Landfill Manager or nominated Deputy is responsible for ensuring that the Corrective Action Procedures, Emergency Response Procedures and Contingency Arrangements specified in the Waste Licence are implemented.

The Landfill Manager is responsible for arranging appropriate training programmes for all facility personnel and for maintaining training records.

8.1.2 Contingency Arrangements

In the event of the absence of the above named persons from the facility the following arrangements will be implemented.

Where absence is due to scheduled holidays or periods of illness extending to a maximum of two weeks the following applies: -

- In the absence of the Landfill Manager the nominated Deputy will be either Ms Geraldine Glennon or Mr. Peter Buckley Caretaker.

- In the absence of the Caretaker the Assistant Caretaker will deputise.

For longer periods of absence the Landfill Manager will be responsible for ensuring that appropriate alternative staff are available.

8.2 Summary of New/Amended Procedures for the Facility

8.2.1 New and Revised Procedures

No procedures were revised during 2008

8.3 Bund Testing

The licence requires an integrity bund test to be carried out every three years. An integrity bund test was carried out by Mr. Donal O Donoghue, Assistant Engineer, Westmeath County Council in accordance with BS80007 (design of concrete structures for retaining aqueous liquids) on all bunds on site including the leachate storage tank, the fuel storage bund, the wheel wash and silt trap during 2006 and all structures were found to be satisfactory.

8.4 Financial Provision

The EPA has not set a date for the establishment of a fund or other form of approved security required to ensure the implementation of the Restoration and Closure Plan as set out in Condition 11.2.1 of the Waste Licence.

Notwithstanding this, the Council has made provision for the closure and aftercare of the facility as follows: -

- The gate charge is currently €145 / tonne for both domestic and commercial waste with a sliding scale charge for larger volume. These prices include landfill tax by the Department of the Environment.

- During 2008, €211,620 was set aside as a restoration fund.

- During 2009, €211,620 will be set aside as a restoration fund, and this amount will be increased in all subsequent years.

APPENDIX 1

Meteorological Report

January Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	1	1	0.3	6.0	150	93	1016.8	10.7	6.9	0.50	0.61
2008	1	2	0.0	10.0	115	78	1008.8	6.9	3.6	0.50	0.65
2008	1	3	0.5	9.0	80	79	1003.8	3.3	-2.2	0.44	0.50
2008	1	4	6.3	6.3	180	93	991.3	4.9	-3.5	0.74	0.92
2008	1	5	0.9	9.5	230	84	992.7	5.6	2.7	0.27	0.32
2008	1	6	8.3	5.0	210	94	1001.9	5.2	-0.1	0.36	0.45
2008	1	7	2.9	9.9	215	87	1003.9	6.7	3.2	0.29	0.33
2008	1	8	15.5	9.1	195	93	997.8	9.0	1.4	0.90	1.10
2008	1	9	3.9	8.7	210	92	998.8	6.9	0.7	0.53	0.62
2008	1	10	10.5	5.4	210	93	992.4	7.4	1.4	0.39	0.48
2008	1	11	0.0	2.9	190	94	997.4	4.4	-1.9	0.35	0.55
2008	1	12	0.0	6.0	150	97	999.6	10.4	-0.1	0.92	1.09
2008	1	13	4.5	8.2	160	94	987.1	10.4	4.9	0.69	0.82
2008	1	14	2.9	7.5	235	94	984.8	8.2	4.0	0.56	0.68
2008	1	15	4.5	4.1	190	96	977.5	7.8	3.2	0.46	0.59
2008	1	16	0.1	3.0	270	94	991.6	5.9	1.9	0.38	0.51
2008	1	17	11.8	8.7	240	90	992.5	8.5	3.4	0.61	0.75
2008	1	18	9.0	11.4	230	91	1000.1	13.0	4.8	1.24	1.48
2008	1	19	9.3	2.8	250	97	1013.1	10.0	6.6	0.44	0.57
2008	1	20	3.6	6.2	240	97	1014.9	11.8	7.1	0.64	0.79
2008	1	21	8.8	9.4	220	90	1008.3	11.5	-0.2	0.82	0.98
2008	1	22	4.9	5.7	165	99	1018.8	11.0	0.1	1.06	1.28
2008	1	23	6.3	9.1	200	94	1014.7	12.9	7.5	0.95	1.14
2008	1	24	0.8	9.4	235	81	1024.2	6.6	2.5	0.43	0.54
2008	1	25	0.4	14.5	230	77	1028.3	10.8	7.3	0.64	0.83
2008	1	26	0.0	11.4	230	78	1030.0	10.4	7.3	0.56	0.74
2008	1	27	0.0	5.8	215	89	1031.8	11.7	3.9	0.75	0.92
2008	1	28	0.3	5.9	175	91	1028.3	10.6	2.6	0.74	0.90
2008	1	29	8.2	6.4	265	90	1023.0	10.8	1.9	0.91	1.10
2008	1	30	0.2	7.9	210	91	1025.1	6.0	-0.5	0.66	0.85
2008	1	31	9.6	13.5	250	85	997.4	7.3	1.1	0.78	1.02
Total			134.3							19.5	

February Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	2	1	3.4	6.5	260	94	1004.4	3.2	-0.6	0.45	0.61
2008	2	2	0.4	8.4	180	93	1005.3	7.7	-2.6	1.05	1.30
2008	2	3	5.6	12.4	165	90	985.0	8.1	0.5	1.06	1.38
2008	2	4	4.7	8.5	195	89	989.0	8.8	-0.3	0.94	1.16
2008	2	5	15.5	6.7	245	95	989.3	6.7	3.4	0.45	0.62
2008	2	6	1.7	6.5	175	85	1021.0	8.9	-0.6	0.79	1.00
2008	2	7	0.2	10.4	175	88	1021.6	13.6	8.7	0.83	1.04
2008	2	8	0.8	10.1	170	91	1020.6	10.8	9.3	0.49	0.69
2008	2	9	0.0	9.2	170	87	1023.9	13.3	4.9	1.03	1.26
2008	2	10	0.0	4.5	135	93	1031.7	7.4	0.5	0.41	0.55
2008	2	11	0.0	6.3	135	91	1030.1	11.0	4.4	0.74	0.97
2008	2	12	0.2	3.7	130	85	1034.0	11.8	1.3	0.69	1.01
2008	2	13	0.0	3.2	65	88	1037.3	12.4	-0.9	0.50	0.77
2008	2	14	0.0	6.8	70	89	1038.1	5.7	3.4	0.48	0.68
2008	2	15	0.0	4.1	85	84	1039.1	5.9	2.7	0.48	0.64
2008	2	16	0.0	2.4	75	83	1041.5	7.2	-3.1	0.40	0.68
2008	2	17	0.0	2.6	30	94	1039.9	5.6	-5.4	0.39	0.62
2008	2	18	0.0	3.8	70	93	1032.9	7.6	-1.0	0.68	0.99
2008	2	19	0.0	3.9	170	91	1023.2	5.6	-5.6	0.44	0.64
2008	2	20	0.7	4.3	215	91	1017.1	7.3	0.7	0.39	0.55
2008	2	21	0.9	12.2	230	90	1015.0	10.9	5.6	1.02	1.34
2008	2	22	1.8	11.2	235	85	1017.7	11.4	6.0	0.95	1.31
2008	2	23	0.2	10.4	205	88	1016.1	11.7	6.2	1.01	1.31
2008	2	24	1.9	6.8	240	82	1014.5	10.0	1.9	0.99	1.33
2008	2	25	7.5	10.6	175	88	1006.4	9.9	1.0	1.27	1.60
2008	2	26	1.6	10.2	235	80	1003.4	8.7	4.3	0.97	1.40
2008	2	27	0.1	4.3	225	87	1016.7	9.7	0.5	0.85	1.05
2008	2	28	0.0	4.1	215	92	1019.4	9.4	1.9	0.87	1.20
2008	2	29	7.1	12.8	195	92	1005.1	11.1	4.0	1.22	1.58
Total			54.3							21.8	

March Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	3	1	1.8	11.2	255	83	1008.1	11.1	5.2	0.76	1.10
2008	3	2	1.1	8.0	250	78	1010.3	9.3	0.8	0.92	1.33
2008	3	3	3.1	7.2	225	93	1011.1	4.3	-0.7	0.56	0.85
2008	3	4	0.3	5.8	285	82	1032.1	9.0	1.4	0.94	1.36
2008	3	5	0.1	6.8	235	87	1032.9	9.3	4.0	0.73	1.03
2008	3	6	3.3	10.4	230	85	1018.3	9.5	4.3	0.73	1.12
2008	3	7	2.3	8.4	225	87	1006.7	9.0	1.6	0.83	1.31
2008	3	8	4.8	11.2	215	86	994.2	10.3	3.6	0.95	1.46
2008	3	9	2.1	8.5	225	84	989.3	7.4	1.3	0.97	1.50
2008	3	10	12.9	10.3	290	89	964.6	7.8	1.2	0.88	1.33
2008	3	11	5.0	11.0	235	83	980.6	9.9	2.9	1.19	1.71
2008	3	12	8.1	12.5	250	83	998.6	8.6	2.9	1.21	1.89
2008	3	13	1.7	6.3	205	87	1007.6	10.1	2.3	0.85	1.21
2008	3	14	0.0	4.7	135	88	1009.4	8.1	-0.1	0.59	0.85
2008	3	15	7.7	5.0	65	96	1002.2	9.2	6.7	0.50	0.71
2008	3	16	2.1		50	81	1011.9	8.3	4.2	0.95	1.31
2008	3	17	0.4	5.1	60	80	1021.6	8.3	0.0	1.00	1.46
2008	3	18	0.0	2.7	350	77	1025.9	8.2	-1.3	1.09	1.57
2008	3	19	0.3	3.6	295	84	1029.1	8.9	-1.5	1.07	1.54
2008	3	20	5.0	9.5	265	91	1015.9	9.9	4.2	0.58	0.89
2008	3	21	2.1	10.9	295	75	1002.8	8.9	2.8	1.42	2.17
2008	3	22	0.0	7.2	335	71	1013.9	7.3	1.5	1.42	2.05
2008	3	23	1.1	6.8	320	79	1007.1	8.3	2.3	1.15	1.66
2008	3	24	1.7	4.0	310	83	1006.5	8.2	1.2	1.14	1.63
2008	3	25	1.8	4.2	225	91	1008.0	10.1	0.0	1.02	1.45
2008	3	26	0.9	5.1	260	83	1000.1	9.6	2.5	1.47	2.19
2008	3	27	1.9	6.0	190	78	999.9	9.9	-1.6	1.44	2.14
2008	3	28	9.4	10.1	240	90	990.7	9.1	2.7	0.84	1.44
2008	3	29	10.1	8.0	185	90	992.7	10.3	2.2	1.03	1.50
2008	3	30	0.0	6.1	220	79	995.8	11.2	2.1	1.54	2.20
2008	3	31	1.2	7.4	190	85	1009.7	10.4	-0.1	1.04	1.73
Total			92.3							30.8	

April Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	4	1	1.3	11.8	250	74	1014.8	12.1	7.7	2.06	3.13
2008	4	2	0.9	5.6	245	90	1026.4	14.0	6.7	1.16	1.66
2008	4	3	0.0	4.2	265	80	1031.9	15.5	7.1	1.80	2.45
2008	4	4	0.3	5.2	235	86	1027.9	13.9	3.3	1.48	2.09
2008	4	5	0.2	6.7	335	74	1023.5	8.9	1.5	1.81	2.70
2008	4	6	0.4	7.8	325	76	1014.7	7.5	-1.0	1.68	2.55
2008	4	7	0.3	6.0	325	84	1007.0	7.8	0.1	1.53	2.32
2008	4	8	0.2	2.4	275	81	1003.5	9.4	0.6	1.37	1.90
2008	4	9	0.0	4.1	270	81	999.7	9.9	1.7	1.69	2.43
2008	4	10	4.0	4.7	215	87	994.3	8.3	2.2	1.45	2.11
2008	4	11	5.0	4.7	275	86	993.2	9.5	2.1	1.55	2.22
2008	4	12	5.7	3.4	245	91	1001.1	9.2	-0.3	1.02	1.42
2008	4	13	1.2	4.2	295	81	1011.8	11.7	1.1	1.92	2.75
2008	4	14	0.0	3.7	290	74	1022.5	12.0	0.8	2.09	2.95
2008	4	15	0.0	2.3	245	74	1023.0	11.8	-1.7	1.83	2.56
2008	4	16	0.0	8.0	90	76	1017.4	11.1	2.2	1.92	2.88
2008	4	17	0.8	10.3	75	79	1009.7	7.7	3.7	1.59	2.40
2008	4	18	2.0	10.3	70	79	1002.9	8.8	2.6	1.28	1.91
2008	4	19	0.0	11.0	60	72	1003.1	8.6	5.8	1.51	2.07
2008	4	20	1.6	7.9	60	85	1007.0	8.4	5.7	1.08	1.45
2008	4	21	0.0	5.9	65	79	1010.4	11.9	6.1	1.55	2.12
2008	4	22	6.2	7.8	125	82	1008.4	15.6	6.0	2.21	3.19
2008	4	23	0.1	6.9	175	80	1011.9	15.7	3.2	2.44	3.60
2008	4	24	4.2	7.7	210	81	1014.1	13.2	5.6	1.98	2.95
2008	4	25	1.2	8.1	180	88	1018.8	15.1	6.4	1.34	1.91
2008	4	26	0.5	7.0	260	77	1016.3	14.2	5.4	1.82	2.71
2008	4	27	13.7	2.8	190	81	1011.0	15.7	0.3	2.34	3.23
2008	4	28	7.6	4.3	255	88	1000.8	12.5	4.5	1.81	2.56
2008	4	29	0.5	4.4	55	79	995.9	12.9	1.9	2.09	2.98
2008	4	30	1.2	7.0	330	81	994.5	11.9	5.9	1.96	2.78
Total			59.1							51.3	

May Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	5	1	3.4	5.1	235	80	1002.7	12.9	3.6	2.25	3.21
2008	5	2	0.3	6.6	160	82	1014.5	14.6	2.5	2.31	3.37
2008	5	3	2.6	11.7	135	80	1014.0	18.9	9.9	3.12	4.62
2008	5	4	4.1	7.1	205	75	1015.6	18.4	8.3	2.69	3.86
2008	5	5	0.0	4.6	135	76	1024.7	19.5	4.8	3.29	4.61
2008	5	6	0.0	6.3	85	70	1021.8	21.2	7.4	3.45	4.77
2008	5	7	0.0	5.2	80	70	1017.9	21.6	8.9	3.44	4.66
2008	5	8	0.3	7.1	70	72	1011.5	22.5	11.0	3.43	4.53
2008	5	9	1.0	3.2	300	90	1012.8	14.9	11.8	1.27	1.65
2008	5	10	0.2	2.5	340	89	1019.4	16.7	11.0	1.39	1.80
2008	5	11	0.0	2.6	70	80	1021.2	20.1	9.6	2.41	3.18
2008	5	12	0.0	6.4	70	75	1020.1	20.6	12.4	3.45	4.76
2008	5	13	0.0	7.5	65	76	1021.2	17.3	10.2	3.31	4.73
2008	5	14	0.0	6.5	65	74	1018.5	16.2	9.1	3.09	4.35
2008	5	15	0.0	5.3	55	74	1013.7	15.5	7.1	2.75	3.92
2008	5	16	0.0	4.5	75	77	1010.3	17.1	2.6	2.67	3.76
2008	5	17	0.0	4.7	60	80	1010.9	15.4	4.4	1.78	2.47
2008	5	18	0.0	6.5	75	74	1016.7	13.5	6.9	2.32	3.31
2008	5	19	0.0	5.5	145	71	1017.9	15.8	2.5	2.41	3.41
2008	5	20	0.0	6.4	130	69	1017.2	12.9	3.6	1.94	2.68
2008	5	21	1.1	8.9	115	69	1012.9	14.9	8.5	2.71	3.83
2008	5	22	5.0	6.7	95	93	1010.4	13.4	9.6	1.14	1.57
2008	5	23	0.4	6.5	80	81	1012.4	17.2	8.4	2.31	3.25
2008	5	24	0.0	8.6	55	75	1017.3	15.8	9.5	2.91	4.25
2008	5	25	0.0	9.9	50	67	1019.5	17.4	6.4	3.42	5.04
2008	5	26	0.0	11.6	50	64	1019.5	16.3	9.4	3.72	5.46
2008	5	27	0.4	7.7	45	82	1015.3	12.1	8.9	1.58	2.13
2008	5	28	0.0	2.3	35	88	1007.3	14.5	9.5	1.29	1.66
2008	5	29	0.5	2.4	180	80	1012.2	17.9	8.4	2.44	3.22
2008	5	30	0.1	1.8	55	74	1015.4	21.1	10.4	2.67	3.49
2008	5	31	4.0	2.0	35	80	1017.8	22.4	11.1	3.03	3.94
Total			23.4							80.0	

June Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	6	1	0.1	3.4	70	79	1017.1	21.2	7.6	2.96	3.94
2008	6	2	6.6	3.2	110	83	1012.8	20.9	4.8	3.03	4.06
2008	6	3	0.0	4.5	220	72	1014.5	17.1	7.9	3.72	5.16
2008	6	4	6.5	5.8	155	87	1012.9	14.0	6.3	1.39	2.00
2008	6	5	2.8	1.7	35	81	1016.4	15.7	2.1	2.49	3.32
2008	6	6	3.1	3.1	260	83	1019.9	16.5	6.7	2.54	3.44
2008	6	7	0.0	2.5	245	74	1021.8	19.8	6.2	3.72	4.97
2008	6	8	0.0	1.8	220	83	1025.6	19.4	10.6	1.98	2.54
2008	6	9	0.0	5.7	225	83	1027.0	19.5	13.4	2.99	4.10
2008	6	10	0.0	5.2	285	75	1028.1	18.0	11.5	3.39	4.62
2008	6	11	3.8	3.5	285	88	1025.8	14.7	9.9	1.66	2.23
2008	6	12	0.0	4.0	320	77	1023.8	13.9	7.2	2.17	2.97
2008	6	13	0.0	4.5	295	74	1020.7	15.5	8.2	2.59	3.51
2008	6	14	3.1	2.8	285	81	1017.2	14.6	3.7	2.36	3.19
2008	6	15	1.8	2.6	325	76	1014.3	14.1	6.5	2.41	3.25
2008	6	16	0.0	3.6	295	73	1013.6	14.6	6.2	2.48	3.39
2008	6	17	2.3	7.8	200	82	1006.4	15.7	9.1	2.42	3.44
2008	6	18	9.2	5.2	195	88	1001.5	16.1	9.3	2.05	2.78
2008	6	19	3.1	5.4	255	80	1007.4	16.3	7.4	2.77	3.97
2008	6	20	0.0	3.0	250	68	1016.4	17.2	5.6	3.68	5.00
2008	6	21	16.6	6.0	65	92	1009.1	15.5	8.9	1.19	1.61
2008	6	22	7.7	10.0	260	86	1002.8	14.2	9.3	1.78	2.89
2008	6	23	0.5	2.8	225	84	1018.7	15.5	5.5	2.25	3.02
2008	6	24	2.2	8.5	140	88	1013.1	14.5	10.9	1.63	2.39
2008	6	25	3.1	10.3	235	79	1008.1	16.4	11.7	3.05	4.55
2008	6	26	6.3	7.0	200	88	1012.1	14.9	9.3	1.72	2.49
2008	6	27	3.1	6.2	225	93	1012.5	17.5	7.6	1.37	1.95
2008	6	28	1.1	7.2	215	85	1013.8	17.0	12.4	2.21	3.12
2008	6	29	1.5	7.0	225	82	1014.1	16.4	10.5	2.93	4.17
2008	6	30	0.2	8.7	175	81	1014.6	18.1	11.9	2.31	3.20
Total			84.7							73.2	

July Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	7	1	8.0	11.5	155	84	1003.5	18.3	12.0	2.10	3.09
2008	7	2	4.5	5.7	150	90	1002.3	15.1	11.0	1.63	2.29
2008	7	3	18.6	1.3	255	95	1007.9	14.3	9.0	1.04	1.27
2008	7	4	0.2	5.2	95	80	1011.3	18.3	3.7	3.06	4.35
2008	7	5	23.6	7.8	65	87	1001.6	18.3	11.7	2.32	3.27
2008	7	6	18.2	4.0	320	93	997.4	16.0	11.2	1.58	2.11
2008	7	7	0.6	5.7	295	84	999.8	16.1	10.7	2.46	3.42
2008	7	8	0.0	5.0	250	74	1006.8	17.7	9.3	3.06	4.17
2008	7	9	4.0	5.1	75	92	1003.8	15.1	10.7	1.36	1.83
2008	7	10	2.4	5.8	235	94	1000.6	14.8	11.8	1.27	1.73
2008	7	11	0.3	5.4	310	82	1007.7	14.9	9.8	1.96	2.71
2008	7	12	0.4	4.7	285	80	1011.8	16.0	8.6	2.33	3.22
2008	7	13	0.0	3.6	210	82	1014.3	19.1	4.6	2.63	3.60
2008	7	14	0.0	4.8	235	90	1020.2	20.7	14.3	2.14	2.83
2008	7	15	0.9	7.2	250	79	1024.5	18.9	11.9	2.88	4.10
2008	7	16	0.2	5.5	250	84	1023.2	15.9	11.7	1.81	2.46
2008	7	17	0.6	5.6	245	87	1014.0	16.4	12.8	1.69	2.28
2008	7	18	1.7	5.4	240	93	1008.2	16.3	13.5	1.27	1.74
2008	7	19	0.8	7.0	305	77	1011.6	17.4	9.3	3.02	4.34
2008	7	20	0.0	5.8	285	76	1022.8	18.3	7.8	3.31	4.69
2008	7	21	0.0	3.9	265	86	1026.9	17.8	5.3	2.30	3.17
2008	7	22	0.1	4.5	225	90	1025.5	19.5	12.1	1.67	2.24
2008	7	23	0.2	4.5	135	86	1022.0	22.3	11.1	2.96	3.97
2008	7	24	0.6	6.4	85	84	1014.6	21.9	13.6	2.65	3.62
2008	7	25	1.4	3.8	90	85	1008.8	19.9	14.3	1.81	2.36
2008	7	26	0.0	2.2	225	76	1015.6	22.5	10.6	3.33	4.36
2008	7	27	0.0	2.9	185	74	1017.4	23.3	9.5	3.72	4.91
2008	7	28	0.0	4.6	65	85	1014.0	22.9	11.1	2.60	3.46
2008	7	29	3.1	7.8	155	84	1006.2	20.7	13.3	2.92	4.11
2008	7	30	5.6	7.0	135	82	1007.9	20.1	13.5	2.45	3.40
2008	7	31	12.9	4.6	115	93	1005.4	18.7	12.1	1.44	1.90
Total			108.9							70.8	

August Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	8	1	6.2	4.6	245	86	1004.1	18.3	12.3	2.05	2.74
2008	8	2	3.3	5.3	210	83	1008.2	19.2	12.3	2.58	3.51
2008	8	3	0.6	5.5	215	81	1007.1	18.1	12.3	2.69	3.67
2008	8	4	0.0	2.7	260	83	1009.6	18.3	11.9	2.07	2.71
2008	8	5	6.0	4.9	70	93	1007.4	17.1	12.5	1.07	1.44
2008	8	6	9.8	3.1	155	93	1005.1	18.1	14.4	1.27	1.63
2008	8	7	0.2	4.0	325	86	1007.0	17.1	13.2	1.50	1.96
2008	8	8	0.0	3.3	280	75	1014.2	17.8	9.1	2.66	3.59
2008	8	9	23.0	7.0	225	90	1001.5	20.1	12.9	1.76	2.35
2008	8	10	6.1	7.5	235	85	996.9	17.3	11.9	2.06	2.94
2008	8	11	25.4	6.5	200	88	994.6	18.4	11.7	2.01	2.71
2008	8	12	1.1	4.0	270	85	987.1	16.7	10.3	2.18	2.92
2008	8	13	0.8	4.8	270	88	997.4	17.7	9.4	1.99	2.72
2008	8	14	0.0	4.8	220	79	1009.4	17.9	9.6	2.64	3.62
2008	8	15	4.4	6.5	200	85	1010.3	17.5	11.6	1.95	2.71
2008	8	16	48.7	8.0	130	91	997.2	16.4	11.6	1.40	1.95
2008	8	17	0.6	6.3	155	88	997.7	17.8	8.5	1.70	2.35
2008	8	18	3.2	5.4	120	88	992.0	18.6	12.9	1.79	2.39
2008	8	19	0.6	5.0	285	88	1001.8	17.7	13.4	1.66	2.19
2008	8	20	0.5	3.7	210	86	1007.2	17.2	12.7	1.68	2.22
2008	8	21	0.0	3.6	290	81	1013.7	17.7	9.8	2.36	3.22
2008	8	22	0.0	3.8	280	80	1018.3	16.8	9.6	2.04	2.73
2008	8	23	7.2	6.0	160	93	1009.4	14.8	8.0	0.75	1.10
2008	8	24	0.3	7.0	210	83	1004.4	17.8	11.6	2.20	3.07
2008	8	25	2.9	8.3	210	89	1006.7	15.9	13.2	1.13	1.55
2008	8	26	1.3	7.5	215	90	1015.1	17.1	13.5	1.07	1.44
2008	8	27	0.6	5.7	245	91	1019.3	17.1	14.6	1.07	1.40
2008	8	28	0.1	5.2	230	89	1020.4	20.7	14.4	1.72	2.28
2008	8	29	0.2	3.4	175	90	1018.1	19.0	13.8	1.71	2.18
2008	8	30	0.0	6.2	160	87	1013.0	18.1	14.8	1.39	1.84
2008	8	31	1.3	3.4	250	80	1010.6	17.1	11.3	2.05	2.75
Total			154.4							56.2	

September Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	9	1	5.4	6.1	205	82	1004.7	15.6	8.8	1.93	2.74
2008	9	2	5.4	5.1	185	87	997.2	15.1	8.0	1.49	2.05
2008	9	3	3.8	6.9	235	85	993.7	14.7	8.0	1.64	2.33
2008	9	4	2.1	2.7	225	78	995.2	17.1	9.3	2.26	3.07
2008	9	5	25.6	7.3	40	93	991.0	12.8	8.7	0.65	0.89
2008	9	6	4.2	6.9	360	78	1001.4	17.0	8.2	1.93	2.65
2008	9	7	0.2	3.5	285	79	1010.3	17.1	6.6	2.13	2.95
2008	9	8	1.3	4.8	160	82	1010.2	16.6	8.7	1.66	2.29
2008	9	9	6.9	9.6	120	90	999.6	16.5	10.0	0.98	1.34
2008	9	10	6.3	9.5	150	91	998.6	16.0	7.7	0.82	1.19
2008	9	11	2.2	8.2	185	87	997.1	16.1	10.1	1.21	1.72
2008	9	12	3.5	2.6	285	89	1014.0	16.4	10.5	1.41	1.88
2008	9	13	0.1	2.5	165	84	1018.9	17.6	5.1	1.53	2.10
2008	9	14	17.2	4.9	130	92	1021.8	14.8	11.8	0.83	1.09
2008	9	15	1.6	4.0	285	90	1022.7	15.1	11.6	1.07	1.43
2008	9	16	0.3	3.5	315	88	1024.2	14.0	9.9	0.89	1.17
2008	9	17	0.0	2.5	300	86	1023.3	15.6	5.8	1.22	1.66
2008	9	18	0.8	3.2	205	87	1022.4	15.9	4.5	1.22	1.67
2008	9	19	0.1	4.4	205	89	1026.5	15.7	11.1	1.07	1.40
2008	9	20	0.0	3.5	200	81	1028.2	19.4	10.4	1.93	2.65
2008	9	21	0.1	2.1	95	86	1027.5	17.4	6.5	1.33	1.83
2008	9	22	0.1	3.5	345	78	1031.7	15.0	7.0	1.52	2.11
2008	9	23	0.0	2.9	55	81	1030.9	15.4	5.8	1.35	1.87
2008	9	24	0.1	2.4	65	85	1030.1	14.8	5.1	0.90	1.21
2008	9	25	0.0	1.3	90	85	1033.7	17.3	7.4	1.26	1.77
2008	9	26	0.0	3.6	170	83	1034.0	17.5	8.1	1.39	1.91
2008	9	27	0.6	3.0	190	88	1030.3	16.3	4.2	1.08	1.49
2008	9	28	0.1	2.5	335	79	1028.4	13.7	8.1	1.23	1.74
2008	9	29	2.0	5.7	245	87	1018.6	14.1	7.8	1.02	1.38
2008	9	30	14.7	7.8	255	90	1004.0	13.8	10.6	0.91	1.26
Total			104.7							39.9	

OctoberRainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	10	1	4.8	7.5	270	81	1002.1	11.2	5.3	0.98	1.50
2008	10	2	1.6	6.9	270	84	1008.2	10.8	4.0	0.99	1.41
2008	10	3	0.0	4.7	280	78	1019.1	10.2	3.3	1.09	1.55
2008	10	4	15.8	8.2	195	90	1001.7	14.2	6.8	0.67	0.92
2008	10	5	3.2	2.8	5	81	1002.8	11.9	1.4	0.99	1.46
2008	10	6	4.0	6.3	155	92	1002.9	14.5	2.2	0.59	0.82
2008	10	7	7.0	3.9	250	92	999.8	12.7	6.8	0.54	0.74
2008	10	8	0.2	2.9	210	88	1018.5	15.7	4.0	0.97	1.39
2008	10	9	9.0	8.3	170	92	1021.8	14.2	4.4	0.61	0.87
2008	10	10	17.3	8.2	180	93	1017.6	16.2	9.5	0.55	0.79
2008	10	11	0.3	2.9	210	90	1022.1	14.4	5.2	0.74	1.04
2008	10	12	0.1	2.6	180	91	1019.7	14.8	1.5	0.74	1.09
2008	10	13	0.1	4.5	210	85	1015.1	16.1	6.6	0.89	1.25
2008	10	14	9.2	1.6	350	95	1015.2	11.4	4.4	0.50	0.63
2008	10	15	0.9	4.1	220	90	1012.4	12.1	3.2	0.62	0.86
2008	10	16	1.0	4.0	265	85	1017.4	11.9	4.6	0.71	1.03
2008	10	17	0.4	4.0	205	92	1018.9	11.4	2.3	0.59	0.83
2008	10	18	1.7	5.9	205	92	1014.5	12.8	7.4	0.76	1.00
2008	10	19	1.4	10.0	190	89	1005.3	13.9	9.2	0.63	0.87
2008	10	20	3.8	10.6	215	82	996.8	13.2	5.7	0.72	1.02
2008	10	21	1.3	6.0	225	81	1009.1	10.6	3.4	0.89	1.20
2008	10	22	0.2	6.8	215	85	1016.7	12.2	4.0	0.76	1.03
2008	10	23	12.4	12.9	185	86	1005.4	14.7	7.3	0.91	1.18
2008	10	24	0.4	7.8	210	78	1018.1	11.0	4.8	0.93	1.21
2008	10	25	14.3	11.7	185	88	1014.3	13.4	8.2	0.81	1.05
2008	10	26	1.2	6.8	235	81	1012.4	11.5	4.0	0.45	0.68
2008	10	27	0.1	5.0	290	85	1013.6	8.5	2.2	0.54	0.79
2008	10	28	1.1	4.6	270	85	1016.3	5.1	-0.9	0.35	0.54
2008	10	29	9.8	5.0	260	92	1003.3	7.0	0.1	0.42	0.57
2008	10	30	1.6	7.2	15	81	1002.8	6.7	2.6	0.67	0.88
2008	10	31	0.0	4.0	335	80	1015.7	8.3	1.3	0.47	0.70
Total			124.2							22.1	

November Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evaporation											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	11	1	0.0	3.5	335	83	1017.4	7.0	0.8	0.38	0.57
2008	11	2	0.0	2.4	315	88	1022.1	9.9	3.4	0.32	0.50
2008	11	3	0.1	2.0	335	92	1021.7	9.0	2.8	0.16	0.33
2008	11	4	0.2	3.0	30	91	1021.5	9.0	1.7	0.36	0.47
2008	11	5	0.5	1.9	70	94	1021.5	10.7	8.0	0.38	0.51
2008	11	6	0.8	5.8	115	91	1009.4	9.9	6.4	0.42	0.56
2008	11	7	8.9	9.0	200	91	995.3	9.1	4.7	0.47	0.64
2008	11	8	5.4	7.5	170	90	994.4	10.8	3.8	0.52	0.69
2008	11	9	12.1	9.5	205	89	996.2	6.2	1.8	0.50	0.67
2008	11	10	6.9	11.4	205	83	993.3	8.4	2.8	0.38	0.52
2008	11	11	3.6	7.3	255	84	1005.1	9.3	4.7	0.58	0.72
2008	11	12	0.2	4.5	265	88	1018.7	10.0	4.0	0.32	0.46
2008	11	13	4.7	7.9	245	94	1018.5	11.8	7.8	0.49	0.64
2008	11	14	1.0	9.2	225	89	1020.6	12.3	10.5	0.55	0.70
2008	11	15	3.4	3.9	240	91	1024.3	11.9	8.5	0.21	0.31
2008	11	16	5.6	1.8	80	90	1031.6	9.6	7.5	0.36	0.51
2008	11	17	4.8	7.4	200	93	1022.6	10.7	7.8	0.43	0.58
2008	11	18	0.3	5.7	285	90	1023.0	10.6	6.4	0.20	0.29
2008	11	19	0.8	6.0	260	92	1025.2	11.4	5.7	0.32	0.44
2008	11	20	1.6	9.5	280	89	1021.3	11.5	9.2	0.27	0.34
2008	11	21	2.3	7.7	290	86	1022.5	9.8	6.5	0.31	0.41
2008	11	22	0.6	4.5	300	90	1022.1	8.3	6.1	0.42	0.54
2008	11	23	8.2	10.0	275	86	1002.1	10.4	3.3	0.35	0.45
2008	11	24	2.8	7.9	320	80	1010.0	7.5	1.3	0.33	0.41
2008	11	25	0.4	3.8	270	89	1028.5	8.2	2.0	0.17	0.25
2008	11	26	0.2	6.0	230	91	1025.5	10.6	7.9	0.27	0.36
2008	11	27	0.1	10.0	200	89	1015.6	8.9	8.9	0.56	0.62
2008	11	28	0.0	2.9	210	92	996.8	4.8	-3.0	0.06	0.14
2008	11	29	0.0	1.5	230	95	997.3	2.9	-5.0	0.00	0.03
2008	11	30	0.1	3.2	290	92	1003.4	3.6	-2.0	0.00	0.04
Total			75.6							10.1	

nber Rainfall, Windspeed & Direction, Temperature, Humidity, pressure, potential evapotranspiration & evapo											
Year	Month	Day	Rainfall (mm)	Wind Speed (Knots)	Wind Direction (Degrees from North)	Relative Humidity (%)	MSL Pressure (hPa)	Max. Temp. (Degrees Celsius)	Min. Temp. (Degrees Celsius)	Potential Evapotranspiration (Penman)	Evaporation (mm)
2008	12	1	0.0	3.5	295	90	1011.8	5.2	-0.9	0.03	0.09
2008	12	2	1.3	3.8	250	89	1005.1	3.7	0.7	0.21	0.30
2008	12	3	6.2	4.6	235	92	999.9	4.7	-3.8	0.05	0.08
2008	12	4	7.3	6.9	220	89	977.0	6.4	2.5	0.03	0.05
2008	12	5	0.8	5.1	280	91	992.2	7.2	1.6	0.15	0.20
2008	12	6	0.0	1.1	160	91	1016.7	6.8	-3.6	0.00	0.07
2008	12	7	0.0	3.5	195	90	1024.3	6.0	-5.1	0.05	0.10
2008	12	8	3.9	4.8	265	90	1020.8	6.5	0.7	0.18	0.25
2008	12	9	0.1	4.9	280	89	1026.9	5.7	0.8	0.13	0.18
2008	12	10	0.2	1.5	250	96	1023.1	4.3	-1.3	0.10	0.16
2008	12	11	4.3	3.0	160	96	1011.7	5.9	1.6	0.22	0.29
2008	12	12	19.6	7.6	200	92	998.0	9.5	1.3	0.41	0.55
2008	12	13	0.0	3.5	240	93	987.7	4.8	-0.8	0.00	0.00
2008	12	14	0.8	4.3	295	93	1003.9	3.9	-0.8	0.13	0.19
2008	12	15	0.3	3.5	190	93	1017.4	6.9	-3.0	0.12	0.17
2008	12	16	3.3	7.5	210	90	1008.5	9.7	3.6	0.36	0.48
2008	12	17	1.7	7.8	220	91	1011.5	10.5	0.8	0.31	0.41
2008	12	18	4.2	9.1	230	84	1012.4	10.6	3.2	0.57	0.71
2008	12	19	1.5	10.5	220	88	1016.4	11.5	1.4	0.53	0.71
2008	12	20	3.9	7.3	230	90	1021.3	11.5	7.8	0.46	0.60
2008	12	21	1.6	9.7	230	92	1025.2	11.9	9.4	0.46	0.58
2008	12	22	0.3	5.7	205	91	1031.5	10.7	5.7	0.25	0.34
2008	12	23	0.0	4.0	180	87	1033.3	9.2	4.6	0.17	0.25
2008	12	24	0.0	1.8	160	86	1034.1	8.8	5.8	0.29	0.46
2008	12	25	0.0	2.8	100	83	1035.0	7.7	3.9	0.22	0.31
2008	12	26	0.0	3.0	70	84	1037.8	6.0	0.9	0.33	0.45
2008	12	27	0.0	4.9	60	88	1036.9	5.5	0.7	0.14	0.18
2008	12	28	0.0	6.8	70	86	1029.9	5.7	1.8	0.23	0.26
2008	12	29	0.0	3.9	100	86	1027.1	2.8	0.2	0.18	0.26
2008	12	30	0.0	5.8	100	85	1027.4	3.9	0.0	0.40	0.52
2008	12	31	0.0	5.8	100	88	1027.0	4.7	1.5	0.17	0.22
Total			61.3							6.9	

Effective Rainfall Calculation 2008 (Actual Rainfall minus Potential Evaporation)

Month	Rainfall (mm)	Potential Evapotranspiration (mm)	Effective Rainfall (mm)
Jan	134.3	19.5	114.8
Feb	54.3	21.8	32.5
Mar	92.3	30.8	61.5
Apr	59.1	51.3	7.8
May	23.4	80.0	-56.6
Jun	84.7	73.2	11.5
Jul	108.9	70.8	38.1
Aug	154.4	56.2	98.2
Sep	104.7	39.9	64.8
Oct	124.2	22.1	102.1
Nov	75.6	10.1	65.5
Dec	61.3	6.9	54.4
Total	1077.2	482.6	594.6

Note: The effective rainfall value for May is negative value, assumed to be 0

Effective Rainfall Calculation 2008 (Actual Rainfall minus Potential Evaporation)

Month	Rainfall (m)	Potential Evapotranspiration (m)	Effective Rainfall (m)
Jan	0.1343	0.0195	0.1148
Feb	0.0543	0.0218	0.0325
Mar	0.0923	0.0308	0.0615
Apr	0.0591	0.0513	0.0078
May	0.0234	0.0800	-0.0566
Jun	0.0847	0.0732	0.0115
Jul	0.1089	0.0708	0.0381
Aug	0.1544	0.0562	0.0982
Sep	0.1047	0.0399	0.0648
Oct	0.1242	0.0221	0.1021
Nov	0.0756	0.0101	0.0655
Dec	0.0613	0.0069	0.0544
Total	1.0772	0.4826	0.5946

Note: With potential evaptranspiration higher than actual rainfall for May, it will be assumed effective rainfall for this month is 0.

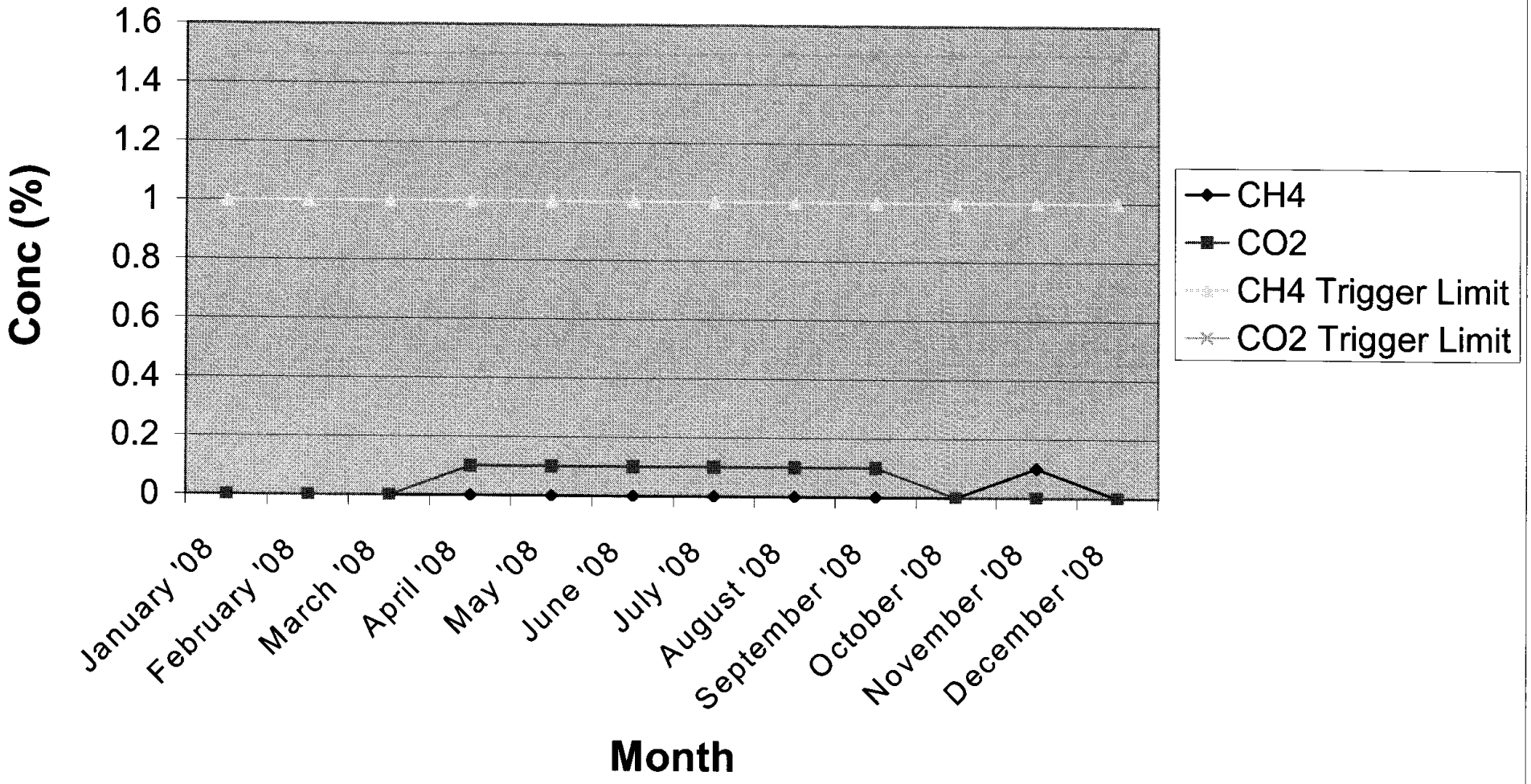
Summary Monthly Rainfall 2008

Month	Rainfall (mm)	Rainfall (m)
Jan	134.3	0.1343
Feb	54.3	0.0543
Mar	92.3	0.0923
Apr	59.1	0.0591
May	23.4	0.0234
Jun	84.7	0.0847
Jul	108.9	0.1089
Aug	154.4	0.1544
Sep	104.7	0.1047
Oct	124.2	0.1242
Nov	75.6	0.0756
Dec	61.3	0.0613
Total	1077.2	1.0772

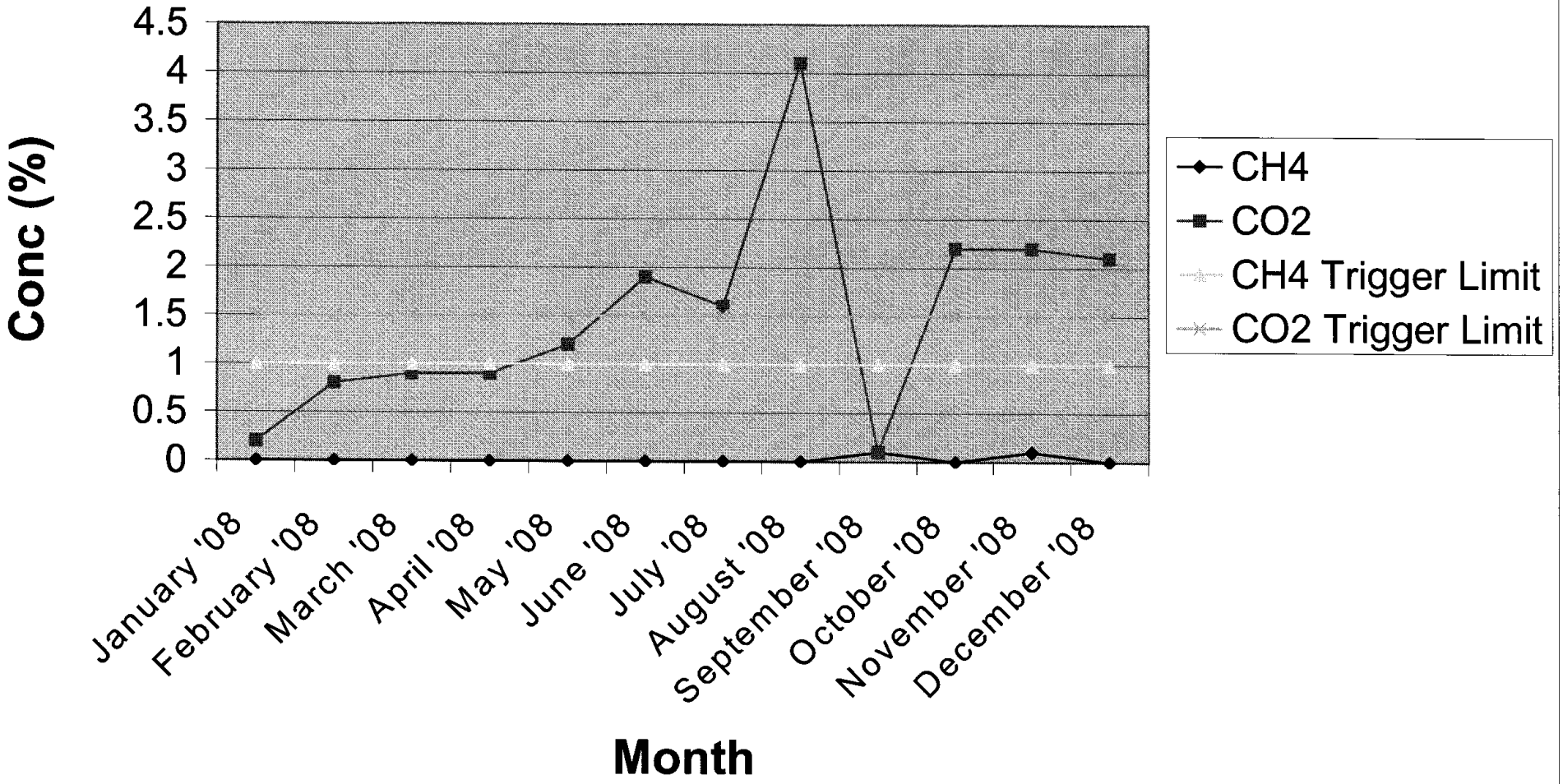
APPENDIX 2

Monitoring Results

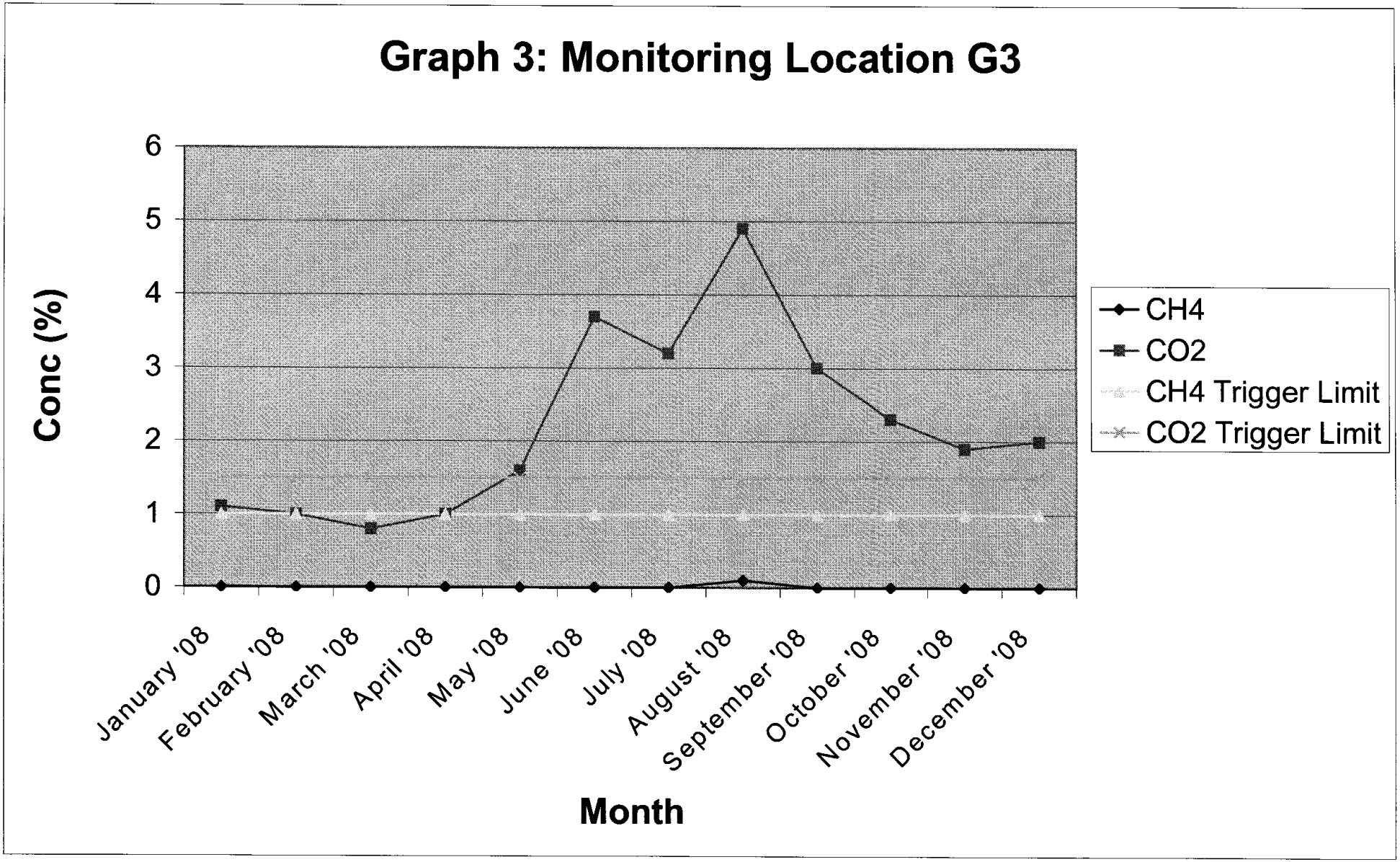
Graph 1: Monitoring Location G1



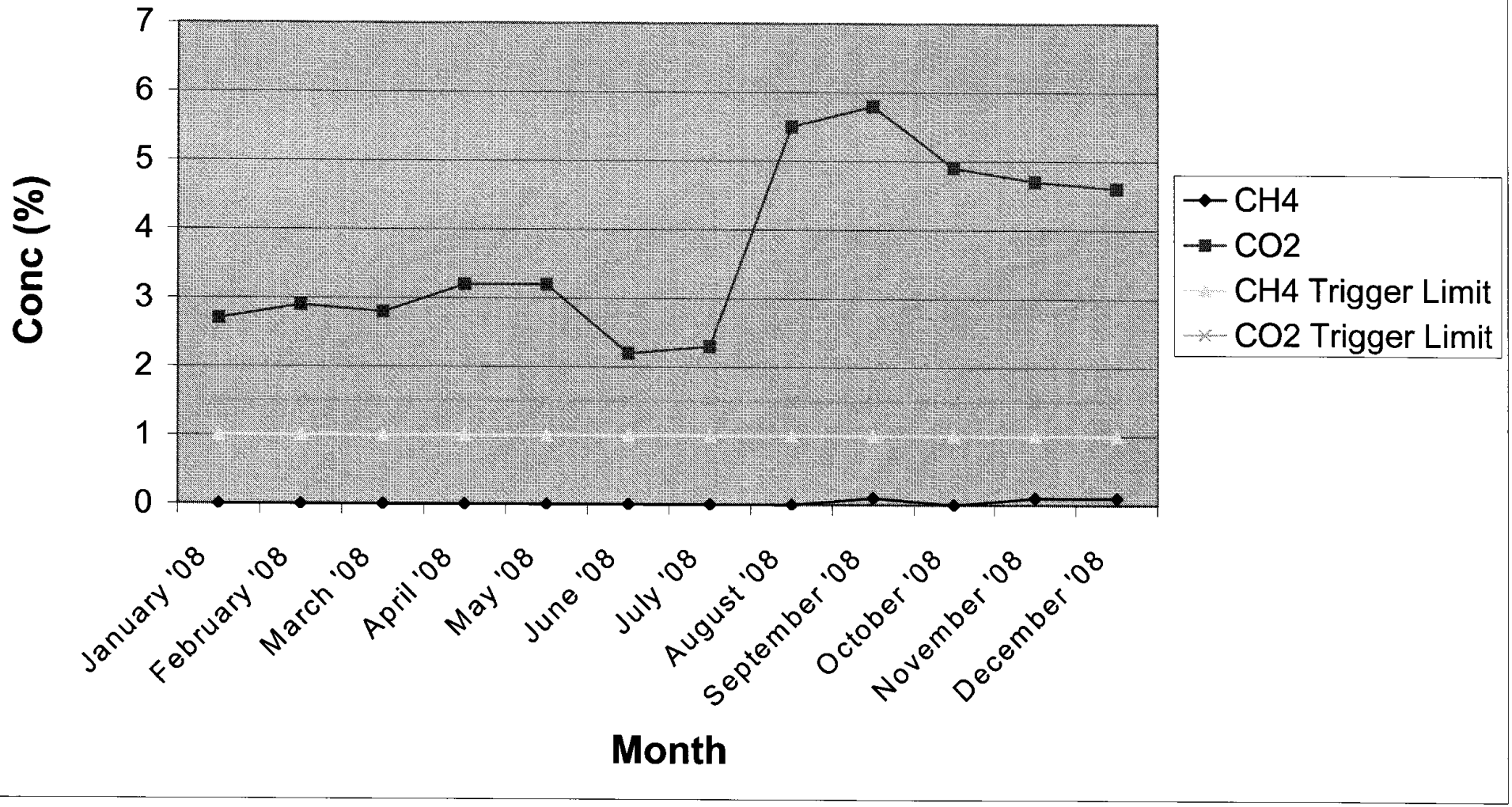
Graph 2: Monitoring Location G2



Graph 3: Monitoring Location G3

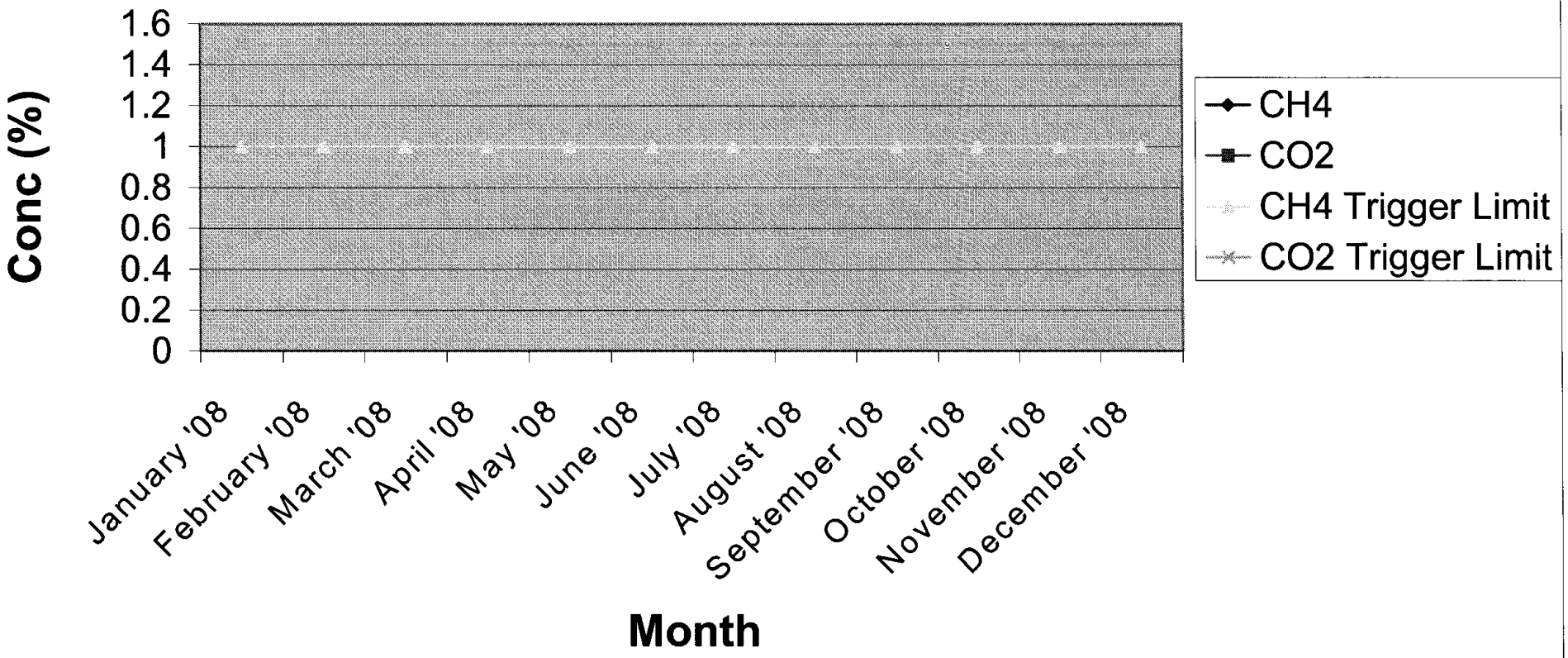


Graph 4: Monitoring Location G4

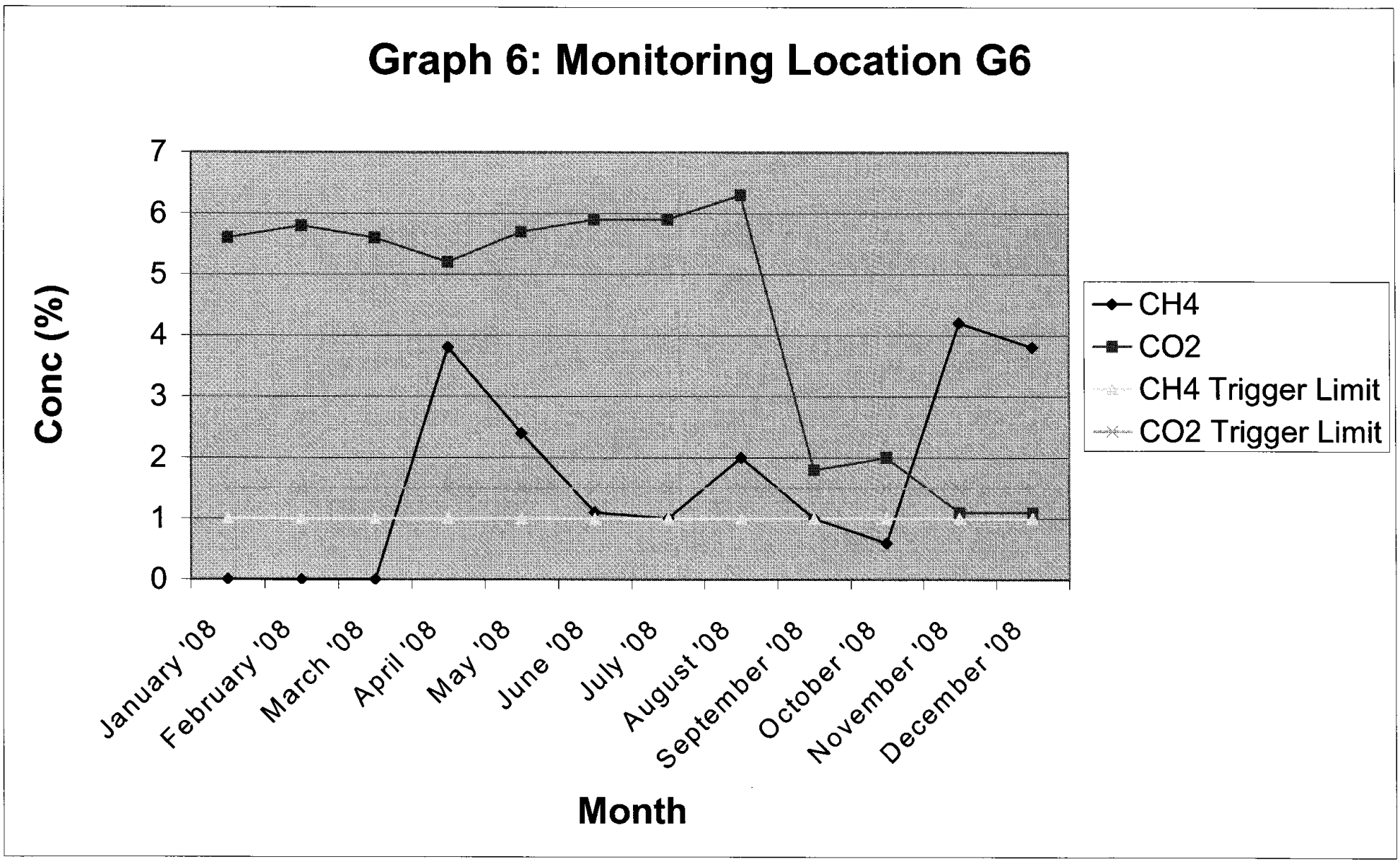


Graph 5: Monitoring Location G5

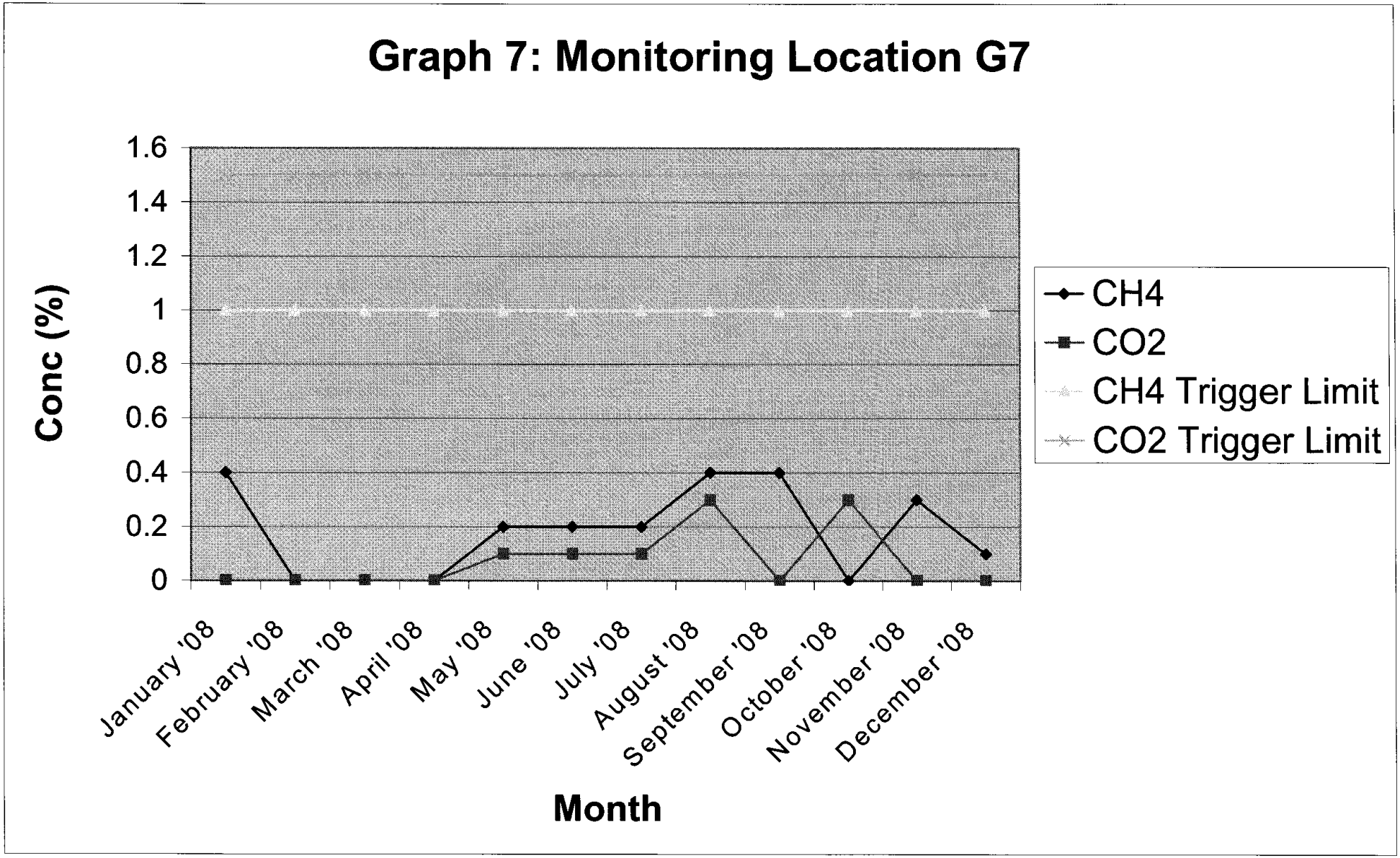
LOCATION G5 REMOVED DURING CONSTRUCTION OF EXTENSION TO LANDFILL



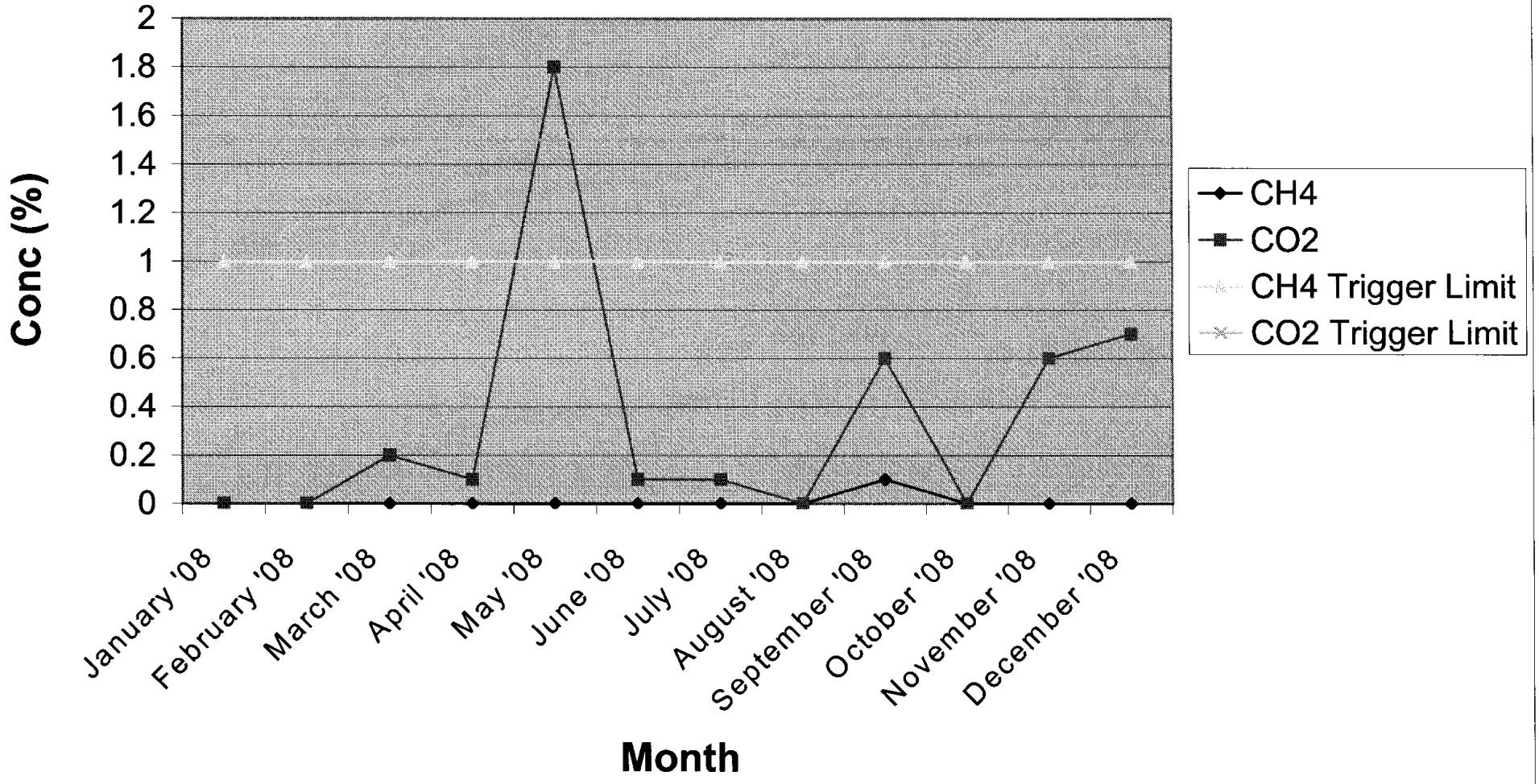
Graph 6: Monitoring Location G6



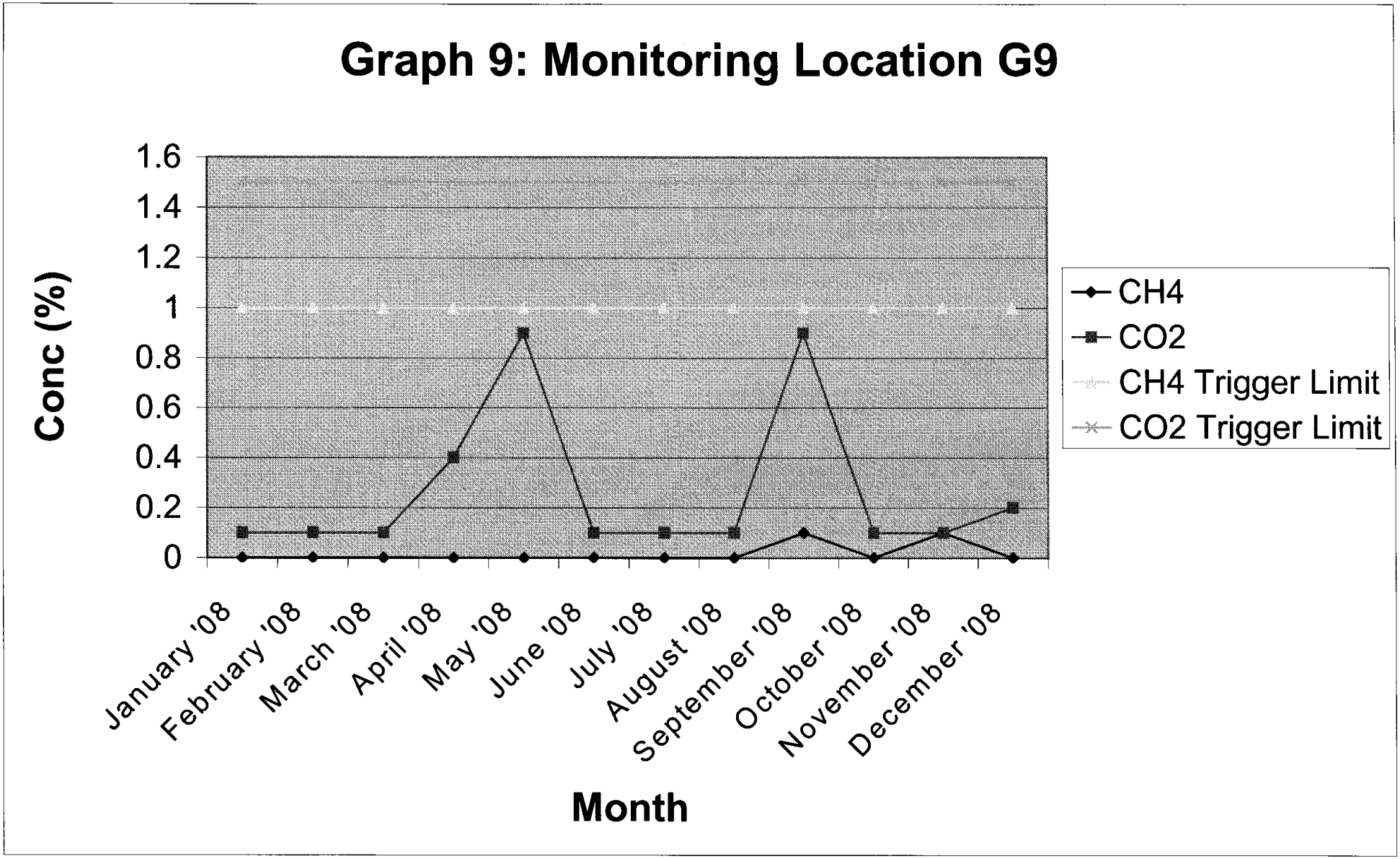
Graph 7: Monitoring Location G7



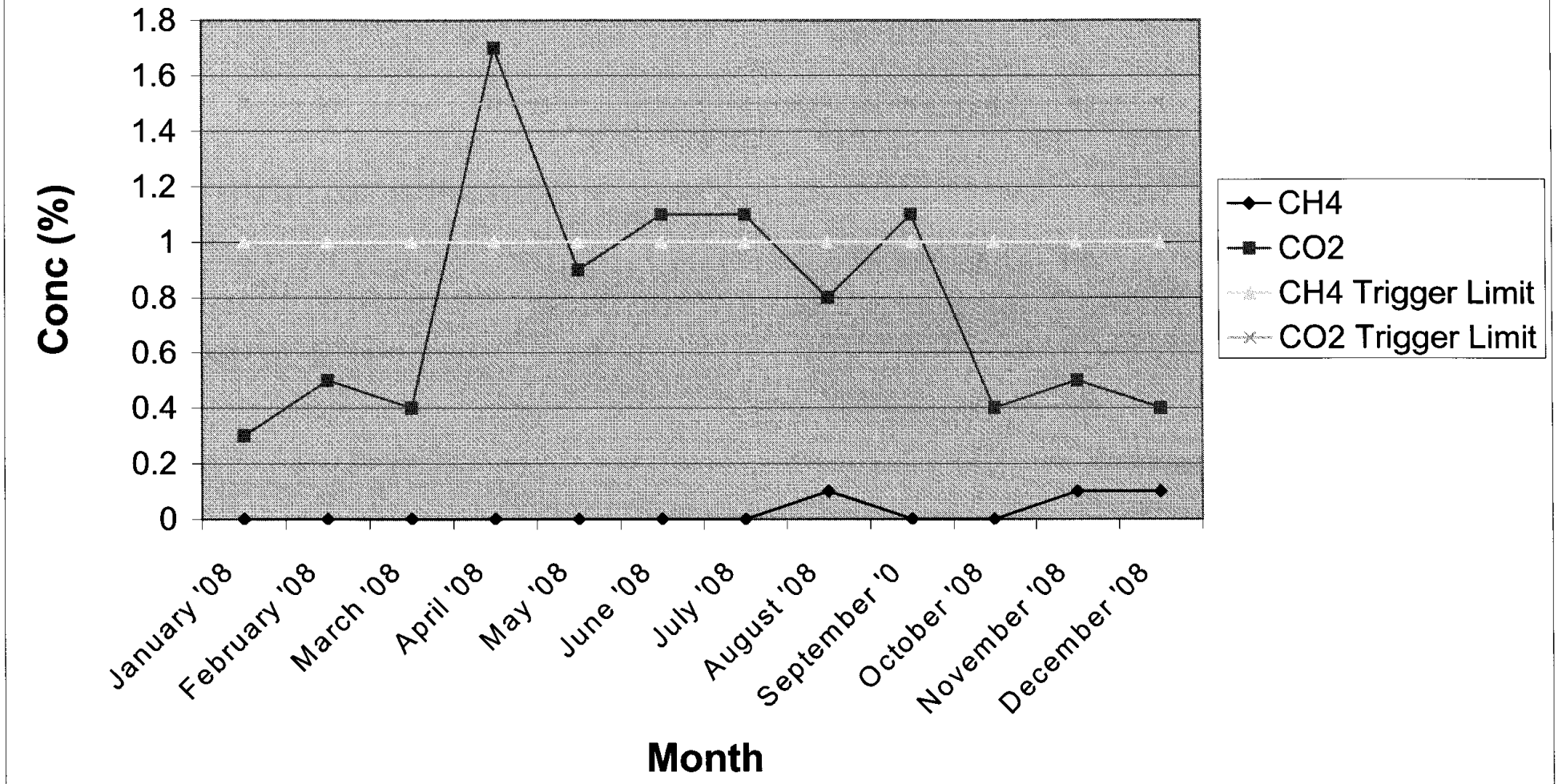
Graph 8: Monitoring Location G8



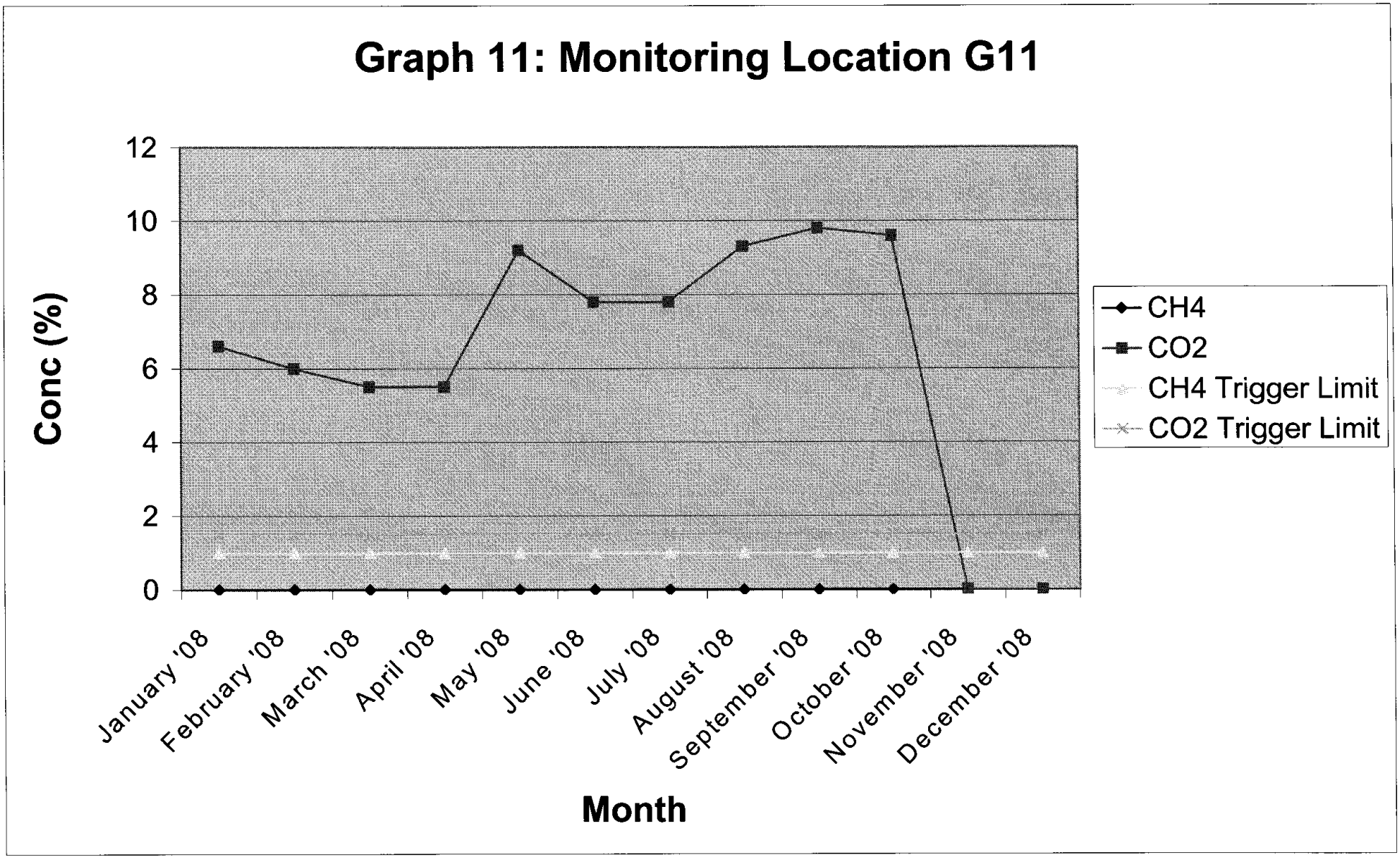
Graph 9: Monitoring Location G9



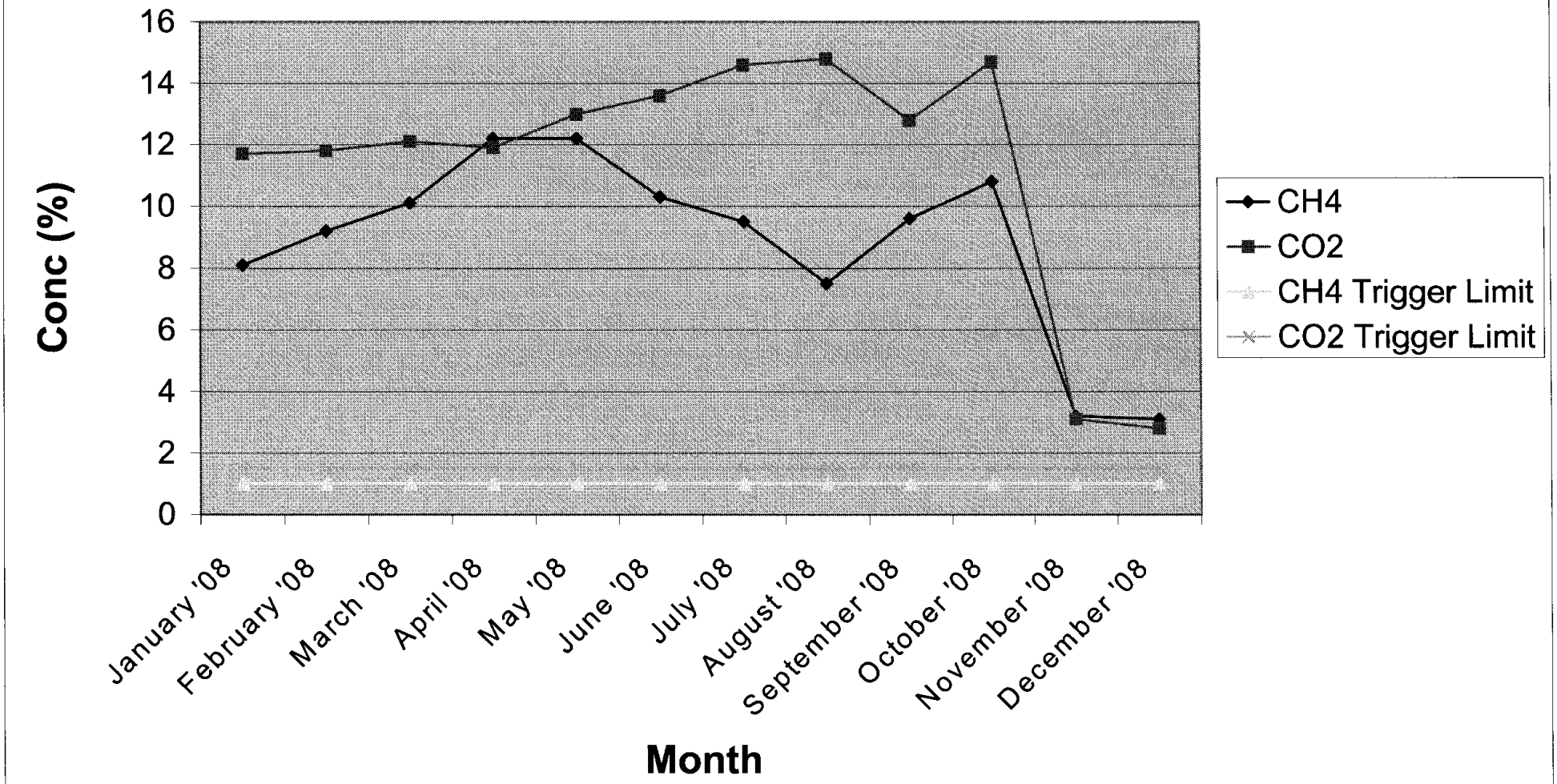
Graph 10: Monitoring Location G10



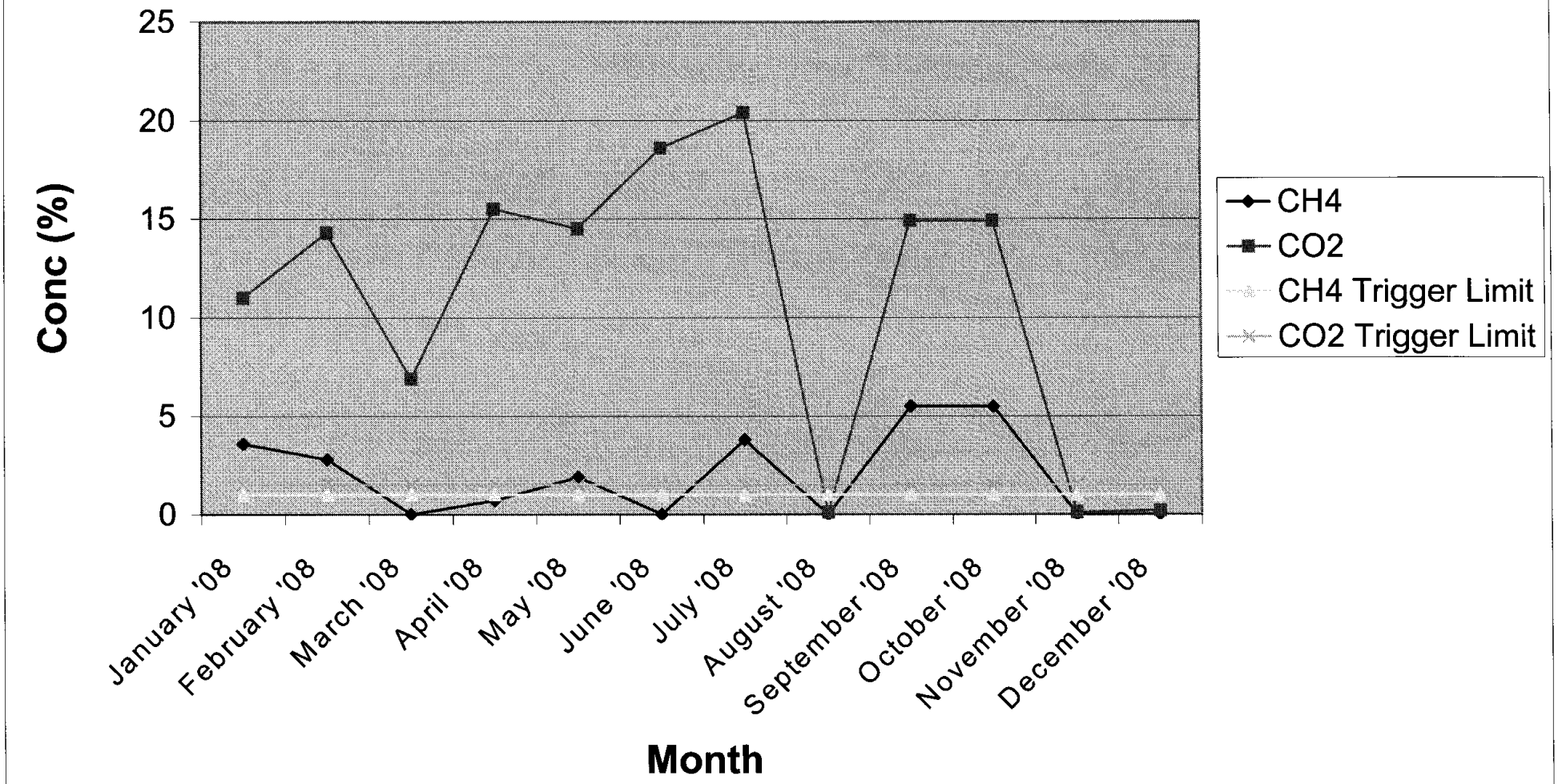
Graph 11: Monitoring Location G11



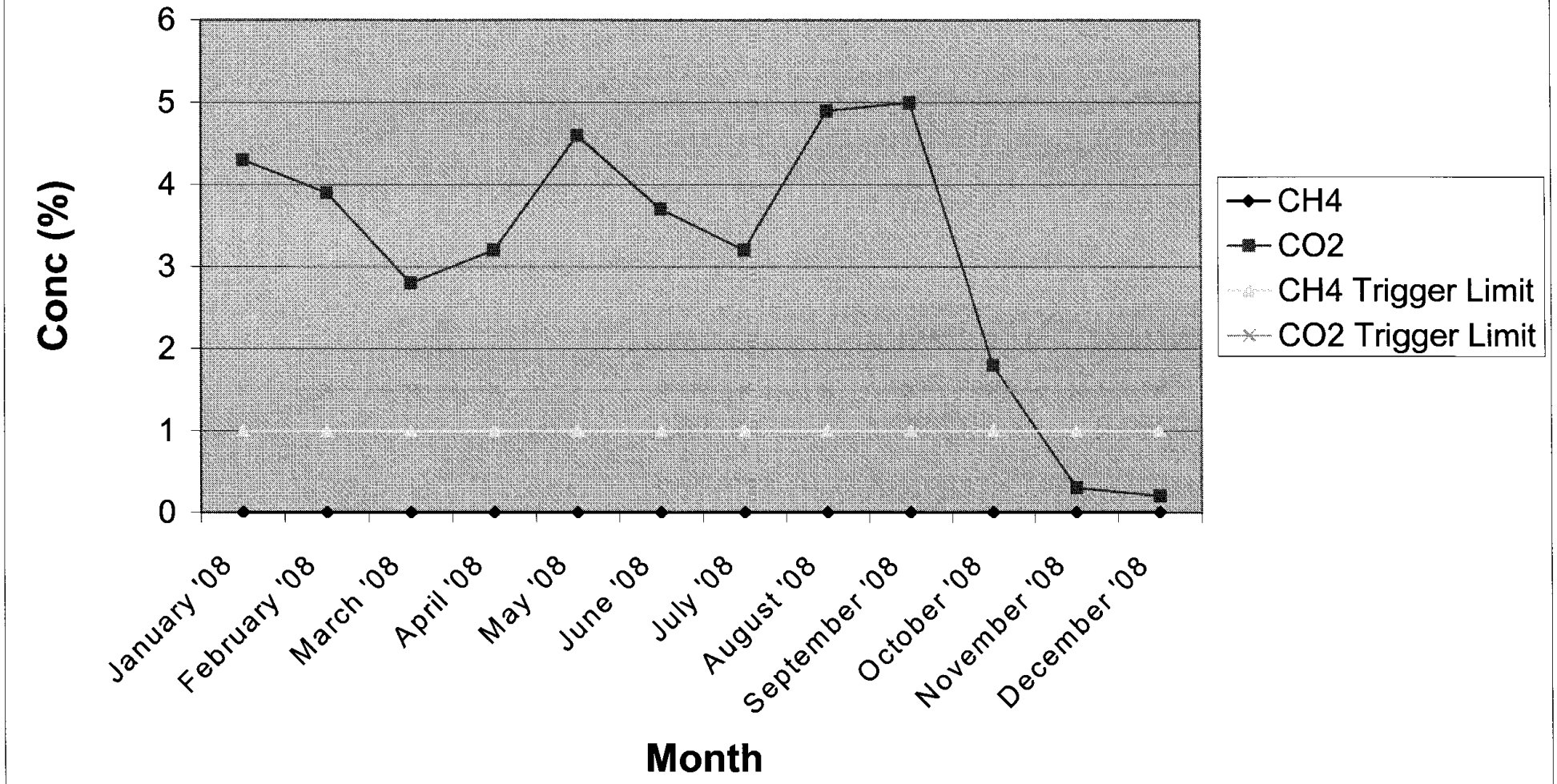
Graph 12: Monitoring Location G12



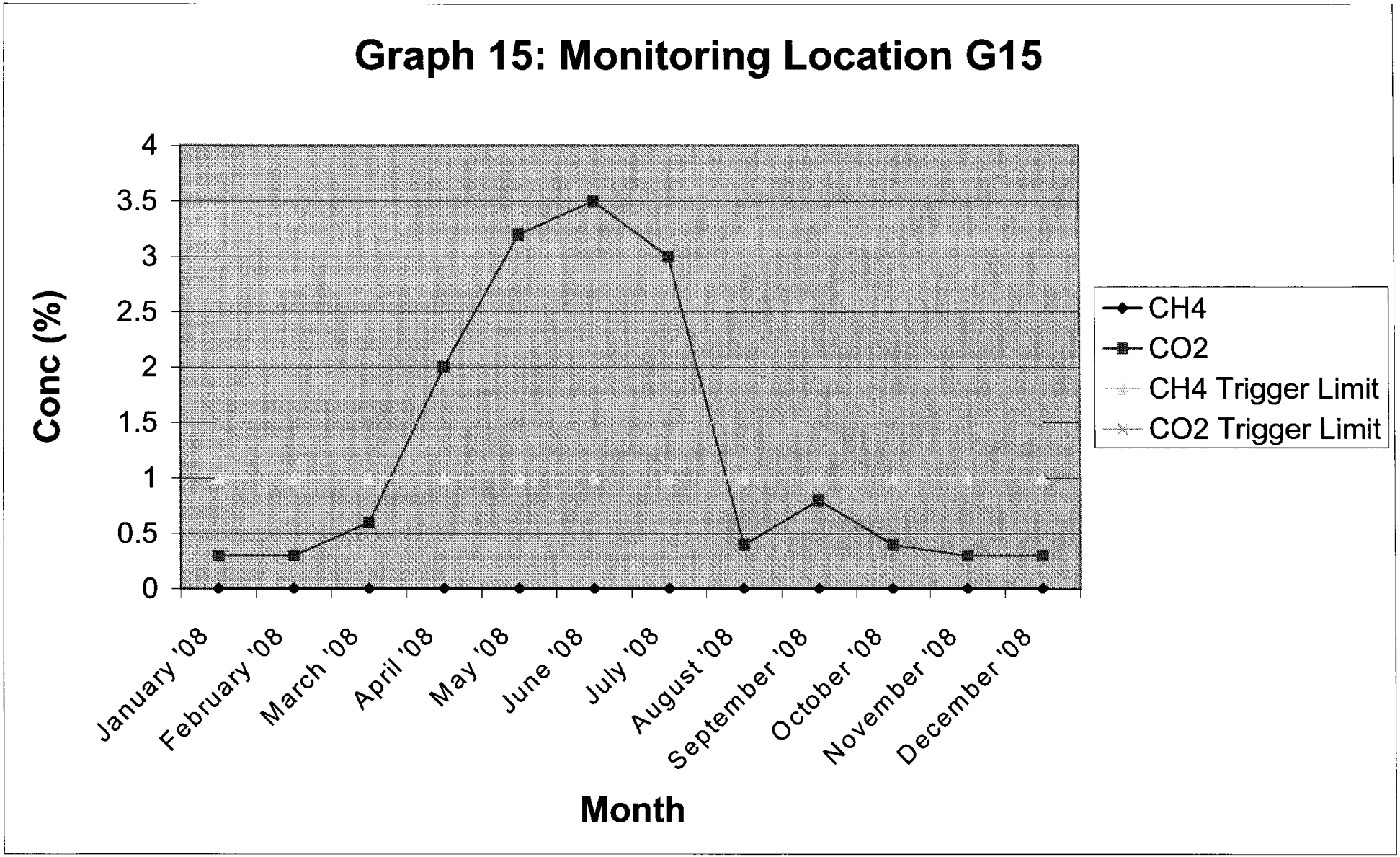
Graph 13: Monitoring Location G13



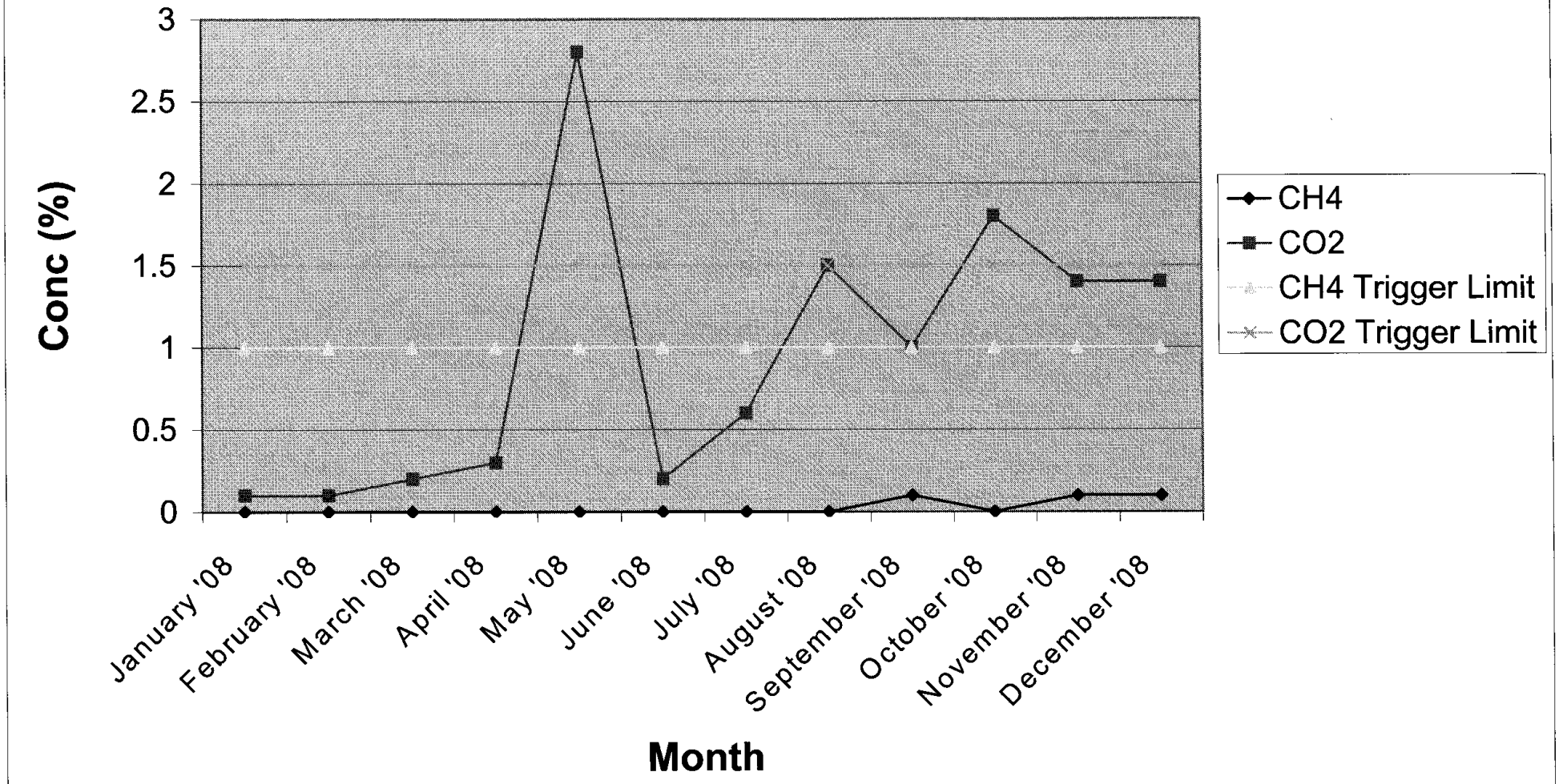
Graph 14: Monitoring Location G14



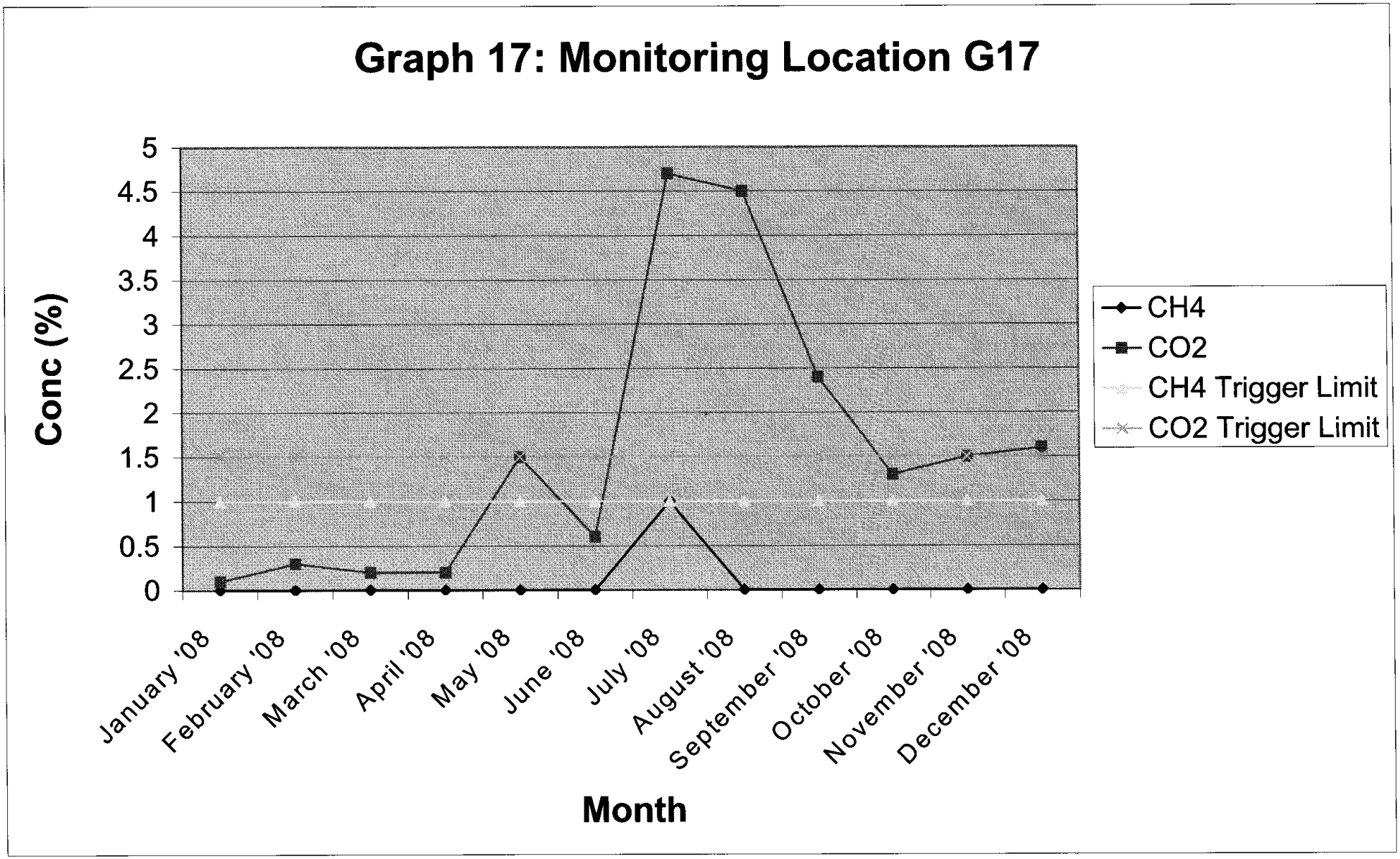
Graph 15: Monitoring Location G15



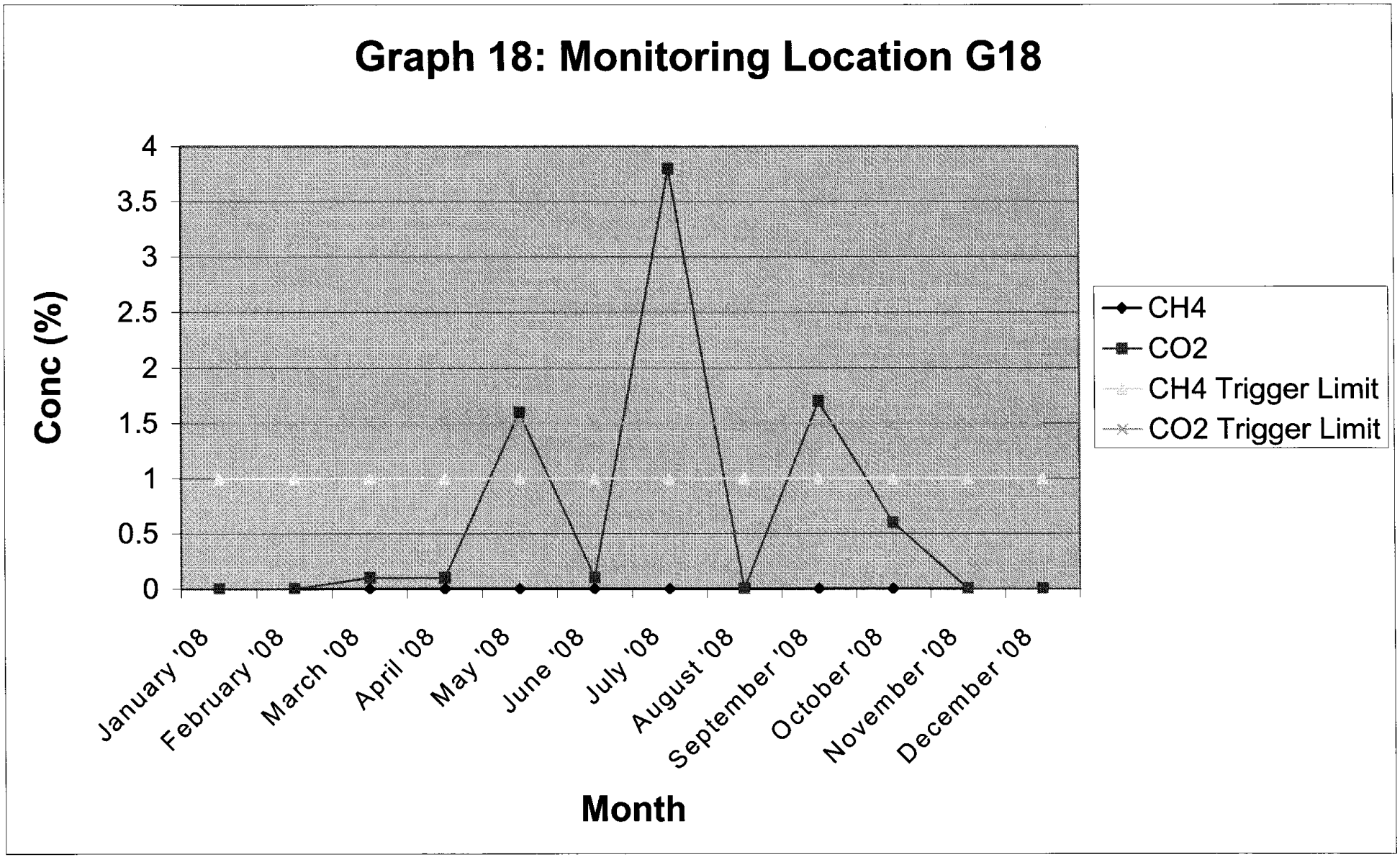
Graph 16: Monitoring Location G16



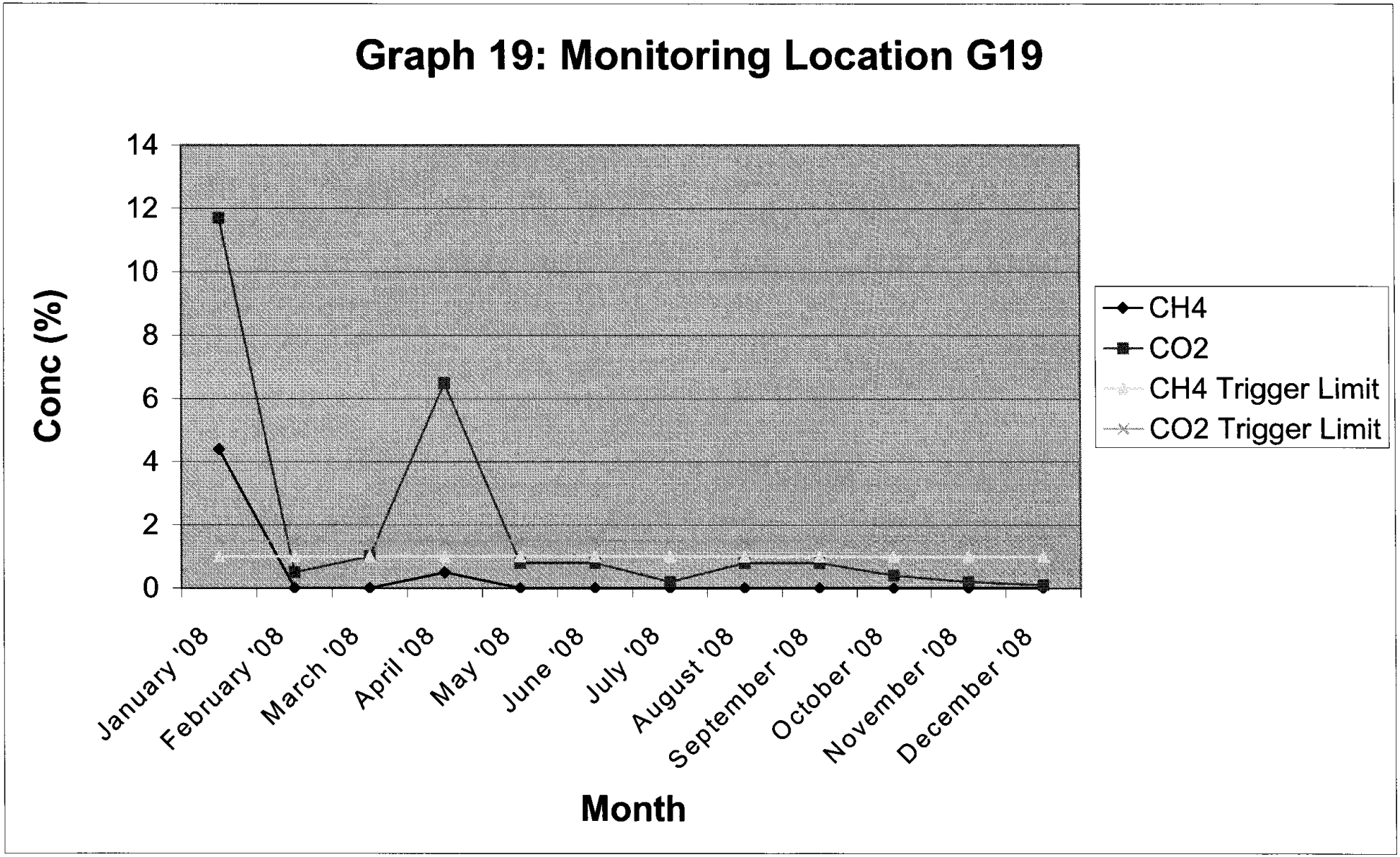
Graph 17: Monitoring Location G17



Graph 18: Monitoring Location G18

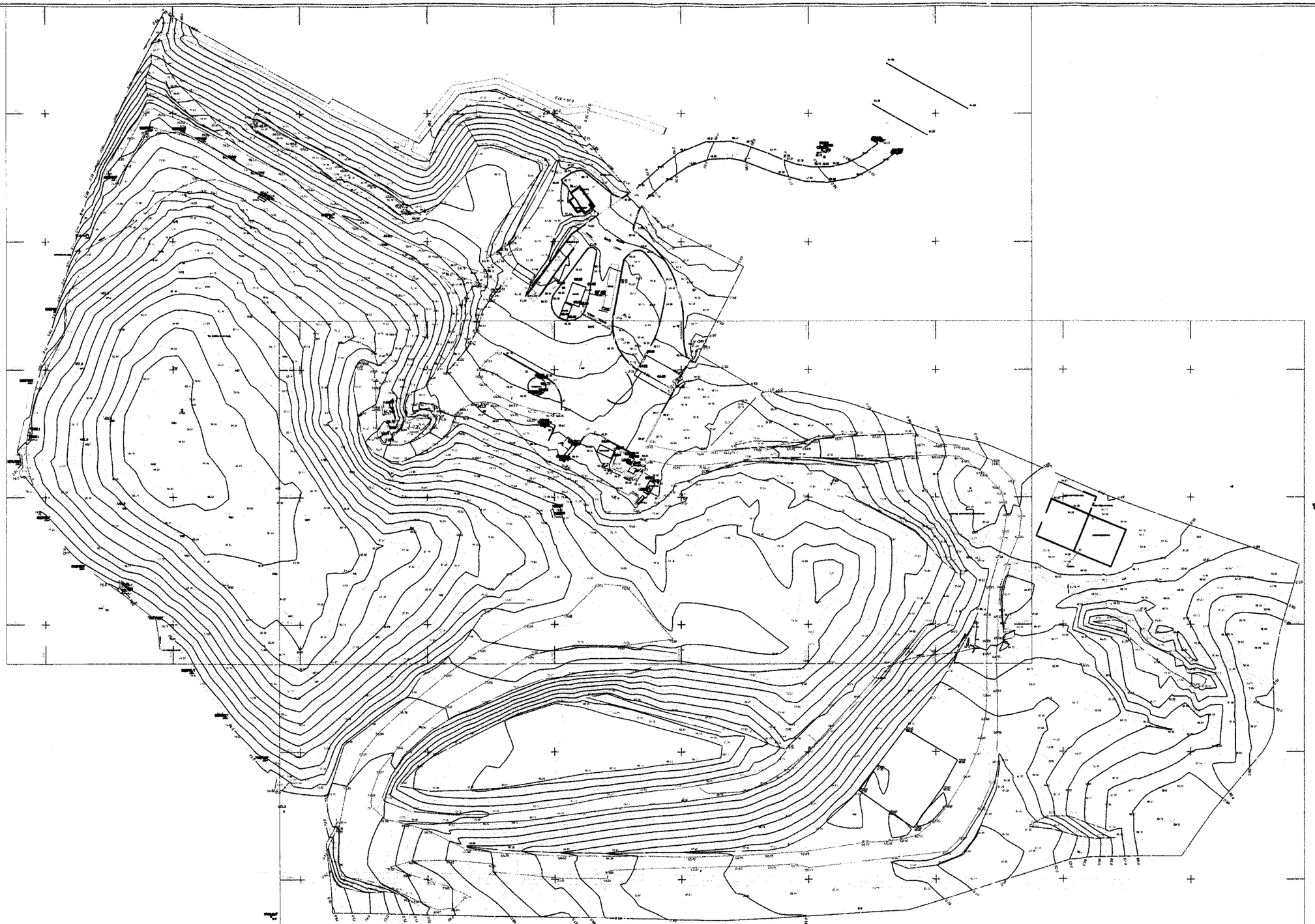


Graph 19: Monitoring Location G19



APPENDIX 3

Detailed Site Survey



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Topographical Survey
Ballydonagh

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh
Landfill

SURVEYED : Murphy Surveys
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : NTS
DATE : 23/03/09
DATUM :

DRAWING NO.
Surv_08

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
Survey 08 WCC title block.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings

APPENDIX 4

Electronic AER Returns Worksheet

Environmental Protection Agency

AER Returns Worksheet

Version 1.1.03

REFERENCE YEAR	2008

1. FACILITY IDENTIFICATION

Parent Company Name	Westmeath County Council
Facility Name	Ballydonagh Landfill
PRTR Identification Number	W0028
Licence Number	W0028-02

Waste or IPPC Classes of Activity

No.	class_name
3.5	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.3	Recycling or reclamation of metals and metal compounds.
4.4	Recycling or reclamation of other inorganic materials.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
3.1	Deposit on, in or under land (including landfill).
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.

Address 1	Ballydonagh
Address 2	Dublin Road
Address 3	Athlone
Address 4	Co. Westmeath
Country	Ireland
Coordinates of Location	0,000
River Basin District	IE-Shannon
NACE Code	382
Main Economic Activity	Waste treatment and disposal
AER Returns Contact Name	John Waldron
AER Returns Contact Email Address	jwaldron@westmeathcoco.ie
AER Returns Contact Position	Senior Ex. Technician - Environment Section
AER Returns Contact Telephone Number	044 9332157
AER Returns Contact Mobile Phone Number	087 7853567
AER Returns Contact Fax Number	044 9342330
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	www.westmeathcoco.ie

2. PRTR CLASS ACTIVITIES

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

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

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

4.1 RELEASES TO AIR

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR								
POLLUTANT		METHOD				QUANTITY		
		Method Used						
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	C	PER	Calculated using GasSim	0.0	156000.0	0.0	156000.0
03	Carbon dioxide (CO2)	C	PER	Calculated using GasSim	3890000.0	4273000.0	0.0	383000.0

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

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

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

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

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

Additional Data Requested from Landfill operators

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

Landfill: Ballydonagh Landfill

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

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	911000.0	C	PER	Calculated using GasSim	N/A	
Methane flared	755000.0	E	Estimate	w/hr by CH4 conc by Sp. Gr	1000.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	156000.0	C	Oth	Methane generated minus m	N/A	

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

[PRTR# : W0029] [Facility Name : Ballynagh Landfill] [Filename : W0029_2006(1).xls] [Return Year : 2006]

15/03/2007 16:33

Transfer Destination	European Waste Code	Hazardous	Quantity T/Year	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Name and Licence / Permit No. of Recoverer / Disposer / Broker	Address of Recoverer / Disposer / Broker	Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)	Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	25720.0	Leachate	D8	M	Volume Calculation	Onsite in Ireland	Athlone Wastewater Treatment Plant	Golden Island, Athlone, Co. Westmeath		
Within the Country	20 01 02	No	14.0	Glass	R5	M	Weighed	Onsite in Ireland	Glassgo Recycling Ltd. WP 247-2006	Unit 4, Oberstown Bussiness Park, Carragh Rd. Naas, Co. Kildare.		

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

ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR

BALLYDONAGH LANDFILL

WASTE LICENCE NO. W0028- 02

Prepared By: -

Environment Section,
Westmeath County Council,
Bishopgate Street,
Mullingar,
Co. Westmeath.

April 2009

TABLE OF CONTENTS

PAGE

1. INTRODUCTION 1

2. DETAILS OF OPERATOR 2

2.1 SITE LOCATION 2

3. SITE DESCRIPTION 5

3.1 BOUNDARIES AND TOPOGRAPHY 5
3.2 GEOLOGY AND HYDROGEOLOGY 5
3.2.1 Bedrock Geology 5
3.2.2 Quaternary Geology 6
3.2.3 Aquifer Status 6
3.2.4 Aquifer Vulnerability 6
3.2.5 Groundwater Flow 6
3.3 HYDROLOGY 7
3.4 METEOROLOGY 7

4. TYPES OF WASTE ACCEPTED 8

4.1 WASTE TYPES 8
4.2 WASTE ACCEPTANCE PROCEDURES 8
4.3 WASTE RECORDS 9
4.4 WASTE VOLUMES 9
4.5 SITE CAPACITY 10

5. ENGINEERING DETAILS 12

5.1 ENGINEERING DETAILS 12
5.2 SITE PREPARATION AND SERVICES 13
5.3 CONTAINMENT DETAILS 13
5.4 LEACHATE 13
5.5 LANDFILL GAS ABATEMENT METHODS 17
5.6 MONITORING POINTS 18
5.7 SITE SECURITY 22
5.8 SITE ACCESS ROADS 22
5.9 SITE FACILITIES 22
5.10 CURRENT LANDSCAPING 23
5.11 WHEEL CLEANING 23
5.12 SURFACE WATER CONTROL MEASURES 24
5.13 SITE SERVICES 24

6. OPERATIONAL MATTERS 25

6.1 GENERAL DESCRIPTION OF THE OPERATION 25
6.2 OPENING HOURS 25
6.3 PHASING OF FILLING 25
6.4 WATER, LEACHATE AND GAS CONTROL MEASURES 26
6.4.1 Surface Water Control Measures 26
6.4.2 Leachate Management 26
6.4.3 Gas Control Measures 26
6.5 CONTROLS OF ENVIRONMENTAL NUISANCES 27
6.5.1 Dust Emission Controls 27
6.5.2 Noise Emission Controls 27
6.5.3 Odour Emission Controls 27

6.5.4 Litter Control *28*
6.5.5 Vermin Control *28*
6.5.6 Visual Intrusion *28*
6.6 ACCESS CONTROL AND WASTE ACCEPTANCE PROCEDURES 28
6.7 EQUIPMENT 29
6.8 WASTE PLACEMENT PROCEDURES 29
6.9 COVER REQUIREMENTS 29
6.10 SITE PERSONNEL 30
6.11 WHEEL CLEANING 30
6.12 OPERATIONAL AND SAFETY RULES AND EMERGENCY RESPONSE PROCEDURES 30
6.13 ASSESSMENT OF WASTE DENSITY AND SETTLEMENT 30

7. CLOSURE AND AFTERCARE 31

7.1 SITE LIFE 31
7.2 FINAL CONTOURS 31
7.3 RESTORATION PLAN 31
7.4 PHASES FOR CLOSURE AND RESTORATION 31
7.5 AFTERCARE MONITORING 32
7.6 MAINTENANCE FOR AFTERCARE 32

8. ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT 33

8.1.1 Projects Relating to the Objectives and Targets *34*
8.1.1.1 Project 1 & 2 – Recovery & Recycling of Waste 34
8.1.1.2 Project 3 – Packaging Waste Reduction 35
8.1.1.3 Project 4 – Construct Permanent Landfill Cap for Phase 1 and Phase 2 and cell 9 of Phase 3. 36
8.1.1.4 Project 5 – Landfill Gas Recovery 37
8.1.1.5 Project 6 – Install additional Gas Extraction Wells in the Active Cells. 38
8.1.1.6 Project 7 - Resources use and Energy Efficiency 39
8.1.1.7 Project 8 - Put in place a Landfill Closure Strategy for 2010. 40
8.3 DOCUMENT CONTROL 41
8.4 AWARENESS AND TRAINING 41
8.5 CORRECTIVE ACTION 41
8.6 MANAGEMENT STRUCTURE & RESPONSIBILITIES 41

1. INTRODUCTION

This is the tenth Environmental Management Programme (EMP) for Ballydonagh Landfill. It presents background data on the Landfill and information on the site design and operation. The information includes details of the operator, a description of the site, waste type and volumes, engineering details, waste capacity, operational controls, environmental monitoring programmes, surface water management, leachate and landfill gas control and management, closure and aftercare measures and a Schedule of Objectives and Targets.

The EMP was prepared in response to the requirements of the Environmental Protection Agency (EPA) Waste Licence Registration No. W0028-02 and is based on the EPA Manuals on Landfill Monitoring and Landfill Operational Practices and the EPA Draft Guidance On Environmental Management and Reporting to the Agency and comments on the previous years EMP.

The purpose of the EMP is to permit the operation of the site in accordance with regulatory requirements and best landfill practice and implement the Schedule of Objectives and Targets. The EMP also serves as a guidance document for site staff and describes operational control and management practices to be followed at the site.

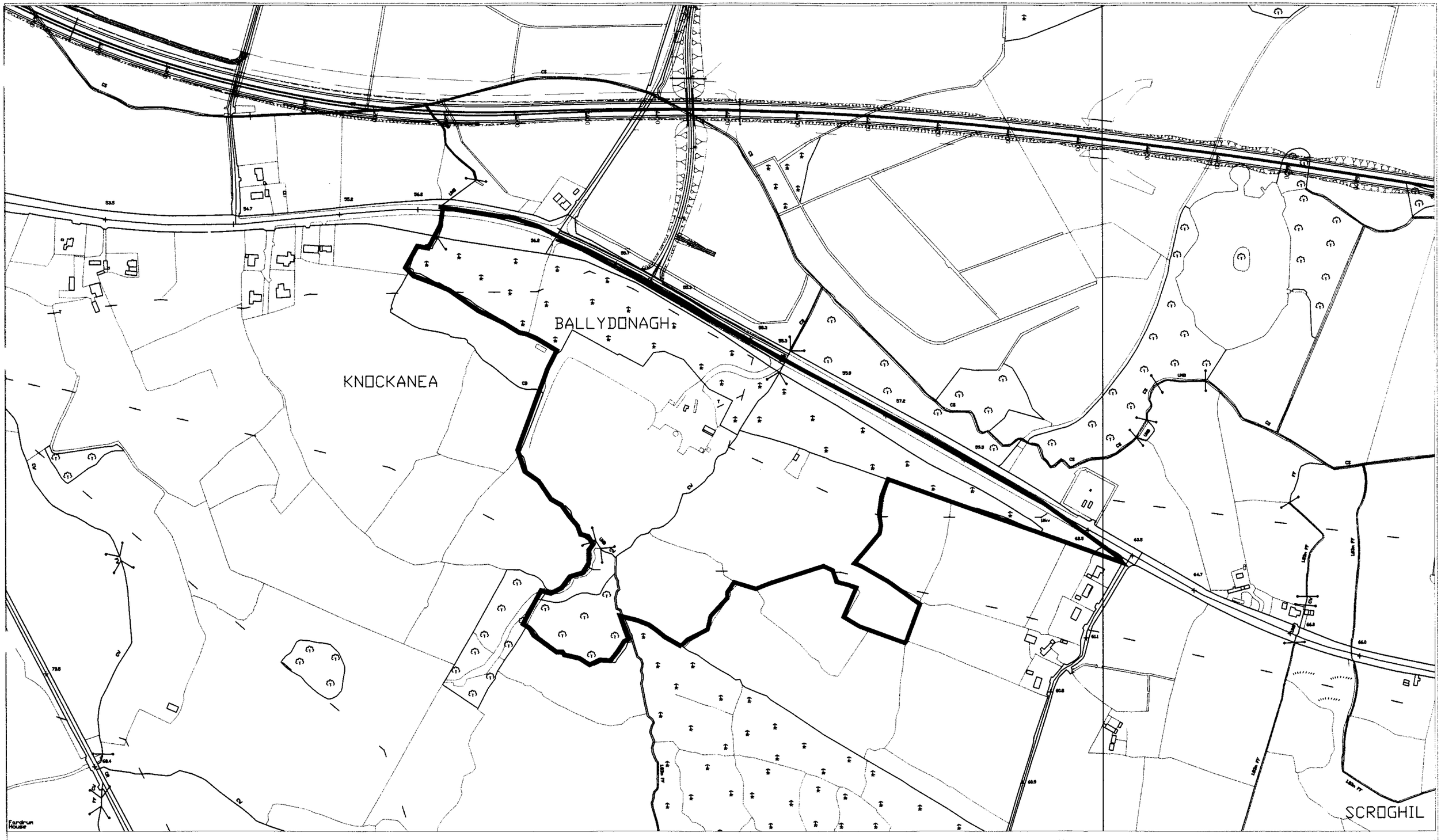
2. DETAILS OF OPERATOR

The operator of Ballydonagh Landfill is Westmeath County Council, County Buildings, Mullingar, Co. Westmeath. Mr. P.J. Carey Senior Executive Engineer, Environment Section is the Landfill Manager. Contact phone number is (044) – 9332177, Fax (044) – 9384239.

The address of the facility is Ballydonagh Landfill, Ballydonagh, Dublin Rd, Athlone, Co. Westmeath. The contact number of the facility is (090) 6475775. The site caretaker is Mr. Peter Buckley.

2.1 Site Location

The site is located approximately 7 km (4 miles) east of Athlone town and is accessed off the N6 Primary National Route from Galway to Dublin. Site location and general layout is shown on Figure No. B.2.1 and Drawing No. 0304501-01, REV.A.



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Extent of Site Ballydonagh

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh Landfill

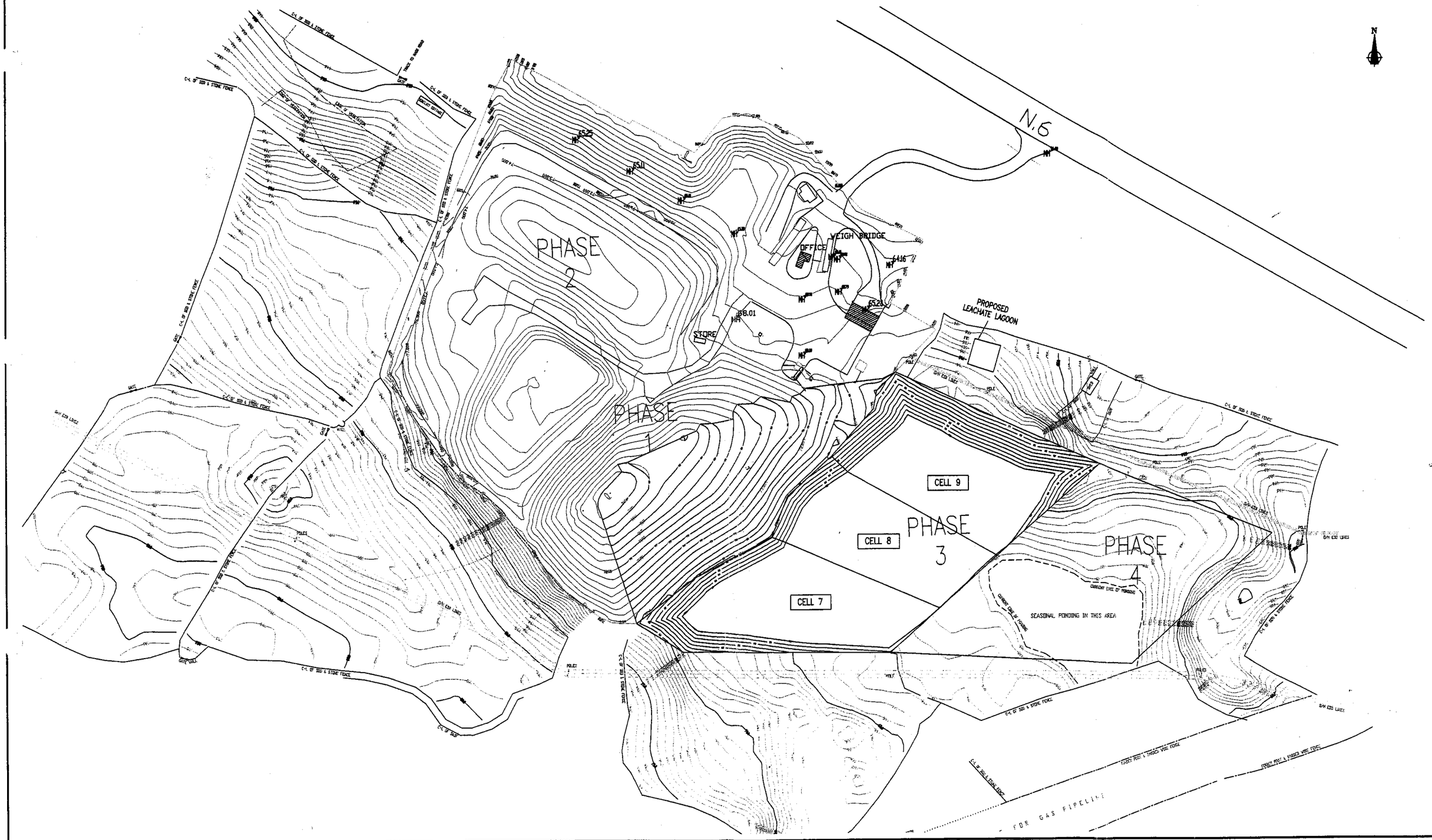
SURVEYED: _____
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : 1:5,000 (A3)
DATE : 26/03/09
DATUM : _____

DRAWING NO. E.O.S._09

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
Extent of Site2009.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings



O' Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : ocm@indigo.ie

environmental management for business

CLIENT
WESTMEATH CO COUNCIL

TITLE
PROPOSED EXTENSION
LAYOUT

DRAWING No.
0304501-01

SCALE
1:2000
A3

REV.
A

NOTES

DOS Filename : *********

3. SITE DESCRIPTION

The existing site occupies an area of 26 ha which includes 6.6ha of the new extension. The total landfill cell area is 64,000 m^2 (with 30,000 m^2) added with the new extension. The site is bounded on the north by the N6 and to the east, south and west by agricultural land. See figures 8.1 and drawing 0304501 – 01.

The facility accepts non-hazardous household, commercial and industrial waste. It is an engineered landfill with deposition and covering of waste in specially designed and constructed landfill cells. The landfill cells are designed to control emissions to air, water and land.

The landfill cells have been designed as a containment facility and include a double HDPE liner with leak detection system. An active landfill gas extraction and flaring system is progressively installed.

An extension to the Waste Licence was granted in November 2004, and this allows for a further 300,000 tonnes of waste, and this will extend the lifetime of Ballydonagh Landfill to 2011. However planning permission from An Bord Pleanala is only for three cells and at the current rate of landfilling, this would imply that the landfill will cease in 2010

3.1 Boundaries and Topography

The boundaries and general layout are shown on Figure B.2.1 in Section 2 above. The site topography slopes to the north.

3.2 Geology and Hydrogeology

The geology and hydrogeology of the area is described in detail in reports submitted with the Waste Licence Application and is summarised below.

3.2.1 Bedrock Geology

The site is underlain by Argillaceous Bioclastic Limestones with Waulsortian Reef Limestone along the southern edge of the property. Bedrock rises from the N6 and outcrops on Knockanea hill just south of the property. It appears that the core of Knockanea is made up of Reef Limestones while it flanks are underlain by darker bedded Argillaceous Bioclastic Limestones.

3.2.2 Quaternary Geology

The bedrock at the site is overlain by a continuous layer of overburden some 1 to 8 m thick thinning southwards and eventually disappearing near the summit of Knockanea.

The overburden varies significantly over the site but consists mainly of unsorted outwash deposits of clay, sand and gravel. The grain size varies with boulders regularly distributed through the outwash deposits.

3.2.3 Aquifer Status

The Argillaceous Bioclastic Limestones underlying the site are classified as a Poor Aquifer and the Waulsortian Reef is classified as a Locally Important Aquifer.

The overburden deposits can form potential aquifers where there are thick sequences of saturated sands and gravels. However, these conditions are absent from the Ballydonagh site.

Boreholes drilled at the site as part of the investigation and monitoring programmes identified that groundwater yields from the bedrock ranged from 90 m^3/day to <10 m^3/day confirming the low aquifer status of the bedrock and overlying unconsolidated deposits.

There are a number of domestic wells to the north of the landfill.

3.2.4 Aquifer Vulnerability

The aquifer vulnerability relates to the nature and thickness of the geological materials that overlie the aquifer. In terms of the current classification assigned by the GSI the bedrock aquifer at Ballydonagh is assigned a 'High' to 'Extreme' Vulnerability Rating due to the free draining nature of the overburden and the thin layer of cover material.

3.2.5 Groundwater Flow

Groundwater levels beneath the site range from 65 m OD in the southern part of the site falling to 56 m OD near the N6. The depth to water table ranges from zero to over 10 m below ground level. The groundwater flow direction is from the south to the north towards the small stream that drains the area.

3.3 Hydrology

There are dry ditches running from south to north along the eastern and western edges of the site. These are dry most of the time and only carry water after high rainfall events. The dry ditches connect to a small drain that runs from the N6 northwards for approximately 100 m before joining with the only significant stream in the area. This stream originates midway between Athlone and Moate about 4 kms west of the site and drains westerly past the site and joins the Shannon about 3 kms south of Athlone.

3.4 Meteorology

The total annual rainfall and evapotranspiration rates for the facility was calculated from data obtained from the nearest weather stations and are as follows: -

- Total Rainfall = 1077.2 mm
- Total Potential Evapotranspiration = 482.6 mm
- Total Effective Rainfall = 594.6 mm

4. TYPES OF WASTE ACCEPTED

4.1 Waste Types

The facility is licensed to only accept the following wastes: -

- Household,
- Commercial,
- Construction & Demolition,
- Industrial Non Hazardous Waste.

Sewage sludge, Industrial Non-Hazardous Liquids or Hazardous wastes are not accepted at the site.

4.2 Waste Acceptance Procedures

Westmeath County Council requires waste producers to characterise the waste prior to acceptance at the site. Such waste characterisation must meet all requirements set by the Council and may include eluate and toxicity testing. The producer/holder of the waste must, if requested, provide documentation that the waste meets the Council's specification. Waste not conforming to the Council's specification is not accepted or deposited at the site.

All waste deliveries are visually inspected at the Site Control Hut and at the working face where the compactor driver radios the caretaker site hut, giving confirmation of the visual inspection. The Council have a waste inspection and quarantine area to inspect the waste. Where site staff consider that the waste does not comply with the Council's specifications, the waste is not accepted.

Where waste loads are rejected the type and quantity of waste involved, the date and time at which it was rejected, the name and address of the producer of the waste, the name and address of the vehicle operator and the vehicle registration number is recorded. The Landfill Manager is immediately notified of non-acceptance of any waste loads.

If the waste is deemed suitable for disposal at the site the following information is recorded: -

- The name of the carrier,
- Vehicle registration number,
- The name of the producer(s) / collector(s),
- Description of the waste,
- Quantity of waste (in tonnes),
- Name of person checking loads (initials).

4.3 Waste Records

A record is kept of the origin, type, nature, quantities and appropriate identification documents of all waste deposited at the site. The name of the waste producer, haulage company and the registration number of each vehicle are recorded.

4.4 Waste Volumes

The facility accepts only the waste types and quantities listed in Tables A.1 of the waste license 28-2.. Table 4.1 below summarises the main categories of waste accepted at the site.

Table 4.1 Categories and Quantities of Waste that can be Accepted

WASTE TYPE	Tonnes Per Annum (Maximum)
Household & Commercial	53,500
Construction & Demolition	2,000
Industrial Waste	4,500

Under Schedule A of its waste license, the facility can accept a maximum of 60,000 tonnes of waste per annum.

4.5 Site Capacity

It is estimated that filling at the site to the finished profiles shown on, Proposed Completed Landscaping Layout Drawing No. CS-002561-LA/02,REV.P1, will accommodate approximately 580,000 tonnes of waste material.

The site was originally designed with a capacity for 400,000 tonnes of waste.
The extension to the landfill was granted on 12th November 2004 and this allows for a further 300,000 tonnes of waste, at a maximum filling rate of 60,000 tonnes of waste per year. This will extend the lifetime of Ballydonagh Landfill to 2011.

However planning permission from An Bord Pleanala is for three cells only with capacity of 180,000 tonnes i.e. 60,000 tonnes per cell. Further planning permission will be required to construct the further two cells to bring the total capacity as approved under the new licence to 300,000 tonnes.

NOTES:

1. ALL LEVELS ARE IN METRES, UNLESS OTHERWISE STATED.
2. ANY DISCREPANCIES FOUND SHOULD BE REPORTED TO O'CALLAGHAN MORAN AND ANY OTHER RELEVANT PARTIES.
3. THE COORDINATE SYSTEM IS BASED ON THE IRISH NATIONAL GRID.
4. ALL LEVELS ARE RELATED TO A SITE TBM WHICH IS A HILTI-NAIL SET IN THE CONCRETE APRON ADJACENT TO THE WASTE COMPACTOR BUILDING, ITS ELEVATION BEING 69.140m MALIN HEAD DATUM AS SHOWN ON THIS DRAWING.
5. THIS SURVEY IS OF THE LANDS ADJACENT TO THE FENCED LANDFILL SITE AND IS MERGED WITH A WESTMEATH COUNTY COUNCIL SURVEY OF THE AREA WITHIN THE PERIMETER FENCE.
6. DUE TO THE UNIQUE NATURE OF THE SOD AND STONE FENCES THERE ARE LARGE BOULDERS ADJACENT TO THE SOD & STONE FENCES.
7. LEVELS IN RED ARE TAKEN AT THE TOP OF BOREHOLE CASINGS.

10m EASEMENT EITHER SIDE OF ESB OVERHEAD CABLES

APPROXIMATE AREA FOR LANDSCAPING

EXISTING YARD AND BUILDING

ACCESS TRACK

LAGOON APRON

LAGOON

ATTENUATION POND

DRAINAGE DITCH

DESCRIPTION	DR	CH	APP	DATE
A INITIAL ISSUE	RE	JS	DY	08/05

NOTES

STATUS

PROJECT: BALLYDONAGH LANDFILL
ATHLONE, Co WESTMEATH

TITLE: PROPOSED LANDSCAPING LAYOUT

DRAWN BY	CHECKED BY	APPROVED BY	DATE	SCALES
RE	JS	JOC	AUGUST.'05	

O' Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 321521 Fax. (021) 321522
email : ocm@indigo.ie

CAPITA SYMONDS
Concourse House
432 Dewsbury Road
Leeds
LS11 7DF
Tel: 0113 385 7000
Fax: 0113 270 1597

JOB NUMBER	DRAWING NUMBER	REV
CS-002561	LA/02	P1

5. ENGINEERING DETAILS

5.1 Engineering Details

The complete engineering details for the facility are presented in the drawings included in the Waste Licence Application. A summary of the engineering detail drawings and their current revision is presented in Table 5.1 below.

Table 5.1 List of All Engineering Detail Drawings

Drawing Number	Date	Title	Scale	Revision
E066-01	March 1996	As constructed survey	1:1000	
E066-02	March 1996	As constructed survey	1:500	
E066-03	March 1996	Proposed Site Plan Phase 2	1:500	D
E066-04	April 1996	Section AA & BB Phase 2	1:500	
E066-05	March 1996	Public Facility Details Sheet 1 of 2	1:250	B
E066-06	March 1996	Public Facility Sections Sheet 2 of 2	1:250	
E066-07	April 1996	East Bund Capping Levels & Details	1:500	
E066-08	June 1996	Site Sections CC & DD	1:500	
E066-09	June 1996	Details of H.D.P.E Sheet Liner	1:10 1:50	
E066-10	June 1996	Foundation Details for Weighbridge	1:25 1:50	A
E066-11	June 1996	Proposed New Public Facility	1:250	C
E066-12	July 1996	East Facing Slopes Final Capping Details	1:100	
E066-13	July 1996	Liner Lap Details Phase 2 & Existing	1:100	
E066-14	July 1996	Control Hut Extension Details	1:50	
E066-15	April 1996	Wheel Wash	1:20 1:50	A
E066-16	April 1996	Gas Flaring Details	1:1000	
2455.10	April 1990	R.C Retaining Wall & Leachate Tank Details	1:50	A
0304501-01	June 2003	Proposed Extension Layout	1:1000	
0304501-02	July 2003	Cell Layout: Formation Levels & Leachate Collection Pipework	1:500	
0304501-03	July 2003	Construction Details	As Shown	
0304501-06	July 2003	Phasing Details	1:1000	
0304501-07	July 2003	Restoration Profile	1:1000	
0304501-08	July 2003	Drainage System Site Entrance	1:500	
0304501-09	August 2003	Surface Water Drainage Extension Area	1:500	

5.2 Site Preparation and Services

The site has been in use as a landfill since 1991. The site is a specially engineered landfill, including separately lined cells that are capped and isolated from each other and the environment.
Work commenced on the lining of the extension in late 2005 and was completed in early 2007.

5.3 Containment Details

The landfill is designed as a containment facility. The design includes a double lined landfill using 2 layers of 2 mm thick welded H.D.P.E. sheets separated by a detection layer containing a leachate detection system laid on a prepared base directly on top of the natural glacial till on the site (Figures D.3.B and D.3.C).

The lining system was placed over the entire base of area to be landfilled and extended up some 6 metres along the slopes of the containment bunds. The base liner was laid with a minimum gradient of 2%. On top of the primary liner a drainage layer was installed together with a leachate collection system, which directs leachate by gravity flow to a leachate holding tank.

A similar liner system is in place for phase 3 of the landfill, which consists of a protective geo-textile on a 2mm HDPE geomembrane on a 1m engineered clay liner.

5.4 Leachate

To minimise the generation of leachate, the landfill is operated in a controlled manner. Surface water runoff is directed away from the fill area by the construction of drains outside the landfill area.

Leachate is extracted from the landfill area in 200 mm diameter slotted H.D.P.E. pipe runs. These leachate collection pipes have been laid at approximately 20 metre centres extending the full length in each cell. The collection pipes have been laid to a collection manhole external to the landfill area. Each pipe run can be inspected at these manholes. When the pipe is external to the landfill, the pipe is solid and each end is butt welded to the other.

The Council has adopted a leachate management plan designed to maintain leachate levels at acceptable levels by routine removal of the leachate from the holding tank in accordance with Operational Practice Sheet No. 2. Also a Leachate Appraisal report undertaken by Westmeath County Council Consultants, Malachi Cullen & Partners, have put forward measures to improve the efficiency of the collection detection system, these measures have been accepted by the agency. An electronic Leachate Monitoring System was installed by our consultants AFS during 2006.

All solid runs of leachate collection sewer were pressure tested and CCTV inspected following construction. The collection manholes are each lined in 2 mm thick H.D.P.E. sheet to a height of 2 metres over the invert of the pipe run. Each manhole is connected into a main leachate sewer 315 mm diameter H.D.P.E. which discharges all leachate into the on site

leachate holding tank. Details of the leachate holding tank is shown on drawing number 2445-10 in the waste license application.

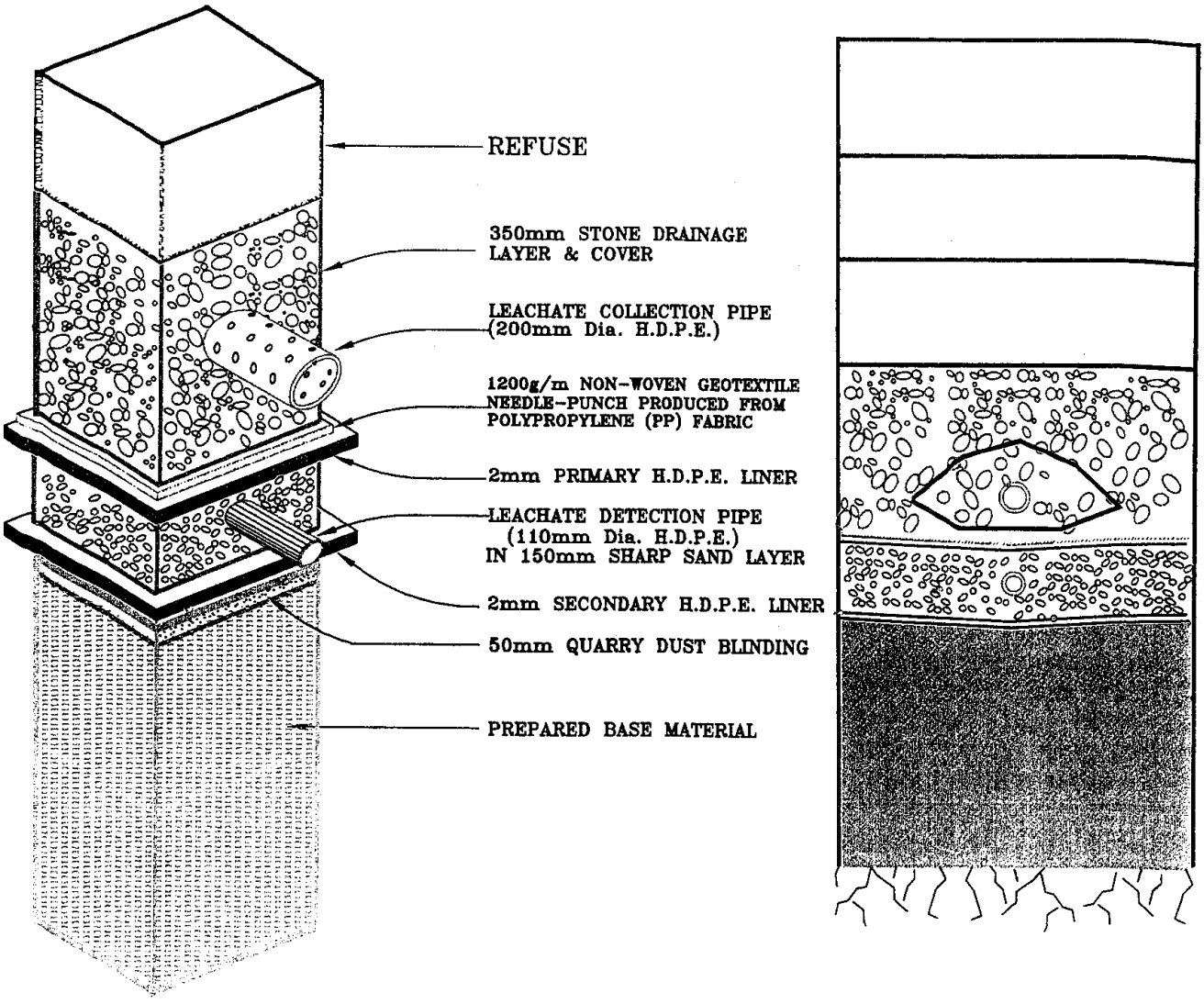
The holding tank has a capacity of 108.6 m3 and is constructed of reinforced concrete and is lined with 2 mm thick HDPE sheeting. The tank is fitted with a electronic sluice valve which will automatically close once the leachate reaches a predetermined upper level.

The new electronic monitoring system automatically alerts the caretaker when the leachate tank is required to be emptied. When sufficient leachate is in the tank the caretaker contracts in a haulage tanker and the leachate is pumped into a transport tanker. The tanker takes the leachate to the Municipal Treatment Works either at Athlone or Moate where the leachate is treated.

It is intended that this system of leachate management will continue after the closure of the active phase of the landfill. It is anticipated that the quantity of leachate will be significantly reduced after the landfill cells are capped and restored.

The new extension involved the installation of a covered Leachate Lagoon that holds all the Leachate generated from the new cells 7, 8 & 9. The leachate is pumped to the lagoon where it is stored with a minimum freeboard of 1M before removal off-site for treatment at the Athlone Sewage Treatment Plant.

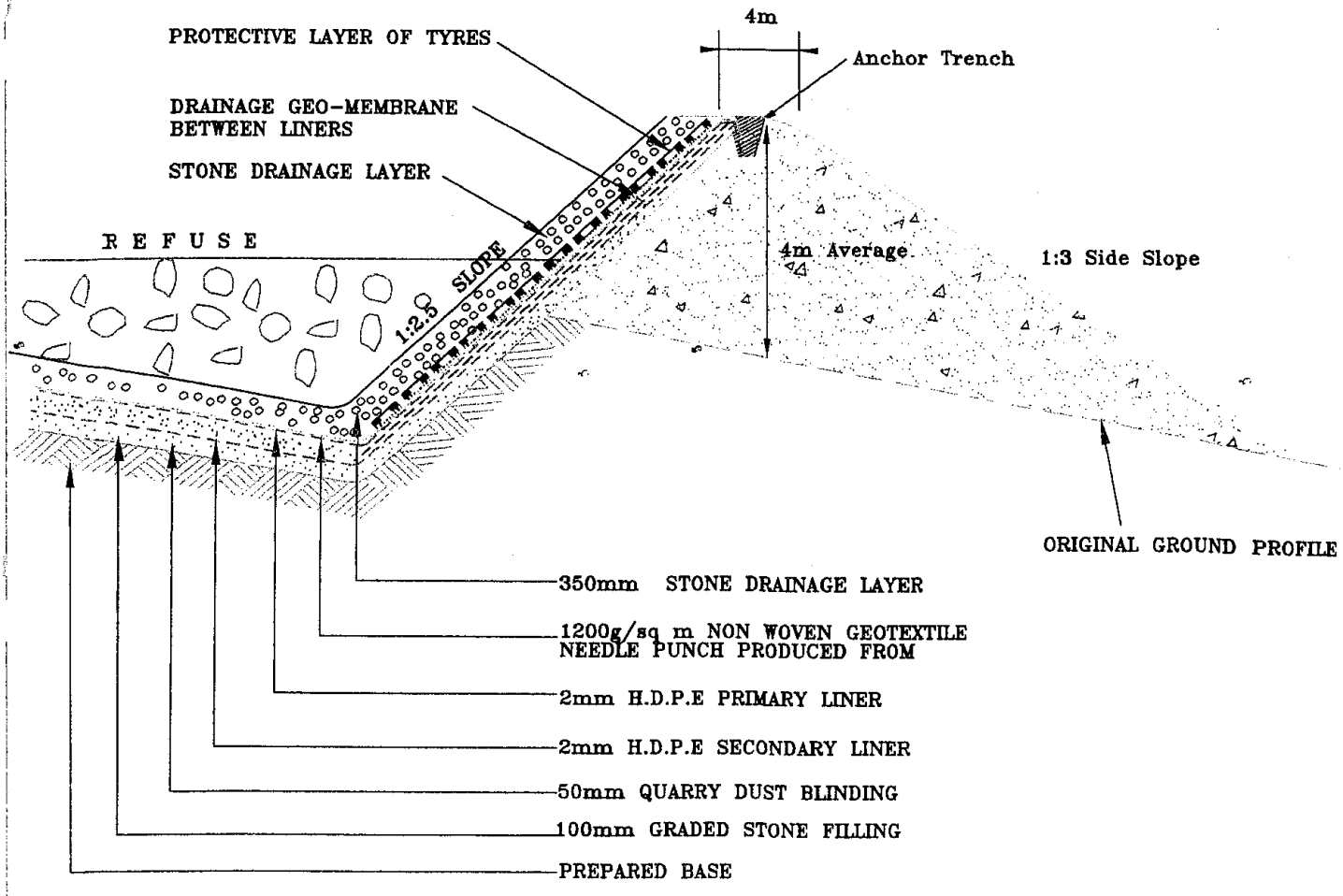
BALLYDONAGH ATHLONE
COUNTY WESTMEATH



CONTAINMENT SYSTEM.

SKETCH D.3.b

BALLYDONACH ATHLONE
COUNTY WESTMEATH



PERIMETER BUND DETAIL

SKETCH D.3.C

5.5 Landfill Gas Abatement Methods

The side slope of the lined cells has been provided with a drainage layer. This layer serves the dual purposes for the collection of leachate and rainfall precipitation.

Prior to the use of vertical gas extraction wells, a system of stone filled trenches was installed in each cell as it increased in height. Trenches 900-mm wide were excavated and filled with 35 to 50 mm stone. These trenches were installed at 20 metre intervals and their locations surveyed. The trenches were installed at right angles to the preceding trenches in each successive layer.

An appraisal of the existing landfill gas extraction network was carried out in 2003 and remediation measures were approved by the EPA in November 2003. This involved extracting gas from thirty new vertical gas extraction wells, 8 wells in cells 1 & 2 in Phase I and 22 wells in cells 3, 4, 5 & 6 in Phase II. Weekly monitoring is carried out on all manifolds to balance the field and to optimise the extraction of the gas from the landfill.

An active gas extraction system is used to extract the landfill gas from Cells 1, 2, 3 4, 5 & 6 and cells 8 and 9 in the new extension. The extracted gas is flared in an enclosed gas-flaring unit with the capacity to vent and flare at 1000 m^3/hr. The new 1000 m^3 enclosed flare is installed and operational since 2nd May 2007. The unit is fitted with automatic controls.

Thirteen new gas wells were installed in cells 3, 4, 5 & 6 during February 2007 to extract more gas and help remediate any odour problems on site. Nine new gas wells were installed in the new extension, Phase III, 3 in each of cells 7, 8 and 9. Currently, 6 of these new gas extraction wells are in operation, three in cell 9 and three in cell 8.

Fifty-one gas extraction wells are currently operating between the three phases with forty new wells to be installed with the capping works during 2009.

5.6 Monitoring Points

Groundwater and surface water monitoring are carried out as per figure J1 and figure C.9.1 respectively. Leachate and gas sampling locations are shown on drawing No. 08214-S1-R1-00.

Borehole 9 (BH-9) was installed in November 2007 (Easting 209641 Northing 238472). This borehole was not sampled as part of any monitoring event until 2008.

Gas monitoring has been carried out at new gas monitoring locations G11-G15 since July 2007. Gas monitoring has been carried out at gas monitoring locations G16-G19 since November 2007. Gas monitoring wells G16-G19 were installed in order to investigate a gas migration problem noted at gas monitoring wells G12 and G13.

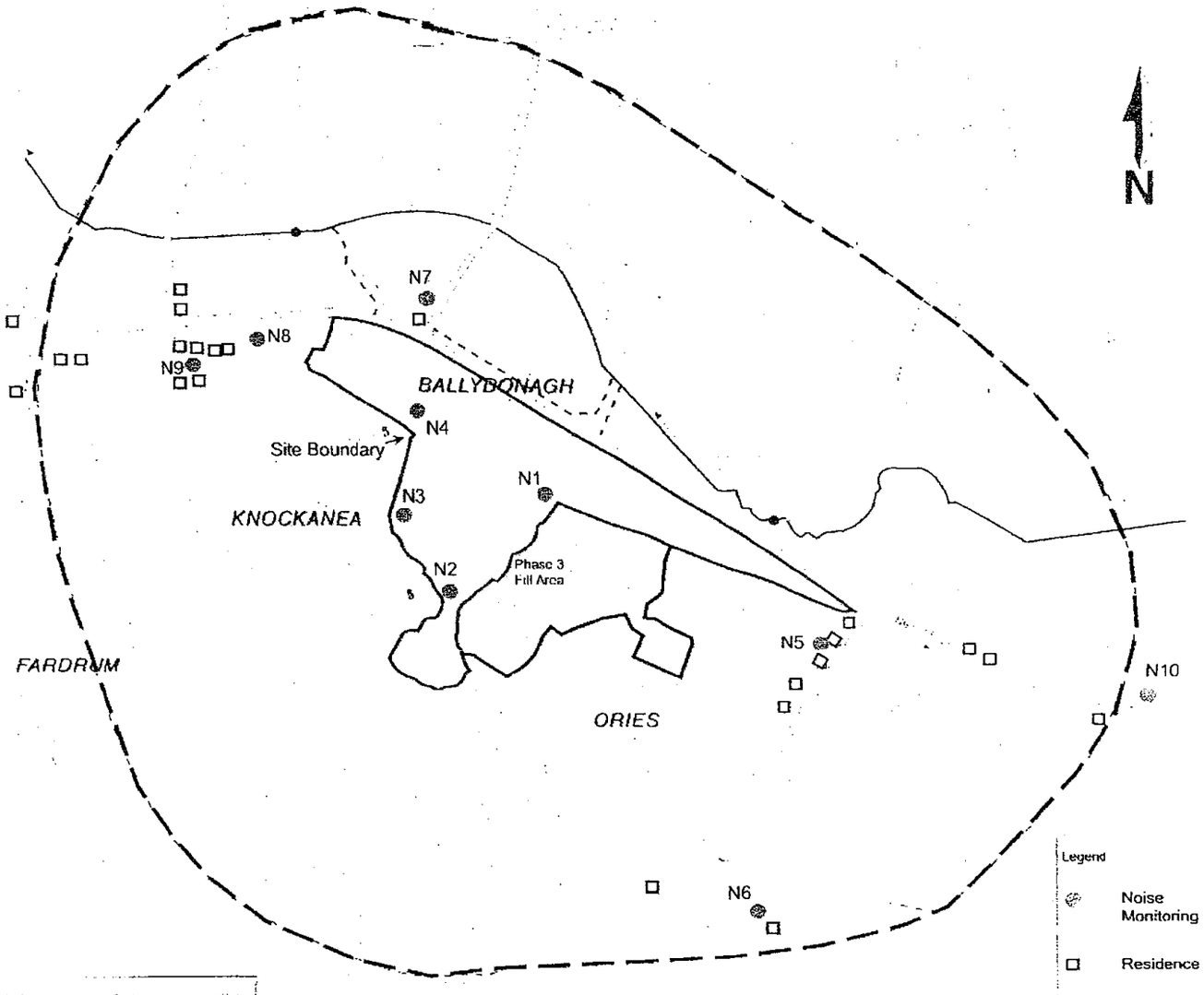
Our consultants TMS Environment carried out an investigation into the methane and carbon dioxide found in the perimeter wells and compared them to the methane and carbon dioxide from each of the three phases within the landfill. They concluded that the methane and carbon dioxide found at the perimeter wells is a naturally occurring gas and not migrating gas from the landfill.

Noise monitoring locations are shown on Figure 10.2. Dust is also monitored at seven monitoring locations on-site as described in Table 5.2 below.

Table 5.2 Dust Monitoring Locations

Station	Easting	Northing
D1	209420	238605
D2	209304	238483
D3	209177	238622
D4	209210	238710
D5	209620	238806
D6	209465	238725
D7	209683	238507

Station	Grid Ref:
N1	E209167 N238655
N2	E209277 N238500
N3	E209185 N238615
N4	E209200 N238728
N5	E209980 N238400
N6	E209879 N237935
N7	E209260 N239000
N8	E208905 N238920
N9	E208805 N238873
N10	E210517 N238315



O'Callaghan Moran & Associates
Granary House, Rutland Street
Cork Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : ocm@indigo.ie

Client: Westmeath County Council

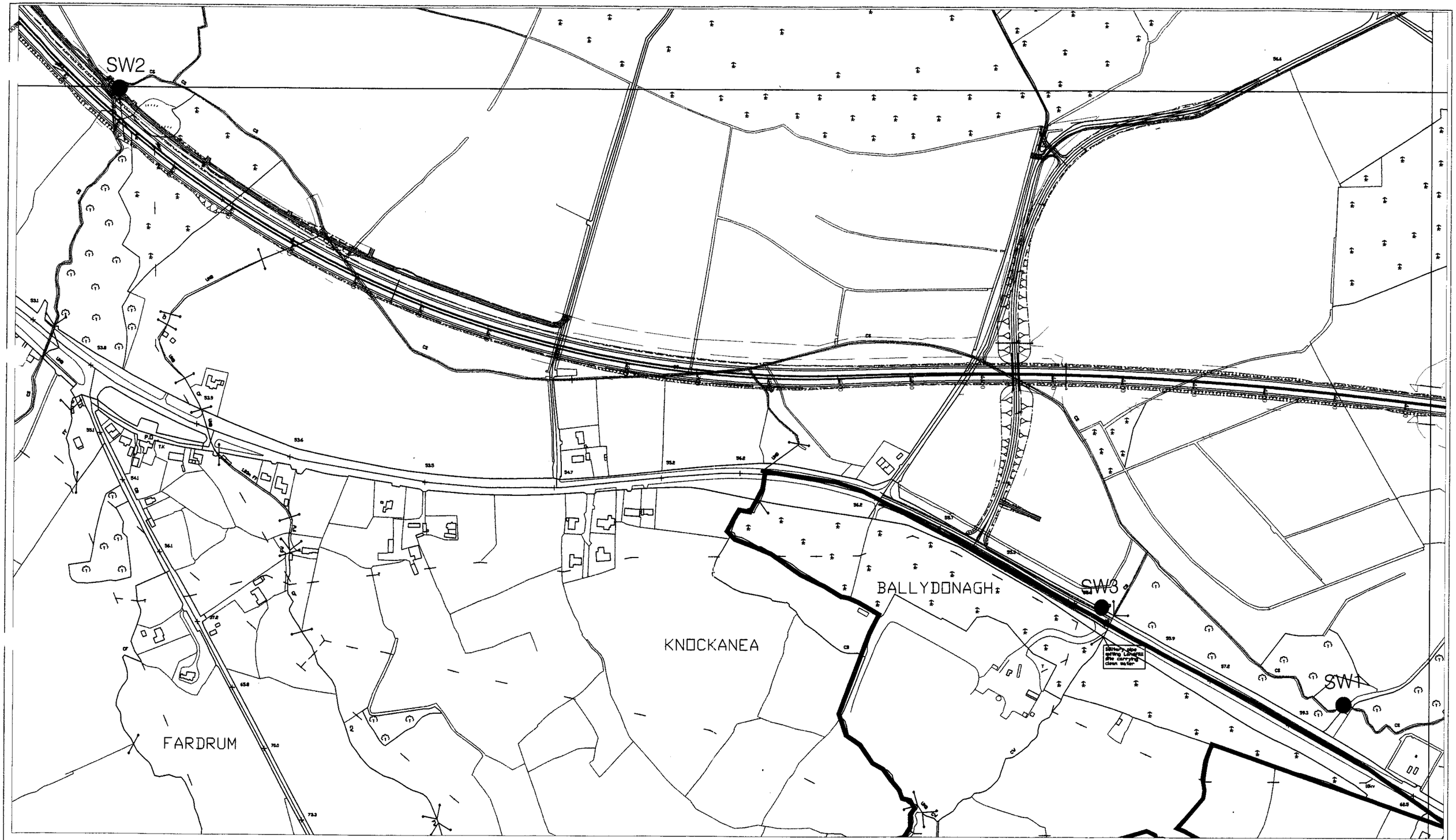
Title: Noise Monitoring Locations

Details: O.S Licence Agreement Number AR 0038702

Ordance Survey Ireland, Government of Ireland

Figure Number: Noise '09

Scale: As Shown



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Surface Water Monitoring Locations
Ballydonagh

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh
Landfill

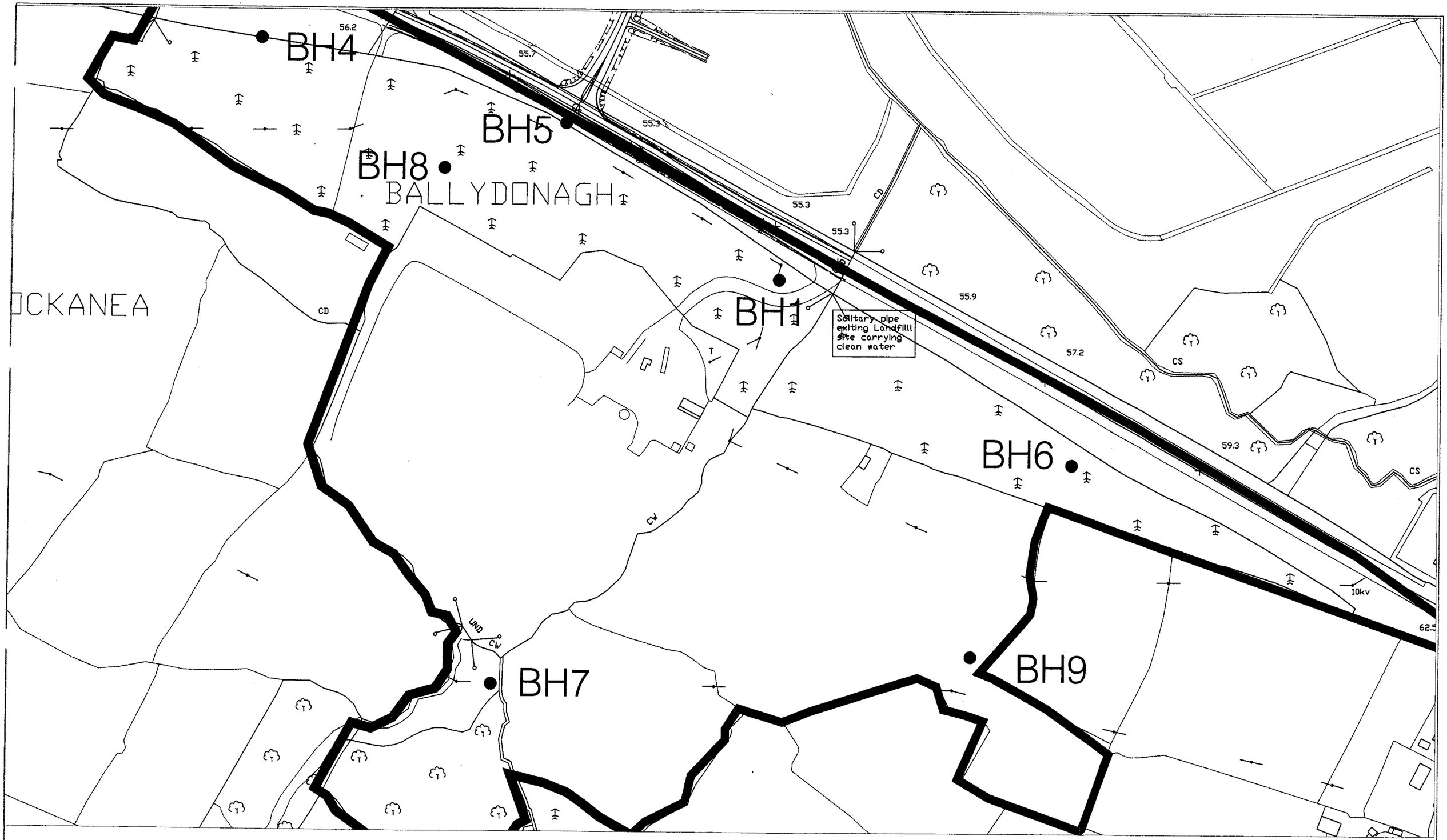
SURVEYED:
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : 1:5,000 (A3)
DATE : 26/03/09
DATUM :

DRAWING NO.
SWM_09

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
SW Locations2009.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Borehole Locations
Ballydonagh

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh
Landfill

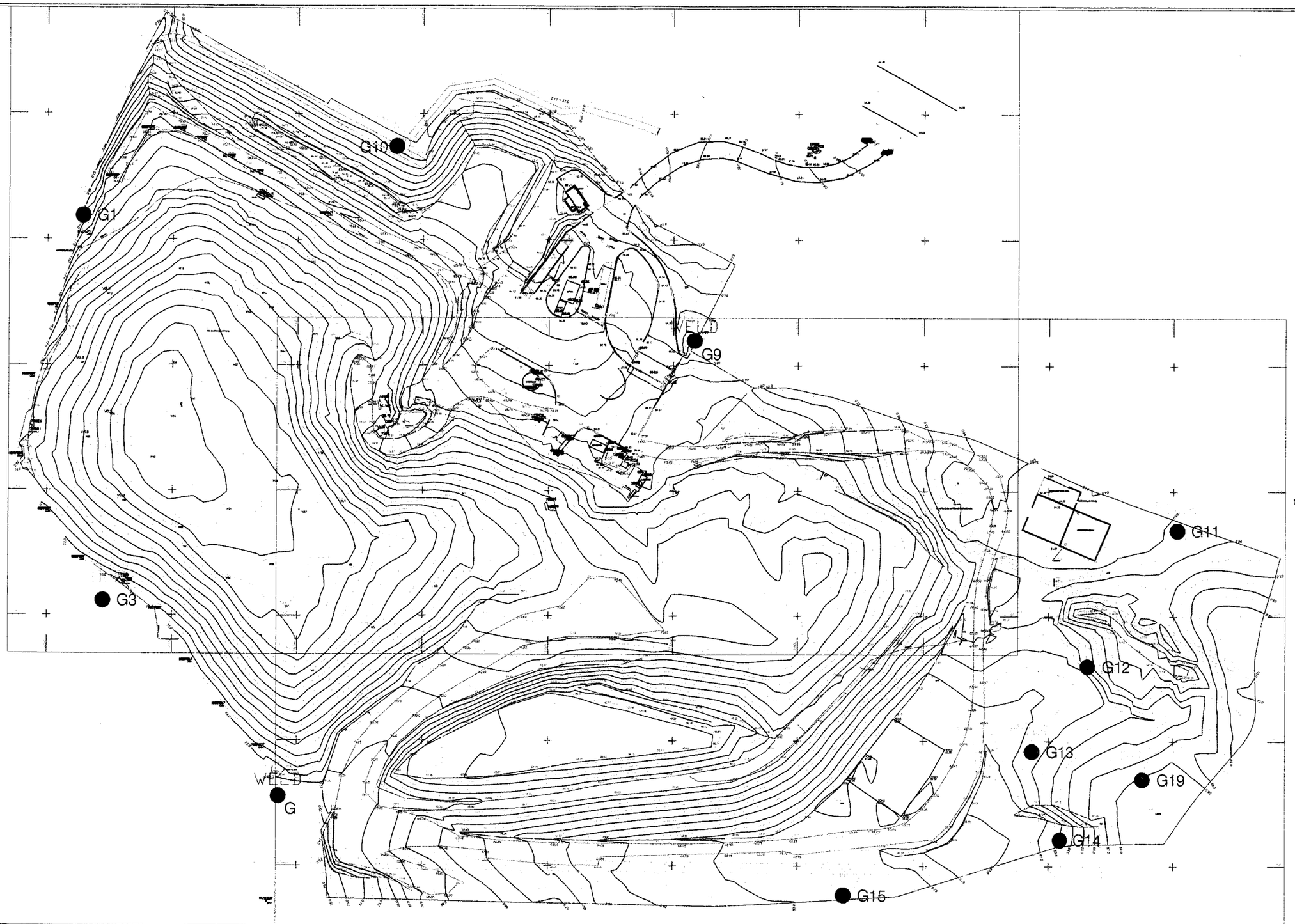
SURVEYED:
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : 1:2,500 (A3)
DATE : 26/03/09
DATUM :

DRAWING NO.
Fig. No. J1

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
Borehole Locations09.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings



REVISION	DESCRIPTION	DATE

DRAWING TITLE

Perimeter Gas Wells

WESTMEATH COUNTY COUNCIL

PROJECT

Ballydonagh Landfill

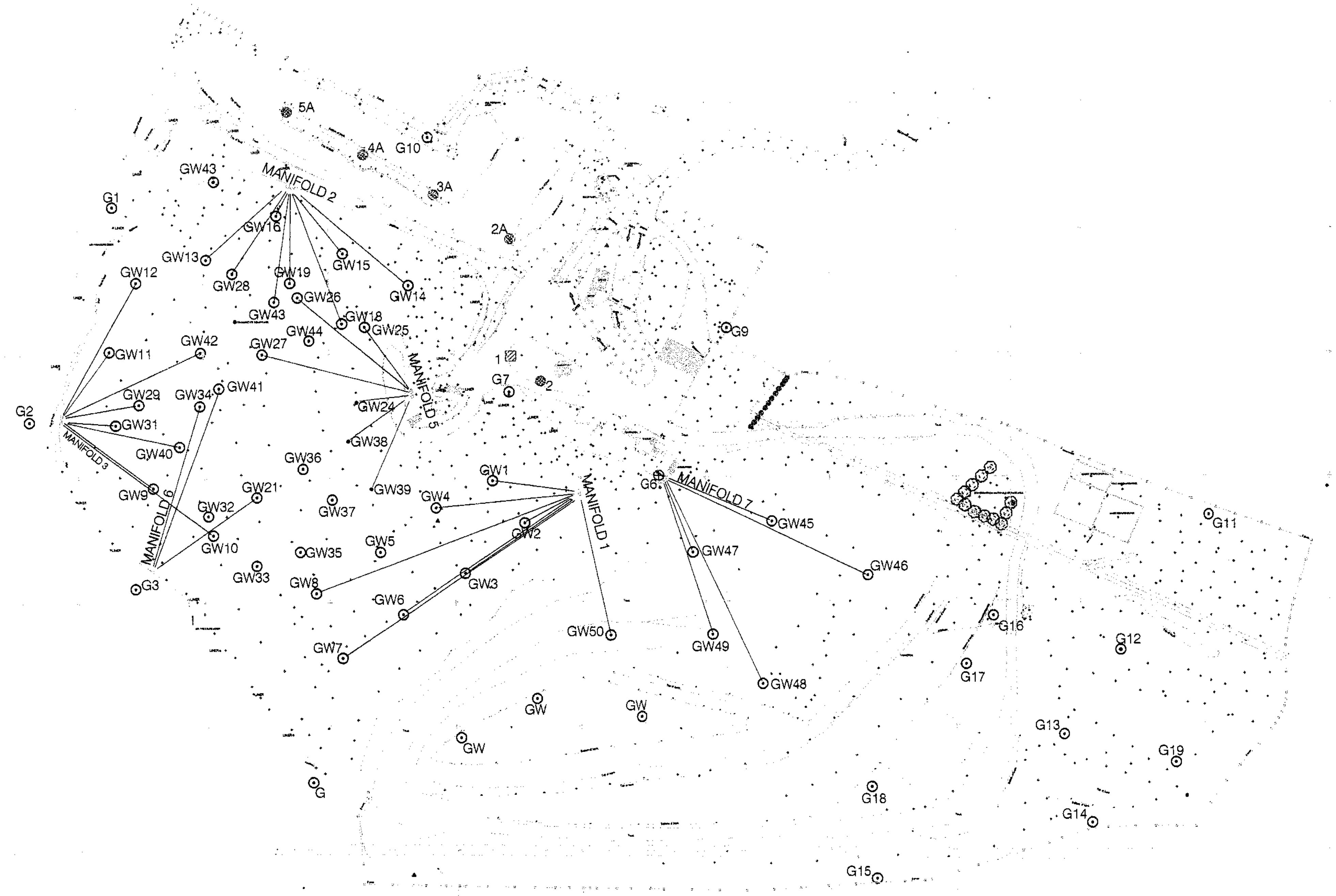
SURVEYED: Murphy Surveys
DRAWN: M. Rooney
CHECKED: P.J.Carey
APPROVED: H.O'Reilly

SCALE : NTS
DATE : 31/03/09
DATUM :

DRAWING NO.
PGW_09

DESIGN DEPARTMENT
COUNTY BUILDINGS
MULLINGAR. TEL (044) 9332000

FILE NAME & DIRECTORY
Perimeter Gas Wells 09.dwg
F:\PROJECTS\ENVIRONMENT\Landfills\Ballydonagh\Drawings



Office
House
Kilcullen Business Campus
Kilcullen
Co. Kildare
Ireland
Phone: (+353) 045 895402
Fax: (+353) 045 895403
Email: info@murphysurveys.ie

Cork
Douglas, Cork
Phone: (+353) 021 4895704
Fax: (+353) 021 4369230
cork@murphysurveys.ie

Belfast
The Gasworks
Phone: (+44) 028 9044 7606
Fax: (+44) 028 9044 7645
belfast@murphysurveys.co.uk

London East
Woolwich, London,
Phone: (+44) 0208 3018651
Fax: (+44) 0208 3018149
london@murphysurveys.co.uk

London West
Ealing, London
Phone: (+44) 020 8832 37184
Fax: (+44) 020 8832 3778
london@murphysurveys.co.uk

www.murphysurveys.ie

LEGEND

Notes: All levels relate to Malin Head Datum. The coordinate system is ING.

North

murphy SURVEYS LTD
Kildare Cork Belfast London

Drawing Number: 08214-S1-R1-00

Date: 06.05.08 **Scale:** 1:1000

Client: Fehily Timoney

Project: Ballydonagh Landfill

Description: Topographic Survey

5.7 Site Security

The total site of the existing landfill, comprising some 26 hectares, is fenced in by means of a fence and hedging consisting of, generally whitethorn and ash along the east to west boundary, separating the lands from adjacent agricultural land. The remaining land fronting onto the N.6 is fenced by means of a concrete post and rail fence.

The immediate landfilled area is secured by means of a 2.4-m high security fence consisting of precast concrete post.

Work commenced on the extension in late 2005 and was completed in February 2007. This included extending the security fence all around the extension.

5.8 Site Access Roads

The site is accessed from the N6. Access to the landfill is gained by a tar and chipped surfaced roadway. This section of road is laid out to minimise direct visibility to the landfilled area. Directly inside the security gates all public areas are paved in reinforced 200-mm thick concrete slab. This slab is laid with falls to effect good drainage.

The access roads to cells and haul roads are constructed of hardcore filling, generally clause 803, and are surfaced with a layer of crushed stone to clause 804 of the D.O.E. specification. The access roads to cells are upgraded and extended on an ongoing basis. Where ramps are constructed over the installed liner, the liner is first protected by two layers of geotextile, over which two layers of synthetic industrial bags are placed. On top of this construction, a 100-mm layer of sand is placed and over the sand the access road construction is placed.

5.9 Site Facilities

There are two purpose built buildings on-site and one Portacabin: -

(1) Site control hut and canteen. This building houses the records relating to the facility. Details of this building are shown on drawing number E066-14 in the waste license application.

(2) Public facility building, which encloses the compactor into which the public discharge their waste under cover. Details of this building are shown on drawing numbers E066-05B and 06 in the waste license application.

(3) The portacabin contains the Site Managers office.

A weighbridge is located adjacent to the control hut. The capacity of the weighbridge is 60,000 kg. The weighbridge platform is 18 metres by 3 metres. The weighbridge is fitted with an L115 digital indicator system, which is located in the control hut. The weighbridge has been integrated with the software for the management of waste inputs i.e., "Landfill for Windows".

A CCTV security system has been installed at the Site Control Hut.

A bunded covered fuel oil storage tank is provided for the storage of diesel for site vehicles. A locked robust container is maintained on-site for the storage of small quantities of fuel oil, engine oil etc. stored by means of five-gallon steel drums. This area is not bunded however all drums are stored on sump bunds.

5.10 Current Landscaping

The first stage of restoration took place in the autumn of 1997 when the majority of the eastern section of Phase 1 was temporally capped and seeded generally in accordance with Section 5.4.1 of the Landfill Manuals, Landfill Restoration and Aftercare. The final waste level in cells 1 & 2 was reached in August 2000 after which they were temporarily capped with a minimum thickness of 600mm of good quality topsoil.

As a control measure we have placed approximately 600mm of soil over the entire area of phase 2. Final landscaping plans proposed by OCM Consultants have been agreed by the Agency. Permanent capping of phase 1 and phase 2 and cell 9 of phase 3 is scheduled to be completed by end May 2009.

5.11 Wheel Cleaning

A static wheel wash is installed on-site. All vehicles, which travel on the haul roads or cells, must pass through the wheel wash on exiting the site.

Water is supplied to the wheel wash from pressurised main supplied from a submersible pump, from one of the on-site test boreholes. The wheel wash is provided with an overflow pipe that is connected to the leachate holding tank. From time to time the wheel wash is drained to the leachate holding tank, together with the sumps beneath the shaker bars, and the resulting silt is landfilled.

5.12 Surface Water Control Measures

The landfill is designed as a containment facility and is sealed with a double HDPE liner system. All leachate generated in the waste will be contained in the lined cells, drained by gravity flow via a manifold system and piped to the leachate storage facilities located on-site. Therefore, there are no emissions of leachate into the surface water drains.

The perimeter drains located outside the cells are directed to a drain that runs northwards under the N6 and discharges to the stream. These drains collect surface water run-off from the site. Generally, the drains are dry therefore it is not possible to quantify the flow from the site.

Silt traps have been installed in the drains to prevent silting up of the stream.

Drainage from the council paved area behind the public tipping buildings is by means of a surface water sewer discharge to the drain via a silt trap & oil interceptor. This drain runs north-west under the N6.

5.13 Site Services

The site is served with the following services: -

1. 3 Phase electricity supply, 440/23 volts, 50Hz not exceeding 50KVA.

2. Telephone line serviced by Eircom.

3. Water is provided from a submersible pump from one of the on-site test boreholes. This water is not suitable for potable purposes, however drinking water is supplied on site by the Council.

4. A foul sewer system is in place on-site to cater for sewerage from the canteen and toilets in the operators building. The sewer is connected to a septic tank. The location of the septic tank is shown on Drawing No. E066-03 Revision D submitted as further information on the 27th November 1998.

6. OPERATIONAL MATTERS

6.1 General Description of the Operation

The facility is an engineered landfill with deposition and covering of waste in specially designed and constructed landfill cells. The landfill cells are designed to control emissions to air, water and land. The cells have been designed as a containment facility and include a double HDPE liner with leak detection system. An active landfill gas extraction and flaring system is progressively installed. The recycling facility was relocated to Athlone Civic Amenity Recycling Centre in Golden Island, Athlone during August 2004 excluding one set of bring banks for glass bottles and aluminium cans.

6.2 Opening Hours

The facility is open Monday to Saturday. The opening hours are: -

Monday to Friday 8.00 am to 4.30 pm.

Saturday 10.00 am to 3.00 pm.

6.3 Phasing of Filling

The phasing of filling of the cells is in the following order Cell 1 followed by Cell 2, Cell 3, Cell 5, Cell 4 and Cell 6. However, for practical reasons it will not be possible to fill to full capacity any one cell without bringing up a portion of the adjacent cell. Final waste levels have been reached in Cells 1, 2 ,3, 4, 5 and 6. The haul road through cells 3 and 5 was filled up over the summer months of 2007.

Land-filling in the extension commenced on 20th of March 2007. The phasing of filling of the cells in the new Phase III is in the following order Cell 9 followed by Cell 8 and then Cell 7. However, again, for practical reasons it will not be possible to fill to full capacity any one cell without bringing up a portion of the adjacent cell. Cell 9 has reached its maximum height and landfilling began in cell 7 during January 2009.

6.4 Water, Leachate and Gas Control Measures

6.4.1 Surface Water Control Measures

Surface water control measures include paved and kerbed travelled surfaces draining to gullies. Water drainage from the completed landfill surface is towards the perimeter of the site. This water runs-off into perimeter drains and discharges into a drain that runs under the N6 in a northerly direction to the main stream in the area. The need for silt traps on the drainage system is reviewed on an on-going basis.

6.4.2 Leachate Management

The landfill is designed as a containment facility and is sealed with a double HDPE liner system. All leachate generated by the waste is contained in the lined cells, drained by gravity via a manifold pipe system and piped to the leachate storage facilities located on-site. A leak detection layer beneath the primary liner has been included in Phases 1 and 2 of the development to provide an early warning of possible impact on groundwater.

The Council has adopted a leachate management plan designed to maintain leachate levels at acceptable levels by routine removal of the leachate from the holding tank in accordance with Operational Practice Sheet No. 2. Also a Leachate Appraisal report undertaken by Westmeath County Council Consultants, Malachi Cullen & Partners, have put forward measures to improve the efficiency of the collection detection system, these measures have been accepted by the agency. Our consultants AFS have installed an electronic Leachate Monitoring System, where the control panel is in the caretakers office to read the levels in the leachate chamber and in two cells from both phases I and II. The leachate telemetry system also reads the levels of leachate in both Cell 9 and cell 8 in the caretakers office

Water Balance calculations are carried out to predict the volumes of leachate generated during filling and from the restored areas. These are discussed in detail in the Annual Environmental Report.

Leachate is collected from the leachate-holding tank and the new covered leachate lagoon (that holds any leachate generated from the new cells 7, 8 & 9 in Phase III) and tankered to the County Council treatment plant at Athlone.

6.4.3 Gas Control Measures

An active extraction and flaring system control landfill gas. The gas is collected by 51 (40 wells from phases 1 & 2, and 11 wells from phase 3) gas abstraction wells, which in turn are connected to an enclosed flaring unit.

As part of the capping contract for phase 1 and phase 2 and cell 9 of phase 3, forty new gas extraction wells will be installed with the prior approval of the Agency. This is discussed in further detail in the Schedule of Objectives and Targets in Section 8 of the Environmental Management Programme.

6.5 Controls of Environmental Nuisances

6.5.1 Dust Emission Controls

Dust emissions are minimised by the presence of the following engineering structures and activities: -

- Paved roads,
- Power sweeping and road cleaning,
- Vegetation of surfaces,
- Provision and use of a wheel wash,
- Perimeter breams with tree planting.

6.5.2 Noise Emission Controls

Noise emissions are minimised by the following methods: -

- Provision of bunds to surround the active working area,
- Using plant, which meets Noise Emission Regulations.

6.5.3 Odour Emission Controls

Odour emissions are reduced by the use if the following operational procedures and engineering controls: -

- The daily working/tipping area is kept small,
- Daily covering of waste,
- Immediate burial of malodorous materials,
- Upgrading of existing gas extraction system,
- Final capping of phases 1 & 2 and cell 9 of phase 3.
- Our consultants are using Bio-kill as part of their odour management plan for the capping works.
- Implementing the odour management plan that was prepared for the landfill.

6.5.4 Litter Control

Litter control is achieved using the following methods: -

- Frequent covering with imported granular cover material,
- Litter screens and breams are been installed around the active cells. The effective height of the litter screens shall be ca. 5 m,
- Periodic collection of any wind blown litter from bordering hedges and road verges.

6.5.5 Vermin Control

Vermin control is carried out as follows: -

- Regular baiting is carried out by on-site personnel to control the rodent population.
- Frequent covering of waste will reduce the potential nuisance of flies and birds,
- A new bird management programme for Ballydonagh Landfill commenced in April 2008. This employs the use of Bird Control Ireland, experts in bird control techniques. The bird management system combines the use of falcons, distress calls, kites and helium kites along with our own bird scaring pistol to maintain bird control.

6.5.6 Visual Intrusion

The operating plan includes a Master Landscape Plan. The site will be restored in accordance with the Master Plan.

6.6 Access Control and Waste Acceptance Procedures

Access control is exercised by means of an electrically operated barrier system. Signage is provided to direct all non commercial vehicles to the public facilities and all commercial H.G.V are directed to the cell in operation.

Waste acceptance procedures are dealt with in Section 4.2.

6.7 Equipment

The following equipment is used to spread, compact and cover the waste: -

- Bomag Compactor,
- Hymac excavator.
- Bulldozer.
- Dumper truck.

6.8 Waste Placement Procedures

Waste is deposited directly on the surface of the immediately preceding layer of waste close to the advancing tipping face by a variety of different waste collection and haulage vehicles. Deposited waste is spread in shallow layers on an inclined surface and compacted. The compactor operates solely on the gradient of the more shallow face, pushing thin layers of waste and applying compaction pressure to them. The waste is covered on a daily basis by cover material.

Only one working face is operated at any time. The working face is maintained at less than 25 metres wide and 2.5 metres in height after compaction with a slope of no greater than 1.3, as per condition 5.9 of the Waste Licence. Cover material is placed over the working face at the end of each working day.

6.9 Cover Requirements

A stockpile of granular clay / cover material is maintained on-site at all times. The quantity of cover material kept on-site varies but at all times is approximately 300 tonnes or greater. This is sufficient cover material to provide daily cover material for 20 days. This stockpile is replenished on an ongoing basis. Management of the quantity of cover material stored on-site is done by the Landfill Manager.

6.10 Site Personnel

The management and staffing structure at the facility is as follows: -

Landfill Manager:	Mr. P.J. Carey, Senior Executive Engineer Env. Section
Deputy Manager:	Ms. Geraldine Glennon, Env. Technician Grade 1
Deputy Manager / Caretaker:	Mr. Peter Buckley
Assistant Caretaker:	Mr. Pat Conway
General Operative:	Mr. Michael Browne

Mr. P.J. Carey and Ms. Geraldine Glennon have successfully completed the Waste Management Training Programme run by FAS. Peter Buckley is on a waiting list to attend the FAS training programme. Pat Conlon has already undertaken the FAS course.

6.11 Wheel Cleaning

Wheel cleaning procedures are dealt with in Section 5.11.

6.12 Operational and Safety Rules and Emergency Response Procedures

A copy of the current Emergency Response Procedures for the facility was submitted in 2005. A copy of the Contingency arrangements for Fire Fighting, Breakdown or Emergency and Contamination of Environmental Media which were included in Attachment K.1 to the Waste Licence Application were also included in Appendix 3 of the AER for 2000.

All contractors working on-site are expected to comply with Council Health & Safety requirements and Emergency Response Procedures.

6.13 Assessment of Waste Density and Settlement

The recent topographic survey Drawing no.Surv_08, included in Appendix 3 of the 2008 AER included the restored areas of Phase 1. The survey did not identify any significant settlement in the restored areas compared to previous surveys.

The estimated waste density of the placed waste is 0.85 t/m^2 and this has been used in the calculation for the remaining void space available in section 4.5 Site Capacity.

7. CLOSURE AND AFTERCARE

7.1 Site Life

The remaining capacity of the landfill is estimated at approximately 200,217 tonnes of waste. This includes phase III of the landfill, the licence was granted on 12th May 2004 at a maximum filling rate of 60,000 tonnes of waste per year. This will extend the lifetime of Ballydonagh landfill to 2011 subject to obtaining planning permission for the final two cells.

7.2 Final Contours

The final contours of the site are shown on Drawing CS-002561-LA/02, REV.P1 in Section 4. The level of waste shall be some 1.5-m below the contours shown on the drawing.

7.3 Restoration Plan

The first phase of restoration took place in the autumn of 1997 when the eastern, northern and southern sections of Cells 1 & 2 (Phase 1) were restored. A temporary cap of 600mm of good quality topsoil was placed over the entire area of Cells 1, 2, 3, 4, 5 & 6.

The permanent restoration plan is currently taking place for cells 1 to 6 and cell 9. This will result in the restoration of phases 1 & 2 of landfilled area to one large dome so as to blend this artificial landform into the existing landscape. The restoration plan also includes for the planting of trees and hedges on the restored embankments. Restoration will be in accordance with the report entitled "Report on Phasing and Restoration" submitted by the council to the Agency.

7.4 Phases for Closure and Restoration

The first phase of restoration took place in the autumn of 1997 when the eastern, northern and southern sections of Cells 1 & 2 (Phase 1) were restored. Waste deposition then switched to cells 3 & 5, which were used until the 27th March 2001. Landfilling then switched to Cells 4 & 6. Cells 4 & 6 were used from the 27th March 2001 until the 28th June 2001 when landfilling reverted to cells 3 & 5. Since then all 4 cells of phase 2 have been filled to maximum height.

During March 2007 a temporary cap of approximately 600mm to 1M of soil has been placed over the entire area of phase 2.

Landfilling then commenced in the extension on March 20th 2007. The phasing of filling of the cells in the new Phase III is in the following order Cell 9 followed by Cell 8 and then Cell 7. Currently, waste is being deposited in Cell 8 and Cell 7, after the haul road was built in the south east corner of the landfill through cell 7 to gain access to cell 8. Cell 9 has been filled to its maximum height and will be final capped by end June 2009.

7.5 Aftercare Monitoring

The aftercare-monitoring programme will be adapted from the operational phase monitoring programme and will largely depend on the results from the on-going monitoring.

7.6 Maintenance for Aftercare

Maintenance for aftercare of the site shall include: -

- Gully Cleaning,
- Seeding Grassland Areas,
- Replanting Trees in Perimeter Areas,
- Repairing and Gates,
- Backfilling settled areas on the landfill surface to maintain drainage.

Other maintenance requirements will be addressed as they arise, and will generally be done in accordance with Landfill Manuals, "Landfill Restoration and Aftercare" published by the EPA.

8. ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

The following list of objectives and targets has been prepared for Ballydonagh landfill in compliance with condition 2.2 of the Waste Licence WL0028-02.

Table 8.1 Schedule of Objectives and Targets for 2009

OBJECTIVE	TARGET
1.Encourage the public to increase waste recovery and recycling in accordance with the Waste Management Plan for the Midland Region.	Continue and extend the public information campaign to encourage recycling.
2. Reduce the quantities of green waste landfilled on-site.	Continue to increase awareness of the Recycling Centre in Athlone as a facility for the collection of green waste from households for composting.
3. Reduce the quantities of packaging waste accepted on-site.	Continue to communicate with the producers of packaging waste to ensure compliance with the Packaging Regulations. Continue implementation of Packaging Regulations 2001 to 2004. Continue to promote awareness of the new Civic Recycling Centre Mullingar. Continue the pilot scheme for brown bin collection of organic waste.
4. Construction of permanent Landfill cap for Phase 1 and Phase 2 and cell 9 of Phase 3	Permanent capping of Phase 1 and Phase 2 and cell 9 of Phase 3 by 30/05/2009.
5. Carry out detail assessment for designing a system for using landfill gas as a source of energy.	Design a specification for a small on site CHP generating plant by 30/09/2009 if deemed feasible.
6. Provide additional gas extraction wells in active cells	To install 4 number additional gas extraction wells, 2 in cell8 and 2 in the east side of cell 1 by May 09.
7. Resources use and Energy Efficiency	Carry out an Audit of energy efficiency of the site by 20 /11/2009. Identify reductions in water usage on the site by 20/11/2009. Carry out an assessment of use of raw materials and reduction in waste generated and identify any improvements made.
8. Put in place a landfill closure strategy for 2010	Draw up a closure strategy by August 2009 for the landfill closing in 2010. The strategy will deal with the landfilling of public waste post closure.

8.1.1 Projects Relating to the Objectives and Targets

8.1.1.1 Project 1 & 2 – Recovery & Recycling of Waste

Relationship to Objectives and Targets

In line with Westmeath County Council's objective to encourage the public to increase waste recovery and recycling the following project is planned. This project implements both objectives one and two given in Table 7.2 above.

Reason for Undertaking the Project

Encourage the Public to increase recovery and recycling of waste with a view to reducing the quantities of waste entering the landfill.

Targets

Continue the public information campaign to encourage recycling.
Increase awareness of the Recycling Centre in Athlone as a facility for the collection of green waste for composting.

Project Summary

Task 1: Continue the public information campaign e.g. newspaper advertisements, postal drops, site notices and radio advertisements aimed at encouraging the public to recycle materials. This task will be ongoing over the entire lifetime of the landfill.

Task 2: Increase awareness of the Recycling Centre in Athlone as a facility for the collection of green waste for composting. This will entail the Environmental Awareness Office running publicity campaigns to increase the numbers of users of the facility.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project.

Capital Cost and Returns

The cost of the project is estimated at €60,000. A dedicated Environmental Awareness Officer will carry out Task 1 and Task 2.

Time-frame
Task 1 will be ongoing over the entire lifetime of the landfill.
Task 2 will be ongoing during the year.

8.1.1.2 Project 3 – Packaging Waste Reduction

Relationship to Objectives and Targets

In line with Westmeath County Councils objective to reduce the quantities of packaging waste accepted on-site the following project is planned. This project implements objective 3 in Table 7.2.

Reason for Undertaking the Project

To reduce the quantities of waste entering the landfill and therefore, save landfill space , in line with the Regional WM Plan objectives.

Targets

Continue to communicate with the major producers of packaging waste in the County with a view to ensuring compliance with the Packaging Regulations and to extend this to all smaller producers of packaging waste, including retailers under the new Packaging Regulations.

Project Summary

Task 1: Continue to communicate with the producers of packaging waste, small as well as large producers including small retailers in the county with a view to ensuring compliance with the Packaging Regulations. This will be ongoing over the lifetime of the landfill.

Task 2: Implement Packaging Regulations 2001 to 2004 in relation to major producers and producers of packaging waste in conjunction with REPAK. Continue auditing of all producers and take enforcement proceeding if necessary to ensure compliance.

Task 3. Promote the awareness of Mullingar Recycling Centre.

Task 4. Continue the pilot scheme for the introduction of the Brown bin collection of organic waste. 1000 brown bins have been distributed to Council Refuse collection customers.

Designation of Responsibility

The Landfill manager is responsible for the implementation of this project. Three environmental enforcement officers have been employed by Westmeath County Council to enforce waste legislation including the Packaging Regulations. The Environmental Awareness Officer will carry out the promotion work.

Capital Cost and Returns

The cost of the Task1 to 5 is estimated at €160,000. There is no direct financial payback from this investment.

Time-frame

Task 1 is ongoing.
Task 2 is ongoing .
Task 3 is ongoing .
Task 4 is ongoing .

8.1.1.3 Project 4 – Construct Permanent Landfill Cap for Phase 1 and Phase 2 and cell 9 of Phase 3.

Relationship to Objectives & Targets

In line with Westmeath County Councils objective to reduce Greenhouse gas emissions the following project is planned. This project implements objective 4 in Table 7.2.

Reason for Undertaking the Project

To reduce Greenhouse gas emissions and odours from the Landfill.

Targets

To construct a permanent cap on Phase 1 and Phase 2 and cell 9 of Phase 3.

Project Summary

Task 1. Construct new cap and gas extraction system as per SEW submitted to the Agency.

Task 2. Supervision of contract construction quality assurance (CQA) and contract management on site.

Task 3 Produce CQA validation report for Agency approval.

Capital Cost

The cost of the project is estimated at €2,000,000.

Time-frame
It is proposed to have this project completed before end of June 2009.

8.1.1.4 Project 5 – Landfill Gas Recovery.

Relationship to Objectives and Targets

In line with Westmeath County Councils objective to utilise the gas as a source of energy the following project is planned. This project implements objective 5 in Table 7.2.

Reason for undertaking this project

To utilise landfill gas as a source of energy.

Targets

To investigate the design and install the necessary equipment on site with a view to utilising the gas as a source of energy.

Project Summary

Task 1: Carry out a detail assessment for designing a system for using landfill gas as a source of energy.

Task 2 : Design a small on site Combined Heat and Power (CHP) generating plant by the 30/09/2009 if deemed feasible.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project. Specialist contractors will be used as required.

Capital Cost and Returns

The cost of the project is estimated at €6,000 (Design Cost)

Time-frame

It is proposed to implement Task 1 and Task 2 by the 30/09/2009.

8.1.1.5 Project 6 – Install additional Gas Extraction Wells in the Active Cells.

Relationship to Objectives & Targets

In line with Westmeath County Councils objective to reduce Greenhouse gas emissions the following project is planned. This project implements objective 6 in Table 7.2.

Reason for Undertaking the Project

To reduce Greenhouse gas emissions and odours from the Landfill.

Targets

To construct 4 No. additional gas extraction wells in the active area of cell 8 and cell 9 of Phase 3.

Project Summary

Task 1 As part of the present capping work install an additional 2 No. gas extraction wells in each of cell 8 and cell 9 of Phase 3 .

Capital Cost

The cost of the project is estimated at €16,000.

Time-frame
It is proposed to have this project completed before end of June of 2009.

8.1.1.6 Project 7 - Resources use and Energy Efficiency

Relationship to Objectives and Targets

In line with the Council's objective to comply with the amendment to the waste licence and manage the resources of the site efficiently. This project implements objective 7 in Table 7.2.

Reason for Undertaking the Project

To manage resources efficiently and effect a reduction in the waste generated from various processes used on the site.

Targets

Carry out an Audit of processes that use energy and identify reductions in water usage and waste generated.

Project Summary & Timeframe

Task 1: Carry out an Audit of energy efficiency of the site by 20 /11/2009.

Task 2: Identify reductions in water usage on the site by 20/11/2009.

Task 3: Carry out an assessment of use of raw materials used in various processes and obtain a reduction in waste generated from the various processes and identify any improvements made.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project. Specialist contractors will be used as required.

Capital Cost

The cost of the project is estimated at €2000

8.1.1.7 Project 8 - Put in place a Landfill Closure Strategy for 2010.

Relationship to Objectives & Targets

In line with Westmeath County Councils objective to close the landfill in 2010 a strategy to deal with the disposal of household waste post closure will be put in place.

Reason for Undertaking the Project

To put in place a closure strategy which will deal with the disposal of household waste post landfill closure.

Targets

Complete landfill closure strategy by August 2009.

Project Summary

Task 1:- Draw up a strategy for the disposal of household waste post the landfill closure in 2010.

Time-frame
It is proposed to have this project completed by August 2009.

Designation of Responsibility

The Landfill Manager is responsible for the implementation of this project.

8.3 Document Control

All documents relating to the Waste Licence are controlled in accordance with the current Document Control Procedure.

8.4 Awareness and Training

Westmeath County Council has revised its Awareness and Training Procedure, following comments from the agency, to ensure that the awareness and training needs of landfill site personnel are identified and the required training provided.

8.5 Corrective Action

Westmeath County Council has prepared Corrective Action Procedures (CAP) to ensure that corrective action is taken should specified licence requirements of the Waste Licence not be fulfilled. This Procedure describes the content and applicability of the CAPs and assigns responsibility for their implementation, maintenance and update. A copy of this procedure was submitted to the Agency for approval.

8.6 Management Structure & Responsibilities

Westmeath County Council has established a Management Structure for the Ballydonagh facility. This management structure also assigns responsibilities. A copy of the management structure is contained in Section 8 of the 2008 AER.