

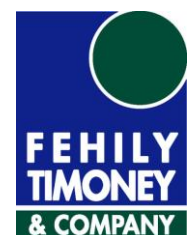
**ANNUAL ENVIRONMENTAL REPORT FOR
ARTHURSTOWN LANDFILL, KILL, CO. KILDARE**

FOR THE PERIOD

1ST JANUARY 2017 – 31ST DECEMBER 2017

WASTE LICENCE NO: W0004-04

MARCH 2018



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User is Responsible for Checking the Revision Status of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue to Client	JL/CF	TR	TR	26/03/2018

Client: South Dublin County Council

Keywords: Annual Environmental Report (AER)

Abstract: This is the AER for the calendar year 2017.

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1. INTRODUCTION

1.1. Site Location

Arthurstown landfill, Kill, Co. Kildare is owned and operated by South Dublin County Council (SDCC). SDCC was granted a waste licence to operate the site by the Environmental Protection Agency. Landfilling commenced in October 1997 and ceased at the end of December 2010.

The current waste licence register number is W004-04 and was issued December 2009. The facility is located approximately 25 km south-west of Dublin City and catered for the Greater Dublin Region.

The national grid coordinates for the facility are E 295691 N 220936. Figure 1-1 and Figure 1-2 present the location of the site.

The prevailing land use in the area is the bloodstock industry and agriculture. The site was a disused quarry when purchased by SDCC in 1992. It had been a sand and gravel quarry. Some unauthorised dumping took place in the 1970's. SDCC carried out remediation and restoration works on the unauthorised "dump" known locally as "Gavin's Dump".

Groundwater generally flows in a north-westerly direction. There are two rivers in the area, the Hartwell River and the Kill River. Surface water run-off from the site is first collected and stored in the on-site surface water storage lagoon before being discharged to the Hartwell River along with pumped groundwater. Groundwater levels beneath the landfill were artificially reduced during cell construction using a cut-off pipe system so that the water table is maintained below the landfill lining system base level.

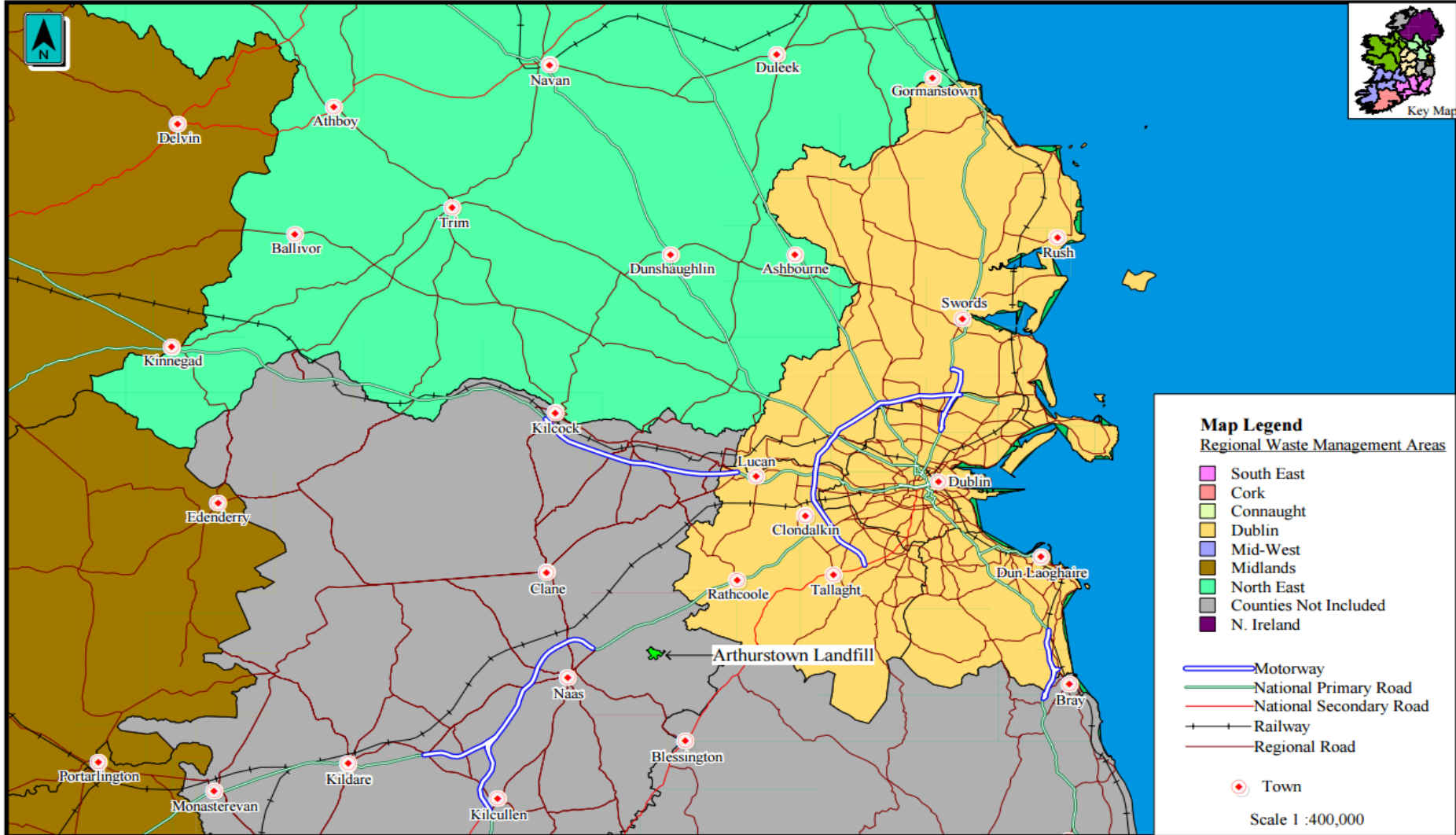
The prevailing winds are south to south westerly. The annual rainfall for the area was approximately 730 mm.

Final capping is now complete and this was achieved during the final quarter of 2013.

The landfill is closed and is in the aftercare and restoration phase.

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 SDC-AP_Figure 2.1_Site Location-Regional_Rev A

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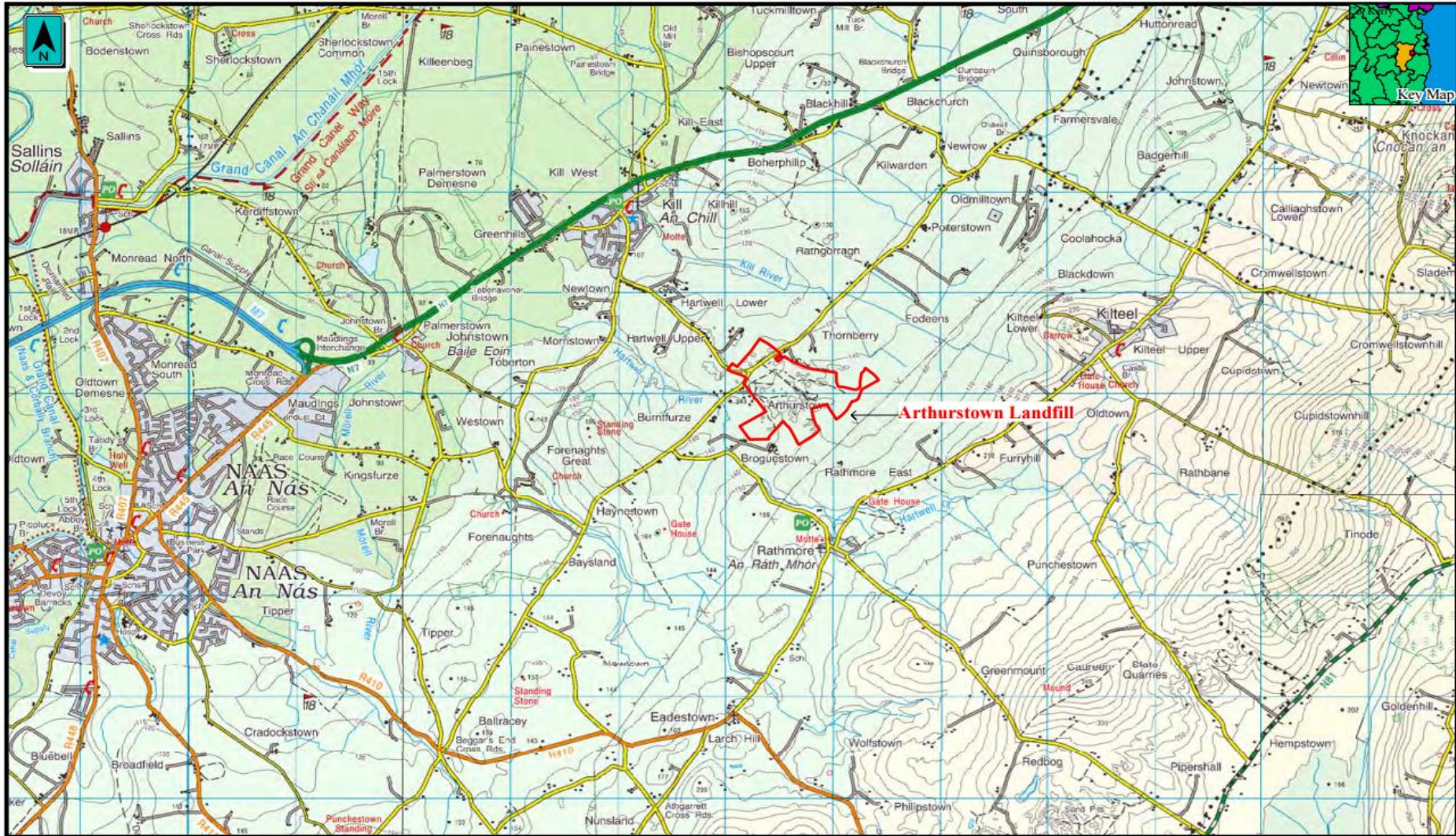
Site Location - Regional

Figure 2.1

Figure 1-1: Site Location Map (Regional)

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SDC-AP_Figure 2.2_1 to 50000 Site Location Map_Rev A

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1: 50,000 Site Location Map

Figure 2.2

Figure 1-2: Site Location Map

1.2. Purpose

This Annual Environmental Report (AER) has been prepared in compliance with Condition 11.5 of the waste licence. It is the 19th AER for the facility.

Condition 11.5 “Annual Environmental Report” states that:

11.5.1 The licensee shall submit to the Agency for its agreement, by 31st March each year, an Annual Environmental Report (AER).

11.5.2 The AER shall include as a minimum the information specified in *Schedule F: Content of Annual Environmental Report*, of this licence and shall be reported in accordance with any relevant written guidance issued by the Agency”.

The AER includes all of the items that are required by Schedule F of the current waste licence for the facility.

This AER covers the operational period of the landfill from 1st January 2017 to 31st December 2017.

This is the seventh AER to cover the period of closure for the facility as this facility is now closed for receiving waste since 21st December 2010.

2. SITE DESCRIPTION AND ACTIVITIES

2.1. Waste Activities

Waste activities carried out at Arthurstown Landfill were in accordance with the licence. Currently closed to waste acceptance. Ongoing aftercare activities including operation of the landfill gas and leachate management and treatment systems. There is an operational leachate treatment plant (SBR) and landfill gas utilisation plant on site.



Figure 2-1: Completed Landfill Cap at Arthurstown

2.2. Waste Quantities

Table 2-1 is a list of waste material received at the facility for land-filling since operations commenced in 1997 until 21st December 2010 when landfilling ceased.

Table 2-1: Waste Intake (tonnes)

Year	Waste Materials (tonnes)	
	Cumulative Waste Inputs	Annual Waste Inputs
2010	4,779,021.09	191,553
2009	4,587,468	214,560
2008	4,372,908	301,828
2007	4,071,077	480,529
2006	3,590,548	591,755
2005	2,998,793	497,400
2004	2,501,393	423,626
2003	2,077,767	483,582
2002	1,594,185	463,436
2001	1,130,749	334,333
2000	796,416	274,642
1999	521,774	271,079
1998	250,695	216,284
1997	34,411	34,411

2.3. Resource and Energy Consumption

The principal resources consumed at the landfill facility are diesel oil and electricity. Site vehicles were fuelled by diesel oil.

There are two site vehicles presently on site due to the progression of the aftercare and restoration phase of the closure programme.

Table 2-2: Resource Use and Energy Consumption

Resource/Energy	Units	Quantity Used in 2017
Water	litre	34,000
Oil	litres	21,977 L (gas engines)
Electricity Used	kWh	24,698
Electricity Generated	MWh	28,118

2.4. Leachate Generation

In 2017, leachate was collected from the waste cells and pumped to the leachate tanks on site. Following this, treated leachate was discharged via the local sewer to Osberstown WWTP with the permission of Kildare County Council and the Agency.

Table 2-3 lists the quantities of leachate tankered off site and treated leachate discharged to sewer in 2017.

The total quantity of leachate discharged to sewer for 2017 is 11,479 m³.

Table 2-3: Leachate removal off-site for 2017

Tonnes leachate tankered offsite 2017 (m³)	Tonnes leachate discharged to sewer 2017 (m³)	Total Discharged (m³)
0	11,479	11,479

3. ENVIRONMENTAL MONITORING

This is a summary of results and interpretation of environmental monitoring carried out in the period 1st January 2017 to 31st December 2017.

Environmental monitoring of the following is carried out in compliance with Condition 8 and Schedule D of the licence (W0004-04).

- Landfill Gas
- Landfill Gas Utilisation Plant
- Dust Deposition
- Noise
- Surface Water including Biological Assessment
- Groundwater
- Private Wells (Groundwater)
- Leachate (including discharges to sewer)
- Nuisance
- Meteorological

Environmental monitoring is carried out on a monthly, quarterly, bi-annual and annual basis for various parameters of the various media. The AER presents the results of annual monitoring with interpretation. A review of the other results collected during the year is included.

3.1. Monitoring Locations

The environmental monitoring points are shown in Figure 3-1: and again in Appendix 1. All samples were collected at the sampling points are shown listed in Table D.1.1 of the waste licence (W0004-04) unless specified otherwise in the following sections.

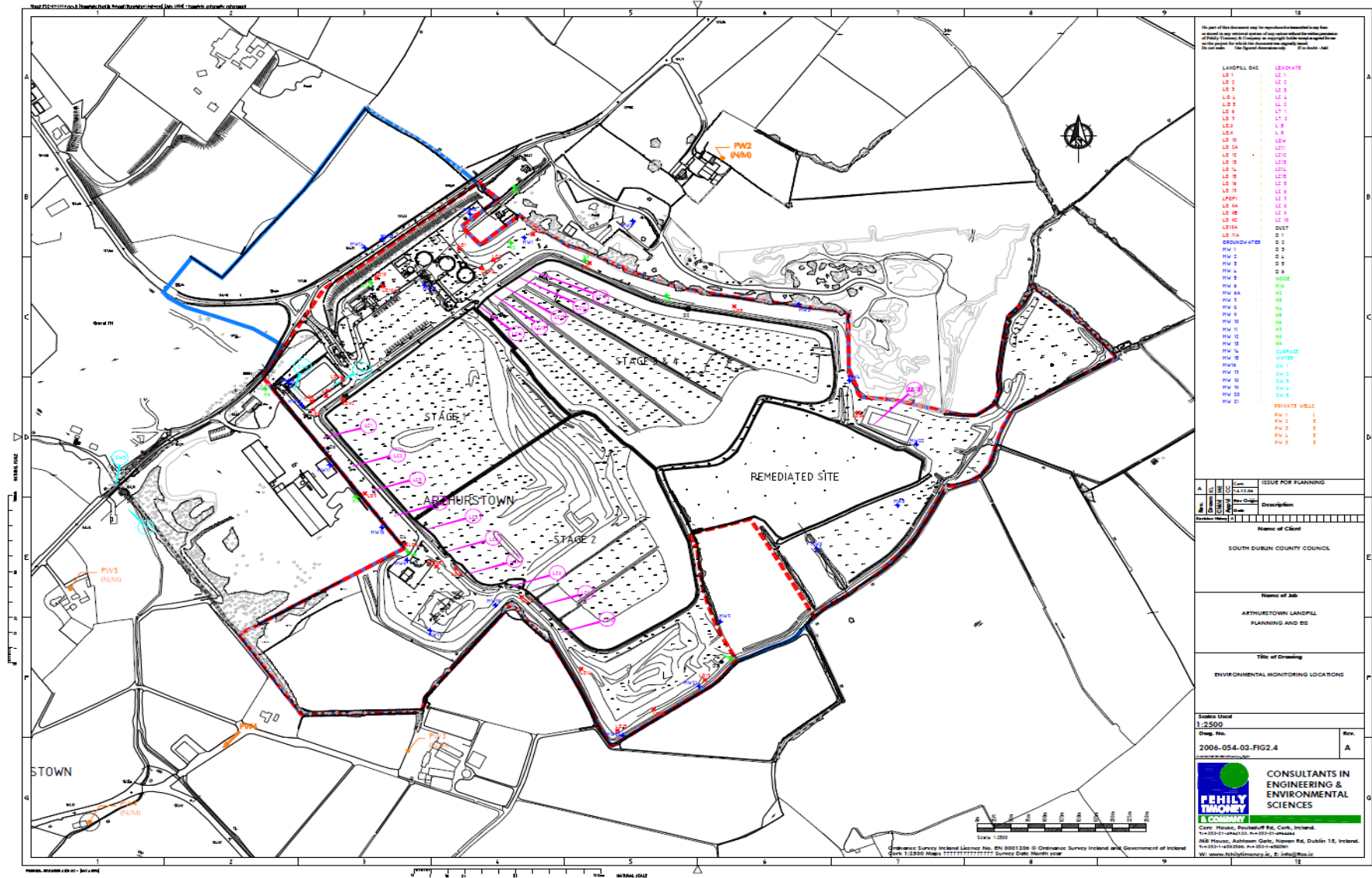


Figure 3-1: Environmental Monitoring Locations

3.2. Landfill Gas

Perimeter Monitoring Wells

There are 23 no. perimeter gas monitoring wells at the facility. In accordance with Schedule D.2.1 of the waste licence, monitoring of the wells is carried out on a monthly basis. An investigation was carried out in 2005 into elevated levels of carbon dioxide and methane at a number of perimeter wells. The investigation concluded that the elevated levels of CH₄ and CO₂ were due to incidences of rotting vegetation, proximity to old percolation areas etc. and was not due to landfill gas migration.

Landfill Gas Extraction Wells

The final capped areas are connected to the gas extraction system. This system is controlled and monitored by landfill gas field balancing. A gas balancing model is used by the staff at Arthurstown Landfill.

Site Buildings

There are four permanent gas monitors, one in each building on site:

- Administration building
- Staff services building
- Leachate plant building
- Maintenance building

Gas was not detected above the trigger level in any of the buildings.

3.2.1. Interpretation of Landfill Gas Results

Gas well 10 has repeated incidents of methane and carbon dioxide above the licence trigger level. Well 10 is in a percolation area of an old septic tank. Gas well 2A was above the trigger levels of carbon dioxide in every quarter in 2017, which could be due to decomposing of vegetation. These exceedances are normal for this site and was previously investigated and reported to the Agency, nonetheless, SDCC continues to report all exceedances as an incident to the EPA. During 2017 gas well 14 has been continually flooded, no measurements were taken.

Landfill Gas Utilisation Plant Emissions

In accordance with Schedule D.7.1 of the licence monitoring of the landfill gas utilisation plant was carried out.

The Landfill Gas Utilisation Plant commenced operations April 2004 with three no. Jenschacher landfill gas engines. Over time, 4 no. enclosed flares were installed and a further 8 no. engines. This accommodated the peak gas capture in 2007 of 13,500 m³/hr. In 2017 there were 5 no. operational engines with 2 back up flares. There are an additional 2 no. enclosed flares on site. The 5 engines do not run continuously, generally 3 of the 5 engines running full time and 2 engines in maintenance. By the end of 2017, the number of operational engines on site reduced to 4 (1.4 MW). Therefore, stack emissions testing was carried out on the 2 flares and 4 engines that were operational on the day of sampling.

Annual monitoring of the landfill gas utilisation plant emissions is a requirement of the licence. Monitoring was carried out for the period 2017 and the results have been submitted to the EPA in the quarterly reports. The annual round of stack monitoring is included in the PRTR.

3.2.2. Interpretation of Utilisation Emissions

All monitoring of flares and engine stacks showed results in compliance with waste licence W0004-04 for 2017.

3.3. Dust Deposition

Dust monitoring was carried out in accordance with the licence at 6 monitoring locations, three times in the year.

Dust monitoring was carried out over a 30-day period. The dates the samples were collected from the site (i.e. the 30th day) were as follows:

- 15th March 2017
- 15th of June 2017
- 05th September 2017

Dust deposition results for 2017 have been previously submitted to the EPA. The licence limit for dust at the facility is 350 mg/m²/day. This was not exceeded during 2017.

3.4. Noise

In compliance with Schedule D (D.4) of the waste licence, noise monitoring was carried out bi-annually during 2017.

The noise monitoring event took place as follows:

Day time and night time monitoring	2 nd November 2017 and 3 rd November 2017 30 th May 2017 and 31 st May 2017
------------------------------------	--

3.4.1. Noise Results

The results of noise monitoring events are as previously submitted to the EPA.

Seven internal boundary points were monitored for broadband and 1/3rd Octave frequency as part of the bi-annual environmental noise surveys. Each point was monitored for 30-minute periods during the day and night time.

Noise levels were consistent with previous years monitoring. The findings of the surveys indicate that there is no significant noise originating from the landfill during the day or the night. The LAeq at N5 remained above the noise limit for night time noise monitoring (45dB) during the survey on the 3rd of November and 31st of May 2017. At the night-time monitoring on the 31st of May at location N6 the LAeq exceeded the limit of 45 Db. In both monitoring events the noise at this location is entirely attributed to the neighbouring wood processing plant. There was no tonal or impulsive noise attributed to any of the locations monitored.

3.5. Surface Water

The following is a summary of annual surface water quality findings in 2017. More detailed information has been submitted in each of the quarterly reports from ANUA (formerly Bord Na Mona).

There are 5 no. surface water monitoring points. Chemical analyses were carried out at all 5 of the monitoring locations and a biological assessment was carried out at SW1 and SW3 (Hartwell River).

The 5-no. surface water monitoring points are located as follows:

- SW1 upstream of the outfall from the storm water lagoon in the Hartwell River
- SW2 outlet for the on-site storm water pond
- SW3 downstream of the outfall from the storm water lagoon in the Hartwell River
- SW4 downstream of Arthurstown Road in the Kill River
- SW5 inlet to the storm water pond (storm and ground waters)

3.5.1. Surface Water Results

Chemical Analysis

The results of surface water analyses are shown in the quarterly surface water reports as previously submitted to the EPA.

3.5.2. Interpretation of Surface Water Results

During 2017 the biological quality rating for surface water has remained consistent with previous years for SW1 and SW3, as can be seen with the Q ratings displayed in Table 3-1.

Quarterly monitoring is carried out by ANUA at all monitoring points for surface water. Monitoring points SW2 and SW5 are at the outlet and inlet to the surface water storage pond. The surface water had no impact on the landfill based on reports already submitted to the EPA during quarter 1, quarter 2, quarter 3 and quarter 4.

During 2017 all SW reports were sent to the Agency, Kildare County Council and the Department of Inland Fisheries.

3.6. Biological Sampling

During 2017 biological sampling was carried out in the Hartwell River. The river received a Q rating of 3-4, indicating that the quality of water is moderate. In 2017 the Q rating has improved compared to the Q value of 2-3 and 3 for SW1 and SW3 respectively in 2016.

Biological sampling is carried out annually in accordance with the licence. It was carried out during the third quarter of 2017 (20th July 2017). The Q rating system was used. This rating system recognises five macro-invertebrate communities/faunal groups ranging from A to E (i.e. most sensitive to most tolerant of pollution) and relates to their relative abundance, from a standard 2-minute kick sample, to a quality rating – the Q Index. The area surveyed is then assigned a Q rating from 5 to 1, with 5 being pristine unpolluted waters to 1 being gross polluted waters. Results of the biological sampling are shown below in Table 3-1.

Table 3-1: Results of Biological Sampling

Biological Q Rating for Surface Waters		
Location	SW1	SW3
Q-Rating	3-4	3

The results of this biological survey indicate that the quality of water in the Hartwell River is good (using the Q-value system) both upstream and downstream of the landfill.

The point SW1 is upstream of the Arthurstown surface water discharge point, while the point SW3 is downstream of the landfill. Results indicated that discharges from the surface water retention pond from the landfill are having no impact on the surface water quality at point SW3.

It is reasonable to conclude that the Arthurstown landfill is not having a discernible negative impact on the biological surface water quality in its surrounds.

3.7. Groundwater

There are 23 no. groundwater monitoring wells and 5 no. private wells. Table 3-2 shows the locations of the groundwater monitoring wells in relation to the facility. Private wells are discussed in Section 3.8.

Table 3-2: Location of Groundwater Monitoring Boreholes Relevant to the Facility

Well	Direction with respect to the facility
MW-1	Approx. 140 meters N.E of landfill cells
MW-1A	N.E of landfill cells close to MW1
MW-2	Approx. 260 meters N.E of landfill cells
MW-3	Approx. 260 meters N.E of landfill cells
MW-4	Approx. 400 meters East of landfill cells
MW-5	Approx. 400 meters E of landfill cells
MW-6	Approx. 100 meters E.S.E of landfill cells
MW-7	Approx. 80 meters S.E of landfill cells
MW-8	Approx. 240 meters E of landfill cells
MW-9	Approx. 50 meters W of landfill cells
MW-10	Approx. 50 meters W of landfill cells
MW-11	Approx. 50 meters W of landfill cells
MW-12	Approx. 50 meters N.W. of landfill cells
MW-13	Approx. 100 meters N of landfill cells
MW-14A	Approx. 200 meters N.N.E. of landfill cells (across public road)
MW-15	Approx. 200 meters N.N.E of landfill cells (across public road)
MW-16	Approx. 90 meters N.N.W of landfill cells
MW-17	Approx. 100 meters W.S.W. of landfill cells
MW-18	Approx. 170 meters N of landfill cells
MW-19	Approx. 20 meters W.S.W. of landfill cells
MW-20	Approx. 150 meters S of landfill cells
MW-21	Approx. 140 meters S.S.E. of landfill cells
MW-22	Approx. 400 meters East of landfill cells.

Note: Wells highlighted in bold font are those that are required to be monitored by the waste licence.

Schedule D.1, Table D.1 of the waste licence (W004-004) states that groundwater levels should be recorded for all wells monthly and that sampling for chemical parameters should be carried out in 7 no. wells. These 7 wells (as selected by the Agency) are MW2, MW8, MW9, MW14, MW16, MW20 and MW22.

3.7.1. Groundwater Results

The results of groundwater analyses are shown in the groundwater, private well and leachate reports as previously submitted to the EPA and to be made available online at www.epa.ie.

3.7.2. Interpretation of Groundwater Results

Annual Results

A total of 23 no. groundwater monitoring boreholes are located at Arthurstown Landfill. During the annual sampling event for 2017 a total number of 7 boreholes were sampled. The annual sampling was completed on the 3rd of August 2017.

Chemical analysis, metals analysis, organic analysis and microbial analysis were carried out as part of the annual analysis of the groundwater.

The groundwater annual monitoring results and all elevated readings for the annual monitoring event can be summarised as follows:

- Orthophosphate level at MW2 (0.05 mg/l) above the IGV limit (0.03 mg/l).
- Manganese levels at MW2 (133 µg/l), MW6A (59.5 µg/l) and MW8 (152 µg/l) above the IGV limit (50 µg/l).
- Ammonia levels at MW2 (0.27mg/l) and MW8 (0.27mg/l) above the IGV limit (0.05-0.136 mg/l).
- Calcium levels at MW3 (255 µg/l) and MW20 (261 µg/l) above the IGV limit (200 µg/l).
- Chloride levels at MW3 (81 mg/l) above the IGV limit (187.5 mg/l).
- Sulphate levels at MW3 (414mg/l) and MW20 (366 mg/l) above the IGV limit (187.5 mg/l).

Locations MW2 and MW3 are not within the boundary of the landfill and are in an agricultural location (i.e. a farm adjacent with poor housekeeping).

The majority of monitoring at all other locations is consistent with previous years monitoring results.

3.8. Private wells (groundwater)

There are 5 no. private groundwater monitoring wells, referred to as private wells. Monitoring of the wells is carried out on a quarterly and annual basis.

The location of the wells is shown on Figure 3-1:

3.8.1. Private Wells Results

The results of the private well analyses are shown in the groundwater, private well and leachate reports as previously submitted to the EPA and to be made available online at www.epa.ie.

3.8.2. Interpretation of Results

Annual Results

Four private wells (PW1, PW3, PW4 & PW5) were sampled during the 2017 annual period. The location of all wells is rural agricultural.

Results for the private wells show that the water is of similar quality to those levels recorded in previous annual monitoring events. Sodium was detected at levels that exceed the respective limit value (150 mg/l) at PW5 (183 mg/l). Manganese was detected in PW2 at a concentration of 86.7mg/l. Total coliforms was detected at (920cfu/100ml) in PW4 at levels that exceeded the Maximum Admissible Concentration. All other chemical parameters were within their respective MAC limit values.

SVOCs, VOCs and pesticides were not detected above the laboratory limit of detection at any of the private wells.

Quarterly Results

The groundwater had no impact on the landfill based on reports already submitted to the EPA during quarter 1, quarter 2, quarter 3 and quarter 4.

3.9. Leachate

Schedule D.1, Table D.1 of the waste licence W004-04 states that leachate levels should be recorded for all sumps and collection points on a continuous basis. This continued during 2017.

SDCC carried out quarterly and annual monitoring at a number of locations during 2017.

3.9.1. Leachate Results

The results of the leachate analyses are shown in the groundwater, private well and leachate reports as previously submitted to the EPA and to be made available online at www.epa.ie.

3.9.2. Interpretation of Leachate Results

Leachate results for 2017 are typical for leachate analysis for Arthurstown Landfill depending on age of the waste in the cell being tested.

At the end of 2007 all 15 cells contained leachate.

During 2017 in quarter 3 during the annual monitoring, BOD levels increased from 43 mg/l to 1,125 mg/l which is typical for a leachate of this age. The COD levels varied from 646 mg/l to 17,650 mg/l which is also typical for an ageing leachate as what remains is the recalcitrant element of the COD also known as "hard COD".

Final capping was completed in 2013, which should reduce leachate volumes in the coming years.

3.10. Meteorological Monitoring

Condition 8.10.1 and Schedule D.6.1. of the current Waste Licence W0004-04 requires daily monitoring of rainfall, temperature (min/max), wind speed and direction, evaporation, humidity and atmospheric pressure at the landfill site.

All weather data has been recorded by the onsite "VIASALA" Weather Station which was installed during March 2003.

The data is available on site if required.

3.11. Odour and Odour Control at Arthurstown

The facility management staff endeavour at all times to reduce odours and complaints at the facility.

The facility has been closed to waste acceptance since the 21st of December 2010 and has been capped since 2013.

The integrity of the cap will continue to be checked every quarter by the surface VOC emissions monitoring carried out by Odour Monitoring Ireland. Gas balancing is the predominant feature of odour control since closure.

3.11.1. Quarterly Odour Assessments

Waste licence W0004-04 states in condition 8.14.5 that an independent odour assessment is carried out once every quarter. The quarterly odour audits are carried out by Odour Monitoring Ireland Ltd.

Quarterly surface VOC emissions monitoring audits are carried out on site by Odour Monitoring Ireland Ltd. They took place on:

- Q1 – 15th March 2017
- Q2 – 25th May 2017
- Q3 – 06th September 2017
- Q4 – 04th November 2017

The methodologies employed include:

- Capping source monitoring using a continuous ppb PID and Jerome 631X analyser to detect areas of potential landfill gas release.
- Sniff odour assessments at pre-selected resident locations in the vicinity of the landfill
- Geo-referencing of detected leakage locations for remediation.

Once the quarterly odour audit is carried out, the findings are brought to the attention of the Facility Manager, who carries out the appropriate remediation.

3.11.2. Odour Results

The results of the quarterly odour emissions were as follows:

- Q1 – 15th March 2017 – 10 locations exceeding 500 ppm
- Q2 – 25th May 2017 – 6 locations exceeding 500 ppm
- Q3 – 06th September 2017 – 4 locations exceeding 500 ppm
- Q4 – 04th November 2017 – 2 locations exceeding 500 ppm

Colour odour charts for the landfill that are produced for each quarter are contained in the quarterly odour monitoring reports as previously submitted to the EPA and to be made available on www.epa.ie. The colour maps of the site highlight where there is a potential odour issue.

At the end of each odour audit the consultant meets with the Facility Manager to highlight the areas for remediation. These works are carried out as soon as possible.

3.12. Complaints for 2017

There were no complaints made in 2017.

Q1 – 2017	Total Complaints	0
Q2 – 2017	Total Complaints	0
Q3 – 2017	Total Complaints	0
Q4 – 2017	Total Complaints	0

Total Complaints for 2017 was 0.

Q1 – 2016	Total Complaints	0
Q2 – 2016	Total Complaints	0
Q3 – 2016	Total Complaints	0
Q4 – 2016	Total Complaints	0

Total Complaints for 2016 was 0.

3.13. Landfill Gas Emissions

Approximately 17,358,336 m³ of landfill gas was captured by the gas extraction system in 2017. As this landfill is fully capped, the fugitive emission rate is very low. A conservative estimate of 5% is assumed. This is shown in the PRTR in Appendix 2.



Figure 3-2: Landfill Gas Utilisation Plant at Arthurstown

3.14. Indirect Emissions to Groundwater

There are no indirect emissions to groundwater. It is a fully engineered landfill, and groundwater monitoring does not indicate any potential impacts.

A hydrogeological risk assessment was prepared in accordance with the relevant guidance and submitted to the Agency in 2015 as per Technical Amendment B. It confirms that the risk to groundwater is low.

3.15. Water Balance

A number of assumptions were made in the calculation of the water balance.

Evaporation

Due to the nature of baled waste, rainfall tends to flow through the edges of each bale quickly and makes its way deep into the waste body or onto the cell floor quickly. Hence a nominal value of 10% of the recorded evaporation in the calculation.

Capped Areas

Total Complete Final Capped Area 290,000 m²

Absorptive Capacity of Waste

Due to the nature of baled waste, cells with new waste will have a lower absorptive capacity. This increases with the age of the waste and as the waste is in contact with moisture for longer periods. An absorptive capacity of 15% of the traditional value of 0.07 m³/t has been assumed.

The volume of leachate discharged to sewer in 2017 was 11,479 m³.

Results of the water balance calculation estimate that a theoretical figure of approximately 20,952 m³ of cumulative leachate was produced during 2017.

The pumping of the leachate from each cell will continue during 2018.

Facility management staff is endeavouring at all times to maintain the levels to the 1 m limit by constant pumping of leachate.

A summary of the calculation for 2017 is shown overleaf in Table 3-3: .

Table 3-3: Water Balance Calculation Summary 2017

Month	Rainfall	Evaporation	Effective Rainfall	Waste Input	Active Area	Intermediate Area (temporarily capped)	Fully Capped Area	Active Infiltration	Intermediate Infiltration *	Capped Infiltration	Active Leachate	Total Predicted Leachate	Cumulative Predicted Leachate	Leachate Discharged to Sewer	Actual leachate tankered off site	Actual SW/GW discharged to river*
	(mm)	(mm)	(mm)	(tonnes)	(m ²)	(m ²)	(m ²)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)
Jan-17	26.1	2.61	23.49	0	0	0	290,000	-	-	68	0	1,593	1,661	957	0	162
Feb-17	63.6	6.36	57.24	0	0	0	290,000	-	-	166	0	1,593	3,420	957	0	148
Mar-17	65.9	6.59	59.31	0	0	0	290,000	-	-	172	0	1,593	5,185	957	0	81
Apr-17	8.8	0.88	7.92	0	0	0	290,000	-	-	23	0	1,593	6,801	957	0	119
May-17	67.1	6.71	60.39	0	0	0	290,000	-	-	175	0	1,593	8,569	957	0	84
Jun-17	91.8	9.18	82.62	0	0	0	290,000	-	-	240	0	1,593	10,402	957	0	81
Jul-17	42.9	4.29	38.61	0	0	0	290,000	-	-	112	0	1,593	12,107	957	0	78
Aug-17	65.4	6.54	58.86	0	0	0	290,000	-	-	171	0	1,593	13,871	957	0	85
Sep-17	70.5	7.05	63.45	0	0	0	290,000	-	-	184	0	1,593	15,648	957	0	55
Oct-17	57.2	5.72	51.48	0	0	0	290,000	-	-	149	0	1,593	17,390	957	0	1
Nov-17	79.5	7.95	71.55	0	0	0	290,000	-	-	207	0	1,593	19,190	957	0	10
Dec-17	64.7	6.47	58.23	0	0	0	290,000	-	-	169	0	1,593	20,952	957	0	143
Total	703.5	70.35	633.15	0	0	0	290,000	-	-	1,836	0	19,116	20,952	11,484	0	1,047

4. FACILITY DEVELOPMENT

4.1. Site Survey

A Side Slope Stability Assessment (SSSA) was carried out at the landfill facility by Malone O'Regan in 2017. This was completed in compliance with Condition 8.13.1 of the Waste Licence Register number W0004-04:

8.13.1 The Licensee shall carry out a stability assessment of the side slopes of the facility annually.

The assessment included a comparison between the site walk over carried out in 2016 and 2017. The assessment determined that there were no significant issues with respect to slope stability. The report has been uploaded to EDEN.

4.2. Developments Undertaken in 2017

No developments took place in 2017.

4.3. Developments Proposed for 2018

1. Intake of Leachate for Treatment from Kildare area
2. Maintenance and service contract for Arthurstown

4.4. Restoration Report

4.4.1. Restoration

The final phase (phase 8) of the capping works was completed during 2013.

Landscaping and fencing continued in 2017.

General maintenance of the site continues a regular basis including the maintenance of leachate pumps, the leachate treatment plant and all ancillary infrastructure and the landfill gas collection infrastructure.



Figure 4-1: Leachate Treatment Plant

5. ENVIRONMENTAL OBJECTIVES AND TARGETS

5.1. Objectives and Targets

Refer to EMP in Section 6.

6. FACILITY MANAGEMENT

6.1. Summary of New Written Procedures

The revision of the EMP will take place in 2018 with the updated EMS taking into account the recent closure and the need for a final EMP submission and a review of other annual monitoring requirements.

6.2. Tank, Pipeline and Bund Testing

Routine inspections of tank, pipeline and bund inspections are carried out once every three years. They were completed in 2016. All infrastructure tested passed inspection.

6.3. Reported Incidents

Incidents reported during 2017 are recorded online on the EPA EDEN software. Incidents are defined by Condition 1.6 of the current waste licence (W004-04).

Q1 – 2017	Total Incidents 3
Q2 – 2017	Total Incidents 4
Q3 – 2017	Total Incidents 2
Q4 – 2017	Total Incidents 0

6.4. Review of Nuisance Controls

The review of litter, birds and vermin no longer takes place since the facility is now final capped for over three years so there is no longer the requirement for this review.

Odour reviews are still required under the waste licence obligation.

6.5. Report on Staff Training

There was no attendance at training courses by the staff at Arthurstown Landfill during 2017.

6.6. Non-Compliances at Arthurstown Landfill during 2017

Non-compliances are logged on EDEN. There was one non-compliance in 2017 where a new stainless-steel tank for the storage of sodium hydroxide was not banded. A response has been prepared by SDCC for submission on Eden.

6.7. Reports of Financial Provision

6.7.1. Report on Financial Provisions under Waste Licence W0004-04

South Dublin County Council has taken out a bond in favour of Kildare County Council (the local authority in whose functional area the facility is located) in order to ensure satisfactory completion of Arthurstown Landfill. Significant contributions are made annually towards leachate treatment, environmental monitoring and landfill closure/aftercare.

Budgetary estimates for site function activities at Arthurstown during 2017 were in the region of € 250,000.

Under the Closure Restoration and Aftercare Management Plan (CRAMP) as part of the Environmental Liabilities and Risk Assessment (ELRA) conditions of the waste license, South Dublin County Council has contributed approximately €12 million to the aftercare and restoration fund.

6.7.2. Report on Programme for Public Information

In accordance with Waste Licence W0004-004, information is made available on site and submitted to the EPA on a regular basis.

Information about the facility is available on the updated website which can be accessed at www.arthurstown.ie. Site contact numbers are posted at the facility entrance.

Report on Management and Operation Structure

The site is owned and managed by South Dublin County Council, who also holds the Waste Licence and Planning Permission (now expired) for the facility. As the facility is now closed, the aftercare and restoration works, monitoring and reporting are supervised by the Facility Manager (J. Smith).

At the end of 2017 South Dublin County Council had 2 direct employees engaged in full time management and administrative functions at the site, the Facility Manager (J. Smith) and E. Comerford (GO). A sub-contractor is retained on site to manage M&E. The Senior Engineer for South Dublin County Council Environmental Services is Mr. Leo Magee and the Director of Services for Environmental Services is Ms. Teresa Walsh.

6.8. Local Environmental Project Funding

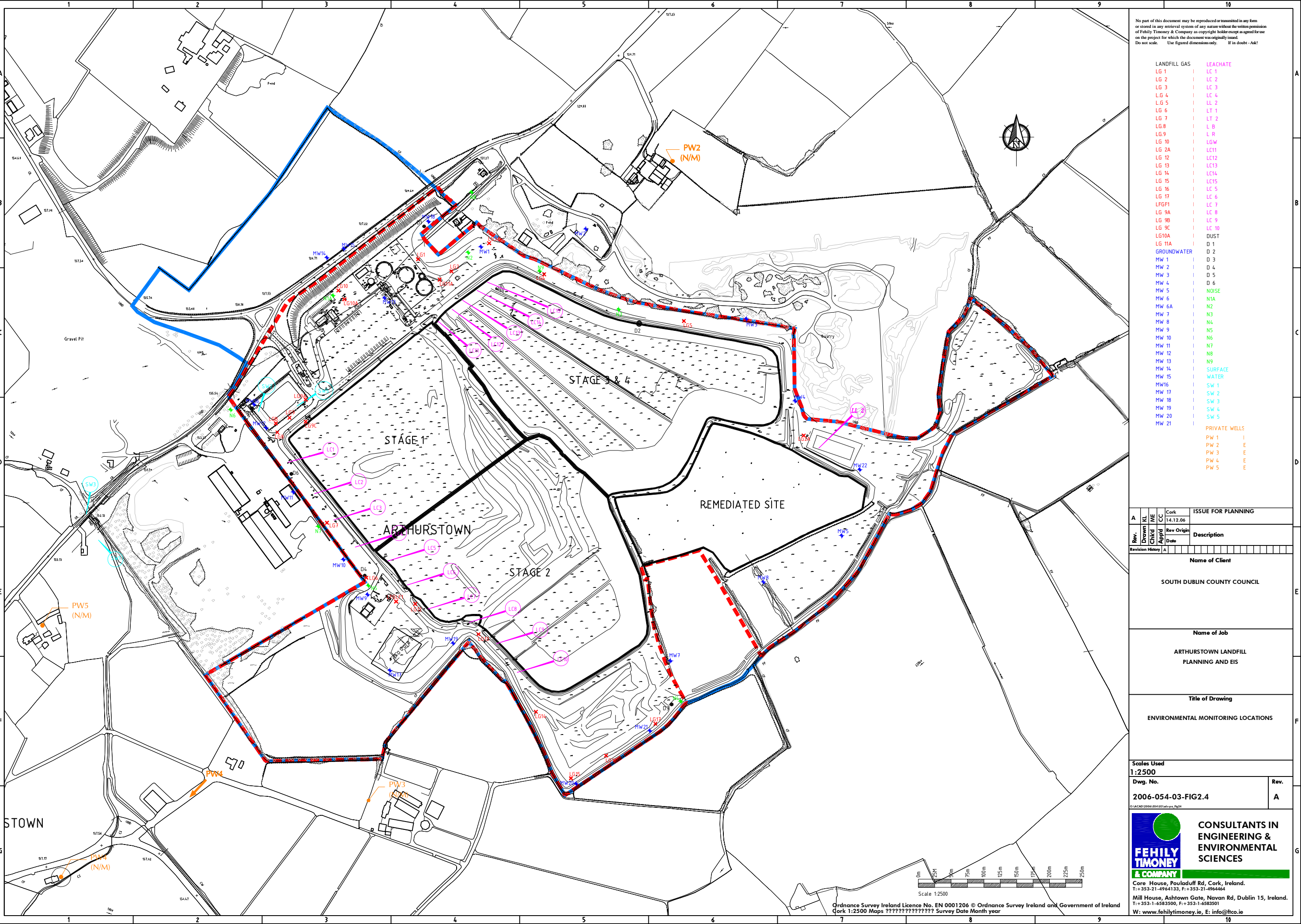
There was no local environmental funding during 2017.

This has now concluded and will no longer be reported on.

APPENDIX 1

Monitoring Locations Drawing





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Do not scale. Use figured dimensions only. If in doubt - Ask!

LANDFILL GAS	LEACHATE
LG 1	LC 1
LG 2	LC 2
LG 3	LC 3
LG 4	LC 4
LG 5	LC 5
LG 6	LC 6
LG 7	LC 7
LG 8	LC 8
LG 9	LC 9
LG 10	LC 10
LG 11A	LC 11A
LG 12	LC 12
LG 13	LC 13
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APPENDIX 2

PRTR Returns for 2017 (Copy of Submission)





[Guidance to completing the PRTR workbook](#)

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2017
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1. FACILITY IDENTIFICATION

Parent Company Name	South Dublin County Council
Facility Name	Arthurstown Landfill
PRTR Identification Number	W0004
Licence Number	W0004-04

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

Address 1	Arthurstown
Address 2	Kill
Address 3	
Address 4	
Country	Kildare
Country	Ireland
Coordinates of Location	-8.10013 54.5569
River Basin District	IIEEA
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	
AER Returns Contact Email Address	
AER Returns Contact Position	
AER Returns Contact Telephone Number	
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	0
User Feedback/Comments	Airtab-Section A to C diffs of +/-50% in stack em.The difference in mass flow em are mainly derived from difference in run time. Difference flow rates impact on mass em. Results were compared before and after calulations for mass emission to check for changes. Generation is estimated using Gassim 2.5 & Landgem, the outputs are calibrated for site.
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

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

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

4. WASTE IMPORTED/ACCEPTED ONTO SITE

[Guidance on waste imported/accepted onto site](#)

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

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

4.1 RELEASES TO AIR

[Link to previous years emissions data](#)

| PRTR# : W0004 | Facility Name : Arthurstown Landfill | Filename : w0004_2017.xls | Return Year : 2017 |

29/03/2018 14:27

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR				Please enter all quantities in this section in KGs								
No. Annex II	POLLUTANT Name	M/C/E	METHOD Method Used	QUANTITY								
				Flare 1	Flare 2	Engine AR02	Engine AR06	Engine AR07	Engine AR08	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6			
02	Carbon monoxide (CO)	M	EN 15058:2004 HICR by Horiba PG-250	0.32	2.34	4060.18	21471.63	21459.06	22043.29	69036.82	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005 Chemiluminescence	5.32	114.68	1357.25	6073.96	5364.99	6667.98	19584.18	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	EN 14791:2005 NDIR Adsorption	3.36	69.52	1986.18	10298.92	10500.8	9556.61	32415.39	0.0	0.0
01	Methane (CH4)	M	ESTIMATE Calculation	0.0	0.0	0.0	0.0	0.0	0.0	383909.43	0.0	383909.43
07	Non-methane volatile organic compounds (NMVOC)	M	ALT FID	0.0	0.0	0.82	3.62	4.55	7.37	16.36	0.0	0.0
03	Carbon dioxide (CO2)	M	OTH	9745.0	214412.0	829382.0	4441116.0	4537890.0	4468864.0	14501409.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

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

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

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

RELEASES TO AIR				Please enter all quantities in this section in KGs							
Pollutant No.	POLLUTANT Name	M/C/E	METHOD Method Used	QUANTITY							
				Engine AR02	Engine AR06	Engine AR07	Engine AR08	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
			Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4				
244	Total Particulates	M	ALT Gravimetric	3.75	17.2	14.55	14.74	50.24	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: Arthurstown 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)	4937706.43	C	OTH	Landgem	N/A
Methane flared	161848.0	M	OTH	Measured at Flares	4500.0 (Total Flaring Capacity)
Methane utilised in engines	4391949.0	M	OTH	Measured at Engines	1890.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	383909.43	C	OTH	Calculated	N/A

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR#: W0004 | Facility Name : Arthurstown Landfill | Filename : w0004_2017.xls | Return Year : 2017 |

29/03/2018 14:27

Please enter all quantities on this sheet in Tonnes

3

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non-Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	11479.0 in 19 07 02	landfill leachate other than those mentioned	D9	M	Weighed	Offsite in Ireland	Osberstown Wastewater Treatment Plan, ..	Osberstown Wastewater Treatment Plan,Naas,Kildare,..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](#)