

BALLEALLY LANDFILL, BALLEALLY, LUSK, CO. DUBLIN

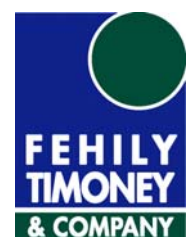
ANNUAL ENVIRONMENTAL REPORT 2016

IED LICENCE REF. NO. W0009-03

ORIGINAL

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Comhairle Contae
Fhine Gall
Fingal County
Council



BALLEALLY LANDFILL, BALLEALLY, LUSK, CO. DUBLIN

ANNUAL ENVIRONMENTAL REPORT 2016

INDUSTRIAL EMISSIONS LICENCE IED LICENCE REF. NO. W0009-03

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Abstract: This report represents the monitoring results for Balleally landfill, Balleally, Lusk, Co. Dublin. This report covers the annual reporting period of 2016 in accordance with Industrial Emissions Licence Reg. No. W0009-03.

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1 INTRODUCTION

1.1 Reporting Period

The reporting period for the AER is 1st January to 31st December 2016.

1.2 IED Licence

In 2000 Fingal County Council was granted a IED Licence (Reg. 9-1) to continue operating Balleally Landfill. In July 2001 Fingal County Council applied for a review of this licence. IED Licence W0009-02 was issued on the 8th January 2003. On the 21st December 2009 the Environmental Protection Agency (EPA) issued Fingal County Council a third revision of the IED Licence for Balleally Landfill: IED Licence W0009-03. The licence was subsequently brought into conformity with the provisions and requirements of the Council Directive 2010/75/EU on the 20th December 2013, becoming an Industrial Emissions (IE) Licence.

This licence permits the operation of a non-hazardous landfill. In accordance with the requirements of Condition 11.6 of the IED Licence, an Annual Environmental Report (AER) for the facility must be submitted to the EPA.

1.3 Facility Location

Fingal County Council has responsibility for the management and operation of the facility. The facility is located at:

Balleally Landfill
Balleally Lane
Lusk

National Grid reference E322500 N252200.

Drawing Monitoring Locations (Figure 1) in Appendix 1 is a map of the facility and the monitoring locations.

1.4 Licensed Industrial Emissions Activities at the Facility

Balleally Landfill is situated in Lusk, Co. Dublin. It has been in operation since 1971. Activities at the facility include landfill, special handling, a construction and demolition (C&D) recycling facility (which ceased in August 2005 due to capping commitments) and a civic amenity site (which ceased in December 2008 due to capping/operational commitments). Balleally Landfill closed to waste acceptance on 11th May 2012.

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

The licensed activities under the IE amendment are:

- 11.5 Landfills, within the meaning of Section 5 (amended by Regulations 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste.
- 11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

Landfill gas is collected and converted to electricity.

E39 is the appropriate NACE code to describe activities undertaken in Balleally during 2016 – “Remediation activities and other waste management activities.”

1.5 Local Environmental Conditions

The landfill site covers approximately 50 ha in total. The east face of the landfill is bordered by the Dublin-Belfast railway line and the southern boundary is the Rogerstown Estuary. See Figure 1, Drawing DE07-164-03-001, Appendix 1.

The former landfill facility was approx. 40ha. The extension to this facility to the north west of the site consists of 6 engineered / lined cells (approx. 10 Ha).

1.6 Environmental Monitoring

Environmental monitoring is carried out in accordance with licence conditions and is reported quarterly to the Agency. The quarterly reports include results, interpretation and a certificate of analysis. The original results certificates are not included again in this report. This report only presents summary data.

1.7 EPA Updated Reporting Requirements

Fingal County Council has prepared the annual environmental report in line with the new EPA 2013 draft reporting requirements “AER Draft Guidance Document: Annual Environmental Report: Standardised Reporting Guidance for all IPPC (Excluding Intensive Agriculture) and IED Licences”. To this end a text document is being employed whereby the 2016 AER follows the same format as the summary template structure, where possible, and includes only information as required in the AER template. In all instances except for Bund testing, individual tabs from the AER Workbook are filled out and included as appendices to the text document.

2 AIR EMISSIONS MONITORING

2.1 Stack Emissions

As per Schedule D.7.1 of IED Licence W0009-03 the licensee is required to carry out annual or periodic environmental monitoring of the Gas Combustion Plant/Enclosed Flare. Exova carried out the stack emissions monitoring on behalf of Fingal County Council. All results for 2016 were compliant with Emission Licence Values set out in the IED licence W0009-03. The Air emissions tab of the AER template is complete and included in Appendix 2.

2.2 Dust Monitoring

Dust monitoring was carried out at 4 locations in accordance with Schedule D of the licence. The locations of these monitoring points are shown on Balleally Monitoring Locations Map, Appendix 1.

Bergerhoff style gauges were used to determine total dust deposition levels at the site. Four gauges were set up so that the dust jars were at a height of at least 1.5 m above the ground and the jars were set in place during the monthly monitoring events. The samples were submitted to Alcontrol Laboratories Ltd (taken over by ALS Global in late 2016) for analysis of total dust contents.

2.2.1 Dust & PM₁₀ Monitoring Results

The annual results for total dust deposition are presented in Table 2.1. PM10 monitoring results are shown in Table 2.1.

Table 2-1: Total Dust Deposition Results (mg/m²/day)

Monitoring Locations	May-June 2016	Aug-Sept 2015	September 2016	Nov-Dec 2016
D1	22.4	35.5		47.8
D2	24.1	45.7		8.33
D3	16.1		10.3	15.6
D4	28.2	19.4		10

Table 2-2: Total Dust PM₁₀ Results (ug/m³)

Monitoring Locations	24-hour sampling start date	Average Concentration Value µg/m ³ Q4 2016
PM1	19-07-16	28
PM2	20-09-16	14
PM3	21-07-16	28

2.2.2 Interpretation of Results

A full laboratory analysis of daily dust deposition was completed. The results indicate that during the monitoring period all results were under the licence limit of 350 mg/m³/day.

The PM10 limit (50 µg/m³) as set out in the IED Licence was not exceeded at any location during the monitoring period.

2.3 Surface Emissions

Fingal County Council commissioned Odour Monitoring Ireland to perform a landfill gas surface emissions survey of Balleally landfill facility to ascertain any likely sources of landfill gas surface emissions from the closed landfill.

Landfill gas surface emissions are the predominant source of odour emissions from landfills in Ireland. The survey was carried out on the 8th July 2016. During the surface emissions survey, the following tasks were performed on site:

1. Identification of the key mechanisms that lead to the release of landfill gas surface emissions from the site.
2. Identify geographically on a site map, the locations of landfill gas surface emissions to perform remediation of the identified surface emissions areas.

The following conclusions were drawn from survey:

There were no zones of surface emissions identified within the landfill facility that exceeded recommended trigger levels.

2.3.1 Conclusions

The following conclusions were drawn from the survey of Balleally Landfill facility:

There were no surface emissions zones greater than or equal to 500 ppm around identified features. There were no surface emissions zones greater than or equal to 100 ppm instantaneous reading on open surfaces within the landfill footprint.

3 LANDFILL GAS MONITORING

The licence requires monthly monitoring of perimeter gas boreholes/vents/wells. The location of the 13 no. monitoring positions is shown on Balleally monitoring Locations Map, Appendix 1.

In addition to the perimeter landfill gas perimeter monitoring wells, two leachate monitoring wells (chosen at random) from each of the southern and eastern boundaries LMW1-LMW18 were also monitored. LMW1 – LMW18 boreholes are located on the landfill side of the vertical barrier wall.

It should be noted that boreholes LMW1-18 are leachate sampling wells in the waste body and not specifically designed for monitoring landfill gas.

In accordance with Table D.2.1 of the IED Licence, gas wells were monitored for Methane (CH₄), Carbon Dioxide (CO₂), Oxygen (O₂) and atmospheric pressure.

3.1 Monitoring Results

The gas (LFG) monitoring results were included in the 2016 quarterly reports submitted to the Agency.

3.2 Interpretation of Results

Carbon dioxide was detected on a number of occasions in perimeter monitoring wells at levels above the trigger levels of 1.5%v/v for carbon dioxide. These were reported as incidents to the EPA.

Elevated concentrations of carbon dioxide can occur naturally at shallow depths of up to 2 m due to microbial activity associated with the roots of many types of vegetation.

Please refer to incidences tab of AER template summary.

4 SURFACE WATER & LEACHATE MONITORING

The bulk of the AER information on surface water is contained in the Water/Wastewater tab of the AER Summary Template in Appendix 2. This section is in support of that information and to provide some supplementary information on:

- Leachate monitoring results
- Sewer Gas monitoring results

As of April 2014, Fingal County Council commenced the discharge of leachate to sewer on Rogerstown Lane. Relevant information is included on water/wastewater tab of the AER summary sheet (Appendix 2).

4.1 Surface Water

Schedule D of the IED Licence specifies the monitoring to be carried out for licence compliance. The licence lists 7 no. surface water monitoring locations. Monitoring is currently carried out at S7, S3, SW20a at SWV1 as listed in the licence and at SWFD. The surface water monitoring locations are predominately upstream of the landfill footprint. The results of surface water monitoring are included in the Water_Wastewater tab of the AER summary template (Appendix 2).

There are 2 no. surface water monitoring locations, in addition to those listed in the licence, that are monitored by Fingal County Council as part of an ongoing investigation into surface water quality. These locations are located on site and are part of the surface water management system. Surface water outfalls from the southern boundary of the site are also monitored on a quarterly basis.

Fingal County Council submitted 4 quarterly reports in 2016 which included the results of monthly, quarterly and annual sampling, visual and odour inspections and interpretation of the results.

4.2 Surface Water Monitoring

The sample locations can be seen in Drawing Balleally Monitoring Locations Map, Appendix 1. There are 5 no. surface water monitoring locations.

SWFD

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

SWV1

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

S3

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

S7

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

SW20a

This sampling point is located at a drainage ditch to the east of Rogerstown Lane, close to the north-eastern tip of the landfill. It is currently bunged and does not discharge to the estuary.

4.2.1 Surface Water Improvements

A review of surface water contamination at the site is ongoing since August 2011. Fingal County Council committed to continuing additional monitoring at P2, SWV1, SWMH7 and at surface water outfalls OF1-OF4 and submitted two reports to the Agency entitled "*W00-09-03-SWV1-010.pdf, SWV1 Trigger Level Proposal and Loading Report*" and "*Report OF1-OF4-009.pdf, Trigger Level and Nutrient Loading from OF1 to OF4 off Southern Boundary*" respectively. The former proposal was rejected by the Agency pending further investigations and the latter was accepted.

The ongoing capping programme and final restoration of the landfill has alleviated surface water contamination at SWV1. The new shallow vertical barrier surrounding the facility has been completed at the entrance as part of the closure plan. The programme of works relating to remedial measures to address contamination of surface water in this area is being managed through Compliance Investigation CI 000992 is ongoing.

Remedial works were first undertaken during Q2, 2009 and again in Q1, 2012 to protect the surface water drain/ditch near SW20A. A 50 m length of the drain/ditch was excavated and cleaned prior to lining with low-permeability clay and a HDPE liner pinned and stabilised to the underlying clay bank. These two layers of impermeable material serve to minimise inputs into the drainage ditch. The ditch adjacent to SW20a was re-graded with stone fill, which allows the movement of water through the gravel. A manhole access point was built to facilitate visual assessment and the required periodic environmental sampling. Consequently, there is no flow into the estuary from SW20a as the outfall point is bunged.

The shallow vertical barrier at the site entrance was constructed in 2016.

4.2.2 Conclusions

Surface water results during 2016 indicate that water quality is impacted by both the landfill (which is both a dilute and disperse landfill and an engineered designed landfill) and the nearby estuary, in terms of salinity sources from the estuary. However, surface water results improved significantly during the year after the completion of the vertical barrier.

Fingal County Council has and continues to undertake additional measures in relation to monitoring and on-site works to mitigate the impact in consultation with the EPA.

4.3 Leachate Monitoring

Prior to April 2014, leachate was tankered off-site to a wastewater treatment plant. As of April 2014, leachate was discharged to sewer. In 2016, leachate was discharged to sewer. Monitoring of discharge to sewer is as per Technical Amendment B, Schedule C. Relevant information is therefore included on water/wastewater tab of the AER summary sheet.

4.3.1 Leachate Treatment Plant

Operation of the leachate treatment plant was suspended during Q2, 2009. During 2009, FCC applied for a full licence review for the site. The licence review was seeking to remove Chemical Oxygen Demand (COD) as a leachate treatment plant parameter and to raise the ELV levels for some of the other leachate treatment plant parameters. This application was withdrawn and a technical amendment was sought to facilitate discharge to sewer. Technical Amendment B to Industrial Emissions Licence (12/03/2014) provides for the discharge of leachate to a sewer on Rogerstown Lane and this commenced early in April 2014.

4.3.2 Bund / Pipeline Testing

Condition 3.11 of W0009-03 governs Tank and Drum Storage Areas and the need for testing of same. All tanks are rendered impervious to the materials stored therein as per condition 3.11.1.

Condition 3.11.2 stipulates that all tank and drum storage areas are to be bunded either locally or remotely, to a volume not less than the greater of the following:

- (a) 110% of the capacity of the largest tank or drum within the bunded area; or
- (b) 25% of the total volume of substance which could be stored within the bunded area.

There are two areas on site (Landfill Gas Utilisation Plant & Leachate Treatment Plant) that are remotely bunded in the sense that as per Condition 3.11.3 the drainage from these bunded areas can be diverted for collection and safe disposal – back through the leachate treatment plant and through the leachate storage and treatment tanks.

The Leachate storage and treatment tanks are inspected by Irish Industrial Tanks Limited. As per condition 3.11.5 The Leachate and Storage Tanks are inspected at least once every three years. They were last tested in March 2016 – Storage tanks T1a, T1b, SBR1, SBR2, T4 and PFT were found to be satisfactory following inspection for structural and liquid integrity. The next integrity assessment is due March 2017. The inspection reports are available for inspection at the site offices.

4.3.3 Water Balance and Leachate Transfers

A water balance for the reporting period has been prepared and is included as Table 4.1. The water balance calculation is derived from EPA Landfill Manuals "Landfill Site Design" (EPA, 2000; p59) and indicates that there was 16,962m³ of leachate was produced at the landfill. Infiltration rate used was 5% for capped areas and 25% for temporary capped areas.

The total of leachate removed from site was 21,903 m³. The volume of leachate tankered off-site was greater than that estimated as generated in the water balance, but some contaminated water pumped to plant may account for this.

4.3.4 Leachate levels

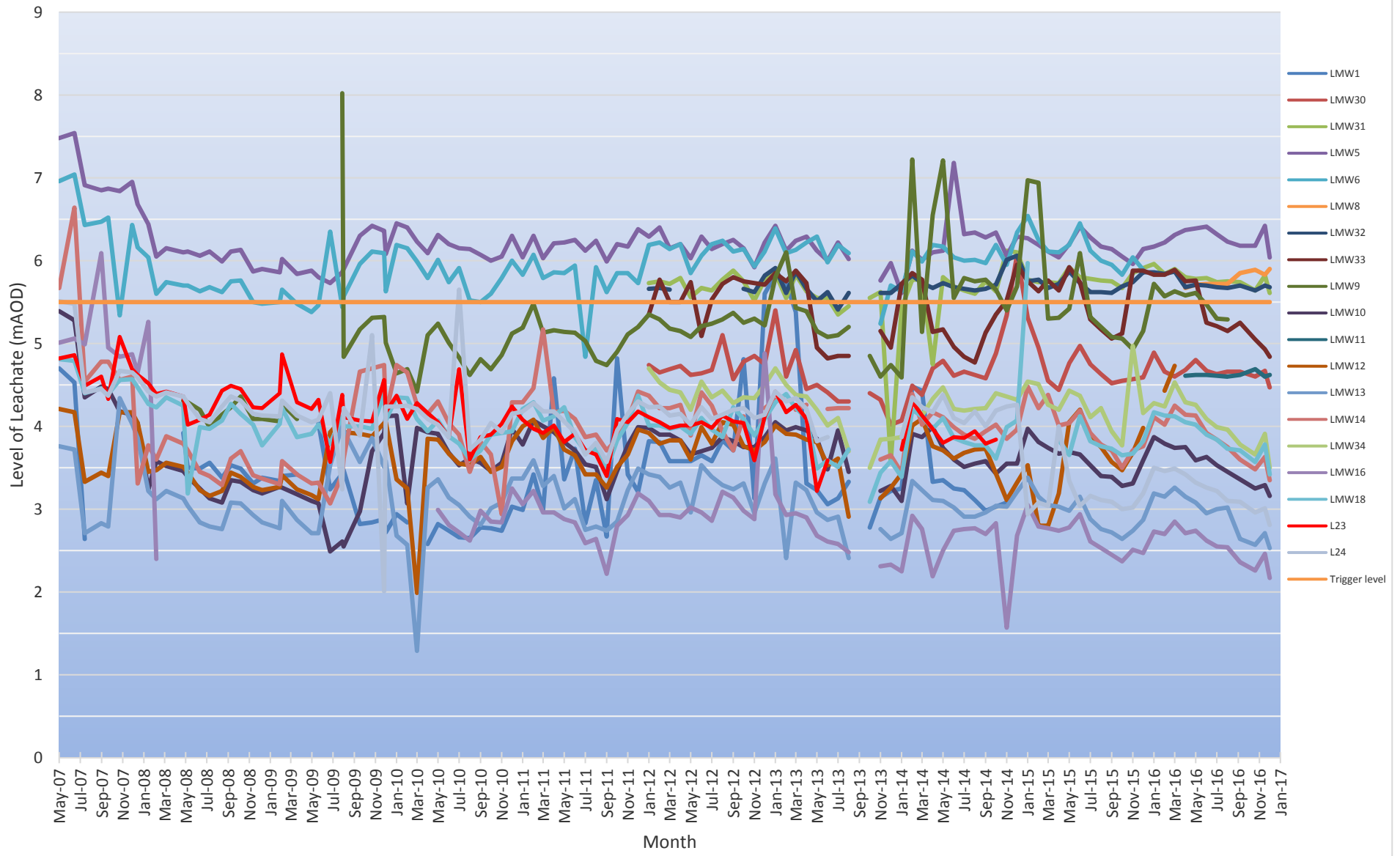
A trigger level of 5.5 meters above ordnance datum (m AOD) for wells between LMW1 to LMW18 and LMW30 to LMW34 has been established to indicate an elevated head of liquid in the landfill. Leachate was recorded above the trigger level at several locations, highlighted in Figure 4.1.

Leachate levels in LMW5, LMW6 LMW31, and LMW32 were above the trigger level for the year. Leachate levels in LMW33 and LMW9 were above the trigger level until May after which levels in both wells dropped. LMW8 was added to the level check regime in April 2016 and has been recorded above the trigger level since.

All the wells (LMW31, LMW5, LMW6, LMW32, LMW33 and LMW9) which exceed the trigger are located beside one another on the southern boundary of the site.

There were no exceedances of the trigger level in leachate monitoring wells LMW10, LMW11, LMW12, LMW13, LMW14, LMW34, LMW16, LMW18, LMW30 and L24.

The level of the vertical barrier is 6m and this level was exceeded at LMW5 on the southern boundary which is set back from the vertical barrier by approximately 20 m. LMW30, LMW31, LMW32 and LMW33, which are adjacent to the vertical barrier recorded leachate levels below 6m during the year. No leachate breakouts were evident along the southern boundary. These incidences were reported to the Agency through EDEN (INCI009515 and subsequent updates). Other than in January at OF4, Ammoniacal nitrogen levels at monitored surface water outfalls (OF1-OF4) were below trigger levels when monitored, (INCI009525).



4.3.5 Leachate Quality

This section presents a summary of the chemical results. The results for leachate monitoring were included in the quarter 4 report to the Agency. The pumping chamber receives leachate from a number of different locations on-site. As it collects leachate from a number of different areas over the site it is representative of general leachate quality over a greater time period than the individual grab samples from each of the leachate wells. The pumping chamber collects leachate from:

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

It is noted that the results for the southern boundary are slightly more concentrated, than the results along the eastern boundary. While variations are noted, the leachate quality is typical of leachate sampled from large landfills, as outlined in the Landfill Operational Practices Guidance Manual, EPA 1997 and EPA Manual on Landfill Site Design (2000).

4.4 Sewer Gas Monitoring

Sewer gas monitoring commenced in 2014 when Fingal County Council was granted permission to pump leachate to sewer, as per Technical Amendment B of the Industrial Emissions Licence, approved by the Agency on 12/03/2014.

The monitoring location is at a manhole on Rogerstown Lane.

The annualised results for monthly monitoring of the wastewater discharge are included in the Water_Wastewater tab in the AER Summary Sheet (Appendix 2).

The sewer gas was compliant on all monitoring occasions, below the Methane daily mean concentration limit of 0.5%v/v.

5 GROUNDWATER MONITORING

The summary results of groundwater monitoring are included in the GW-Soil tab of the AER Summary Template in Appendix 2. This section of the Annual Environmental Report is in support of that information. Balleally Landfill, unlike other landfills did not receive a Technical Amendment to its licence relating to the provisions of Article 12 of the European Communities Environmental Objectives (Groundwater) Regulation 2010. The landfill is on an estuary. The downgradient groundwater monitoring borehole is in an estuarine setting.

5.1 Monitoring Locations

Groundwater monitoring was carried out at the locations shown on Drawing Balleally Monitoring Locations Map, Appendix 1. As part of a previous extension to the landfill a number of the boreholes stipulated in W0009-03 are no longer accessible. During July 2004, a revised monitoring schedule was agreed with the Environmental Protection Agency (EPA) on which the present monitoring is based. Details of the groundwater locations now monitored are presented in Table 5.1.

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

Table 5-1: Groundwater Monitoring Locations

Station	Classification	Easting	Northing
MB18	Eastern Up gradient	323 245	252 783
RC3	Western Up gradient	321 906	252 729
MB35	South western Down gradient	322 029	251 906
CD1	Control Drain N/W of Cell 1	322 008	252 356

Location Description

Borehole MB35

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

Location CD1

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

MB18

This is an upgradient private well of Rogerstown House which lies to the north east of the landfill site along the estuary. No access permitted.

RC3

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

5.1.1 Monitoring Parameters

Groundwater levels were monitored and a visual assessment was performed monthly at all groundwater wells.

Groundwater monitoring location CD1 is sampled monthly and analysed for quarterly groundwater parameters, listed in Table D.5.1 of the IED Licence. MB35 and RC3 are sampled quarterly and analysed for quarterly groundwater parameters, listed in Table D.5.1 of the IED Licence.

The results of quarterly groundwater monitoring undertaken for CD1, MB35 and RC3 were included in each of the quarterly reports to the Agency. Annualised and maximum results are presented in the GW-Soil tab of the AER summary templates. (Appendix 2).

5.2 Interpretation of Results

The groundwater results were historically compared to the relevant Interim Guideline Value (IGV) set out in the EPA report '*Towards Setting Guideline Values for the Protection of Groundwater in Ireland*' but following instruction from the EPA during the 2016 site audit, comparison with the GTVs from the European Communities, Environmental Objectives, Groundwater Regulations 2010 is now carried out. It should be noted that the groundwater beneath the landfill is likely to be estuarine in nature and would not generally be potable water.

Groundwater upgradient of the landfill at RC3 shows a rising trend over a 5-year period for pH, Conductivity and Ammoniacal Nitrogen. Downgradient, as mentioned above, the well is located within the estuary and the third well is located on-site. There is no demonstrable decrease in water quality at CD1 which is located on site. Levels of pH, ammoniacal N and TOC demonstrate an upward trend in MB35 (estuarine location).

5.3 Conclusion

Groundwater results indicate that groundwater quality upgradient of the landfill is impacted by local activities. Water quality on and downgradient of the landfill, maybe impacted by both the landfill (which is both dilute and disperse landfill and an engineered designed landfill) and the nearby estuary (saline intrusion from the estuary).

6 FINANCIAL PROVISIONS

Condition 12.2 of the licence requires the establishment of a fund to implement the Restoration and Aftercare Plan. Fingal County Council has provided in its accounts a reserve for the restoration of the site which amounted to €8,211,999 on 31/12/2016.

See ELRA tab from AER summary templates.doc in Appendix 2.

7 ENVIRONMENTAL MANAGEMENT PROGRAMME

7.1 Environmental Objectives and Targets for 2016

See EMP tab from AER summary templates.doc in Appendix 2.

7.2 Environmental Objectives and Targets for 2017

See EMP tab from AER summary templates.doc in Appendix 2.

7.3 Summary of written procedures

There were no new written procedures during the reporting period.

7.4 Communications Programme for Public Information

The Communications Programme for Fingal County Council contains information on Balleally Landfill. The information can roughly be divided into two areas. Background information prior to granting of IED Licence, and information concerning the waste licence and IED Licence (W009-02 & 03). There is also a register of correspondence to and from the Agency, along with the various correspondences relevant to the Licence. This information was updated on a continuous basis. During Q1 2013, a change came about in that correspondence with The Agency was almost exclusively sent through a new online web based system called EDEN. Most correspondence between the Agency and the Licensee must now be accessed through this system.

Environmental Information can be viewed at the following locations:

- At the Council's Headquarters between 9.30 a.m. and 12.45 p.m. and 2.00 p.m. and 4.00 p.m. Monday to Friday (excluding public holidays), unless otherwise arranged by prior appointment.
- At Balleally Landfill by prior appointment with the Landfill Manager.
- Since March 2013, Licence Reports have been submitted through, stored on and available through the Environmental Protection Agency's Website; www.epa.ie or reporting portal, EDEN.

Site Visits

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

Balleally Landfill Liaison Committee

Information relating to the restoration and aftercare of Balleally Landfill is presented to the Liaison Committee for comment and adoption. Members of the committee during 2016 comprised of:

- Six members of Balleally Residents and Farmers Association / Rush Community Council.
- Seven elected members of Fingal County Council.
- Six Fingal County Council officials.

The Committee met four times during 2016; 12/1/2016, 19/4/2016, 31/5/2016 and 13/9/2016. Agendas were set and minutes kept.

7.5 Management Structure

The facility is owned and operated by Fingal County Council. The Environmental Services Department of Fingal County Council manage the landfill facility. A description of the current management structure is provided in Table 7.2.

7.6 Staff Training

Staff from Fingal County Council completed training in 2016 in various aspects of environmental management to improve their skills in operation and management of Balleally Landfill. Details are in Table 7.1 below.

Table 7-1: Staff Training 2016

Position	Training Completed
Senior Engineer	Postgraduate Diploma in Environmental Protection
Senior Engineer	Preparing scope for a training course on landfill management and aftercare.
Landfill Manager, Executive Engineer	Module on Environmental Hydrology and Water Resources as part of an MSc in Civil Engineering.
Landfill Manager, Executive Engineer	Module on Ground Engineering as part of an MSc in Civil Engineering.
Landfill Manager, Executive Engineer	Module on Urban Drainage and Water Supply as part of an MSc in Civil Engineering.
Landfill Manager, Executive Engineer	Module on Water and Wastewater Treatment as part of an MSc in Civil Engineering.
A/ Senior Executive Scientist	Module on Project Management as part of a MSc. in Operations Management.
A/ Senior Executive Scientist	Module on Waste Management and Waste Infrastructure as part of a Masters in Applied Environmental Science.

Table 7-2: Management Structure - 2017

TITLE	NAME	BASE	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS	EXPERIENCE
Director of Services	Mr. Gilbert Power	Blanchardstown Office, Grove Road Dublin 15	Responsible for Environmental and Water Services Department		38 years LA Experience
A/Senior Engineer	Mr. James Walls	HQ	Responsibility for Environment Section	B.Eng in Civil Engineering 1984, MIEI Post Grad. Diploma in Env. Protection 2016	14 years Water Service experience. 3 years in Waste Management and Water Pollution Control
A/Senior Executive Scientist	Mr. Brian Reynolds	HQ	Responsibility for Waste Infrastructure	MSc in Operations Management 2004 MSc in Applied Environmental Science 1997 C Eng. MIEI	17 years experience in Water and Waste Management and Water Pollution Control Experience in Local Authority
Landfill Manager, Executive Engineer	Mr. David Devine	Balleally Landfill & HQ	Landfill Management. Management of Waste Licence Compliance. Specified Engineering Works	BSc Civil Engineering, MIEI, Chartered Engineer, F.Á.S. Waste Management Training Course. F.Á.S. Management Safety in Construction Training Course.	18 years Civil Engineering and Project Management experience. 12 Years Local Authority experience
Executive Scientist	Mr. Mortimer Loftus	HQ & Balleally Landfill	Supervision of Scientific Monitoring, Reporting and liaison with the Environmental Protection Agency on issues relating to Environmental monitoring	PhD Ecology, BSc Environmental Science, Dip Environmental Impact Assessment Management, F.A.S. Waste Management Training	12 years Local Authority experience

TITLE	NAME	BASE	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS	EXPERIENCE
				Course, F.A.S. Managing Safety in Construction Training Course.	
	Mr. Richard Donnelly	Balleally Landfill	Deputy in the absence of the Landfill Manager, Waste Acceptance Manager, Safety inspections and day to day supervision of staff.	Completed course in Health & Safety (SAFE PASS), Manual Handling, Specified Signing Lighting and Guarding Training, CONSAW Training. Also, Elected Health & Safety Rep.	Over 20 years Local Authority Service. Assistant Foreman in Dunsink Landfill and appointed to Balleally Landfill in 2010.

8 NOISE MONITORING

An Annual Noise Survey was undertaken in July 2016 to assess the existing noise emissions from the site and to establish the existing noise environment at potentially sensitive receptors near the site in accordance with Schedule D of IED Licence W0009-03. Noise monitoring was carried out during daytime hours. The location of noise monitoring points can be seen in Figure Balleally Monitoring Locations map, Appendix 1.

Noise measurements were taken for 30 minutes at each location. A Noise Monitoring Report has previously been submitted to the EPA along with commentary on noise sources. The results are included in the noise tab of the AER summary template in Appendix 2.

9 RESOURCE USAGE

See Resource-Energy tab from AER summary templates.doc in Appendix 2.

Resources consumed at Balleally Landfill include diesel fuel, electricity, hydraulic oil and lubricating oil. Table 9.1 presents a summary of the quantities of each used on site for the period of this report. Electricity consumed on site was used for the purpose of heating, lighting, the operation of office equipment and the leachate treatment plant. The largest consumer of electricity was the leachate treatment plant until it was mothballed during 2009. There was a sustained and significant drop in energy usage since 2008 peak, with an increase through 2013 - 2015 associated with new pumping arrangements from the Leachate Treatment Plant. During 2016 electricity usage dropped as tankering of leachate resumed and pumping of leachate from the Leachate Treatment Plant was suspended.

Diesel and petrol consumption (zero) have dropped off on site because several items of plant were off-hired for longer periods than in previous years. Additionally, the area of operation for the excavator and Dozer has reduced.

Water Consumption in Balleally was lower in 2016 (5,390 m³) than 2015 (6,843 m³).

Table 9-1: Summary of resources used on site 2016

Resource	FCC	BPS
Electricity	62,317 KWh	6,816 kWh
Diesel *	89,315 litres	
Petrol*		
Lube Oil		11,890 litres
Water	5,390 m ³	

*Estimates based on average weekly usage

Table 9-2: Electricity consumption on site for the period January 2000 to December 2016

Year	Site	Site	Leachate Treatment Plant	KWhr Total
2016	Ceased	38,240	24,067	62,317
2015	Ceased	54,100	41,590	95,690
2014	Ceased	50,170	29,086	79,256
2013	Ceased	67,450	7,457	74,906
2012	Ceased	58,075	7,423	65,498*
2011	Ceased	59,100*	5,109*	64,209*
2010	Ceased	71,575*	6,460*	78,035*
2009	Ceased	82,950*	101,367*	184,317*
2008	1,832*	91,350*	202,739*	295,921*
2007	1,726*	84,900*	202,669*	289,295*

Year	Site	Site	Leachate Treatment Plant	KWHR Total
2006	2,109*	97,600*	73,420*	173,129*
2005	1,033*	115,050*	N/R	15,050*
2004	NR	66,250*	N/R	66,250*
2003	NR	NR	N/R	89,155
2002	NR	NR	N/R	76,529
2001	NR	NR	N/R	55,453
2000	NR	NR	N/R	49,016

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

Note:

1. There was a significant increase in electricity consumption in the period 2006 – 2008, from previous years as can be observed from the table. This was attributable to the operation of site leachate treatment plant. The decrease in 2009 was attributable to the mothballing of the leachate treatment plant.
2. The electricity consumption increased each year from 2000 (exception 2004) to 2008 and decreased through to 2011. 2011 decrease may in part be due to milder winter (less heating), direr conditions (less pumping) and the move from an automated to manual wheel wash. Electricity consumption was stable during 2012. There was an increase during 2013 to 2015, associated with pumping from the Leachate Treatment plant. During 2016 electricity usage dropped as tankering of leachate resumed and pumping of leachate from Leachate Treatment Plant was suspended.

See Waste tab from AER summary templates.doc in Appendix III.

Table 9-3: Equipment and Plant list at Balleally Landfill and quantities 2016

Type of Item	Item	Quantity
Transport	Isuzu 4X4* Jeep	2
	VW Van Caddy	1
	Mitsubishi Canter Van	1
	01 D 72074 Renault Twin Cab Pick Up*	1
	CAT Minidigger	1
Plant	John Deere 4X4 Tractor*	1
	Same Tractor*	1
Heavy Plant		1
	Cat excavator 330* / Dozer Package	1
	30 Ton Vibrating Roller*	1
	Diesel H/P power washer and Bowser*	1
Auxiliary Plant	CONSAW*	1
	6-inch pump*	1
	6.5 KVA diesel generator*	1
Survey	Sokkiswa level and tripod*	1
	Sokkiswa theodolite & Tripod*	1
	NIKON auto level*	1
	Garmen GPS*	1
	GAS DATA LMSXi	1
Type of Item	Item	Quantity
	GMI FI 2000*	1
	30 Metre steel Tape*	1
	30m dip meter*	1
	Various P.C.s and printers*	1

9.1 Landfill gas utilisation

See Table 7 in the Waste tab from AER summary templates.doc in Appendix 2.

Landfill gas is actively extracted by means of a series of wells and a collection pipe network in the waste body. The gas is pumped through two main lines to the site utilisation plant. The utilisation plant comprises four generators (BY01-BY04), grouped into two operating units AER1 and AER3.

The power station/utilisation plant operators, Bioverda Power Systems Limited, regulate the inflow of gas to the station in an effort to achieve the 50% Methane target. The total power output from the station for the period is shown in Table 9.4 and Table 9.5.

Table 9-4: Electricity output (MW) from the on-site power station at Balleally Landfill 2016

YEAR	ELECTRICITY OUTPUT (MWhr)
2003	30,194
2004	21,636
2005	21,234*
2006	20,529*
2007	23,762
2008	27,117
2009	25,429
2010	21,909
2011	20,534
2012	20,928
2013	16,693
2014	13,679
2015	10,811
2016	10,478

Table 9-5: Electricity output (MW) from the on-site power station at Balleally Landfill 2016

Month	Combined BY01-BY04 (MWhrs)
January	972
February	866
March	962
April	833
May	890
June	778
July	903
August	900
September	842
October	890
November	826
December	816
Total	10,478

10 ENVIRONMENTAL INCIDENTS & COMPLAINTS

Please See Complaints and Incidents tab from AER summary templates.doc in Appendix 2.

11 WASTE SUMMARY

Please refer to the Waste tab of the AER summary sheet (Appendix III).

The landfill closed to waste acceptance in 2012. No C&D waste was accepted at the site in 2016 for closure and restoration works.

21,903 m³ of leachate was transferred off-site in 2016.

9,581,048 m³ of landfill gas was captured on site for utilisation in the landfill gas engines.

11.1 Remaining Landfill Capacity

The landfill is closed to waste acceptance.

12 METEOROLOGICAL MONITORING

Condition 8 and Schedule D.6.1 of Waste Licence W0009-03 require daily monitoring of precipitation volume, temperature (max. /min.), wind force and direction, and atmospheric pressure, Evaporation and Atmospheric humidity.

July and August were warmest with the highest maximum mean monthly temperatures. Monthly Rainfall was highest during January and April when highest volumes of rainfall were recorded. The site was predominantly affected by south westerly winds. Evaporation and potential evapo-transpiration were highest in May and July.

Meteorological data is obtained from Met Eireann for Dublin Airport's Met. Station. Please see table 12.1 below for monthly averages of this data. Other meteorological parameters and daily data are available to view in Fingal County Hall and on site.

Table 12-1: Mean Monthly Data for meteorological parameters: Dublin Airport (Source Met Eireann)

Year	Month	Mean Temperature (C)	Total Rainfall (mm)	Mean MSL Pressure (hpa)	Mean Wind Speed (Knots)	Mean Evaporation mm	PE mm	Mean Atmospheric Humidity %
2016	1	5.7	118.4	993	13.2	0.66	0.49	87.06
2016	2	4.4	59.7	997	13.2	1.05	0.71	83.3
2016	3	5.9	36.3	1004	10.6	1.87	1.26	77.51
2016	4	6.2	88.2	1003	10.6	2.69	1.73	77.12
2016	5	11.1	46.8	1005	9.5	3.96	2.67	75.67
2016	6	14	58.5	1004	7.7	3.74	2.64	80.15
2016	7	15.7	43.7	1005	10.3	4.20	2.95	76.87
2016	8	15.4	61.9	1006	10.8	3.42	2.42	78.86
2016	9	14.3	56.6	1003	10.3	2.44	1.79	75.76
2016	10	10.4	60	1011	9.4	1.33	0.98	89.76
2016	11	5.6	36.9	1005	10.6	0.68	0.52	89.0
2016	12	6.7	46.6	1013	9.8	0.60	0.48	94.8

13 SITE DEVELOPMENT WORKS

13.1 Work carried out in the reporting period 2016

Table 13-1: Work carried out during 2016

Objective/ Target	Description	Timescale
Objective 1	To minimise environmental impact on the immediate environment	
Target 1	To continue to monitor Ammoniacal Nitrogen levels at OF1-OF4 in line with agreed trigger levels.	Ongoing
Target 2	To investigate sources of SW contamination in landfill and propose mitigation measures to The Agency. Continue monthly monitoring of catchment of SWV1.	Ongoing
Target 3	To Commence Leachate Recirculation in Cells 5 & 6	Completed
Objective 2	Restoration of the facility	
Target 1	Grass seeding of capped areas	Completed
Target 2	Completion of a vertical barrier at the northern boundary	Completed
Target 3	Install footpaths and Service Road Service Road	Ongoing
Target 4	Address flooding issue at entrance	Following closure of the landfill for clay.
Target 5	To provide for Leachate Recirculation in Cells 5 & 6 and Piggybacked area. Infrastructure installed	Completed
Target 6	Fencing along Southern and Eastern Boundary	Completed

Works for next reporting period (2017)

Table 13-2: Works to be carried out during 2017

Objective/ Target	Description	Timescale
Objective 1	To minimise environmental impact on the immediate environment	
Target 1	Replacement / Rehabilitation of surface water and foul lines, manholes and pumps in area between Gas Utilisation Plant and Site Offices.	2017
Target 2	To determine final mitigation measures to deal with surface water contamination at SW20a and propose Specified Engineering Works if required.	2017
Target 3	Address remaining flooding issue at Entrance to Site	2017
Target 4	Final Capping of area around Gas Compound	2017
Objective 2	Restoration of the facility	
Target 1	Grass seeding of capped areas	2017
Target 2	Install Footpaths and Service Road	2017

13.2 Progress on Site Restoration

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

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

Figure 2, Appendix 1, indicates the agreed phases for the capping and restoration of Balleally Landfill. The phasing provides for the restoration of the original landfill initially, and then the landfill extension area. Capping was concentrated in Phase 6 during 2015.

The total area for capping is 46.5 Hectares approx.

Between 2004 and December 2015, approx. 46 Hectares were capped. During 2016, an additional 0.5 ha Hectare approx. (GCL) was capped – Some of this included necessary overlap between LLDPE and GCL. The majority of the "Old Landfill" is capped and the new landfill is now 100% capped. A total of 46.5 Hectares is now capped. The remaining area to be capped is the Landfill Gas Plant. A map showing the current extent of capping is included in Appendix 1.

13.3 Annual Topographical Survey

Condition 8.5.1 of WL W0009-03 requires an annual Topographical Survey to be undertaken in Balleally Landfill. The last full topographic survey was completed Q1 2017, and is available to view on site or in Fingal County Hall.

13.4 Slope Stability

As required under Licence Condition 8.8.1. a slope stability survey was undertaken in Balleally Landfill in December 2016.

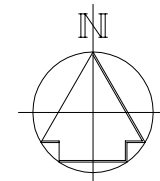
The conclusions and recommendations in the survey report are noted and will be implemented.

APPENDIX 1

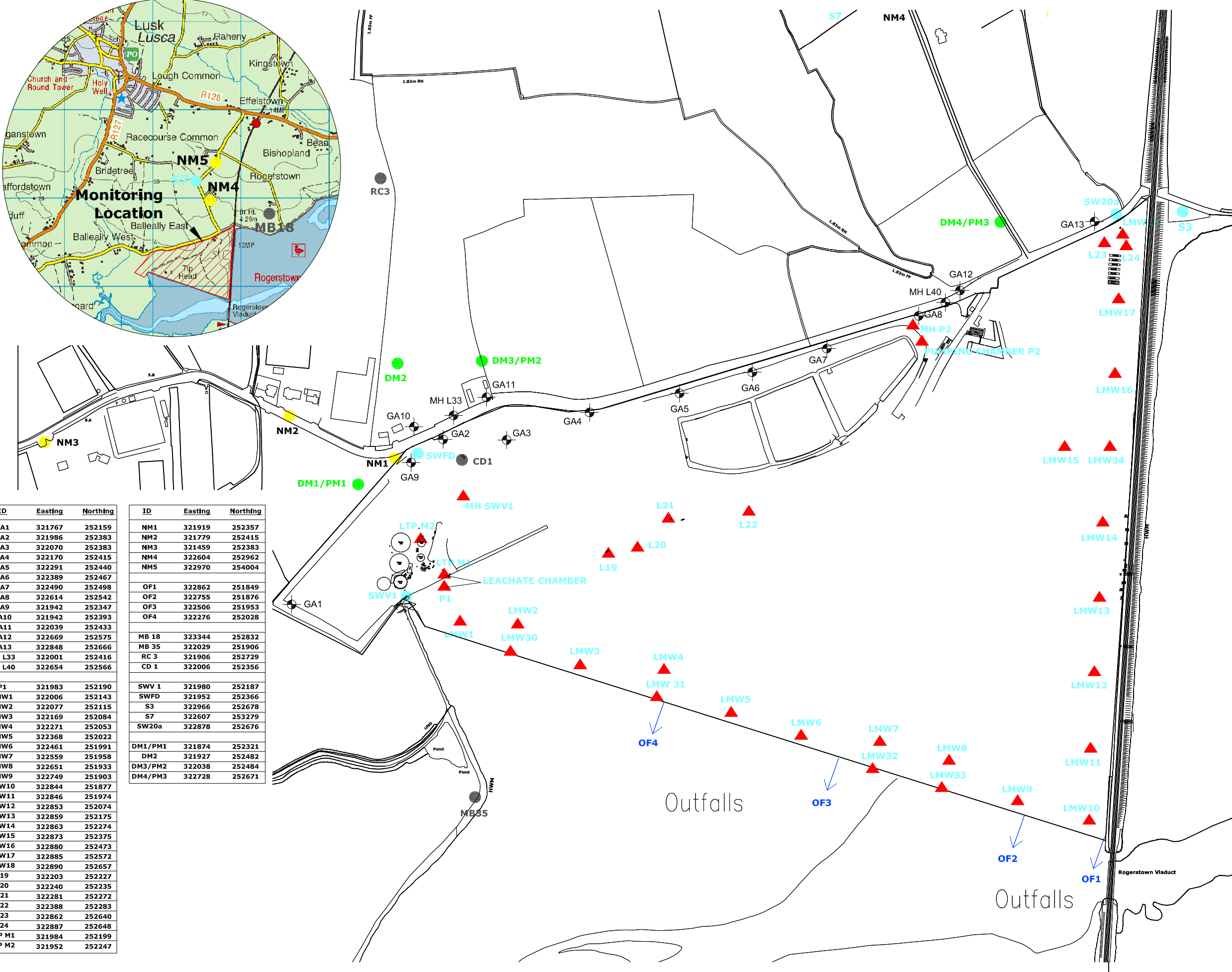
DRAWINGS



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



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

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

Rev.	Drawn	Checked	App'd	Date	Description	
B	MM/c	TM	DD	DD	10.01.08	ISSUE FOR INFORMATION
A	MM/c	TM	DD	DD	05.07.07	ISSUE FOR INFORMATION

Name of Client

 Fingal County Council
 (Confidential Council Name)

Name of Job
 ENVIRONMENTAL MONITORING
 BALLEALLY

Title of Drawing
 ENVIRONMENTAL MONITORING
 LOCATIONS

Scales Used
 1:2500 A1 / 1:5000 A3

Dwg. No.	Rev.
DE07-164-03-001	B
Dublin	

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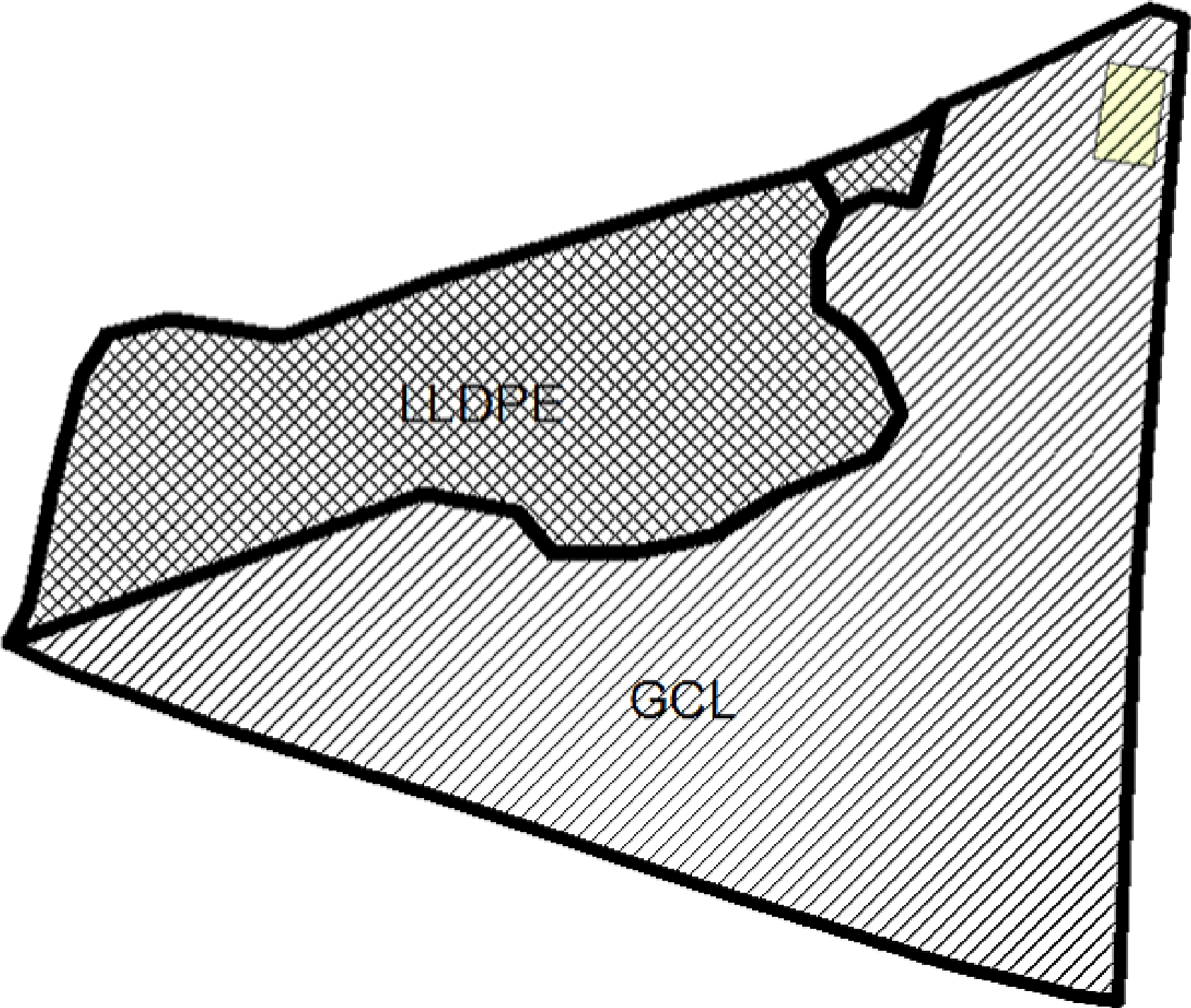
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 Mill House, Ashtown Gate, Navan Rd, Dublin 15, Ireland.
 T: +353-1-6583500, F: +353-1-6583501
 W: www.fehilytimoney.ie, E: info@ftco.ie

BALLEALLY LANDFILL - LLDPE AND GCL CAPPING SYSTEMS



CAPPING MATERIALS

-  GAS PLANT
-  GCL
-  LLDPE



APPENDIX 2

AER SUMMARY TEMPLATES



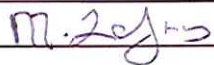
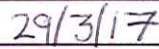
Facility Information Summary	
AER Reporting Year	2016
Licence Register Number	W0009-03
Name of site	Balleally Landfill
Site Location	Balleally, Lusk, County Dublin.
NACE Code	E39
Class/Classes of Activity	11.1, 11.5
National Grid Reference (6E, 6 N)	E322500 N252200

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year **and an overview of compliance with your licence listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.**

Balleally landfill is closed to waste acceptance since 2012. The main activity on site in 2016 was the construction of a vertical barrier wall to mitigate potential impacts to surface water, a small area of final capping, the management of leachate and landfill gas and licence compliance monitoring and management activities. Leachate was discharged to sewer on Rogerstown Lane during 2016. There were 4 incidents notified during 2016, one relating to exceedances of trigger levels in landfill gas perimeter wells, one relating to leachate levels and two relating to elevated levels of parameters in surface water. There were no complaints in 2016 and no exceedance of noise, dust or PM10 licence limits.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

	
Signature Group/Facility manager <small>(or nominated, suitably qualified and experienced deputy)</small>	Date

AIR-summary template	Lic No: W0009-03	Year: 2016
-----------------------------	------------------	------------

Answer all questions and complete all tables where relevant

- 1 Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licensed emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables

Additional information	
Yes	

Periodic/Non-Continuous Monitoring

- 2 Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below

No	
----	--

- 3 Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? [Basic air monitoring checklist](#)

[AGN2](#)

Yes	
-----	--

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision thereof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments -reason for change in % mass load from previous year if applicable
Flare 1	Carbon monoxide (CO)	Annual	50		1.48	mg/Nm3	Yes	EN 15058:2004	0.08	Flare ran 48 hours in 2016 bs 280 hours in 2015 so lower mass emissions
Flare 1	Nitrogen oxides (NOx/NO2)	Annual	150		79	mg/Nm3	Yes	EN 14792	4.15	Flare ran 48 hours in 2016 bs 280 hours in 2015 so lower mass emissions
Flare 1	Hydrogen Chloride	Annual	50	at mass flows > 0.30 kg/hr	1.88	mg/Nm3	Yes	EN1911	0.1	Flare ran 48 hours in 2016 bs 280 hours in 2015 so lower mass emissions
Flare 1	Hydrogen Fluoride	Annual	5	at mass flows > 0.05 kg/hr	<0.4	mg/Nm3	Yes	ISO 15713	<0.02	Flare ran 48 hours in 2016 bs 280 hours in 2015 so lower mass emissions
Flare 1	Total VOCs as Carbon	Annual	10		1.06	mg/Nm3	Yes	EN 12619:2013	0.06	Flare ran 48 hours in 2016 bs 280 hours in 2015 so lower mass emissions
BY03, BY04, Flare	volumetric flow	Annual	4500		4374	SELECT	Yes	OTH		
BY03	Carbon monoxide (CO)	Annual	1400		592.18	mg/Nm3	Yes	EN 15058:2004	1232	N/A engine not tested last year
BY03	Nitrogen oxides (NOx/NO2)	Annual	500		326.22	mg/Nm3	Yes	OTH	678.89	N/A engine not tested last year
BY03	TA Luft organic substances class 1	Annual	20	at mass flows > 0.1 kg/hr	1.7	mg/Nm3	Yes	CAT/TS 13649	<3.54	N/A engine not tested last year
BY03	TA Luft organic substances class 2	Annual	100	at mass flows > 2 kg/hr	<1.42	mg/Nm3	Yes	CAT/TS 13649	<2.95	N/A engine not tested last year
BY03	TA Luft organic substances class 3	Annual	150	at mass flows >3 kg/hr	<1.42	mg/Nm3	Yes	CAT/TS 13649	<2.95	N/A engine not tested last year
BY03	Hydrogen Chloride	Annual	50		1	mg/Nm3	Yes	EN1911	2.08	N/A engine not tested last year
BY03	Hydrogen Fluoride	Annual	5	at mass flows > 0.30 kg/hr	1.79	mg/Nm3	Yes	ISO 15713	3.72	N/A engine not tested last year

AIR-summary template				Lic No:	W0009-03	Year	2016			
BY04	Carbon monoxide (CO)	Annual	1400	at mass flows > 0.05 kg/hr	1064.4	mg/Nm3	Yes	EN 15058:2004	17146	N/A engine not tested last year
BY04	Nitrogen oxides (NOx/NO2)	Annual	500		343.33	mg/Nm3	Yes	EN 14792	5525	N/A engine not tested last year
BY04	TA Luft organic substances class 1	Annual	20	at mass flows > 0.1 kg/hr	<1.47	mg/Nm3	Yes	CAT/TS 13649	<23.74	N/A engine not tested last year
BY04	TA Luft organic substances class 2	Annual	100	at mass flows > 2 kg/hr	<1.47	mg/Nm3	Yes	CAT/TS 13649	<23.74	N/A engine not tested last year
BY04	TA Luft organic substances class 3	Annual	150	at mass flows >3 kg/hr	<1.47	mg/Nm3	Yes	CAT/TS 13649	<23.74	N/A engine not tested last year
BY04	Hydrogen Chloride	Annual	50	at mass flows > 0.30 kg/hr	0.71	mg/Nm3	Yes	EN1911	11.39	N/A engine not tested last year
BY04	Hydrogen Fluoride	Annual	5	at mass flows > 0.05 kg/hr	1.83	mg/Nm3	Yes	ISO 15713	29.52	N/A engine not tested last year

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template	Lic No:	W0009-03	Year	2016
Continuous Monitoring				

<p>4 Does your site carry out continuous air emissions monitoring? If yes please review your continuous monitoring data and report the required fields below in Table A2 and compare it to its relevant Emission Limit Value (ELV)</p>	No	
<p>5 Did continuous monitoring equipment experience downtime? If yes please record downtime in table A2 below</p>	SELECT	
<p>6 Do you have a proactive service agreement for each piece of continuous monitoring equipment?</p>	SELECT	
<p>7 Did your site experience any abatement system bypasses? If yes please detail them in table A3 below</p>	SELECT	

Table A2: Summary of average emissions -continuous monitoring

Emission reference no:	Parameter/ Substance	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission	Annual maximum	Monitoring Equipment downtime (hours)	Number of ELV exceedences in current reporting year	Comments
	ELV in licence or any revision thereof								
	SELECT		SELECT	SELECT					
	SELECT			SELECT					
	SELECT			SELECT					
	SELECT			SELECT					
	SELECT			SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table A3: Abatement system bypass reporting table [Bypass protocol](#)

Date*	Duration** (hours)	Location	Reason for bypass	Impact magnitude	Corrective action

* this should include all dates that an abatement system bypass occurred

** an accurate record of time bypass beginning and end should be logged on site and maintained for future Agency inspections please refer to bypass protocol link

AIR-summary template		Lic No:	W0009-03	Year	2016			
Solvent use and management on site								
8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5					No			
Table A4: Solvent Management Plan Summary Total VOC Emission limit value		Solvent regulations Please refer to linked solvent regulations to complete table 5 and 6						
Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as %of solvent input	Total Emission Limit Value (ELV) in licence or any revision thereof	Compliance			
					SELECT			
					SELECT			
Table A5: Solvent Mass Balance summary								
	(I) Inputs (kg)	(O) Outputs (kg)						
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	Solvents lost in water (kg)	Collected waste solvent (kg)	Fugitive Organic Solvent (kg)	Solvent released in other ways e.g.	Solvents destroyed onsite through	Total emission of Solvent to air (kg)
Total								

Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If **you do not have** licensed emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections

Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections

Additional information	
Yes	The site has both licensed emission to surface water at SWV1 and licensed emission to sewer, monitored at T4. The emission to surface water is stormwater, there is no process effluent There are also 4 surface water outfalls to the estuary at OF1, OF2, OF3 and OF4. Leachate was discharged to sewer in 2016, 21,903 m3.
Yes	

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licensed Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	License Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
SWV1	downstream	SELECT	pH (Field)	2016		N/A	7.55	pH units		
SWV1	downstream		Temperature	2016		N/A	11.53	degrees C		
SWV1	downstream		Ammoniacal Nitrogen	2016		N/A	5.23	mg/L		Contaminated surface water and potentially groundwater have been impacting SWV1. Mitigation works on the vertical barrier wall were completed in June 2016 and there has been a significant improvement in parameters measured (Ammoniacal Nitrogen) at SWV1 in the period July-Dec 2016.
SWV1	downstream		Chloride	2016		N/A	92.88	mg/L		
SWV1	downstream		BOD	2016		N/A	3.59	mg/L		As above
SWV1	downstream		COD	2016		N/A	41.96	mg/L		As above
SWV1	downstream		Total Suspended Solids	2016	50	All values < ELV	46.54	mg/L	Yes	two events in March and November 2016 with levels in exceedance of the ELV, which elevated the annualised figure.
SWV1	downstream		Dissolved Oxygen	2016		N/A	8.21	mg/L		
SWV1	downstream		Electrical Conductivity (Field)	2016		N/A	1.32	mS/cm		This is an estuarine location and EC levels can be variable due to tidal influence at this location aswell.
SWFD	onsite		pH (Field)	2016		N/A	7.65	pH units		
SWFD	onsite		Temperature	2016		N/A	8.55	degrees C		
SWFD	onsite		Ammoniacal Nitrogen	2016		N/A	0.12	mg/L		
SWFD	onsite		Chloride	2016		N/A	26.68	mg/L		
SWFD	onsite		BOD	2016		N/A	5.95	mg/L		
SWFD	onsite		COD	2016		N/A	67.35	mg/L		
SWFD	onsite		Total Suspended Solids	2016		N/A	76.38	mg/L		
SWFD	onsite		Dissolved Oxygen	2016		N/A	7.96	mg/L		
SWFD	onsite		Electrical Conductivity (Field)	2016		N/A	0.66	mS/cm		
S3	downstream		pH (Field)	2016		N/A	8.02	pH units		
S3	downstream		Temperature	2016		N/A	10.3	degrees C		
S3	downstream		Ammoniacal Nitrogen	2016		N/A	0.6	mg/L		
S3	downstream		Chloride	2016		N/A	66.11	mg/L		
S3	downstream		BOD	2016		N/A	<1	mg/L		
S3	downstream		COD	2016		N/A	16.22	mg/L		
S3	downstream		Total Suspended Solids	2016	50	All values < ELV	7.1	mg/L	yes	
S3	downstream		Dissolved Oxygen	2016		N/A	10.25	mg/L		
S3	downstream		Electrical Conductivity (Field)	2016		N/A	909	mS/cm		
SW20a	downstream		pH (Field)	2016		N/A	7.8	pH units		
SW20a	downstream		Temperature	2016		N/A	8.9	degrees C		
SW20a	downstream		Ammoniacal Nitrogen	2016		N/A	0.656	mg/L		
SW20a	downstream		Chloride	2016		N/A	41.3	mg/L		
SW20a	downstream		BOD	2016		N/A	1.38	mg/L		
SW20a	downstream		COD	2016		N/A	69.43	mg/L		
SW20a	downstream		Total Suspended Solids	2016		N/A	312	mg/L		
SW20a	downstream		Dissolved Oxygen	2016		N/A	6.64	mg/L		
SW20a	downstream		Electrical Conductivity (Field)	2016		N/A	811	mS/cm		
S7	upstream		pH (Field)	2016		N/A	7.9	pH units		
S7	upstream		Temperature	2016		N/A	8.2	degrees C		

AER Monitoring returns summary template-WATER/WASTEWATER(SEWER) Lic No: W0009-03 Year 2016

Location	Direction	Parameter	Value	Unit	Notes
S7	upstream	Ammoniacal Nitrogen	0.0578	mg/L	
S7	upstream	Chloride	46.67	mg/L	
S7	upstream	BOD	2.775	mg/L	
S7	upstream	COD	73.62	mg/L	
S7	upstream	Total Suspended Solids	203	mg/L	
S7	upstream	Dissolved Oxygen	8.7	mg/L	
S7	upstream	Electrical Conductivity (Field)	726	mS/cm	
OF1	downstream	Temperature	7.3	degrees C	temperature was measured quarterly. On two occasions, sample point was dry
OF2	downstream	Temperature	12.5	degrees C	temperature was measured quarterly. On one occasion, sample point was dry
OF3	downstream	Temperature	14	degrees C	
OF4	downstream	Temperature	8.4	degrees C	temperature was measured quarterly. On two occasions, sample point was dry
OF1	downstream	pH	8.3	pH units	
OF2	downstream	pH	8.3	pH units	
OF3	downstream	pH	7.9	pH units	
OF4	downstream	pH	8	pH units	
OF1	downstream	Dissolved Oxygen	11.29	mg/L	
OF2	downstream	Dissolved Oxygen	10.14	mg/L	
OF3	downstream	Dissolved Oxygen	9.27	mg/L	
OF4	downstream	Dissolved Oxygen	10.11	mg/L	
OF1	downstream	Conductivity	1160	µS/cm @20oC	
OF2	downstream	Conductivity	1350	µS/cm @20oC	
OF3	downstream	Conductivity	1660	µS/cm @20oC	
OF4	downstream	Conductivity	1790	µS/cm @20oC	
OF1	downstream	Ammoniacal Nitrogen as N	1.34	mg/L	All values < ELV
OF2	downstream	Ammoniacal Nitrogen as N	0.84	mg/L	All values < ELV
OF3	downstream	Ammoniacal Nitrogen as N	1.11	mg/L	All values < ELV
OF4	downstream	Ammoniacal Nitrogen as N	1.81	mg/L	All values < ELV

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual Inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3 Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below

4 Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box

External /Internal Lab Quality checklist Assessment of results checklist

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no.	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
T4	Wastewater/Sewer	pH	discrete	monthly	Monthly	6-10	Daily mean concentration	7.67	pH units	yes	pH Meter (Electrode)	Manufacturer method			
T4	Wastewater/Sewer	Temperature	discrete	monthly	Monthly	42	Daily mean concentration	7.9	degrees C	yes	pH Meter (Electrode)	Manufacturer method			
T4	Wastewater/Sewer	Conductivity	discrete	monthly	Monthly			497	µS/cm @20oC		Conductivity Meter (Electrode)	Manufacturer method			
T4	Wastewater/Sewer	BOD	discrete	monthly	Monthly	150	Daily mean concentration	6.79	mg/L	yes	Filtered by Oxygen Meter on liquids	UK SCA "Blue Book" series		256.374615	
T4	Wastewater/Sewer	COD	discrete	monthly	Monthly	1100	Daily mean concentration	261.33	mg/L	yes	Dr Lange Kit	ISO		7330.56905	
T4	Wastewater/Sewer	Ammonia (as N)	discrete	monthly	Monthly	800	Daily mean concentration	271.33	mg/L	yes	Kone Analyser	B.S. (British Standard)		6522.530875	
T4	Wastewater/Sewer	Suspended Solids	discrete	monthly	Monthly	800	Daily mean concentration	19.67	mg/L	yes	TSS in waters	B.S. (British Standard)		387.865625	
T4	Wastewater/Sewer	Ortho-phosphate (as PO4)	discrete	monthly	Monthly	10	Daily mean concentration	0.45	mg/L	yes	Kone spectrophotometric Analysers	US EPA		54.3698169	
T4	Wastewater/Sewer	Sulphate	discrete	monthly	Monthly	1000	Daily mean concentration	378.67	mg/L	yes	Kone spectrophotometric Analysers	US EPA		6308.064	
T4	Wastewater/Sewer	Chromium (diss.filt)	discrete	monthly	Monthly	300	Daily mean concentration	42.67	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.822786195	
T4	Wastewater/Sewer	Copper (diss. Filt.)	discrete	monthly	Monthly	500	Daily mean concentration	2.76	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.050547257	
T4	Wastewater/Sewer	Nickel (diss.filt.)	discrete	monthly	Monthly	500	Daily mean concentration	26.9	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.701891591	
T4	Wastewater/Sewer	Zinc (diss. Filt.)	discrete	monthly	Monthly	1500	Daily mean concentration	17	µg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)	APHA / AWWA "Standard Methods"		0.311592078	
T4	Wastewater/Sewer	mineral oil >C10 C40 (aq)	discrete	monthly	Monthly	10000	Daily mean concentration	<10	µg/L	yes	EPH in waters	Other (please specify)	Petroleum	<0.21903	
T4	Wastewater/Sewer	TPH/Oils & Greases	discrete	monthly	Monthly	100	Daily mean concentration	1.31	mg/L	yes	IR spectroscopy	Other (please specify)	HMSO London	38.41238625	
T4	Wastewater/Sewer	Chloride	discrete	monthly	Monthly	6000	Daily mean concentration	392.67	mg/L	yes	Kone Spectrophotometric Analysers	US EPA		10688.664	
T4	Wastewater/Sewer	MTBE	discrete	monthly	Monthly			2.98	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.061218885	
T4	Wastewater/Sewer	Benzene	discrete	monthly	Monthly			1.98	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		0.054209925	
T4	Wastewater/Sewer	Toluene	discrete	monthly	Monthly			<1	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		<0.021903	
T4	Wastewater/Sewer	Ethylbenzene	discrete	monthly	Monthly			<1	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		<0.021903	
T4	Wastewater/Sewer	m,p-Xylene	discrete	monthly	Monthly			<1	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		<0.021903	
T4	Wastewater/Sewer	o-Xylene	discrete	monthly	Monthly			<2	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		<0.043806	
T4	Wastewater/Sewer	Sum of Detected Xylenes	discrete	monthly	Monthly			<2	µg/L		GCMS (Gas Chromatography Mass Spectroscopy)	US EPA		<0.043806	
T4	Wastewater/Sewer	Sum of BTEX	discrete	monthly	Monthly	5000	Daily mean concentration	<5	µg/L	yes				<0.109515	
T4	Wastewater/Sewer	Methane in headspace	discrete	monthly	Monthly	0.5	Daily mean concentration	0			Gas meter	Manufacturer method			
T4	Wastewater/Sewer	volumetric flow	discrete	monthly	Monthly	150	max in any one day	57.27	m3/day						average flow based on total volume in 2016

Note 1: Volumetric flow shall be included as a reportable parameter
 Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

Continuous monitoring

5 Does your site carry out continuous emissions to water/sewer monitoring? Additional Information

If yes please summarise your continuous monitoring data below in Table W4 and compare it to its relevant Emission Limit Value (ELV)

6 Did continuous monitoring equipment experience downtime? If yes please record downtime in table W4 below

7 Do you have a proactive service contract for each piece of continuous monitoring equipment on site?

8 Did abatement system bypass occur during the reporting year? If yes please complete table W5 below

Table W4: Summary of average emissions -continuous monitoring

Emission reference no:	Emission released to	Parameter/ Substance	ELV or trigger values in licence or any revision thereof	Averaging Period	Compliance Criteria	Units of measurement	Annual Emission for current reporting year (kg)	% change +/- from previous reporting year	Monitoring Equipment downtime (hours)	Number of ELV exceedences in reporting year	Comments
	SELECT	SELECT		SELECT	SELECT	SELECT					
	SELECT	SELECT		SELECT	SELECT	SELECT					

note 1: Volumetric flow shall be included as a reportable parameter.

Table W5: Abatement system bypass reporting table

Date	Duration (hours)	Location	Resultant emissions	Reason for bypass	Corrective action*	Was a report submitted to the EPA?	When was this report submitted?
						SELECT	

*Measures taken or proposed to reduce or limit bypass frequency

Groundwater/Soil monitoring template	Lic No: W0009-03	Year	2016
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			Comments
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	yes	Please provide an interpretation of groundwater monitoring data in the interpretation box below or if you require additional space please include a groundwater/contaminated land monitoring results interpretation as an additional section in this AER
2	Are you required to carry out soil monitoring as part of your licence requirements?	no	
3	Do you extract groundwater for use on site? If yes please specify use in comment section	no	
4	Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below.	yes	
5	Is the contamination related to operations at the facility (either current and/or historic)	yes	
6	Have actions been taken to address contamination issues? If yes please summarise remediation strategies proposed/undertaken for the site	yes	
7	Please specify the proposed time frame for the remediation strategy	SELECT	
8	Is there a licence condition to carry out/update ELRA for the site?	SELECT	
9	Has any type of risk assesment been carried out for the site?	N/A	
10	Has a Conceptual Site Model been developed for the site?	N/A	
11	Have potential receptors been identified on and off site?	N/A	
12	Is there evidence that contamination is migrating offsite?	N/A	

Groundwater quality is influenced by leachate from the unlined portion of the landfill and also by saline intrusion.

This landfill has unlined cells built to a dilute and disperse sepcification. There is evidence of an upward trend in ammonical nitrogen in MB35 a downgradient well in the estuary. Conductivity and chloride levels in these wells are impacted by saline water as well as potentially by leachate. There is an upward trend in EC and ammonical N levels at the upgradient monitoring point. The onsite well CD1 has not shown upward trends in parameters assessed for the 5 year period. Quarterly groundwater monitoring reports with interpretation are submitted to the Agency through EDEN providing all of the monitoring results for groundwater sampling on a monthly, quarterly and annual basis. A separate groundwater monitoring template has not been completed.

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	unit	GTV's*	IGV	Upward trend in pollutant concentration over last 5 years of monitoring data
2016	RC3	pH (pH units) (Field)	Probe	Quarterly	7.8	7.7	pH units	>6.5 & <9.5		yes
2016	RC3	Temperature (°C) (Field)	Probe	Quarterly	11.6	9.1	°C		25	no
2016	RC3	Dissolved Oxygen mg/l (Field)	Probe	Quarterly	16.7	11.85	mg/l		No Abnormal Change	no
2016	RC3	Ammoniacal Nitrogen as NH3	Kone Spectrophotometric Analyser	Quarterly	1.2	0.44	mg/l	0.136		yes
2016	RC3	Chloride	Kone Spectrophotometric Analyser	Quarterly	21.6	21.18	mS/cm	1.875		no
2016	RC3	Conductivity	Determination of EC using a Conductivity meter	Quarterly	0.7	0.68	mg/l	187.5		yes
2016	RC3	Organic Carbon, Total	Colorimetry	Quarterly	3.1	0.78	mg/l		No Abnormal Change	no
							SELECT			SELECT

.* where average indicates arithmetic mean

.*+ maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Groundwater/Soil monitoring template	Lic No: W0009-03	Year: 2016
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Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit	GTV's*	SELECT**	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data	
2016	MB 35	pH (field)	Probe	Quarterly	7.52	7.36	pH units	>6.5 &<9.5		yes	
2016	MB 35	Temperature	Probe	Quarterly	14.1	11.80	°C		25	no	
2016	MB 35	Ammoniacal Nitrogen	Kone Spectrophotometric Analyser	Quarterly	5.67	3.21	mg/l		No Abnormal Change	yes	
2016	MB 35	Dissolved Oxygen	Probe	Quarterly	6.04	5.74	mg/l	0.136		yes	
2016	MB 35	Conductivity (Laboratory)	Determination of EC using a Conductivity meter	Quarterly	15300	14,600	mS/cm	1.875		no	
2016	MB 35	Chloride	Spectrophotometric Analyser	Quarterly	36.6	31.90	mg/l	187.5		no	
2016	MB35	TOC	Colorimetry	Quarterly	7.38	7.38	mg/l		NAC	yes	
on-site	2016	CD1	pH (field)	Probe	Monthly	7.929	7.29	pH units	>6.5 &<9.5		no
on-site	2016	CD1	Temperature	Probe	Monthly	19	13.10	°C		25	no
on-site	2016	CD1	Ammoniacal Nitrogen	Spectrophotometric Analyser	Monthly	1.78	0.57	mg/l	0.136		no
on-site	2016	CD1	Dissolved Oxygen	Probe	Monthly	8.16	4.87	mg/l		No Abnormal Change	no
on-site	2016	CD1	Conductivity (Laboratory)	Determination of EC using a Conductivity meter	Monthly	1.583	1.20	mS/cm	1.875		no
on-site	2016	CD1	Chloride	Spectrophotometric Analyser	Monthly	118	62.48	mg/l	187.5		no
on-site	2016	CD1	TOC	Colorimetry	Monthly	5.33	3.92	mg/l		Change	no

*please note exceedance of generic assessment criteria (GAC) such as a Groundwater Threshold Value (GTV) or an Interim Guideline Value (IGV) or an upward trend in results for a substance indicates that further interpretation of monitoring results is required. In addition to completing the above table, please complete the Groundwater Monitoring Guideline Template Report at the link provided and submit separately through ALDER as a licensee return or as otherwise instructed by the EPA. [Groundwater monitoring template](#)

More information on the use of soil and groundwater standards/ generic assessment criteria (GAC) and risk assessment tools is available in the EPA published guidance (see the link in G31). [Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites \(EPA 2013\)](#).

**Depending on location of the site and proximity to other sensitive receptors alternative Receptor based Water Quality standards should be used in addition to the GTV e.g. if the site is close to surface water compare to Surface Water Environmental Quality Standards (SWEQS). If the site is close to a drinking water supply compare results to the Drinking Water Standards (DWS)

[Groundwater regulations](#)
[Surface water EQS](#) [GTV's](#) [Drinking water \(private supply\) standards](#) [Drinking water \(public supply\) standards](#) [Interim Guideline Values \(IGV\)](#)

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template

Lic No:

W0009-03

Year

2016

[Click here to access EPA guidance on Environmental Liabilities and Financial provision](#)

			Commentary
1	ELRA initial agreement status	Required but not submitted	See Sec 53A Response for Year Ending 31/12/2012
2	ELRA review status	Review required and not completed;	See Sec 53A Response for Year Ending 31/12/2012
3	Amount of Financial Provision cover required as determined by the latest ELRA	Specify	See Sec 53A Response for Year Ending 31/12/2012
4	Financial Provision for ELRA status		See Sec 53A Response for Year Ending 31/12/2012
5	Financial Provision for ELRA - amount of cover	Specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,211,999 on 31/12/2016
6	Financial Provision for ELRA - type	Other please specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,211,999 on 31/12/2016
7	Financial provision for ELRA expiry date	Enter expiry date	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,211,999 on 31/12/2017
8	Closure plan initial agreement status	Required but not submitted	
9	Closure plan review status	Review required and not completed	
10	Financial Provision for Closure status	Required but not submitted	
11	Financial Provision for Closure - amount of cover	Specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,211,999 on 31/12/2016
12	Financial Provision for Closure - type	Other please specify	Fingal County Council has provided in its accounts a reserve for the restoration which amounted to €8,211,999 on 31/12/2016
13	Financial provision for Closure expiry date	Enter expiry date	Reserve Set Annually

Environmental Management Programme/Continuous Improvement Programme template	Lic No:	W0009-03	Year	2016
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Highlighted cells contain dropdown menu click to view	Additional Information
1 Do you maintain an Environmental Management System (EMS) for the site. If yes, please detail in additional information	Yes Schedule of the Environmental Objectives & Targets
2 Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes Key objective of 2016 was the installation of the Vertical Barrier Wall to mitigate surface water contamination by leachate. Capping of the area around the site offices.
3 Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes Please refer to Section 13 of the word document AER for a list of objectives and targets for 2016 and 2017.
4 Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes Self Monitoring Reports hardcopies available for inspection.

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Reduction of emissions to Water	Complete Vertical Barrier	100	Completed	Section Head	Reduced emissions
Reduction of emissions to Water	Replace / Rehabilitate Surface Water Pipes / Manholes	90	Procurement Process almost completed this year.	Section Head	None
Reduction of emissions to Wastewater	Replace / Rehabilitate Foul Water Pipes / Manholes	90	Procurement Process almost completed this year.	Section Head	None
Reduction of emissions to Water	Complete Capping	90	Procurement Process almost completed this year.	Section Head	None

Noise monitoring summary report Lic No: W0009-03 Year: 2016

- 1 Was noise monitoring a licence requirement for the AER period?
If yes please fill in table N1 noise summary below
- 2 Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6?
- 3 Does your site have a noise reduction plan
- 4 When was the noise reduction plan last updated?
- 5 Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?

[Noise Guidance note NG4](#)

Table N1: Noise monitoring summary

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA _{eq}	LA ₉₀	LA ₁₀	LA _{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is <u>site</u> compliant with noise limits (day/evening/night)?
20/07/2016	11:34	NM1		56	39	54		No	SELECT	Off site noise	Yes
20/07/2016	12:22	NM2		49	42	51		No			Yes
20/07/2016	13:02	NM3		50	41	47		No			Yes
20/07/2016	14:08	NM4		50	40	51		No			Yes
20/07/2016	14:57	NM5		43	39	46		No			Yes

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options?

** please explain the reason for not taking action/resolution of noise issues?
Any additional comments? (less than 200 words)

Resource Usage/Energy efficiency summary

Lic No:

W0009-03

Year

2016

Additional information

- 1 When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below
- 2 Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information
- 3 Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information

Enter date of audit	2006
No	
SELECT	

Table R1 Energy usage on site				
Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	95.96	69.117	-27%	27.97%
Total Energy Generated (MWHrs)	10.8	10.5	-2.7%	2.78%
Total Renewable Energy Generated (MWHrs)	10.8	10.5	-2.70%	2.78%
Electricity Consumption (MWHrs)	95.96	69.117	-0.27	27.97%
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)	86	89.3	plus 3.84%	-3.84%
Light Fuel Oil (m3)				
Natural gas (m3)				
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)				
Renewable Biomass				
Renewable energy generated on site				

* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site					Water Emissions	Water Consumption
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m ³ /yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr
Groundwater						
Surface water						
Public supply	6843	5390	-21%			
Recycled water						
Total						

* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

** where site production information is available please enter percentage increase or decrease compared to previous year

6843					
	Total	Landfill	Incineration	Recycled	Other
Hazardous (Tonnes)					
Non-Hazardous (Tonnes)					

Resource Usage/Energy efficiency summary	Lic No: W0009-03	Year	2016
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Table R4: Energy Audit finding recommendations								
Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
2006	Set Up Sleep Mode on PCs		energy audit	560 kWhrs of 3,500,0	2008	Fingal County Council	2010	
	Monitoring Vehicle Use		energy audit	175,090 Kwhrs of 3,5	2006	Fingal County Council	2010	
	Driver Training		energy audit	203,595Kwhrs of 3,5	2006	Fingal County Council	ONGOING	

Table R5: Power Generation: Where power is generated onsite (e.g. power generation facilities/food and drink industry) please complete the follow

	BY01	BY02	BY03	BY04	Station Total
Technology	Gas Combustion	Gas Combustion	Gas Combustion	Gas Combustion	
Primary Fuel	Landfill Gas	Landfill Gas	Landfill Gas	Landfill Gas	
Thermal Efficiency					
Unit Date of Commission	Aug-06	Aug-06	Aug-06	Aug-06	
Total Starts for year					
Total Running Time	1202	20	890	7916	
Total Electricity Generated (GWH)					
House Load (GWH)					
KWH per Litre of Process Water					
KWH per Litre of Total Water used on Site					

WASTE SUMMARY	Lic No: W0009-03	Year: 2016
SECTION A-PRTR ON SITE WASTE TREATMENT AND WASTE TRANSFERS TAB- TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES	PRTR facility logon	dropdown list click to see options

SECTION B- WASTE ACCEPTED ONTO SITE-TO BE COMPLETED BY ALL IPPC AND WASTE FACILITIES

Were any wastes accepted onto your site for recovery or disposal or treatment prior to recovery or disposal within the boundaries of your facility?; (waste generated within your 1 boundaries is to be captured through PRTR reporting)

If yes please enter details in table 1 below

2 Did your site have any rejected consignments of waste in the current reporting year? If yes please give a brief explanation in the additional information

3 Was waste accepted onto your site that was generated outside the Republic of Ireland? If yes please state the quantity in tonnes in additional information

No	Additional Information
No	
No	
No	

Table 1 Details of waste accepted onto your site for recovery, disposal or treatment (do not include wastes generated at your site, as these will have been reported in your PRTR workbook)

Licensed annual tonnage limit for your site (total tonnes/annum)	EWC code	Source of waste accepted	Description of waste accepted Please enter an accurate and detailed description - which applies to relevant EWC code European Waste Catalogue EWC codes	Quantity of waste accepted in current reporting year (tonnes)	Quantity of waste accepted in previous reporting year (tonnes)	Reduction/ Increase over previous year +/- %	Reason for reduction/ increase from previous reporting year	Packaging Content (%): only applies if the waste has a packaging component	Disposal/Recovery or treatment operation carried out at your site and the description of this operation	Quantity of waste remaining on site at the end of reporting year (tonnes)	Comments -

SECTION C-TO BE COMPLETED BY ALL WASTE FACILITIES (waste transfer stations, Composters, Material recovery facilities etc) EXCEPT LANDFILL SITES

4 Is all waste processing infrastructure as required by your licence and approved by the Agency in place? If no please list waste processing infrastructure required onsite

5 Is all waste storage infrastructure as required by your licence and approved by the Agency in place? If no please list waste storage infrastructure required on site

6 Does your facility have relevant nuisance controls in place?

7 Do you have an odour management system in place for your facility? If no why?

8 Do you maintain a sludge register on site?

SELECT	
SELECT	
SELECT	
SELECT	
SELECT	

SECTION D-TO BE COMPLETED BY LANDFILL SITES ONLY

Table 2 Waste type and tonnage-landfill only

Waste types permitted for disposal	Authorised/licenced annual intake for disposal (tpa)	Actual intake for disposal in reporting year (tpa)	Remaining licensed capacity at end of reporting year (m3)	Comments
Household	152,500	0		Landfill Closed May 2012 for this waste
Commercial	200,000	0	N/A	Landfill Closed May 2012 for this waste
Sewage Sludge	30,000	0		Landfill Closed May 2012 for this waste
Construction and Demolition	63,000	0	N/A	Material used in Recovery and capping only

Table 3 General information-Landfill only

Area ID	Date landfilling commenced	Date landfilling ceased	Currently landfilling	Private or Public Operated	Inert or non-hazardous	Predicted date to cease landfilling	Licence permits asbestos	Is there a separate cell for asbestos?	Accepted asbestos in reporting year	Total disposal area occupied by waste	Lined disposal area occupied by waste	Unlined area	Comments on liner type
										ha	ha	ha	
N/A	Apr-04	May-12	No	Public	Non Hazardous	May-12	No	No	No	46.25	10.11	36.14	Original Landfill Cells 1-6 and Piggybacking - HDPE

WASTE SUMMARY	Lic No: W0009-03	Year: 2016
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Table 4 Environmental monitoring-landfill only [Landfill Manual-Monitoring Standards](#)

Was meteorological monitoring in compliance with Landfill Directive (LD) standard in reporting year +	Was leachate monitored in compliance with LD standard in reporting year	Was Landfill Gas monitored in compliance with LD standard in reporting year	Was SW monitored in compliance with LD standard in reporting year	Have GW trigger levels been established	Were emission limit values agreed with the Agency (ELVs)	Was topography of the site surveyed in reporting year	Has the statement under S53(A)(5) of WMA been submitted in reporting year	Comments
Met Data From Dublin Airport	Yes	Yes	Yes	No	Yes	Yes	No	Landfill Gas Surface Water and Groundwater Results presented within text of AER

..+ please refer to Landfill Manual linked above for relevant Landfill Directive monitoring standards

Table 5 Capping-Landfill only

Area uncapped*	Area with temporary cap	Area with final cap to LD Standard m2 ha, a	Area capped other	Area with waste that should be permanently capped to date under licence	What materials are used in the cap	Comments
0.25 ha approx		0	46.5		46.5 Geosynthetic clay liner / HDPE	

*please note this includes daily cover area

Table 6 Leachate-Landfill only

9 Is leachate from your site treated in a Waste Water Treatment Plant?

Yes

10 Is leachate released to surface water? If yes please complete leachate mass load information below

No

Volume of leachate in reporting year(m3)	Leachate (BOD) mass load (kg/annum)	Leachate (COD) mass load (kg/annum)	Leachate (NH4) mass load (kg/annum)	Leachate (Chloride) mass load kg/annum	Leachate treatment on-site	Specify type of leachate treatment	Comments

Please ensure that all information reported in the landfill gas section is consistent with the Landfill Gas Survey submitted in conjunction with PRTR returns

Table 7 Landfill Gas-Landfill only

Gas Captured & Treated by LFG System m3	Power generated (MW / KWh)	Used on-site or to national grid	Was surface emissions monitoring performed during the reporting year?	Comments
9581048	10,478 MW hr	to national grid	Yes	No emissions

APPENDIX 3

PRTR





[Guidance to completing the PRTR workbook](#)

PRTR Returns Workbook

Version 1.1.10

REFERENCE YEAR 2016

1. FACILITY IDENTIFICATION

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

Classes of Activity	
No.	class_name
	- Refer to PRTR class activities below

Address 1	Balleally
Address 2	Lusk
Address 3	
Address 4	
Country	Dublin
Coordinates of Location	Ireland
River Basin District	-7.26329 55.2542
NACE Code	IEEA
Main Economic Activity	3821
AER Returns Contact Name	Treatment and disposal of non-hazardous waste
AER Returns Contact Email Address	Mortimer Loftus
AER Returns Contact Position	mortimer.loftus@fingal.ie
AER Returns Contact Telephone Number	Executive Scientist
AER Returns Contact Mobile Phone Number	018905000
AER Returns Contact Fax Number	0876872025
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	6
User Feedback/Comments	Em to Air: total capacity is in m3 LFG. Engines 3 and 4 tested 2016, engines 1 and 2 tested 2015. Flare ran 48 hrs in 2016 and 280 hours in 2015 so lower mass emissions. Net methane generation dropped slightly as expected, total capture also decreased and net emissions were slightly higher due to the lower capture rate. This is expected as gas quality diminishes.
Web Address	

2. PRTR CLASS ACTIVITIES

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

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

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

4. 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)?	
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This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR

[Link to previous years emissions data](#)

| PRTR# : W0009 | Facility Name : Balleally Landfill | Filename : W0009_2016.xls | Return Year : 2016 |

29/03/2017 08:09

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASERS TO AIR		Please enter all quantities in this section in KGs								
No. Annex II	POLLUTANT Name	M/C/E	METHOD		Flare			QUANTITY		
			Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005	Horiba PG-250	4.15	678.89	5525.0	6208.04	0.0	0.0
02	Carbon monoxide (CO)	M	EN 15058:2004	NDIR by Horiba PG-250	0.08	1232.0	17146.0	18378.08	0.0	0.0
01	Methane (CH4)	C	OTH	Predicted generation minus captured gas.	0.0	0.0	0.0	2190204.44	0.0	2190204.44

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASERS TO AIR		Please enter all quantities in this section in KGs								
No. Annex II	POLLUTANT Name	M/C/E	METHOD		Flare			QUANTITY		
			Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
84	Fluorine and inorganic compounds (as HF)	M	ISO/DIS 15713:2004	CAT-AP-01	0.02	3.72	29.52	33.26	0.0	0.0
80	Chlorine and inorganic compounds (as HCl)	M	EN 1911-1 to 3:2003	CAT-AP-01	0.1	2.08	11.39	13.57	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)

RELEASERS TO AIR		Please enter all quantities in this section in KGs								
Pollutant No.	POLLUTANT Name	M/C/E	METHOD		Flare			QUANTITY		
			Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
230	TA Luft organic substances class 1	M	ALT	CEN/TS 13649 M109(N) GC MS	0.0	3.54	23.74	27.28	0.0	0.0
231	TA Luft organic substances class 2	M	ALT	CEN/TS 13649 M109(N) GC MS	0.0	2.95	23.74	26.69	0.0	0.0
229	TA Luft inorganic dust particles class 3	M	ALT	CEN/TS 13649 M109(N) GC MS	0.0	2.95	23.74	26.69	0.0	0.0
237	Volatile organic compounds (as TOC)	M	ALT	EN12619:2013 Flame Ionisation by Sick 3006FD	0.06	0.0	0.0	0.06	0.0	0.0

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

Additional Data Requested from Landfill operators

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

Landfill:		Balleally Landfill			
Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used		Facility Total Capacity m3 per hour
			Method Code	Designation or Description	
Total estimated methane generation (as per site model)	4,756,189	E	Model	Gassim 2.5	N/A
Methane flared	13,795	M	measured	Measured at flare	2500.0 (Total Flaring Capacity)
Methane utilised in engine/s	2,652,190	M	measured	measured at engines	3750.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	2,190,204	C	calculated	Subtraction gas capture from	N/A

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR#: W0009 | Facility Name : Balleally Landfill | Filename : W0009_2016.xls | Return Year : 2016 |

29/03/2017 08:09

Please enter all quantities on this sheet in Tonnes

0

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	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		Non	Non	Non	Non	Non	
Within the Country	19 07 03	No	21903.0 in 19 07 02	landfill leachate other than those mentioned	D8	M	Weighed	Offsite in Ireland	Irish Water Portrane Sewerage Works,D0114-01		Portrane Sewerage Works,St. Ita's Hospital,Portrane,Co. Dublin,Ireland			

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

[Link to previous years waste data](#)

[Link to previous years waste summary data & percentage change](#)

[Link to Waste Guidance](#)