# Annual Environmental Report

## GLENALLA LANDFILL SITE
**(Waste Licence Ref. W0125-1)**

**By**
**Donegal County Council**
**For**
**Environmental Protection Agency**

**Reporting Period: January to December 2012**

**May 2013**

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# 1. INTRODUCTION

1.1 This Annual Environmental Report (AER) has been prepared to meet the requirements of Schedule E and F of Waste Licence W0125-1 for Glenalla Landfill. This report provides an environmental review of the site from the 1st of January 2012 to the 31st of December 2012.

1.2 On the 4th of December 2001 the Environmental Protection Agency granted the Council a Waste Licence (registration number W0125-1) for the orderly closure, capping and restoration of the landfill facility, in accordance with the Third Schedule of the Waste Management Act, 1996. Donegal County Council ceased operational activity at Glenalla Landfill Site after the Christmas period in December 2001. Subsequently, Donegal County Council was only permitted to accept inert waste for disposal for the purposes of restoration and aftercare of the site. The quantity of inert waste to be accepted is limited to 46,000 tonnes. The Council has managed the facility to ensure that activities have not caused environmental pollution and carries out regular environmental monitoring. All monitoring data is submitted to the EPA. The site was formally restored in 2005/6.

1.3 Glenalla Landfill is an unlined facility, historically operated on the dilute and disperse principle, whereby leachate generated by rainfall infiltration and the decomposition of the landfilled waste is allowed to disperse into the surrounding environment. The landfill site is situated in a low-lying hollow that has been infilled by peat deposits constituting an area of blanket bog. These deposits can represent an effective hydraulic barrier to the downward percolation of leachate. The disposal of waste was undertaken by the landraise method, whereby tipping took place directly onto the stripped ground surface raising its level to form an elevated landform flanked by low graded banks. As mentioned above the site was formally restored in 2005/6.

1.4 The landfill is situated in a fully rural setting, some 4km east of Milford in an area of moderate relief that forms part of the upper catchment of the Glenalla River. This watercourse dissects the southwest boundary of the landfill site. The ground surface of the closed hollow in which the landfill is based generally falls in a south to south westerly direction under a shallow gradient towards the Glenalla River. The downstream extent of the landfill is therefore represented by a small area situated on the southern site boundary. The area to the north and northeast of the site represents the principal upstream area.

# 2. WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

## 2.1 Type of Waste

The licensed disposal activities, in accordance with the Third Schedule of the Waste Management Act, 1996 are restricted to those listed as follows

- **Class 1 Deposit on, in or under land (including landfill):** This activity is limited to the deposition of inert waste.
- **Class 4 Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons:** This activity is limited too leachate collection and treatment
- **Class 13 Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced:** This activity is limited to leachate collection and storage prior to treatment.

# 3. QUANTITIES AND COMPOSITION OF WASTE

## 3.1 Quantities of Waste for Restoration

In accordance with Condition 1 of the waste licence only inert waste may be deposited at the facility. A maximum of 46,000 tonnes shall be accepted for the purposes of restoration and aftercare. The quantity of waste received during the reporting period and each previous year at the facility are presented in Table 3.1.

3.2 Glenalla landfill site was closed in 2001 and no material was been imported or exported until restoration works commenced during 2005. The material imported during 2005 was inert and specifically for the purpose of restoring the site.

**Table 3.1 Waste quantities accepted (tonnes)**

| | **1998** | **1999** | **2000** | **2001** | **2002** | **20036** | **2004** | **2005** |
|---|---|---|---|---|---|---|---|---|
| Total | 550 | 1,565 | 5,722 | 10,093 | 0 | 0 | 0 | 34,474* |
| | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

* inert material imported for restoration.

## 4. SUMMARY REPORT OF EMISSIONS

### 4.1 Groundwater

4.1.1 Introduction

Groundwater is monitored at the locations shown on drg. no. BL523421/415. GW1 is located upstream of the landfill and GW3 and GW2 are immediately downstream. GW2 was re-drilled during 2006. Parameters to be monitored and frequencies as required by the Waste Licence are listed in Appendix A. Since restoration the Agency has agreed to reduce monitoring frequency to bi-annual and the requirement to test for annual frequency parameters has been dropped. All results in tabular and graphical format are contained in Appendix B. Results are compared against EC (Quality of Water Intended for Human Consumption) Regulations 1988; EC (Drinking Water) Regulations 2000 and EPA Interim Guideline Values.

4.1.2 Summary of Results

The site was developed on the dilute and disperse principal, however the groundwater receives some protection against contamination from the peat and clay underlying the landfill and the landfill is now fully restored. Results do indicate an impact on downstream groundwater from the landfill.

### 4.2 Surface Water

4.2.1 Introduction

Surface water monitoring is carried out at SW1, SW2, SW3 & SW4 as shown on Drawing No. BL523421/415. SW1 is reflective of the quality of the surface water upstream of the landfill site. The parameters and frequencies of monitoring required by the Waste Licence are listed in Appendix A, however since restoration of the site the Agency has agreed to a frequency of bi-annual monitoring and to drop the requirement for the annual parameters. The results of monitoring in tabular and graphical format are presented in Appendix B. Results are compared against EC (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations 1989.

4.2.2 Summary of Results

On the basis of the hydrogeology of the site, surface water represents the principal receptor of leachate emissions from the site. Surface water results previously did indeed indicate that leachate was being released from the facility into the surrounding environment. Following restoration, levels of emissions to surface water had been reducing. Following a rise in downstream ammonia levels at the end of 2008 however an investigation was undertaken into the cause of the increase in downstream leachate emissions. It was eventually discovered that although the leachate pump appeared to be working, it was not delivering leachate to the lagoon. The pump was repaired and its performance monitored, however, it was still problematic throughout this period and so was replaced entirely during December 2011. It had been anticipated as a result of the replacement of the leachate pump in December 2011 that surface water quality would improve during 2012, unfortunately this has not been the case

and results still indicate that leachate is being released into the surface water system. The reason for this is currently under investigation with the assistance of a hydrogeologist.

### 4.3 Leachate Composition

4.3.1 Leachate is monitored at one location at the facility, L1, as shown on Drawing No. BL523421/415. The results are contained in Appendix B and have been compared with typical leachate quality as reported in EPA Landfill Manual – Landfill Operational Practices (see Section 5.3). All parameters are consistent with typical leachate composition and comparable with levels recorded during the last reporting period.

### 4.4 Landfill gas

4.4.1 Landfill gas is monitored at three locations at the facility as shown on Drawing No. BL523421/415. LG1, LG2, and LG3 are all located in waste. Both LG1 and LG3 were replaced during restoration works. Maintenance works were carried out previously to secure access to these wells. Levels detected during this period are similar to those reported last period.

### 4.5 Dust Monitoring

4.5.1 Dust monitoring was not undertaken in this reporting period.

# 5. RESULTS & INTERPRETATIONS OF MONITORING INCLUDING PLANS & UPDATES OF MONITORING LOCATIONS.

## 5.1 Groundwater

5.1.1 Locations, parameters and monitoring frequencies, as required by the Waste Licence are listed in Appendix A. Locations are shown in Drg no. BL523421/415. Results of the monitoring programme are listed in Appendix B. These results have been compared to EC Quality of Water Intended for Human Consumption Regulations, 1988, the European communities (Drinking Water) Regulations, 2000 and the EPA Interim Report, Towards Setting Guidelines Values (IGV) for the Protection of Groundwater in Ireland

5.1.2 Upstream no parameters were recorded in excess of MAC.

5.1.3 Downstream, exceedances were recorded for Ammoniacal Nitrogen (max. 6.66mg/l) and Chloride (max. 45mg/l).

## 5.2 Surface Water

5.2.1 Locations, parameters and monitoring frequencies, as required by the Waste Licence are listed in Appendix A. Since restoration sampling frequency has been reduced to bi-annual and the annual parameters ceased, by agreement of the Agency. Locations are shown in Drg no. BL523421/415. The results are presented graphically and in tabular format in Appendix B. These results have been compared to EC Quality of Surface Water (Intended for the Abstraction of Drinking Water) Regulations, 1989.

5.2.2 Upstream of the site, results showed elevated levels of COD (max. 48mg/l).

5.2.3 Downstream, levels of Ammoniacal Nitrogen (max. 9.79mgl), COD (max. 50mg/l) and Chloride (max. 44mg/l) are elevated.

## 5.3 Leachate

5.3.1 Leachate quality can vary during the lifetime of landfill site depending on the phase of decomposition of the waste. Leachate results for the reporting period are presented in Appendix B and some of the characteristic parameters of the leachate are listed in Table 5.1 below.

| Table 5.1: Raw Leachate Concentrations 2012 | | | | | |
|---|---|---|---|---|---|
| | Glenalla Landfill Site | | From 30 samples from UK/Irish landfills accepting domestic waste Results in mg/l | | |
| PARAMETER | Min.Conc | Max.Conc | Min.Conc | Max.Conc | Mean |
| Ammonia (mg/N) | 69 | 79 | <0.2 | 1700 | 491 |
| BOD | 5.41 | 6.72 | 4.5 | >4800 | >834 |
| COD | 35 | 65 | <10 | 33,700 | 3078 |
| Chloride (mg/l) | 216 | 225 | 27 | 3410 | 1256 |
| Iron (mg/l) | NA | NA | 0.4 | 664 | 54.4 |
| Potassium (mg/l) | NA | NA | 2.7 | 1480 | 491 |
| TON (mg/l N) | <0.01 | 0.1 | / | / | / |
| Conductivity (mS/cm) | 1369 | 1866 | 503 | 19,200 | 7789 |
| pH | 7.58 | 7.67 | 6.4 | 8 | 7.2 |

NA = not available

5.3.2 Leachate results have been compared to "Typical Leachate Composition of 30 Samples from UK/Irish Landfills accepting mainly Domestic Waste" (Landfill Operational Practices). All parameters are consistent with typical leachate composition.

## 5.4 Landfill Gas

Levels this period are consistent with those recorded post restoration. Maximum and minimum levels are shown in Table 5.2 below and full results and graphs are contained in Appendix B. These wells are all located within waste.

**Table 5.2 Methane and Carbon Dioxide Max & Min for Gas Wells in Waste**

| | 2010 | | 2011 | | 2012 | |
|---|---|---|---|---|---|---|
| Parameter | Max | Min | Max | Min | Max | Min |
| Methane | 74.5% | 4.1% | 74.5% | 4.1% | 75.5% | 1.4% |
| Carbon Dioxide | 46.8% | 2.3% | 29.8% | 2.3% | 36.4% | 1.8% |

## 5.5 Dust

Dust monitoring was not undertaken during this period.

## 6. VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE DISCHARGED

6.1 A water balance calculation has been undertaken and is contained in Appendix C. This indicates that the estimated volume of leachate produced at the site for 2011 was approximately 2355$m^3$.

6.2 Leachate is typically tankered from the collection lagoon on the site one day per week. The total volume of leachate tankered during the last reporting period was 3615$m^3$. Table 6.1 below shows a breakdown of volumes tankered each month and the corresponding rainfall at the Malin Head weather station.

**Table 6.1 Breakdown of leachate volumes by month in 2012 relative to rainfall at Malin Head**

| Month | Leachate Volume ($m^3$) | Rainfall at Main Head (mm) |
|---|---|---|
| January | 330 | 134.7 |
| February | 270 | 68.1 |
| March | 309 | 29.8 |
| April | 215 | 46.3 |
| May | 396 | 50.7 |
| June | 293 | 141.1 |
| July | 236 | 91.4 |
| August | 293 | 87.3 |
| September | 245 | 139.2 |
| October | 237 | 123.5 |
| November | 423 | 87.4 |
| December | 368 | 149.3 |
| **Totals** | **3615** | **1148.8** |

## 7. TOPOGRAPHICAL SITE SURVEY

7.1 A topographical survey of the site was carried out in May 2006 post restoration. Copies of the survey were forwarded to the Agency in March 2007.

## 8. REPORTED INCIDENTS AND COMPLAINTS SUMMARIES

8.1 Donegal County Council reports on an on-going basis all occasions where either surface waters or groundwaters are found to contain in excess of 0.2mg/l ammonia, or where perimeter gas wells are found to contain greater than either 1% methane or 1.5% carbon dioxide. These are reported as incidents each six-monthly reporting period or when the results become available.

8.2 Apart from the on-going emissions exceedance reporting referred to above, no incidents have been reported to the Environmental Protection Agency during this reporting period.

8.3 No complaints where received during this reporting period.

## 9. REVIEW OF NUISANCE CONTROLS

### 9.1 General

As the facility is not operational, and all areas formerly used for placement of municipal waste have been fully restored, the following list of nuisances are no longer deemed likely to cause problems. Regular site inspections carried out by environmental scientists check for evidence of any of the following. Where any sign of these is detected appropriate control measures would be introduced.

- Flies and vermin;
- Dust;
- Litter;
- Birds;
- Noise;
- Odours.

### 9.2.1 EMS

As part of the Environmental Management System a procedure has been developed to ensure that the site is inspected for each of the above-mentioned nuisances on a quarterly basis. This will ensure that should any nuisance arise, the situation is identified and dealt with appropriately.

## 10. MANAGEMENT STRUCTURE OF SITE

### 10.1 Organisation

The management of the landfill site is illustrated in the diagram that follows.

**10.2 Management Responsibility**

Senior Engineer**:** Overall responsibility for the management of the site and ensuring compliance with the Waste Licence. Delegation of authority and responsibility to ensure the effective management of the facility and licence compliance.

Senior Executive Engineer: Responsible for the day-to-day management of the facility as directed by the Senior Engineer.

Executive Environmental Officer: Responsible for overall compliance with EPA Licence.

Scientific Officer: Carry out environmental monitoring of emissions and reporting in accordance with licence requirements.

## 11. PROGRAMME FOR PUBLIC INFORMATION

11.1 A public communication programme has been initiated in accordance with Condition 2 of the Waste Licence to ensure that information concerning the environmental performance is available at reasonable times. The public may view environmental records at the Donegal County Council Environmental Headquarters at Three Rivers Centre in Lifford. Details regarding this programme are contained in Section 2 of the Environmental Management System Manual.

## 12. CAPPING AND RESTORATION OF THE SITE.

12.1 The site was fully restored in 2005/6 in accordance with the approved Restoration and Aftercare Plan dated May 2004.

12.2 It was agreed with the Agency in July 2006 that monitoring and reporting frequency would be reduced to bi-annually. It is hoped that when the benefits of restoration have been fully demonstrated that the Council can surrender the licence for this facility.

12.3 It was further agreed with the Agency in November 2009 that the annual run of List I & II parameters could be dispensed with on the restored sites such as Glenalla.

## 13. REPORT ON STAFF TRAINING

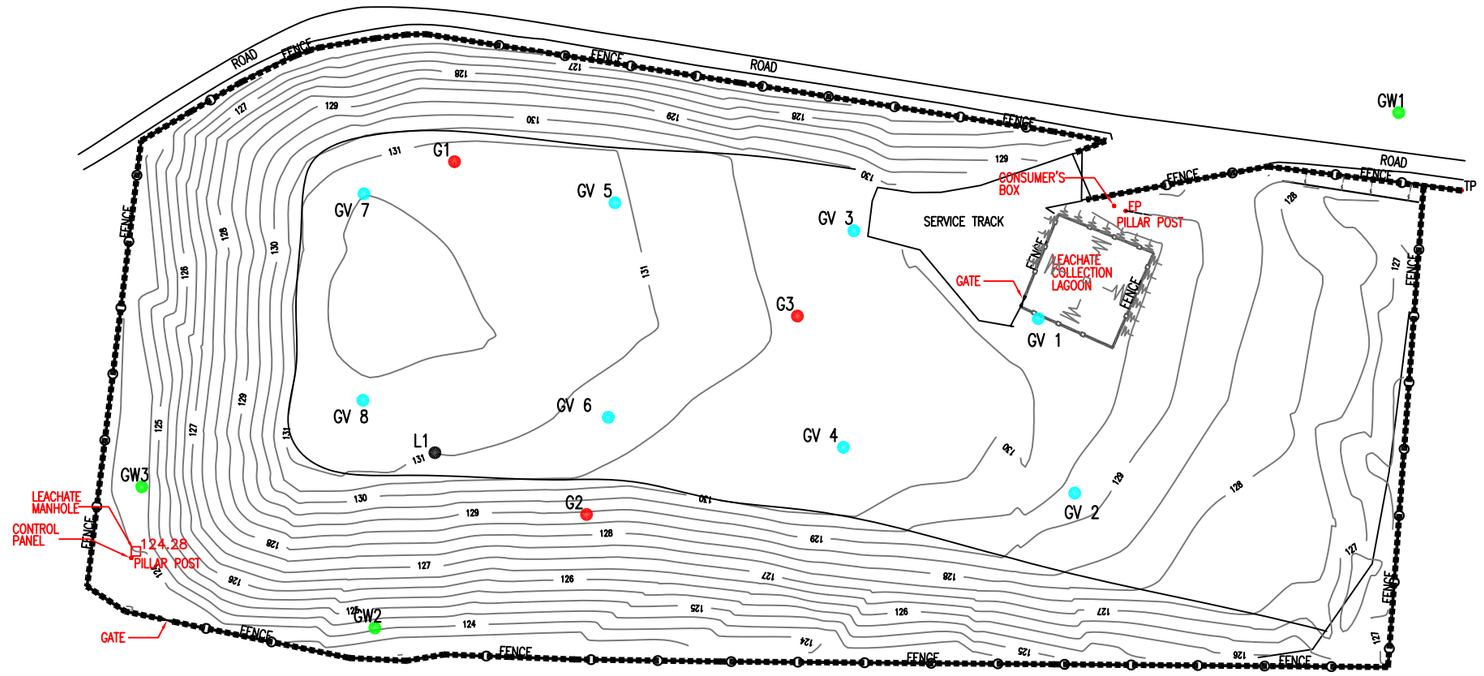
13.1 As the site is no longer operational, management is as per Section 10. The Scientific Officers monitoring the site are scheduled for the following types of training courses:

- FAS Waste Management Training Programme;
- FAS Waste Operatives Training;
- Manual Handling;
- Specific EPA training courses.

## 14. REPORT ON DEVELOPMENT WORK UNDERTAKEN DURING THE REPORTING PERIOD, AND A TIME SCALE FOR THOSE PROPOSED DURING THE COMING YEAR.

14.1 The leachate pump, which delivers gravity fed leachate to the collection lagoon beside the gate, was replaced at the end of this reporting period.

| Borehole Locations | |
|---|---|
| Gas Vents | Grid Reference |
| GV 1 | 223262.21, 427932.43 |
| GV 2 | 223267.63, 427904.00 |
| GV 3 | 223232.14, 427946.76 |
| GV 4 | 223230.43, 427911.45 |
| GV 5 | 223193.16, 427951.33 |
| GV 6 | 223192.09, 427916.36 |
| GV 7 | 223152.23, 427952.74 |
| GV 8 | 223152.07, 427919.12 |




## NOTES

1.KEY

- NEW GAS VENTS

EXISTING BOREHOLES

- L1 LEACHATE MONITORING POINT
- G1 GAS MONITORING POINT
- SW1 SURFACE WATER MONITORING POINT
- GW1 GROUNDWATER MONITORING POINT

| MONITORING TYPE | REF NO | GRID REFERENCE |
|---|---|---|
| GROUNDWATER | GW1 | 223321 427966 |
| | GW2 | 223154 427882 |
| | GW3 | 223116 427905 |
| LEACHATE | L1 | 223169 427902 |
| GAS | G1 | 223167 427958 |
| | G2 | 223190 427895 |
| | G3 | 223224 427929 |
| SURFACE WATER | SW1 | 223060 427912 |
| | SW2 | 223109 427884 |
| | SW3 | 223168 427827 |

| REV | DESCRIPTION | BY DATE | CHECK DATE |
|---|---|---|---|

| | | |
|---|---|---|
| DRAWN BY AMB DATE JAN '08 | CHECK BY DD DATE JAN '08 | APPROVED DD DATE JAN '08 |
| PLOT SCALE 1:1000 | SCHEDULES | SHEET SIZE A3 |

CLIENT

DONEGAL COUNTY COUNCIL

PROJECT

GLENALLA LANDFILL SITE

TITLE

MONITORING POINTS

RPS Consulting Engineers
TEL: 074 91 61927 www.rpsgroup.com/ireland FAX: 074 91 61928
THE ENTERPRISE FUND BUSINESS CENTRE, BALLYRAINE, LETTERKENNY, Co. DONEGAL

| | |
|---|---|
| ARCHITECT | |
| DRAWING No. | BL523421/415 |
| REVISION | |

| DWG. STATUS | |
|---|---|
| PRELIM. | |
| TENDER | |
| CONST. | |
| RECORD | ● |

100mm

100mm

# APPENDIX A

# MONITORING LOCATIONS, FREQUENCIES AND PARAMETERS

**Table A1: Monitoring Locations**

| Type | Label | Location (Grid Ref.) |
|---|---|---|
| Landfill Gas | G1 | 223167 427958 |
| | G2 | 223190 427895 |
| | G3 | 223224 427989 |
| Dust | D1 | TBC |
| Groundwater | GW1 | 223391 427948 |
| | GW2 | 223154 427882 |
| | GW3 | 223116 427905 |
| Leachate | L1 | 223169 427902 |
| Surface Water | SW1 | 223060 427912 |
| | SW2 | 223109 427884 |
| | SW3 | 223168 427827 |
| | SW4 | 223333 427668 |

**Table A2: Groundwater Parameters & Monitoring Frequencies**

| Bi-annually | Annually | |
|---|---|---|
| Chloride | Boron | Magnesium |
| Dissolved Oxygen | Cadmium | Manganese |
| Sodium | Calcium | Mercury |
| TON | Chromium | Orthophosphate |
| TOC | Copper | Zinc |
| Phenols | Cyanide | Residual on evaporation |
| Ammoniacal Nitrogen | Fluoride | |
| Electrical Conductivity | Lead | |
| pH | List I/II substances | |
| Iron | Sulphate | |
| Potassium | | |
| Temperature | | |
| Groundwater Level | | |

**Table A3 Surface Water Parameters & Monitoring Frequencies**

| **Bi-Annually** | **Annually** | |
|---|---|---|
| Chloride | Iron | Magnesium |
| Dissolved Oxygen | Cadmium | Manganese |
| COD | Calcium | Mercury |
| Visual Inspection /Odour | Chromium | Orthophosphate |
| Ammoniacal Nitrogen | Copper | Zinc |
| BOD | Sodium | Potassium |
| Electrical Conductivity | Lead | TON |
| pH | List I/II substances | Sulphate |
| Suspended Solids | | |
| Temperature | | |

# APPENDIX B

# MONITORING RESULTS

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | surface water | | | | | | | | | | | |
| Site No | | SW1 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2774 | | | 4364 | | | 5759 | |
| pH | | | | | | 7.31 | | | 6.79 | | | 6.69 | |
| Temp | C | | | | | 17.5 | | | 18.1 | | | 4.8 | |
| Electrical Conductivity | uS/cm | | | | | 99 | | | 77 | | | 68 | |
| Ammonical Nitrogen | mg/l | | | | | 0.02 | | | 0.40 | | | 0.08 | |
| COD | mg/l | | | | | 40 | | | 48 | | | 46 | |
| BOD | mg/l | | | | | 0.01 | | | 1.33 | | | 2.61 | |
| Dissolved Oxygen | mg/l | | | | | 8.71 | | | 9.84 | | | 13.06 | |
| SS | mg/l | | | | | | | | 12.0 | | | 5.0 | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 20 | | | 21 | | | 20 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | ug/l | | | | | | | | | | | | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | | | | | | | | |
| Sodium | mg/l | | | | | | | | | | | | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | | | | | | | | |
| Total Oxidised Nitrogen | mg/l | | | | | 0.09 | | | 0.03 | | | <0.01 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | | | | | | | | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | | | | | | | | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | surface water | | | | | | | | | | | |
| Site No | | SW2 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2775 | | | 4365 | | | 5760 | |
| pH | | | | | | 7.26 | | | 6.88 | | | 6.78 | |
| Temp | C | | | | | 16.70 | | | 18.10 | | | 4.80 | |
| Electrical Conductivity | uS/cm | | | | | 108 | | | 77 | | | 67 | |
| Ammonical Nitrogen | mg/l | | | | | 0.02 | | | 8.58 | | | 0.09 | |
| COD | mg/l | | | | | | | | 51 | | | 42 | |
| BOD | mg/l | | | | | | | | 1.25 | | | 2.01 | |
| Dissolved Oxygen | mg/l | | | | | 9.17 | | | 9.81 | | | 13.08 | |
| SS | mg/l | | | | | | | | 1.00 | | | 1.00 | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 29 | | | 28 | | | 23 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | ug/l | | | | | | | | | | | | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | | | | | | | | |
| Sodium | mg/l | | | | | | | | | | | | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | | | | | | | | |
| Total Oxidised Nitrogen | mg/l | | | | | 0.09 | | | 0.01 | | | <0.01 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | | | | | | | | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | | | | | | | | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | surface water | | | | | | | | | | | |
| Site No | | SW3 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2776 | | | 4366 | | | 5761 | |
| pH | | | | | | 7.32 | | | 6.82 | | | 6.82 | |
| Temp | C | | | | | 16.80 | | | 18.00 | | | 4.90 | |
| Electrical Conductivity | uS/cm | | | | | 291 | | | 112 | | | 119 | |
| Ammonical Nitrogen | mg/l | | | | | 9.79 | | | 1.00 | | | 1.71 | |
| COD | mg/l | | | | | | | | 50 | | | 47 | |
| BOD | mg/l | | | | | | | | 1.7 | | | 1.6 | |
| Dissolved Oxygen | mg/l | | | | | 8.7 | | | 9.5 | | | 12.9 | |
| SS | mg/l | | | | | | | | 16.0 | | | 2.0 | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | | | | | | | | |
| Chlorine | mg/l | | | | | 44 | | | 35 | | | 25 | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | ug/l | | | | | | | | | | | | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | | | | | | | | |
| Sodium | mg/l | | | | | | | | | | | | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | | | | | | | | |
| Total Oxidised Nitrogen | mg/l | | | | | 0.18 | | | <0.01 | | | <0.01 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | | | | | | | | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | | | | | | | | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | surface water | | | | | | | | | | | |
| Site No | | SW4 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2777 | | | 4367 | | | 5762 | |
| pH | | | | | | 7.65 | | | 7.01 | | | 6.85 | |
| Temp | C | | | | | 16.50 | | | 17.70 | | | 5.40 | |
| Electrical Conductivity | uS/cm | | | | | 209 | | | 110 | | | 122 | |
| Ammonical Nitrogen | mg/l | | | | | 6.08 | | | 0.43 | | | 0.51 | |
| COD | mg/l | | | | | | | | 47 | | | 35 | |
| BOD | mg/l | | | | | | | | 1.4 | | | 2.8 | |
| Dissolved Oxygen | mg/l | | | | | 8.90 | | | 9.4 | | | 12.6 | |
| SS | mg/l | | | | | | | | 6.0 | | | 1.0 | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 44 | | | 34 | | | 31 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | ug/l | | | | | | | | | | | | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | | | | | | | | |
| Sodium | mg/l | | | | | | | | | | | | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | | | | | | | | |
| Total Oxidised Nitrogen | mg/l | | | | | 2.45 | | | 0.34 | | | 0.06 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | | | | | | | | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | | | | | | | | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | groundwater | | | | | | | | | | | |
| Site No | | GW1 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2778 | | | | | | 5763 | |
| pH | | | | | | 7.01 | | | | | | 6.90 | |
| Temp | C | | | | | 14.4 | | | | | | 8.40 | |
| Electrical Conductivity | uS/cm | | | | | 222 | | | | | | 254 | |
| Ammonical Nitrogen | mg/l | | | | | 0.02 | | | | | | 0.05 | |
| COD | mg/l | | | | | | | | | | | | |
| BOD | mg/l | | | | | | | | | | | | |
| Dissolved Oxygen | mg/l | | | | | 6.53 | | | | | | 5.43 | |
| SS | mg/l | | | | | | | | | | | | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 35 | | | | | | 36 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | mg/l | | | | | <0.019 | | | | | | <0.019 | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | 4.2 | | | | | | 3.9 | |
| Sodium | mg/l | | | | | 23 | | | | | | 24 | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | 12 | | | | | | 8 | |
| Total Oxidised Nitrogen | mg/l | | | | | <0.01 | | | | | | 0.01 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | <0.02 | | | | | | <0.02 | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | 0.65 | | | | | | 0.60 | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | groundwater | | | | | | | | | | | |
| Site No | | GW2 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2779 | | | | | | 5764 | |
| pH | | | | | | 7.09 | | | | | | 7.17 | |
| Temp | C | | | | | 14.50 | | | | | | 9.00 | |
| Electrical Conductivity | uS/cm | | | | | 527 | | | | | | 438 | |
| Ammonical Nitrogen | mg/l | | | | | 6.66 | | | | | | 2.86 | |
| COD | mg/l | | | | | | | | | | | | |
| BOD | mg/l | | | | | | | | | | | | |
| Dissolved Oxygen | mg/l | | | | | 1.98 | | | | | | 2.12 | |
| SS | mg/l | | | | | | | | | | | | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 45 | | | | | | 39 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | Mg/l | | | | | <0.019 | | | | | | <0.019 | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | 6.96 | | | | | | 6.88 | |
| Sodium | mg/l | | | | | 36.8 | | | | | | 35.7 | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | 51 | | | | | | 38 | |
| Total Oxidised Nitrogen | mg/l | | | | | <0.01 | | | | | | <0.01 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | <0.002 | | | | | | <0.002 | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | 0.00 | | | | | | 0.60 | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | groundwater | | | | | | | | | | | |
| Site No | | GW3 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2780 | | | | | | 5765 | |
| pH | | | | | | 7.11 | | | | | | 6.83 | |
| Temp | C | | | | | 14.6 | | | | | | 7.8 | |
| Electrical Conductivity | uS/cm | | | | | 509 | | | | | | 369 | |
| Ammonical Nitrogen | mg/l | | | | | 5.45 | | | | | | 2.48 | |
| COD | mg/l | | | | | | | | | | | | |
| BOD | mg/l | | | | | | | | | | | | |
| Dissolved Oxygen | mg/l | | | | | 1.65 | | | | | | 2.03 | |
| SS | mg/l | | | | | | | | | | | | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 42 | | | | | | 27 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | Mg/l | | | | | <0.019 | | | | | | <0.019 | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | 6.21 | | | | | | 5.98 | |
| Sodium | mg/l | | | | | 34.7 | | | | | | 34.2 | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | 49 | | | | | | 31 | |
| Total Oxidised Nitrogen | mg/l | | | | | <0.01 | | | | | | 0.05 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | <0.002 | | | | | | <0.002 | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | 0.00 | | | | | | 0.40 | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | leachate | | | | | | | | | | | |
| Site No | | L1 | | | | | | | | | | | |
| Date of Sample | | Jan 12 | Feb 12 | Mar 12 | Apr 12 | May 12 | Jun 12 | Jul 12 | Aug 12 | Sept 12 | Oct 12 | Nov 12 | Dec 12 |
| Lab No | | | | | | 2781 | | | | | | 5766 | |
| pH | | | | | | 7.58 | | | | | | 7.67 | |
| Temp | C | | | | | 14.7 | | | | | | 11.5 | |
| Electrical Conductivity | uS/cm | | | | | 1369 | | | | | | 1866 | |
| Ammonical Nitrogen | mg/l | | | | | 79 | | | | | | 69 | |
| COD | mg/l | | | | | 65 | | | | | | 35 | |
| BOD | mg/l | | | | | 5.41 | | | | | | 6.72 | |
| Dissolved Oxygen | mg/l | | | | | 1.30 | | | | | | 1.34 | |
| SS | mg/l | | | | | | | | | | | | |
| Residue on Evaporator | mg/l | | | | | | | | | | | | |
| Calcium | ug/l | | | | | | | | | | | | |
| Cadmium | ug/l | | | | | | | | | | | | |
| Chromium | ug/l | | | | | | | | | | | | |
| Chloride | mg/l | | | | | 216 | | | | | | 225 | |
| Chlorine | mg/l | | | | | | | | | | | | |
| Copper | ug/l | | | | | | | | | | | | |
| Cyanide | mg/l | | | | | | | | | | | | |
| Dissolved Iron | ug/l | | | | | | | | | | | | |
| Lead | ug/l | | | | | | | | | | | | |
| Magnesium | ug/l | | | | | | | | | | | | |
| Manganese | ug/l | | | | | | | | | | | | |
| Mercury | ug/l | | | | | | | | | | | | |
| Nickel | mg/l | | | | | | | | | | | | |
| Potassium | mg/l | | | | | | | | | | | | |
| Sodium | mg/l | | | | | | | | | | | | |
| Sulphate | mg/l | | | | | | | | | | | | |
| Zinc | ug/l | | | | | | | | | | | | |
| Total Alkalinity as CaCO3 | mg/l | | | | | | | | | | | | |
| Total Organic Carbon | mg/l | | | | | | | | | | | | |
| Total Oxidised Nitrogen | mg/l | | | | | 0.10 | | | | | | <0.01 | |
| Arsenic | mg/l | | | | | | | | | | | | |
| Barium | mg/l | | | | | | | | | | | | |
| Boron | ug/l | | | | | | | | | | | | |
| Flouride | mg/l | | | | | | | | | | | | |
| Total Phenols | mg/l | | | | | | | | | | | | |
| Phosphorous | mg/l | | | | | | | | | | | | |
| Selenium | mg/l | | | | | | | | | | | | |
| Silver | mg/l | | | | | | | | | | | | |
| Mircrotox | Toxic Units | | | | | | | | | | | | |
| Microtox | Toxic Units | | | | | | | | | | | | |
| Nitrite | mg/l | | | | | | | | | | | | |
| Nitrate | mg/l | | | | | | | | | | | | |
| Phosphate - ORTHO | mg/l | | | | | | | | | | | | |
| Phosphate - TOTAL | mg/l | | | | | | | | | | | | |
| Total Coliforms | | | | | | | | | | | | | |
| Facel Coliforms | | | | | | | | | | | | | |
| Depth | m | | | | | 4.50 | | | | | | 3.90 | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | Landfill Gas levels | | | | | | | | | | | |
| Site No | | G1 | | | | | | | | | | | |
| Date of Sample | | | | | | | | | | | | | |
| **Parameters** | **Units** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** | **Date** |
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| **Methane** | **%** | | | | | 67.5 | | 61.8 | 61.0 | | | *** | |
| **Carbon Dioxide** | **%** | | | | | 36.4 | | 32.5 | 32.5 | | | *** | |
| **Oxygen** | **%** | | | | | 0.5 | | 0.4 | 0.2 | | | *** | |
| **Atmos. Pressure** | **mBar** | | | | | 1063 | | 992 | 997 | | | *** | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | Landfill Gas levels | | | | | | | | | | | |
| Site No | | G2 | | | | | | | | | | | |
| Date of Sample | | | | | | | | | | | | | |
| Parameters | Units | Date | Date | Date | Date | Date | Date | Date | Date | Date | Date | Date | Date |
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Methane | % | | | | | 2.1 | | 1.6 | 1.4 | | | 5.8 | |
| Carbon Dioxide | % | | | | | 2.1 | | 1.9 | 1.8 | | | 3.5 | |
| Oxygen | % | | | | | 17.5 | | 18.8 | 18.7 | | | 10.6 | |
| Atmos. Pressure | mBar | | | | | 1003 | | 992 | 997 | | | 994 | |

| Location | | *Glenalla, Milford Co Donegal* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Type | | Landfill Gas levels | | | | | | | | | | | |
| Site No | | G3 | | | | | | | | | | | |
| Date of Sample | | | | | | | | | | | | | |
| Parameters | Units | Date | Date | Date | Date | Date | Date | Date | Date | Date | Date | Date | Date |
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Methane | % | | | | | 75.5 | | 72.1 | 69.1 | | | 64.1 | |
| Carbon Dioxide | % | | | | | 29.4 | | 26.3 | 30.5 | | | 31.6 | |
| Oxygen | % | | | | | 0.3 | | 0.3 | 0.2 | | | 1.3 | |
| Atmos. Pressure | mBar | | | | | 1003 | | 992 | 997 | | | 994 | |

# APPENDIX C

# WATER BALANCE CALCULATION

**GLENALLA WATER BALANCE CALCULATION**

| Year | Status | Rainfall (mm) | Temp Restored area Area | Temp Restored area infiltration IRCA(m3) | Restored area Area | Restored area infiltration IRCA(m3) | Total Water | Leachate produced Lo(m3) |
|---|---|---|---|---|---|---|---|---|
| **2012** | Closed | 1149 | 0 | | 20500 | 2355 | 2355 | 2355 |
| **Total** | | 1149 | | | | | | 2355 |

**Assumptions**

| | | | |
|---|---|---|---|
| **IRCA=** | Fully Capped/Restored area infiltration of rainfall estimated (2-10% of ER ),EPA Manual | 10% | % |
| **Restored area** | Area capped is 20,500. | 20,500 | $m^2$ |
| **Rainfall Data** | Data taken from Met Eireann Station Malin Head, Total Rainfall used. | 1148.8 | mm |

# APPENDIX D

# E-PRTR Regulations

# (AER Electronic Reporting System)

Environmental Protection Agency

Guidance to completing the PRTR workbook

# AER Returns Workbook

Version 1.1.16

| | |
|---|---|
| **REFERENCE YEAR** | 2012 |

**1. FACILITY IDENTIFICATION**

| | |
|---|---|
| Parent Company Name | Donegal County Council |
| Facility Name | Glenalla Landfill Site |
| PRTR Identification Number | W0125 |
| Licence Number | W0125-01 |

Waste or IPPC Classes of Activity

| No. | class_name |
|---|---|
| 3.1 | The initial melting or production of iron and steel |
| 3.13 | Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced. |
| 3.4 | ########################################################## |

| | |
|---|---|
| Address 1 | Glenalla |
| Address 2 | Milford |
| Address 3 | Co Donegal |
| Address 4 | |
| | |
| | Donegal |
| Country | Ireland |
| Coordinates of Location | -7.63731 55.0981 |
| River Basin District | GBNIIENW |
| NACE Code | 3821 |
| Main Economic Activity | Treatment and disposal of non-hazardous waste |
| **AER Returns Contact Name** | Don Smith |
| **AER Returns Contact Email Address** | don.smith@donegalcoco.ie |
| **AER Returns Contact Position** | Enviromental Technician |
| **AER Returns Contact Telephone Number** | 0749122787 |
| **AER Returns Contact Mobile Phone Number** | 0876860295 |
| **AER Returns Contact Fax Number** | 0749161304 |
| **Production Volume** | 0.0 |
| **Production Volume Units** | |
| **Number of Installations** | 0 |
| **Number of Operating Hours in Year** | 0 |
| **Number of Employees** | 1 |
| **User Feedback/Comments** | |
| **Web Address** | |

**2. PRTR CLASS ACTIVITIES**

| Activity Number | Activity Name |
|---|---|
| 50.1 | General |
| 50.1 | General |

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

| | |
|---|---|
| Is it applicable? | |
| Have you been granted an exemption ? | |
| If applicable which activity class applies (as per Schedule 2 of the regulations) ? | |
| Is the reduction scheme compliance route being used ? | |

**4. WASTE IMPORTED/ACCEPTED ONTO SITE** Guidance on waste imported/accepted onto site

| | |
|---|---|
| Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ? | |

This question is only applicable if you are an IPPC or Quarry site

## 4.1 RELEASES TO AIR

Link to previous years emissions data

### SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

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

### SECTION B : REMAINING PRTR POLLUTANTS

| RELEASES TO AIR | | | | | Please enter all quantities in this section in KGs | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | QUANTITY | | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| 01 | Methane (CH4) | C | OTH | landgem-v302 | 0.0 | 47050.0 | 0.0 | 47050.0 |
| 02 | Carbon monoxide (CO) | C | OTH | landgem-v302 | 0.0 | 23.01 | 0.0 | 23.01 |
| 03 | Carbon dioxide (CO2) | C | OTH | landgem-v302 | 0.0 | 129100.0 | 0.0 | 129100.0 |
| 34 | 1,2-dichloroethane (EDC) | C | OTH | landgem-v302 | 0.0 | 0.2308 | 0.0 | 0.2308 |
| 35 | Dichloromethane (DCM) | C | OTH | landgem-v302 | 0.0 | 6.976 | 0.0 | 6.976 |
| 55 | 1,1,1-trichloroethane | C | OTH | landgem-v302 | 0.0 | 0.3757 | 0.0 | 0.3757 |
| 56 | 1,1,2,2-tetrachloroethane | C | OTH | landgem-v302 | 0.0 | 1.083 | 0.0 | 1.083 |
| 57 | Trichloroethylene | C | OTH | landgem-v302 | 0.0 | 2.158 | 0.0 | 2.158 |
| 60 | Vinyl chloride | C | OTH | landgem-v302 | 0.0 | 2.677 | 0.0 | 2.677 |
| 62 | Benzene | C | OTH | landgem-v302 | 0.0 | 0.8707 | 0.0 | 0.8707 |
| 65 | Ethyl benzene | C | OTH | landgem-v302 | 0.0 | 2.865 | 0.0 | 2.865 |
| 73 | Toluene | C | OTH | landgem-v302 | 0.0 | 21.08 | 0.0 | 21.08 |
| **78** | **Xylenes** | C | OTH | landgem-v302 | 0.0 | 7.474 | 0.0 | 7.474 |

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

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

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

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

### Additional Data Requested from Landfill operators

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

**Landfill:** Glenalla Landfill Site

| Please enter summary data on the quantities of methane flared and / or utilised | T (Total) kg/Year | M/C/E | Method Used: Method Code | Method Used: Designation or Description | Facility Total Capacity m3 per hour | |
|---|---|---|---|---|---|---|
| Total estimated methane generation (as per site model) | 47050.0 | C | OTH | landgem-v302 | N/A | |
| Methane flared | 0.0 | | | | 0.0 | (Total Flaring Capacity) |
| Methane utilised in engine/s | 0.0 | | | | 0.0 | (Total Utilising Capacity) |
| Net methane emission (as reported in Section A above) | 47050.0 | C | OTH | landgem-v302 | N/A | |

## 4.2 RELEASES TO WATERS

Link to previous years emissions data



### SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

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

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

### SECTION B : REMAINING PRTR POLLUTANTS

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

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

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

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

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

## 4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data



### SECTION A : PRTR POLLUTANTS

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

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

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

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

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

## 4.4 RELEASES TO LAND

Link to previous years emissions data

### SECTION A : PRTR POLLUTANTS

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

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

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

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

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

## 5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE



**Please enter all quantities on this sheet in Tonnes**

| Transfer Destination | European Waste Code | Hazardous | Quantity (Tonnes per Year) | Description of Waste | Waste Treatment Operation | Method Used | | Location of Treatment | Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer | Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer | Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY) | Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M/C/E | Method Used | | | | | |
| Within the Country | 19 07 03 | No | 3615.0 | landfill leachate other than those mentioned in 19 07 02 | D8 | M | Weighed | Offsite in Ireland | Donegal County Council,D0009-01 | Thorn rd,Magheranan ,Letterkenny WWTP,Letterkenny County Donegal,Ireland | | |

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

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