

# ***Comhairle Contae Chiarraí***

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## ***Kerry County Council***



Waste Licence Ref No. W0001-04

### ***› Annual Environmental Report for North Kerry Landfill 2016 ‹***

Reporting Period:

January 2016 – December 2016

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## **1.0 Introduction and Reporting Period**

Kerry County Council (KCC) operated a municipal solid waste landfill facility at Muingnaminnane, Kielduff, Tralee, Co. Kerry.

It is located approximately 8km northeast of Tralee, in the Stacks Mountains.

The landfill site accepted solid waste for disposal and is operated under licence W0001-04.

This Annual Environment Report is prepared in accordance with Condition 12.6 and Schedule F of Waste Licence W0001-04.

The reporting period for this Annual Environmental Report is from **January 1<sup>st</sup> 2016 to December 31<sup>st</sup> 2016**.

The acceptance of waste for landfilling and for recycling ceased on site on the 11<sup>th</sup> July 2014. Both the landfill site and the civic amenity site are now closed to all customers.

Kerry County Council is now looking at alternative options for North Kerry Landfill and the Agency will be advised and consulted on the same as this progresses.

## **2.0 Waste Activities carried out at the Facility**

Waste disposal activities carried out at North Kerry Landfill were in accordance with Part 1 of Waste Licence W0001-04.

Licensed activities include;

- |          |  |
|----------|--|
| Class 2  | Land treatment, including biodegradation of liquid or sludge discards in soils.  |
| Class 4  | Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.   |
| Class 5  | Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.   |
| Class 6  | Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule.        |
| Class 7  | Physico-chemical treatments not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule. |
| Class 11 | Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.   |
| Class 12 | Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.   |
| Class 13 | Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.            |

Waste recovery activities carried out at North Kerry Landfill are in accordance with Part 1 of Waste Licence W0001-04.

Licensed activities include:

- Class 2 Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
- Class 3 Recycling or reclamation of metals and metal compounds.
- Class 4 Recycling or reclamation of other inorganic materials.
- Class 10 The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
- Class 11 Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
- Class 13 Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

### **3.0 Quantity and composition of waste received, disposed and recovered**

The acceptance of waste for landfilling and for recycling ceased on site on the 11<sup>th</sup> July 2014. Both the landfill site and the civic amenity site are now closed to all customers.

Kerry County Council is now looking at alternative options for the site. Kerry County Council have procured Consultants to manage this project.

#### Quantity of Waste disposed at facility

Since opening in May 1994 the total quantity of waste disposed of at the facility was 888,400 tonnes.

#### BMW Percentage Composition of Waste disposed at facility

Year	Period	Total Qty MSW of which the BMW Condition Applies	Total Qty BMW	% BMW
2010	Q3 – Q4	9,461.84	5,834.46	61.66
2011	Q1 – Q4	16,315.41	10,301.91	63.14
2012	Q1 – Q4	71,006.59	44,689.45	62.94
2013	Q1 – Q4	55,117.72	30,668.49	55.64
2014	Q1 – Q4	4,741.01	2,628.35	55.44
2015	Q1 – Q4	0	0	0
2016	Q1 – Q4	0	0	0

Please note that submitted figures for 2013 and 2014 were incorrect below shows the discrepancies in both.

Year	BMW Returns	Total Waste Landfilled	Total BMW (biological municipal waste)	% BMW
2013	Reported	55,117.72	30668.49	55.64%
	Actual	55,276.68	29,749.68	53.52%
2014	Reported	4,741.01	2,628.35	55.44%
	Actual	4,521.4	2,476.83	54.78%
2015	Reported	0	0	0
	Actual	0	0	0
2016	Reported	0	0	0
	Actual	0	0	0

#### **4.0 Remaining Capacity and Closure Date**

The North Kerry Landfill and civic amenity site ceased operation on the 11<sup>th</sup> July 2014.

The Total Permitted Landfill Capacity is 1,527,567 m<sup>3</sup> as per Table A.2 of the Waste Licence and the total quantity of waste disposed of at the facility is 888,400 m<sup>3</sup> which leaves an undeveloped licensed volume of 639,167 m<sup>3</sup> which could be utilised in the future.

#### **5.0 Method of Deposition of Waste at North Kerry Landfill**

The civic amenity ceased operation on the 11<sup>th</sup> July 2014.

## **6.0 Summary Report on Emissions for the Reporting Period.**

### **Emissions to Water.**

A full report prepared by the Environmental Laboratory of KCC is included in this document in Appendix B. Also included are the Invertebrate Results and Biological Assessment. Please note that two sampling locations are inaccessible and Kerry County Council wishes to liaise with the Agency to relocate this points via a licensee return on the EDEN Portal Website. The verified lab results are also provided in Appendix B.

### **Emissions to Air.**

Gas management practices at North Kerry Landfill are an interlinked system of actions no one of which can fully control or manage the generation of LFG from the deposited waste mass. In combination however, they comply fully with the requirements of the licence.

The Systems and operations include:

- Active management of the gas control infrastructure
- Odour patrol
- Monitoring and testing of infrastructure

The infrastructure in place at North Kerry Landfill includes the construction of a basal liner and capping system.

Outside the footprint of the landfill is a network of LFG monitoring boreholes. There are constructed in a grid around the footprint of the area that waste has been deposited within. These wells are monitored on a monthly basis for the presence of a suite of indicator gases that would signal the possible migration of LFG.

Perimeter Gas Wells No. 6 through to 6d continues to show methane and CO<sub>2</sub> concentrations above the allowable limits. These are historically problematic wells. In 2004 wells 6a to 6d were constructed to monitor the gas migration in the vicinity of the gas well. These perimeter gas wells also showed gas concentration levels in excess of the allowable at times during the year.

It is noted however that there is no odour nuisance at the location of gas wells 6 through to 6d or any evidence of vegetation die back. The likely cause was due to Historical contamination issues. The perimeter Gas Wells 6, 6a to 6d were constructed on a man-made embankment. These gas wells are currently connected to the gas extraction system and are under a low negative pressure.

In November 2011 the gas to energy project was successfully commissioned. A Genset of nominal rating - 320 kW is in operation at the facility.

The demand of the generation plant has been balanced against the generation output of the field. Field balancing and network management are vital components of a successful operation of the gas to energy project. These are actively managed by B9 to ensure maximum production.

Gas Balancing records, Flare and Engine Stack, Dust and Noise Monitoring are included in are Appendices: C, D, E, F, and G.

## **7.0 Resource and Energy Consumption.**

The following is the energy consumption for North Kerry Landfill for the reporting period.

### **Diesel**

The diesel usage for the reporting period (1<sup>st</sup> January to 31<sup>st</sup> December 2016) was 1,393 litres. This is an increase in diesel of 128 litres from the previously reported year.

### **Electricity**

The total usage for 2016 was 76,900 kWh. This is a decrease in energy consumption of 18,750kWh. This is primarily due to the installation of the SCADA system.

## **8.0 Energy Efficiency and Audit Report Summary**

### **Electricity**

The kW hour usage on site for 2016 is set out in the attached table.

*Table 8.1, kWh usage 2016*

<b>Date scale</b>	<b>Consumption (kWh)</b>
Feb/2016	17,650.81
Apr/2016	15,099.19
Jun/2016	10,850.00
Jul/2016	5,775.00
Aug/2016	5,775.00
Sep/2016	4,450.82
Oct/2016	4,599.18
Nov/2016	6,245.90
Dec/2016	6,454.10
	<b>76,900.00</b>

## **9.0 Proposed Development of the Facility and timescale of the Development**

The following projects are proposed at North Kerry Landfill over 2017.

### **Electrical Infrastructure Upgrade to the Old part of the site**

*Installation of an upgrade to the electrical infrastructure to the old part of the site which will involve installation of cables, electrical panels and leachate pumps.*

### **Optimal Uses of the NKL Site**

*Kerry County Council (KCC) have sought Provision of Environmental Consultancy Services for proposals recommending the optimal uses of the North Kerry Landfill at Muingnaminnane, County Kerry. Landfilling activities on site ceased on the 11th July 2014. There is no further built capacity on site, however there is approx 500,000 m3 of un-built licensed capacity available over approximately 26 acres that could be developed.*

### **Minor Remediation of capping**

*If the VOC survey scheduled for April 2017 highlights areas for remediation to the gas wells, Kerry County Council will undertake minor repairs to repairs them and also improvements to the capping system.*

### **10.0 Volume of leachate produced and volume transported off site.**

Over the reporting period, 39,480.86m<sup>3</sup> of leachate was produced on site.

The total quantity of leachate produced on site since the landfill site opened in May 1994 to the end of the reporting period is 895,655.12m<sup>3</sup>

*Table 10.1. Leachate volumes tankered off –site 2016*

<b>Month</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
January	4,230.94	5,255.90	11,271.74	9,991.34	14,069.56	6,375.97	6,356.84
February	5,666.38	5,395.38	6,780.04	10,926.18	11,161.2	2,905.77	7,070.08
March	3,324.86	3,768.72	2,502.62	2,412.84	6,039.42	4,176.74	3,279.08
April	4,080.68	3,845.78	3,623.48	5,506.44	3,269.7	2,231.66	3,942.24
May	1,711.48	2,805.70	3,724.42	5,322.99	3,479.30	3,859.72	1,562.26
June	1,236.44	3,735.13	4,351.31	3,488.05	2,358.17	2,563.78	1,595.84
July	4,304.64	3,698.12	7,551.38	2,313.66	1,317.42	1,457.82	3,436.38
August	2,208.06	2,751.70	6,072.90	4,572.32	3,043.37	2,236.16	3,034.40
September	4,902.34	3,655.51	4,576.09	2,028.98	1,229.30	2,606.70	2,665.06
October	2,393.60	3,956.40	5,775.56	5,791.80	3,748.06	2,434.60	2,257.14
November	6,719.70	4,905.12	6,997.38	9,154.71	6,346.25	5,147.28	2,654.80
December	1,663.61	6,335.12	5,836.08	6,320.70	5,102.68	8,033.48	1,626.74
<b>Total</b>	<b>42,442.73</b>	<b>50,108.58</b>	<b>69,063.00</b>	<b>67,830.01</b>	<b>61,164.43</b>	<b>44,029.68</b>	<b>39,480.86</b>

### **11.0 Report on Development Works Undertaken during the Reporting Period**

The permanent capping of Cells 17 to 19 and their connection to the landfill gas network was completed in March 2015.

### **12.0 Report on Restoration of Completed Cells and Phases**

All constructed cells 1 – 19 are fully capped with a gas extraction system.

### **13.0 Site Survey showing existing Levels of the Facility at the end of the reporting period**

See Appendix K for Topographical Survey 2016 showing contours of the landfill area



**14.0 Estimated Annual and Cumulative quantities of landfill gas emitted from the Facility**

The LandGEM Landfill Gas Prediction Model was produced by Fehily Timoney & Co in 2016

**1. Actual**

		<i>hrs</i>	<i>rate m3/hr</i>	<i>total m3</i>	<i>methane %</i>	<i>methane m3</i>
Flare	Jan	494	116	57,304.00	45.30	25,440
	Feb	258	125	32,250.00	38.00	12,010
	Mar	264	100	26,400.00	36.00	9,314
	Apr	623	135	84,105.00	46.00	37,915
	May	550	130	71,500.00	48.00	33,634
	Jun	546	105	57,330.00	45.00	25,283
	Jul	596	105	62,580.00	44.10	27,046
	Aug	570	155	88,350.00	48.00	41,560
	Sep	88	150	13,200.00	47.00	6,080
	Oct	70	100	7,000.00	45.40	3,114
	Nov	13	110	1,430.00	41.70	584
	Dec	0	0	0.00	0.00	0
Engine	Jan	692	160	110,720.00	45.30	49,153
	Feb	683	210	143,430.00	38.00	53,413
	Mar	739	200	147,800.00	36.00	52,144
	Apr	685	165	113,025.00	46.00	50,952
	May	697	150	104,550.00	48.00	49,180
	Jun	719	165	118,635.00	45.00	52,318
	Jul	739	150	110,850.00	44.10	47,907
	Aug	728	145	105,560.00	48.00	49,655
	Sep	736	150	110,400.00	47.00	50,850
	Oct	740	165	122,100.00	45.40	54,325
	Nov	697	185	128,945.00	41.70	52,695
	Dec	730	210	153,300.00	38.50	57,840
		<b>12,657.00</b>		<b>1,970,764.00</b>	<b>41.98</b>	<b>842,411</b>

@98% efficiency

**2. Theoretical**

**825,562.75**

		<i>hrs</i>	<i>rate m3/hr</i>	<i>total m3</i>	<i>% Methane</i>	<i>Total</i>
Theoretical		8,760.00	282	2,471,780.00	41.98	1,037,633

methane m3

	<i>Methane</i>	<i>Density</i>	<i>Total</i>
Theoretical	1,037,632.65	0.67	691,163.46
Actual	825,562.75	0.67	556,065.80
			135.10

kg

kg

tonnes unexplained

These figures were used in the estimation of landfill gas generation over the reporting period and submitted as part of the Landfill Gas Survey 2016 (Appendix H) and the PRTR 2016 (Appendix I).

Kerry County Council engaged Fehily Timoney & Co to carry out a Gas Assessment of the Landfill in 2016 and as part of this assessment a revised the Gas Model in 2016 was undertaken.

The development of Gas Predication model for future PRTR estimates that historical landfill gas prediction modelling for the landfill significantly overestimated the potential generation of landfill gas. This over-estimation when referenced to utilisation and flaring flow rates suggested that there was significant fugitive emission escaping from the waste body. This is not the case as evidenced by:

- VOC emission survey results
- No odour issues
- No evidence of vegetation die-back

B9 Power Ltd. has a financial incentive to capture landfill gas for utilisation. The audit findings suggest that the majority of gas that is being produced is being oxidised in either the flare or the engine.

FT believes that gas production flow rates on the site will be similar to current flow rates and will most likely remain low for many years. As leachate drains and is removed following secondary consolidation of the waste, breakdown of the waste body will be initiated in what were leachate saturated pockets and gas production is likely to continue for many years albeit at lower gas production rates.

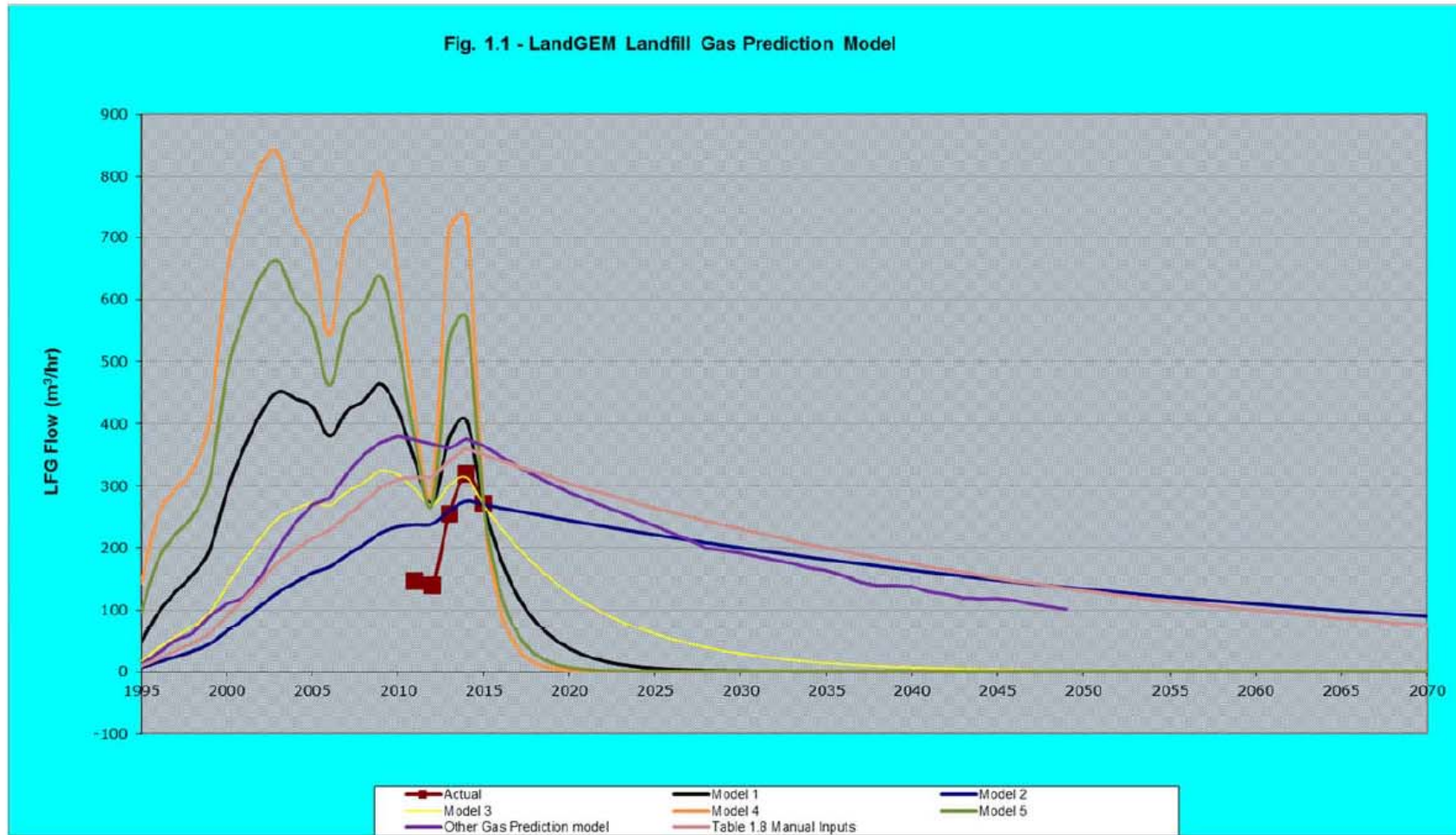
The graph below presents a range of indicative gas production curve of future gas production flow rates. The calibration is based on existing available information

The volume of gas recorded as captured by the flare and engine is shown as 'Actual' on the graph. The GasSim model prepared by B9 Power Ltd. is shown as 'Other Gas Production Model.' For that curve please note that gas production will continue post 2049, it is limited to this date here by our calibration tool.

Model 2 shows a scenario of a long flat curve, created by wet waste conditions. The curve which is likely the best fit, is called '[Table 1.84 Model Inputs.](#)'

Models 1, 4 and 6 use input parameters which are closer to the default settings in Landgem, but as can be seen do not predict generation as high as would have been predicted in the period 2010-2013 in the AERs on file.

FT advises that whilst it is not possible to accurately estimate the future gas production flow rates it is unlikely that these rates will increase significantly year on year given that leachate dissipation within perched bodies will most likely be a function of secondary consolidation.



**Figure 3-8: Calibrated Landfill Gas Prediction Models**

**13.0 Estimated Annual and Cumulative quantities of Indirect Emissions to Groundwater**

None to report.

**14.0 Annual Water Balance Calculation and Interpretation**

The predicted Water Mass Balance calculation shows predicted leachate production for 2016.

$$Lo = [ER(A) + LW + IRCA + ER(I)] - [aW]$$

Year	Active Phase	Active Area A (m2)	1	2	3	4	Total Water 1+2+3+4 (m3)	Absorptive Capacity aW (m3)	Leachate Produced Lo (m3)	Actual Leachate (m3)	Difference (m3)		
			Active Area infiltration ER(A) (m3)	Restored Phase No.	Liquid Waste LW (m3)	Restored Area RCA (m2)						Restored Area Infiltration IRCA (m3)	ER(I)
2002	5	11,800.00	19,918.40	1,2,3	0	22,050	2,840.04	3127.264	25,885.70	1,770.81	49,771.34	34,218.23	-15,553.11
2003	6	16,100.00	20,946.10	1,2,3,4	0	25,450	2,547.55	2430.428	25,924.07	879.12	51,436.60	30,721.59	-20,715.01
2004	6	19,500.00	32,416.80	1,2,3,4	0	27,550	3,306.00		35,722.80	840.95	37,947.25	45,130.40	7,183.15
2005	6,7	16,200.00	27,596.70	1,2,3,4,5	0	29,600	4,004.88		31,601.58	602.54	34,155.79	54,784.59	20,628.80
2006	7	28,800.00	27,596.70	1,2,3,4,5	0	29,600	4,025.60		31,622.30	1,050.44	33,361.86	60,922.61	27,560.75
2007	7	14,400.00	24,036.48	1,2,3,4,5,6	0	53,340	6,769.91		30,806.39	1,391.46	33,307.30	55,436.15	22,128.85
2008	8	24,300.00	50,517.27	1,2,3,4,5,6	0	53,340	6,931.00		57,448.27	1,528.82	59,811.81	78,558.23	18,746.42
2009	8	32,400.00	62,763.98	1,2,3,4,5,6	0	53,340	8,295.22		71,059.21	695.72	73,862.60	73,727.85	-134.75
2010	8	32,400.00	43,957.08	1,2,3,4,5,7	0	63,340	4,736.82		48,693.90	367.27	50,009.27	42,442.00	-7,567.27
2011	8	32,400.00	45,398.88	1,2,3,4,5,7	0	63,340	1,280.86		46,679.74	289.55	46,845.19	50,108.58	3,263.39
2012	8,9	33,616.67	61,630.45	1,2,3,4,5,7,8	0	95,740	11,620.16		73,250.60	1,242.62	72,462.98	69,063.01	-3,399.97
2013	9	38,323.34	53,334.59	1,2,3,4,5,7,8	0	95,740	9,650.59		62,985.18	967.33	62,472.84	67,830.10	5,357.26
2014	9	21,515.00	38,468.82	1,2,3,4,5,7,8	0	134,063	13,961.32		52,430.14	79.12	52,806.01	61,164.43	8,358.42
2015	9	21,515.00	9,524.69	1,2,3,4,5,7,8	0	134,063	12,371.33		21,896.02	23.81	23,948.51	44,029.68	20,081.17
2016				1,2,3,4,5,7,8,9	0	134,063	12,371.33		12,371.33	0.00	14,447.63	39,480.86	25,033.23

Actual leachate does include leachate from civic amenity site area.

**15.0 Report on the Progress towards Achievement of Environmental Objectives contained in previous AER 2015**

<b>Target Area</b>	<b>Objective</b>	<b>Works Carried Out</b>	<b>Results</b>
<i>Reduction in Fugitive Gas Emissions</i>	Reduction in number of on-site minor surface emissions following two VOC surveys	Regular patrol of gas collection infrastructure to ensure that there is no blockages on the lines. Gas extraction from cells 17 to 19. Minor remediation works on gas wells and side risers	No Odour Complaints in 2016.
<i>Surface Water Emissions</i>	Keep Surface Water Emissions within agreed limits	Proper management of leachate on site. Regular inspection of surface water drains Regular inspection of bunded area for integrity on site	No ammonia levels exceeded in surface water lagoons.
<i>Ground Water Emissions</i>	Keep Ground Water Emissions to within agreed limits	Proper management of leachate levels on site.	No licence limit exceeded in Boreholes
<i>Leachate Management</i>	Reduction in the quantity of leachate produced on site	Recirculation Tanks Removed Gas Wells remediated Compost Lagoon Decommissioned ICW Decommissioned	Decrease in leachate produced on site during reporting period.
<i>Energy Resources</i>	Reduce the quantity of diesel and electricity used on site		Slight decrease in electricity consumption on site

**19.0 Schedule of environmental objectives and targets for the forthcoming year.**

The following tables sets out the environmental objectives for the facility under a range of headings.

Target Area	Objective	Actions to be progressed and methods	By	2017	2018	2019
Reduction in Fugitive Gas Emissions	Reduction in number of surface emissions from VOC Survey	<ul style="list-style-type: none"> <li>o Minor remediation works around gas wells and side risers</li> </ul>	FM	On-going		
Surface Water Emissions	Keep surface water emissions within limits	<ul style="list-style-type: none"> <li>o Proper management of leachate on site</li> <li>o Monitoring of SCADA to Cells 1 to 16</li> <li>o Regular inspection of surface water drains</li> <li>o Regular inspection of bunded area for integrity on site</li> </ul>	FM FM FM FM	On-going On-going On-going On-going	On-going On-going On-going On-going	On-going On-going On-going On-going
Ground Water Emissions	No emissions	<ul style="list-style-type: none"> <li>o Proper management of leachate on site</li> <li>o Regular inspection of bunded area for integrity on site</li> </ul>	FM FM	On-going On-going	On-going On-going	On-going On-going
Leachate Management	Reduction in the quantity of leachate produced on site	<ul style="list-style-type: none"> <li>o Remediation works to capping</li> </ul>	FM	On-going	On-going	On-going

FM – Facility Manager

## **20.0 Summary of Procedures Developed by the Licensee during the reporting period**

No additional procedures were developed by the Licensee during the reporting period. The CRAMP has been reviewed and sent to the Agency for approval in Dec 2016. The original CRAMP was approved by the Agency in March 2015.

The Environmental Liabilities Risk Assessment will be reviewed in 2017 and submitted to the Agency for approval. Kerry County Council have engaged Environmental Consultants to review the ELRA in 2017 and will request approval from the Agency in Q2/Q3 2017 via a Licensee Return on the EDEN Portal Website.

## **21.0 Tank, Pipeline and Bund Testing and Inspection Report**

Integrity testing was completed on leachate lagoons 1 and 2 in 2016. The report was sent to the Agency via a Licensee Return in 2016. Integrity testing is to be carried out every 3 years as per Waste Licence Conditions.

## **22.0 Environmental Incidents and Complaints**

### Environmental Incidents

The incidents reported to the agency refer to exceedences experienced in perimeter gas wells 6 to 6d and the temporary exceedence above one meter in the leachate level of Waste Cell 13.

It is noted that there was no odour nuisances in the perimeter gas well exceedences or no vegetative die back and so it is thought that the readings in gas well 6 to 6d refer to a sump effect in a rock fill embankment that is at a finished construction height above the original ground level. Well 6 is currently connected to the gas extraction system and this is noted in the monthly returns to the Agency.

### Complaints

There were no complaints received for the reporting period (2016). There were none in 2015, 1 in 2014 and 10 in 2013

Table 18.1: Breakdown of complaints received over last five years

Issue	2011	2012	2013	2014	2015	2016
Odour	1	16	5	1	0	0
Illegal Dumping	6	3	1	0	0	0
Rubbish on Main Road	2	1	1	0	0	0
Uncovered/unsecure loads being admitted into landfill site	0	9	0	0	0	0
Flies	5	5	0	0	0	0
Site Infrastructure	6	3	3	0	0	0
Speeding Leachate Trucks	0	0	0	0	0	0
Noise from Leachate Lorries at Treatment Plant	1	0	0	0	0	0
Windblown litter	0	0	0	0	0	0
Total Number of Complaints	21	37	10	1	0	0

#### **24.0 Report on Financial Provision**

Kerry County Council has a Landfill Aftercare and Development Fund.

The CRAMP report as submitted to the agency and approved in March 2015 requires the Kerry County Council to maintain the landfill site both during its active phase and closed phase. A review by Kerry County Council was completed in Dec 2016 and submitted to the Agency for approval.

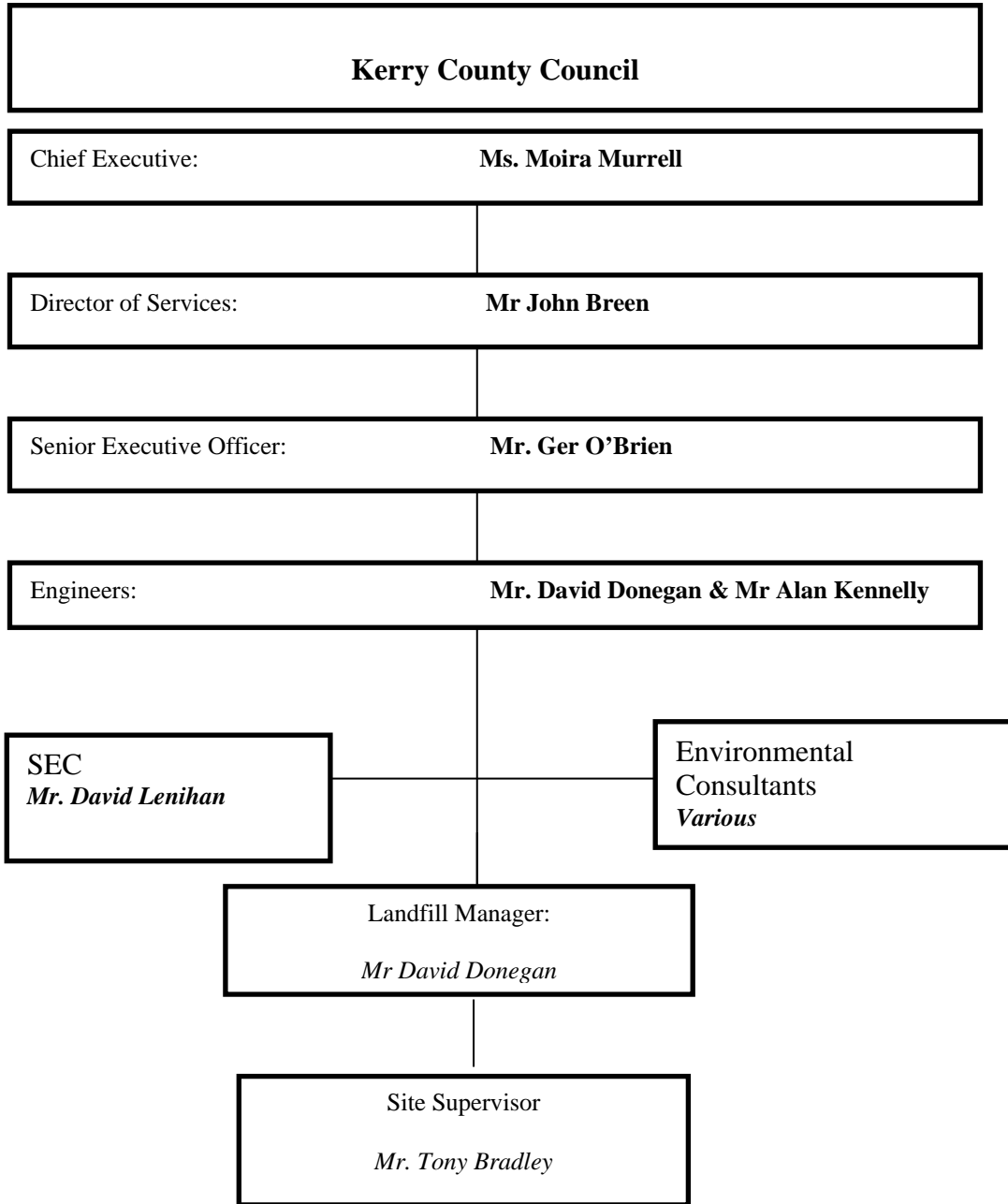
Kerry County Council is well positioned to meet its financial liabilities.

The EPA have corresponded with the Local Authorities to make financial provisions to cover any liabilities associated with the operation (including closure and aftercare) of the facility, as per Condition 13.3.3.

Kerry County Council have submitted licensee returns to deal with these liabilities.



**25.0 Management and Staffing Structure at the Facility 2016**



## **26.0 Programme of Public Information**

The following files are available for inspection and it is proposed that all files will be available at Maine Street, Tralee, Co. Kerry. KCC intend to propose this change as a Licensee Return which will then require approval from the EPA.

The site has been closed since 11<sup>th</sup> July 2014.

- AER of previous reporting year.
- All correspondence with the Agency
- Surface Water Monitoring Results
- Ground Water Monitoring Results
- Perimeter Gas Detection Well Monitoring Results
- Leachate Chemical Analysis results
- Leachate quantities produced
- Operational Procedure Manual

## **27.0 Training of Staff 2016**

The Site Supervisor is up to date with regards to training in SAFEPASS and CSCS.  
The Facility Manager has completed the Waste Management Training Programme Module 1 to 6

## **28.0 Cost of Landfill / Community Fund.**

Please see Condition 13.5 of Waste Licence referenced W000 1-04

***The licensee shall provide the sum of €57,419 per annum (index linked) for local environmental and community initiatives for each year that the landfill accepts waste for disposal. A report on the use of this annual fund shall be included in the Annual Environmental Report to the Agency.***

The Community Fund is operated under the Local Government Act 2001 – Section 109 – (1)

*In this section "community initiative" means any project or programme which in the opinion of the local authority will benefit the local community and includes the provision or improvement of amenity, recreational, cultural or heritage facilities, the protection or enhancement of the environment and programmes to promote social inclusion and community development.*

As no waste was accepted at North Kerry Landfill in 2016, Kerry County Council did not allocate any money to the Community Fund. There is a balance of approximately €50,000 remaining in the Community Fund. Kerry County Council, Environment Section has been in contact with community leaders & asked them to submit a viable community initiative project (or projects), for consideration. The Environmental Management Team have met with the Landfill Committee to discuss possible projects in 2016..

The following table gives a breakdown of the financial outlay under the landfilling headings. The Revenue expenditure accounted for **€385,533.00** and an extra Capital Expenditure accounted for **€244,025.00** to deal with Aftercare Management Items.

Table 22.2, financial outlay 2016

**Statement of Costs for Waste Operations - NKL 2016**

<b>Accelem</b>	<b>Account Element</b>	<b>Euro €</b>
60030	Wages	€ 31,086.00
60040	Salaries	€ 52,452.00
60100	ER PRSI	€ 15,143.00
60200	Overtime	€ 171.00
60300	Arrears	€ 54,846.00
60400	Sick Pay	€ 1,468.00
60500	Annual Leave	€ 3,554.00
60510	Bank Holiday Leave	€ 1,085.00
60600	Travel/Subsistence	€ 27.00
60700	Eating on site allowance	€ 425.00
60800	Acting Allowance	€ 628.00
65500	Minor Contracts- Trade Services & other works	€ 142,564.00
66500	Non-Capital Equip Purchase - Fire Services	€ 37.00
67500	Non-Capital Equip Purchase - Computers	€ 6,894.00
68500	Non-Capital Equip Purchase - Other	€ 385.00
69000	Hire (Ext) - Plant/Transport/Machinery & Equipment	-€ 3,773.00
69200	Repairs & Maint - Plant	€ 1,660.00
69260	Repairs & Maint - Other Equip	€ 24.00
69400	Transfers from Machinery Yard	€ 5,469.00
69600	Other Vehicle Expenses	€ 922.00
70000	Materials	€ 5,034.00
70990	Issues from Stores	€ 1,091.00
71000	Insurance	€ 32,229.00
73400	Staff Travelling & Subsistence Expenses	€ 4,348.00
75000	Computer Software and Maintenance Fees	€ 5,046.00
76000	Communication Expenses	€ 736.00
77100	Courier	€ 50.00
77200	Security - Property	€ 656.00
78000	Training	€ 2,900.00
79000	Legal Fees and Expenses	€ 9,065.00
79900	Consultancy/Professional Fees and Expenses	-€ 39,511.00
81000	Printing & Office Consumables	€ 1,337.00
82100	Statutory Contributions to Other Bodies	€ 24,177.00
85100	Rates & Other LA Charges	€ 95.00
85200	Cleaning	€ 3,440.00
86000	Energy / Utilities	€ 19,758.00
90200	Overdraft interest & financial charges	€ 15.00
	<b>Total</b>	<b>€ 385,533.00</b>

## EPA Compliance & Other Remediation

<b>Accelem</b>	<b>Account Element</b>	<b>Euro €</b>
65500	Minor Contracts- Trade Services & other works	€ 120,962.00
67500	Non-Capital Equip Purchase - Computers	€ 895.00
68500	Non-Capital Equip Purchase - Other	€ 14,051.00
69000	Hire (Ext) - Plant/Transport/Machinery & Equipment	€ 43,471.00
69400	Transfers from Machinery Yard	€ 6,678.00
70000	Materials	€ 15,710.00
77100	Courier	€ 160.00
79900	Consultancy/Professional Fees and Expenses	€ 42,098.00
	<b>Total</b>	<b>€ 244,025.00</b>

## **29.0 Meteorological, Noise and Dust Monitoring Results**

**Table 23.1, Rainfall data 2015 / 2016**

	<b>2015 Rainfall</b>	<b>2016 Rainfall</b>
	(mm)	(mm)
Jan	199.4	293.8
Feb	108.1	190.6
Mar	135.2	104.6
Apr	54.0	104.0
May	127.6	77.9
Jun	81.4	108.0
Jul	120.5	83.3
Aug	126.0	105.1
Sep	148.9	182.7
Oct	96.1	186.4
Nov	199.9	76.7
Dec	339.0	103.8
<i>Total</i>	<i>1,736.1</i>	<i>1,616.9</i>

### **Noise Monitoring 2016**

Southern Scientific were commissioned by Kerry County Council to undertake a noise survey at North Kerry Landfill for 2016

No limits were exceeded as shown in Appendix G

It is intended to seek approval from the EPA to reduce the frequency of noise monitoring now that the Landfill is closed.

### **Dust Monitoring**

The EPA have approved (LR017694) to discontinue certain monitoring criteria as set out in Condition 8.12.

However, this is subject to:

1. The licensee shall contact the Agency should any change occur in the activities on site which may require a reinstatement of this monitoring.
2. Monitoring shall resume in the event of any complaints being received by the facility in relation to litter, vermin, birds or mud.
3. The Agency may revoke/amend this agreement at any time. The Agency does not agree to the discontinuation of odour monitoring at this time as concerns remain in relation to the management of landfill gas at the facility.

## **30.0 Statement on the Achievement of the Waste Acceptance and Treatment Obligations**

*None to Report*



## Appendix A: Historic Data

<b>North Kerry Landfill Leachate Tankered Off Site</b>		
	<b>Waste Tonnes</b>	<b>Leachate m3</b>
<b>1994</b>	16,902	1,494.00
<b>1995</b>	23,505	6,475.00
<b>1996</b>	23,722	8,496.37
<b>1997</b>	25,581.88	12,175.49
<b>1998</b>	33,529.67	20,318.09
<b>1999</b>	57,872.71	22,822.95
<b>2000</b>	60,473.65	36,780.71
<b>2001</b>	63,945.91	18,953.85
<b>2002</b>	62,821.52	34,218.23
<b>2003</b>	50,235.29	30,721.59
<b>2004</b>	48,054.47	45,130.40
<b>2005</b>	34,430.82	54,784.59
<b>2006</b>	60,025.22	60,922.61
<b>2007</b>	56,794.24	55,436.15
<b>2008</b>	62,412.96	78,558.53
<b>2009</b>	39,755.40	73,727.85
<b>2010</b>	20,986.80	42,442.73
<b>2011</b>	16,545.71	50,108.58
<b>2012</b>	71,006.59	69,063.01
<b>2013</b>	55,276.68	67,830.01
<b>2014</b>	4,521.40	61,164.43
<b>2015</b>	0	44,029.68
<b>2016</b>	0	39,480.86
<b>Total</b>	<b>888,400.08</b>	<b>935,135.98</b>

## ***Appendix B: Summary of results and Interpretation of Environmental Monitoring***



# ANNUAL ENVIRONMENT REPORT

## Physio-chemical and Biological Monitoring of North Kerry Landfill

### 2016

Prepared by:  
*David Lenihan*  
Senior Executive Chemist

15/03/2017

## INTRODUCTION

As Part of requirements under EPA Licence for North Kerry landfill this laboratory produces a report on a six monthly basis as well as an annual detailed report. This report can thus be interpreted as *Laboratory contribution to Annual Environment report.*

Enclosed are:

- Annual results in spreadsheet format for Leachate, Surface Water and Groundwater as required per monitoring provisions as of licence requirements for 2016. *Please refer to these as you read report*
- Interpretation of results pertaining to three matrices of concern i.e. Groundwater, Surface water and Leachate
- results from ELS contract laboratory pertaining to individual List 1 and List 2 organics which were analysed for in Nov 2016 at three groundwater locations **App3**
- **Appendix 1** detailing sample locations and associated grid references used in report
- **Table 1** outlines trigger values for strategic parameters analysed in groundwater
- **Appendix 2** details list of List 1,2 Organics monitored and their associated Limits of detection (LODs)
- **Appendix 3; summary of invertebrate report 2016 of impacts sites surrounding North Kerry Landfill**

All except for analysis of *Total cyanide, list 1 and List 2 organic substances*, was conducted at KCC laboratory.

Analysis on these Parameters (*italics and asterix*) was farmed out to **ELS laboratories** Mahon Industrial Estate, Cork.

A summary of Environmental requirements has been prepared by Tobin Consulting engineers. This is the document we are using. Results are also included for monthly analysis of groundwater as required by provisions of old licence

In 2016 a total of **222** samples were sampled by KCC Laboratory personnel

Altogether **2300** tests were analysed to satisfy requirements of licence monitoring.

Of these **2215** tests were analysed in KCC laboratory

The outsourced tests were analysed by *ELS laboratories*. The latter included Cyanide and List1 / 2 organics as required on an annual basis for three groundwater locations. It must however be stressed that each test for SVOCs or VOCs comprises analysis for 153 specific compounds. These are included as appendix to this report

The monitoring locations monitored are as per requirements of licence.

*APPI* outlines locations and associated northing's and easting's

### **Trigger limits**

Trigger limits are required to be set for certain parameters in groundwater and submitted to EPA. Perhaps the best such limits to use are groundwater threshold values as set out in groundwater regulations 2009. Other standards used, correspond to drinking water regulatory standards. However where drinking water limits cannot be adhered to because of natural conditions (non anthropogenic effects) i.e. Ph the trigger value would have to be more flexible. The trigger values for Boreholes 1 to 4 are as highlighted in Table 1. Borehole 5 appears to be monitoring an aquifer which contains a lot of decaying organic matter more than likely from natural sources. Therefore trigger value for ammonia may be too strict.

**Table I Parametric Trigger values for Groundwater**

Parameter	units	Trigger value ( max)	Trigger value(min)
Ammonium	mg/L	0.225	
Nitrite	mg/L	0.38	
Total Oxidised Nitrogen	mg/L	37.5	
	(NO <sub>3</sub> )		
Conductivity	Us/cm	800	
Ph	Ph units	10	4.5
Dissolved Oxygen	mg/L		1.0
	O <sub>2</sub>		
Chloride	mg/L	200	
Flouride	ug/L	1000	
Sodium	mg/L	150	
Potassium	mg/L	10	
Boron	mg/L	0.75	
Copper	mg/L	1.5	
Cadmium	ug/L	3.75	
Chromium	ug/L	37.5	
Arsenic	ug/L	7.5	
Lead	ug/L	10	
Nickel	ug/L	15	
Mercury	ug/L	0.75	
Total Cyanide	ug/L	37.5	
<b><u>VOCs</u></b>			
Benzene	ug/L	0.75	
1,2 dichloroethane	ug/L	2.25	
Tetra chloroethene and Trichloroethene	ug/L	7.5	
Toluene	ug/L	5	
Phenols	mg/L	0.05	

Parameter	units	Trigger value ( max)	Trigger value(min)
<b>SVOCs</b>			
Atrazine	ug/L	0.075	
Simazine	ug/L	0.075	
Poly aromatic Hydrocarbons <sup>1</sup>	ug/L	0.075	
Pesticides <sup>2,3</sup>	ug/L	0.375	

<sup>1</sup> PAHs measured should include at least benzo(b)Fluoranthene, benzo(k) Fluoranthene, benzo(ghi)perylene, indeno(123-cd)pyrene Fluoranthene

<sup>2</sup> the trigger value applies to each individual pesticide measured.

<sup>3</sup>Pesticides include organic insecticides, Organic herbicides, Organic nematocides, organic acaricides, organic algicides, organic rodenticides, organic slimicides, related products (inter alia, growth regulators)

### List 1 and List 2 Organics

Under the provisions of monitoring requirements we are required to monitor List 1 and List 2 organic compounds in three groundwater locations on an annual basis. These locations have to be agreed with EPA. In this report we report on four groundwater locations which were monitored for these compounds i.e. **Borehole 3, 4, 6** and **Sugruess well** ( well on adjoining property to Landfill)

The compounds analysed comprised of two types Volatile Organic compounds ( **VOCs**) and Semi Volatile organic compounds ( **SVOCs**) . VOCs comprise of organic compounds with boiling points close to or less than that of Water i.e. **Petroleum products** and common solvents –up to 79 compounds were screened for using Purge and Trap GC MS.

Semi Volatile compounds comprise of higher boiling point organics and comprise of classes of compounds such as **pesticides, herbicides, PCBs** (polychlorinated Biphenyls) and **PAHs**(Poly aromatic Hydrocarbons) .Up to 63 different compounds in this category were screened for. A list of these compounds, together with limits of detection is given in **Appendix 2. Original report from contract laboratory is also enclosed**

**One VOC compound out of 79 was detected at trace levels in all 4 boreholes that were monitored i.e. cis 12-Dichloroethene Levels varied between 1.2 and 5.2 ug/L . all of remaining 78 were less than detection limit . No SVOCs were detected below detection limit**

### Heavy Metals

As we possess and use \*ICP-MS instrument we monitored many more locations for heavy metals than were strictly required i.e. 12 surface water,6 Leachate, and 8 groundwater locations

\*Inductively coupled Plasma Mass spectrometer

## INTERPRETATION OF RESULTS

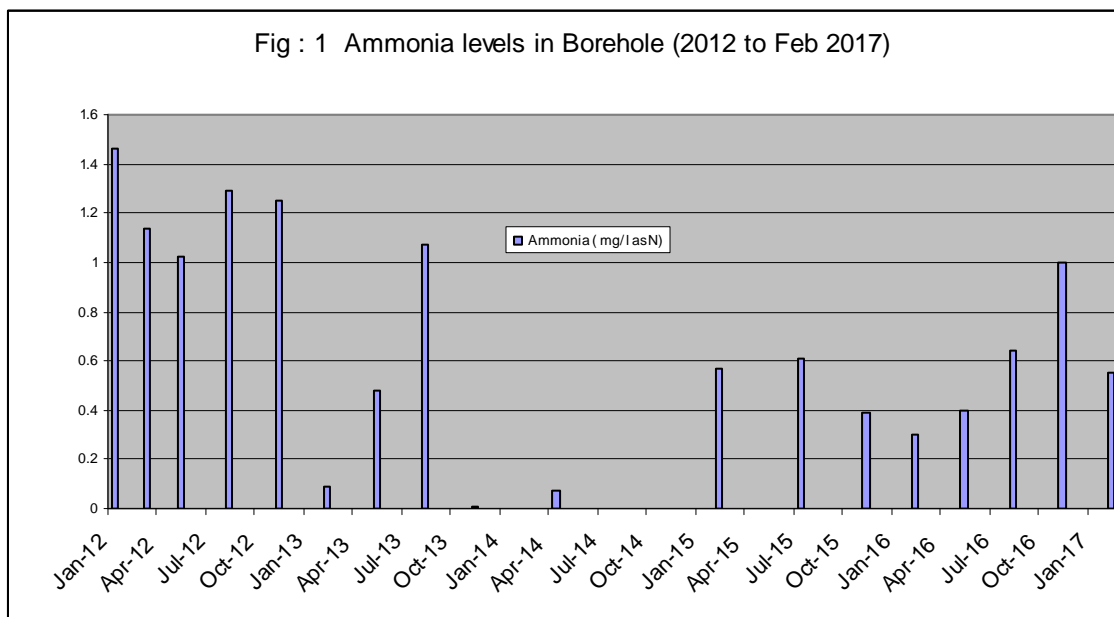
### Groundwater

All boreholes are showing evidence of surface water contamination to a greater or lesser extent –borehole 2 been least affected. . This is evident from turbidity colour and Total Organic carbon levels. The source of this surface water contamination, is undoubtedly exacerbated by abnormally high rainfall.

There have been however no abnormal changes in water quality in wells GWML E1 ,2,3,4,and 6. The last abnormal changes observed were in 2013 with GWML –E1 when high Ammonia levels in May 2013 were experienced due to issues with leakage of leachate . Since then however there has been no recurrence.

Borehole 5 continues pattern of other years i.e. high Ammonias coupled with highest levels of colour and molybdate reactive Phosphorous *see Fig 1* . However in last two years there is also increasing evidence of above background levels of cyanide and Arsenic. This may point to contamination from Landfill source and thus requires further investigation.

Fig 1 Ammonia levels in Borehole 5 2012 to 2017



Boreholes *GWML\_E3, 4, 6* and *Sugruess well* were tested for list 1, 2 organics. The only compound which was detected above detection limit in all wells was *cis 12-Dichloroethene*. However the level detected was tiny and insignificant. However I recommend that Borehole 5 be sampled for same as soon as possible before end of 2017

## Surface water:

### Impact of Suspended solids :

Results from monitoring over last 10 years indicates that most significant threat or impact from Landfill activities in surrounding waters is suspended solids  
Samples were obtained “in site monitoring” from Stations *SWML 1,2,3,4,5,10,11 and new lagoon SWMLE1*.

Suspended solids have declined significantly since 2014 at on site surface water lagoons (*SWMLE1*) and *SWML 10* in Nov. Figs 4 and 7. There was one spike in Western Lagoon (*SWML2*) in Jan 16 which corresponded to preceding heavy rainfall as a result of storm activity *See Fig 3* but since then there has been no significant levels

There has been a noticeable decrease in suspended solids in receiving waters at W1 during period of study – The last significant spike in results was in July 2013

There was also in general less significant impact from Suspended Solids on off site SW1. since the last spike was recorded in July 2015

High suspended solids in river waters may impair fish spawning grounds particularly in winter and spring. Occasional pulses of suspended matter entering these sites are more than likely the main contributory factor for unsatisfactory biological quality at this site in the past (see 2011 AER)

Ecological assessment of *WI* In 2013 denotes a *Q3* value (moderate pollution), which still reflects some impact. This is a deterioration from 2012 where same site scored a *Q3 -4* . However as explained in accompanying Biological report with this AER access to this site was not possible in 2016 due to work in area . Biological assessment at station on Lee about 3 km downstream (O’Brennans bridge) continues to indicate a stream of good quality i.e. *Q =4 and also Q4 at* Glashroeg at Ivy bridge which is a tributary of Smeralagh *see summary of Biological report in appendix*

### Impact of Ammonia levels on receiving waters

No significant levels of ammonia were recorded in period 2014 to 2017 unlike in 2013, where up to Nov 2013 significant levels were recorded in new lagoon *SWML E1*

## Leachate results

Leachate was detected in all detection manholes monitored i.e. *LD1, LD2 and LD3*.

## **Conclusion**

- *Evidence of surface water contamination noted in all boreholes –*
- *Possible evidence of landfill contamination in Borehole 5 requiring further investigation*
- *Biological assessment in 2016 denoted waters of good quality in main impact sites on Glashroeg and Lee*
- *No significant levels of Ammonia detected in receiving water sites unlike in earlier years i.e. 2013*
- *Evidence of leachate was detected in all three leachate detection manholes*

## **References:**

1. *Summary of Environmental Monitoring requirements For- Kerry Co Council Landfill, Muingnaminnane, Tralee, Co Kerry -Waste Licence Ref No: 1-3: Tobin Consulting Engineers*
2. *Biological Invertebrate Monitoring of Surface Waters 2012; Laboratory KCC*

## APPENDIX 1 ; LIST 1, 2 Organics

Appendix1: Details Sampling points referred to in report

<u>Location</u>	<u>comments</u>	<u>old or alternative name</u>	<u>Location Easting</u>	<u>Location Northing</u>
<b><u>Groundwater</u></b>				
<b><u>specified groundwater monitoring pts</u></b>				
Groundwater – GWML-E1			94697	117360
Groundwater - BH-2			94814	117306
Groundwater - BH-3			94808	117005
Groundwater - BH-4			95430	117040
Groundwater - BH-5			94917.5	117152.7
Groundwater – GWML-E3			94843	117658
<b><u>Private boreholes adjacent to landfill</u></b>				
borehole: Dennis O Mahony	not specified in new licence		97390.7	118348.7
borehole: Gerry Sugrue	not specified in new licence		93037.8	116489.5
<b><u>Leachate</u></b>				
<b><u>Detection manholes</u></b>				
LD-1		leachate detection manhole 1	94909	117268
LD-2		leachate detection manhole 2	94894	117298
LD-3		leachate detection manhole from lagoon	94905	117264
<b><u>Lagoon sampling pts</u></b>				
LL-1		Leachate in lagoon 1	94904	117237
LL-2		leachate in Lagoon 2	94927	117166
LL-3		lagoon containing run off from compost	94979	117414
<b><u>Ancillary pts</u></b>				
Puraflo Treatment Inlet	not specified in new licence			
Puraflo Treatment Outlet	not specified in new licence		94867.2	117332
Wheelwash	Not specified in new licence			
<b><u>Surface water</u></b>				
<b><u>Off site sampling pts</u></b>				
Surface Water sampling point: W1	not specified in new licence	biological station	94493.3	117107.5
Surface water sampling point: E2	Not specified in new licence	O'Learys farm	95870.6	116575.6
Surface water sampling point: W2	Not specified in new licence		94493.3	117159.9
SW-1		previously E1	95471	117077
SW-2			95143.6	117969.4
SW-3			94853	118263
<b><u>On site sampling pts</u></b>				
SWML-1		previously 1	94948.3	117376.4
SWML-2	Western Lagoon	previously 2	94837.9	117263.7
SWML-3			94866	117221
SWML-4		previously 4	94883.9	117092.6
SWML-5			94911	117027
SWML-10	Eastern lagoon		95092	117470
SWML-11		previously 11	95067	117520
SWML-E1	New surface water lagoon		94592	117510

SVOCs: (Semi Volatile base Neutrals)  
Std Method 6410 B Liquid-Liquid Extraction  
GC/MS.

<b>Parameter</b>	<b>limit of detection</b>	<b>units</b>
1,3 - Dichlorobenzene	1	ug/l
1,4 - Dichlorobenzene	1	ug/l
Hexachloroethane	1	ug/l
bis(2-Chloroethyl) ether	1	ug/l
1,2-Dichlorobenzene	1	ug/l
bis(2-Chloroisopropyl) ether	1	ug/l
N-Nitrosodi-n-propylamine	1	ug/l
Nitrobenzene	1	ug/l
Hexachlorobutadiene	1	ug/l
1,2,4-Trichlorobenzene	1	ug/l
Isophorone	1	ug/l
Naphthalene	1	ug/l
bis(2-Chlororthoxy) methane	1	ug/l
Hexachlorocyclopentadiene	1	ug/l
2-Chloronaphthalene	1	ug/l
Acenaphthylene	1	ug/l
Acenaphthene	1	ug/l
Dimethyl phthalate	1	ug/l
2,6-Dinitrotoluene	1	ug/l
Fluorene	1	ug/l
4-Chlorophenyl phenyl ether	1	ug/l
2,4-Dinitrotoluene	1	ug/l
Diethyl phthalate	1	ug/l
N-Nitrosodiphenylamine	1	ug/l
Hexachlorobenzene	1	ug/l
a-BHC	1	ug/l
4-Bromophenyl phenyl ether	1	ug/l
γ-BHC	1	ug/l
Phenanthrene	1	ug/l
Anthracene	1	ug/l
B-BHC	1	ug/l
Heptachlor	1	ug/l
d-BHC	1	ug/l
Aldrin	1	ug/l
Dibutyl phthalate	1	ug/l
Heptachlor epoxide	1	ug/l
Endosulfan I	1	ug/l
Fluoranthene	1	ug/l
Dieldrin	1	ug/l
4,4'-DDE	1	ug/l
Pyrene	1	ug/l
Endrin	1	ug/l
Endosulfan II	1	ug/l
4,4'-DDD	1	ug/l
Benzidine	1	ug/l
4,4'-DDT	1	ug/l
Endosulfan sulfate	1	ug/l

**VOCS : Std Method 6210 D-Purge and Trap Capillary Column**  
**GCMS.Screening per USEPA 524.2 list.**

<b>Parameter</b>	<b>limit of detection</b>	<b>units</b>
Dichlorodifluoromethane	10	ug/l
Chloromethane	0.5	ug/l
Ethyl Chloride/Chloroethane	0.5	ug/l
Vinyl Chloride/Chloroethene *(0.5ppb)	0.5	ug/l
Vinyl Chloride/Chloroethene *(25ppb)	0.5	ug/l
Bromomethane	0.5	ug/l
Trichloromonofluoromethane	0.5	ug/l
Ethyl Ether/Diethyl Ether	0.5	ug/l
11 Dichloroethene	0.5	ug/l
Acetone	2	ug/l
Iodomethane/Methyl Iodide	0.5	ug/l
Carbon Disulphide	0.5	ug/l
Allyl Chloride	0.5	ug/l
Methylene Chloride/DCM	5	ug/l
2-Propenenitrile/Acrylonitrile	2	ug/l
Chloroacetonitrile	0.5	ug/l
Nitrobenzene	0.5	ug/l
Propanenitrile	10	ug/l
Hexachlorobutadiene	0.5	ug/l
Trans-1,2 Dichloroethene	0.5	ug/l
MtBE	0.5	ug/l
11 Dichloroethane	0.5	ug/l
22 Dichloropropane	0.5	ug/l
cis-12 Dichloroethene	0.5	ug/l
2-Butanone	5	ug/l
Methyl Acrylate	5	ug/l
Bromochloromethane	0.5	ug/l
Methacrylonitrile	5	ug/l
Tetrahydrofuran	5	ug/l
Chloroform*	1	ug/l
111 Trichloroethane	0.5	ug/l
1-Chlorobutane	0.5	ug/l
Carbon Tetrachloride	0.5	ug/l
11 Dichloropropene	0.5	ug/l
Benzene	0.1	ug/l
12 Dichloroethane )	0.1	ug/l
Trichloroethylene/ Trichloroethene	0.1	ug/l
12 Dichloropropane	0.5	ug/l
Dibromomethane	0.5	ug/l
Methyl Methacrylate	0.5	ug/l
Bromodichloromethane*	2	ug/l
13 Dichloropropene,cis	2	ug/l
MIBK/4 Methyl 2 Pentanone	2	ug/l
Toluene	0.5	ug/l
13 Dichloropropene,trans	2	ug/l
Ethyl Methacrylate	2	ug/l
112 Trichloroethane	0.5	ug/l





# Biological Invertebrate Monitoring

Of

Surface Waters

Draining North Kerry Landfill

2016

Laboratory KCC  
C Markey, I McGloin

date of report: 19/10/2016

## **Introduction:**

Under the EPA License granted to North Kerry Landfill at Muingnamine surface waters draining the landfill are continually monitored. Condition 9.9 of the EPA waste licence requires biological assessment to be carried out annually. Seven sites are

chosen: W1, W2, E1, E2, G1, G2 and N1 (See Map). All sites were sampled or attempted to be sampled between 20<sup>th</sup> and 22<sup>nd</sup> Sep 2016

details of species determination are available in electronic format

### Biological Q Rating:

The samples were classified using the Biological Quality Rating System for Rivers (Q Rating System) as outlined by the Environmental Protection Agency (EPA). The Biological Quality Rating System for Rivers (Q ratings) ranges from Q1 to Q5 where a Q5 denotes a pristine river and Q1 indicates serious pollution (see Quality Rating Table below). From the point of view of the Water Framework Directive all designated river and stream stations must attain least Good status. i.e. Q4, before 2015. High Status River stations are not allowed to deteriorate. There are different classifications for depositing and eroding substrates. The Q system is aimed particularly at larger streams and rivers and is carried out between May and September. Three-minute kick samples are carried out at each station accompanied by stone examinations and weed sweeps.

**Table 1: Q invertebrate status rating vs. Water Framework Directive(WFD) Quality status**

Biotic Index	Water Quality	WFD Quality Status
Q5	pristine	High
Q4-5	Very good	
Q4	Good	Good
Q3-4	Slightly Polluted	Moderate
Q3	Moderately Polluted	Poor
Q2-3	Moderate to Poor	
Q2	Poor	
Q1-2	Poor to bad	
Q1	Bad	

### Results:

**Table 2: Biological Q Rating (Final results and comparison with 2011)**

App 3 AER ; North Kerry Landfill : Invertebrate Monitoring report

<b>Biological Station</b>	<b>Lab Ref No</b>	<b>Date</b>	<b>Result</b>
<b>W1</b>	<b>inaccessible</b>	20/09/2016	
	2013/2428	10/06/2013	<b>3</b>
	2012 / 2448	22/05/2012	<b>4</b>
	2012 / 4517	17/09/2012	<b>3_4</b>
	2011/3450	03/08/2011	<b>3</b>
<b>W2</b>	2016/2964	20/09/2016	<b>4</b>
	2014/3718	16/09/2014	<b>4</b>
	2013/2367	04/06/2013	<b>4_5</b>
	2012 / 2419	21/05/2012	<b>4_5</b>
	2012 / 4518	17/09/2012	<b>4_5</b>
<b>E1</b>	2016/3023	26/09/2016	<b>4_5</b>
	2014 / 3716	16/09/2014	<b>4_5</b>
	2013/2417	10/06/2013	<b>4_5</b>
	2012 / 4519	17/09/2012	<b>4_5</b>
<b>E2</b>	2016/3021	22/09/2016	<b>3_4</b>
	2014//3717	16/09/2014	<b>3</b>
	2013/2368	04/06/2013	<b>3_4</b>
	2012 / 4570	19/09/2012	<b>3_4</b>
<b>G1</b>	2016/3019	22/09/2016	<b>4_5</b>
	2014/3738	17/09/2014	<b>4</b>
	2013/2616	18/06/2013	<b>4</b>
	2012 / 4556	18/09/2012	<b>4_5</b>
<b>G2</b>	<b>inaccessible</b>	22/09/2016	
	2014/3739	17/09/2014	<b>3_4</b>
	2013/2616	18/06/2013	<b>4</b>
	2012 / 4557	18/09/2012	<b>4_5</b>
<b>N1</b>	2016/3018	22/09/2016	<b>4</b>
	2014/3740	17/09/2014	<b>3</b>
	2013/2617	18/06/2013	<b>3_4</b>
	2012 / 4558	18/09/2012	<b>3_4</b>

Table 3: Chemical results

App 3 AER ; North Kerry Landfill : Invertebrate Monitoring report

			Suspended solids	NH <sub>4</sub>	pH	Cond	DO	Temp	TON	MRP	Iron
				N			O2		N	P	
Max.			--	--	9	--	15	--	--	--	
Target			--	--	--	--	--	--	--	--	
Min.			--	--	6	--	5	--	--	--	
Location	Lab Ref no.	Date	mg/l	mg/l	pH units	µS/cm	mg/l	Degrees C	mg/l	mg/l	µg/l
W1	Inaccessible	20/09/2016	-----	-----	-----	-----	-----	-----	-----	-----	---
W2	2016/2964	20/09/2016	2	<0.05	7.5	133	10.72	12.2	<0.5	<0.005	---
E1	2016/3023	26/09/2016	2	<0.05	6.9	81	9.88	12.9	<0.5	<0.005	899
E2	2016/3021	22/09/2016	3	<0.05	5.1	57	10.75	11.9	<0.5	0.1	2302
G1	2016/3019	22/09/2016	2	<0.05	6.2	62	11.19	11	<0.5	0.01	1518
G2	Inaccessible	22/09/2016	----	-----	-----	-----	-----	-----	-----	-----	----
N1	2016/3018	22/09/2016	4	<0.05	6.4	73	11.1	10.6	<0.5	0.03	1597
Ivy Br	2016/3020	22/09/2016	2	<0.05	6.3	63	10.75	12.5	<0.5	0.01	1696

**Discussion:** See Map in *Appendix 1* and detailed field sheets in *Appendix 1*

**W1:**

W1 biological station drains the western side of North Kerry Landfill. It is a very small stream just downstream of the landfill and a tributary of the river Lee. The terrain is very steep, the stream is very narrow and the water flows over a series of small falls. When last sampled In September 2014 this site was found to be inaccessible due to

- (i) A new high wire fence with barbed wire on top running the length of the stream.
- (ii) Trees and bushes cut down and allowed to fall over the stream.

The situation remains the same in September 2016. Therefore this station could not be sampled.

The site was awarded a Q3 in 2013, a pollution status of “moderate”. Sensitive A group species are absent. The more tolerant C group are superabundant but mainly due to the presence of Baetis Rhodani. It is important to note that the more tolerant species from groups D and E are also absent. There had been a deterioration in status since 2012. It has not been possible to assess this site since 2013

## **W2 : R Lee at O Brennans bridge**

**W2** biological station is at O'Brennan's Bridge on the River Lee about 3km downstream of W1. It also drains the Western side of the landfill including many of the surface water drains. This site merited a Q rating of 4 denoting clean unpolluted conditions. Three species of the pollution sensitive A group were found in fair numbers. There is also an absence of the more tolerant D and E groups.

This represents a slight deterioration from 2013 .

**E1** biological station is a small stream draining the Eastern side of the landfill. It runs through bog land. It merits a Q rating of 4-5 suggesting very good quality and a WFD status of "High". Four species of the tolerant A group are present in "Abundant/Dominant" abundance. A relatively low abundance was found in the very diverse C group. The more tolerant D and E groups are absent.

Results of chemical parameters denotes a water which complies with standards for good water quality status in accordance with surface water regulations.

## **E2**

. **E2** biological station also drains the Eastern side of the landfill. It is a tributary of the Smearlagh River. It obtains a Q 3-4 rating indicating slight pollution. Group A is present but in small numbers. Group C falls into the "superabundant/excessive" abundance mainly due to Baetis Rhondani with other group C species being relatively low in number. The more tolerant D and E groups are absent and conditions in the river appear clean. This site has low density and biodiversity, both on this occasion and historically. It is notable that the pH is low at 5.1pH units, the dissolved iron level high at 2302µg/l and the Molybdate Reactive Phosphate at 0.1mg/l. In 2012 Ph was 7.0 here. The only difference in this time period is some private forestry development . These may be contributing factors to the low density and biodiversity and reduced Q rating.

## **G1**

**G1** The Glashoreag River drains the Northern side of the landfill. **G1** biological station is on the Glashoreag River upstream of the Northern stream confluence. It scores a Q4-5 rating which indicates very good quality and a "High" WFD quality status. Three A group species were found in "Numerous" abundance. The more tolerant and diverse C group are

in relatively low numbers and the tolerant D and E groups are absent. These factors are significant in its rating.

Results of chemical parameters denotes a water which complies with standards for high water quality in accordance with surface water regulations

## **N1**

**N1** biological station is situated on a small stream which drains forestry on the northern side of the landfill. For the purposes of this report it will be referred to as the Northern Stream. It is a tributary of the Glashoreag River, its confluence lying between biological stations G1 and G2. It scores a biological Q rating of 4 indicating clean unpolluted conditions. This is an improvement from earlier years since it last scored a Q value of 3 in 2014.

Results of chemical parameters denotes a water which complies with standards for good water quality status in accordance with surface water regulations.

## **G2 Glashoreag**

**G2** biological station is located on the Glashoreag River downstream of the N1 confluence. Access is through private land densely planted with trees with a heavy overgrown ditch at the access point to the river. It has always been a difficult site to access but has become inaccessible due to increased growth in the last two years. Due to this it could not be sampled. It was decided to sample further downstream at Ivy Bridge.

In recent years this site had deteriorated to **Q3-4** (2014) down from 4 in 2013

### **Ivy Bridge:**



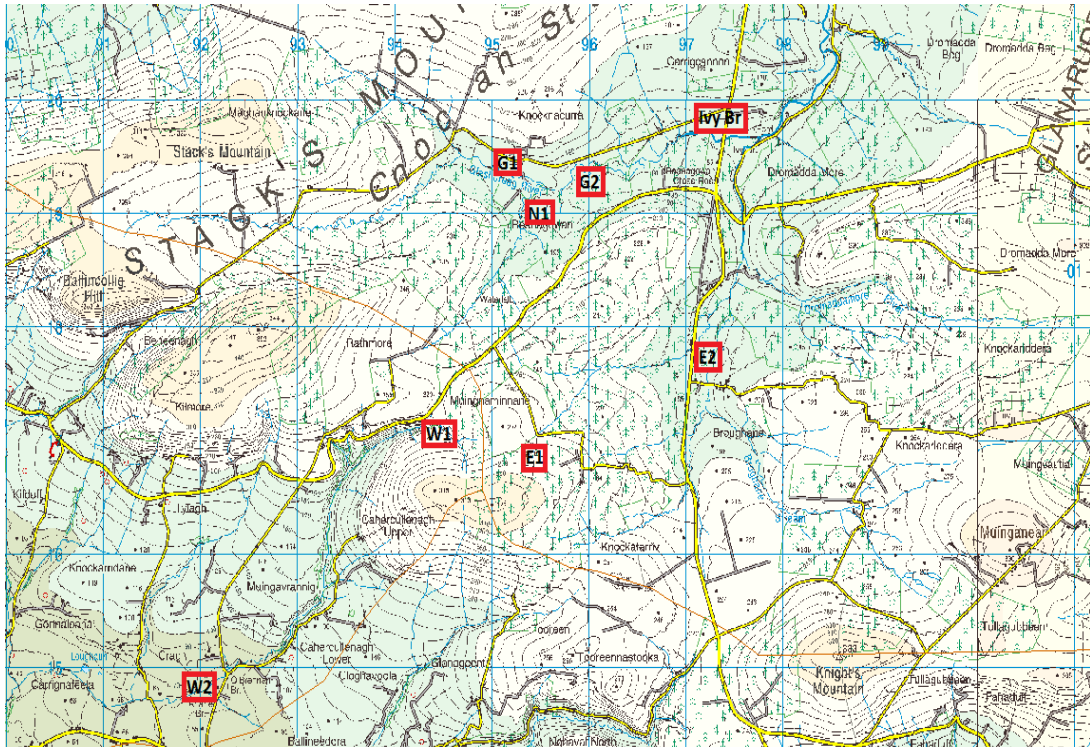
The Glashoreag River at Ivy Bridge is further downstream of G2 and upstream of the confluence with the River Smearlagh. It scores a biological Q rating of 4 indicating good water quality and unpolluted conditions

**Conclusion:**

- Biological station W1 is inaccessible. This station has always been flagged as not very suitable for biological Q rating due to its size. It is now also inaccessible and has been since 2014. Biological station W2 on the River Lee at O'Brennan's Bridge is downstream of W1 and gives a good picture of water draining the Western side of the landfill. It is showing good unpolluted conditions with a Q4.
- The Glashoreag River is in good condition scoring a very high Q4-5 at G1 and deteriorating slightly to a Q4 at Ivy Bridge. As G2 was inaccessible we do not have a picture of the river at this point. The stream draining the Northern side of the landfill is in good condition scoring a Q4.
- E1, a small stream close to bore hole 4 is in very good condition at a Q4-5. Further downstream at E2 there is deterioration to a Q3-4. As noted the deterioration at E2 may be linked to the acidic conditions and elevated phosphate level found there.



## Appendix a: Map of Sampling Stations



# Accreditation Certificate

## Kerry County Council

Áras an Chontae, Rathass, Tralee, Co. Kerry

### Testing Laboratory

Registration number: **340T**

is accredited by the Irish National Accreditation Board (INAB) to undertake testing as detailed in the Schedule bearing the Registration Number detailed above, in compliance with the International Standard **ISO/IEC 17025:2005 2<sup>nd</sup> Edition**

*“General Requirements for the Competence of Testing and Calibration Laboratories”*

*(This Certificate must be read in conjunction with the Annexed Schedule of Accreditation)*

---

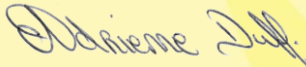
Date of award of accreditation: **08:12:2015**

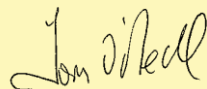
Date of last renewal of accreditation: **n/a**

Expiry date of this certificate of accreditation: **08:12:2020**

---

This Accreditation shall remain in force until further notice subject to continuing compliance with INAB accreditation criteria, ISO/IEC 17025 and any further requirements specified by the Irish National Accreditation Board.

  
**Manager:** \_\_\_\_\_  
Dr Adrienne Duff

  
**Chairperson:** \_\_\_\_\_  
Mr Tom O'Neill

Issued on 08 December 2015

Organisations are subject to annual surveillance and are re-assessed every five years. The renewal date on this Certificate confirms the latest date of renewal of accreditation. To confirm the validity of this Certificate, please contact the Irish National Accreditation Board.

INAB is a signatory of the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement, for Testing.

# Schedule of Accreditation



(Annex to Accreditation Certificate)

Permanent Laboratory:

Category A

## KERRY COUNTY COUNCIL LABORATORY

### Chemical and Biological Testing Laboratory

**Initial Registration Date :** 08-December-2015

**Postal Address:** Áras an Chontae,  
*(Address of other locations as they apply)* Rathass,  
Tralee,  
Co. Kerry.

**Telephone:** +353 (66) 7183592

**Fax:** +353 (66) 7161819

**E-mail:** dlenihan@kerrycoco.ie

**Contact Name:** David Lenihan

**Facilities:** Normally not available for Public testing

# Schedule of Accreditation



Permanent Laboratory:  
Category A

THE IRISH NATIONAL ACCREDITATION BOARD (INAB) is the Irish body for the accreditation of organisations including laboratories.

Laboratory accreditation is available to testing and calibration facilities operated by manufacturing organisations, government departments, educational institutions and commercial testing/calibration services. Indeed, any organisation involved in testing, measurement or calibration in any area of technology can seek accreditation for the work it is undertaking.

Each accredited laboratory has been assessed by skilled specialist assessors and found to meet criteria which are in compliance with ISO/IEC 17025 or ISO/IEC 15189 (medical laboratories). Frequent audits, together with periodic inter-laboratory test programmes, ensure that these standards of operation are maintained.

## Testing and Calibration Categories:

- Category A:** Permanent laboratory calibration and testing where the laboratory is erected on a fixed location for a period expected to be greater than three years.
- Category B:** Site calibration and testing that is performed by staff sent out on site by a permanent laboratory that is accredited by the Irish National Accreditation Board.
- Category C:** Site calibration and testing that is performed in a site/mobile laboratory or by staff sent out by such a laboratory, the operation of which is the responsibility of a permanent laboratory accredited by the Irish National Accreditation Board.
- Category D:** Site calibration and testing that is performed on site by individuals and organisations that do not have a permanent calibration/testing laboratory. Testing may be performed using
- (a) portable test equipment
  - (b) a site laboratory
  - (c) a mobile laboratory or
  - (d) equipment from a mobile or site laboratory

## Standard Specification or Test Procedure Used:

The standard specification or test procedure that is accredited is the issue that is current on the date of the most recent visit, unless otherwise stated.

## Glossary of Terms

### Facilities:

- Public calibration/testing service:** Commercial operations which actively seek work from others.
- Conditionally available for public calibration/testing:** Established for another primary purpose but, more commonly than not, is available for outside work.
- Normally not available for public calibration/testing:** Unavailable for public calibration/testing more often than not.

Laboratory users wishing to obtain assurance that calibration or test results are reliable and carried out to the Irish National Accreditation Board criteria should insist on receiving an accredited calibration certificate or test report. Users should contact the laboratory directly to ensure that this scope of accreditation is current. INAB will, on request, verify the status and scope.

# Scope of Accreditation



## Kerry County Council Laboratory Chemical Testing Laboratory

Permanent Laboratory:  
Category A

INAB Classification number (P9) Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
766 Waters		Documented in-house methods based on AQKM based on HMSO-1981
.01 Waters for potable and domestic purposes	Ammonia 0.05-1 mg/L as N	541-P-004
	Chloride 5-80 mg/L Cl	541-P-006
.99 Other waters - surface waters	Total Oxidised Nitrogen 0.5-10 mg/L as N	541-P-016
	Sulphate 5-100 mg/L SO4	541-P-024
	Nitrite 0.05 - 1 mg/L as N	541-P-018
	pH 4-10	Documented in-house method based on Standard Methods for the Examination of Water and Wastewater 22nd Edition 2012 4500-H 541-P-020
	Conductivity 15-2500 µS/cm	Documented in-house method based on Standard Methods for the Examination of Water and Wastewater 22nd Edition 2012 2510-B 541-P-011

# Scope of Accreditation



## Kerry County Council Laboratory Chemical Testing Laboratory

Permanent Laboratory:  
Category A

INAB Classification number (P9) Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
<b>766 Waters</b>		
.01 Waters for potable and domestic purposes	Turbidity by nephelometric method 0.25-10 NTU	Documented in-house method based on Standard Methods for the Examination of Water and Wastewater 22nd Edition 2012 2130-B 541-P-029
	Fluoride by Ion Selective Electrode 0.1-2. mg/L F	Documented in-house method based on Standard Methods for the Examination of Water and Wastewater 22nd Edition 2012 4500-F 541-P-012
.01 Waters for potable and domestic purposes	Colour 5-100 Hazen units	Hach Method 8025 541-P-010
.99 Other waters - surface waters		
	Major Ions by ICP-MS  Calcium 1-100mg/L Ca	Documented in-house method based on USEPA Method 200.8 (1999) 541-P-038

# Scope of Accreditation



## Kerry County Council Laboratory Chemical Testing Laboratory

Permanent Laboratory:  
Category A

INAB Classification number (P9) Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
766 Waters	Metals by ICP-MS	Documented in-house method based on USEPA Method 200.8 (1999) 541-P-030
.01 Waters for potable and domestic purposes	Arsenic 1-500µg/L As Chromium 1-500µg/L Cr Iron 20-1000µg/L Fe	
.99 Other waters - surface waters	Manganese 1-500µg/L Mn Nickel 10-500µg/L Ni Cadmium 1-500µg/L Cd Lead 1-300µg/L Pb Selenium 1-500µg/L Se Copper 0.002-1.0mg/L Cu	

# Scope of Accreditation



## Kerry County Council Laboratory Biological Testing Laboratory

Permanent Laboratory:  
Category A

INAB Classification number (P9) Materials/products tested	Type of test/properties measured Range of measurement	Standard specifications Equipment/techniques used
<b>870</b> Waters, including effluents  .11    Bacteriological condition of potable waters	Enumeration of Coliforms & E.coli by Idexx ( Colilert 18) Quanti Tray	Documented in-house method based on  MPN by IDEXX Colilert 18 ISO standard 9308-2:2012 541-P-031





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email: [info@elsltd.com](mailto:info@elsltd.com)



<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/001
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3656		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	1,4-Dichlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	2,4,5-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4,6-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dimethylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2,6-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chloronaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylnaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Nitrophenol	*	Default	1.0		<1.0	ug/L	YES	
	3&4-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Bromophenyl Phenyl Ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Chloro-3-methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Chlorophenyl phenyl ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Nitrophenol	*	Default	5.0		<5.0	ug/L	YES	
	Acenaphthene	*	Default	1.0		<1.0	ug/L	YES	
	Acenaphthylene	*	Default	1.0		<1.0	ug/L	YES	
	Anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(b)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(g,h,i)perylene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(k)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzyl Butyl Phthalate	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethoxy)methane	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroisopropyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-ethylhexyl)phthalate	*	Default	5.0		<5.0	ug/L	YES	
	Chrysene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenz(a,h)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenzofuran	*	Default	1.0		<1.0	ug/L	YES	
	Diethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Dimethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	di-n-Butylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Di-n-octylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Diphenylamine	*	Default	1.0		<1.0	ug/L	YES	

*Domenico* *J. Giliberti*

Signed :

14/03/2017

**Domenico Giliberti-Technical Manager**

**NOTES**

- 1.This Report shall not be Reproduced except in full, without the permission of the laboratory and only relates to the items tested.
- 2.SPEC= Allowable limit or parametric value
- 3.OOS=Result which is outside specification highlighted as OOS-A

- 4.LOQ=Limit of Quantification or lowest value that can be reported
- 5.ACCRED=Indicates matrix accreditation for the test,a blank field indicates not accredited
- 6."\*" Indicates sub-contract test

<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/001
		<b>Date of Receipt</b>	24/11/2016
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<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3656		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	Fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Fluorene	*	Default	1.0		<1.0	ug/L	YES	
	Hexachlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	Indeno(1,2,3-c,d)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Isophorone	*	Default	1.0		<1.0	ug/L	YES	
	n-Nitrosodi-n-propylamine	*	Default	1.0		<1.0	ug/L	YES	
	Pentachlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	Phenanthrene	*	Default	1.0		<1.0	ug/L	YES	
	Phenol	*	Default	1.0		<1.0	ug/L	YES	
	Pyrene	*	Default	1.0		<1.0	ug/L	YES	
<b>VOC Full Suite</b>									
	Dichlorodifluoromethane		EO025	10.0		<10.0	ug/L		
	Chloromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Chloride/Chloroethane		EO025	0.5		<0.5	ug/L		
	Vinyl Chloride		EO025	0.1		<0.1	ug/L		
	Bromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Trichloromonofluoromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Ether/Diethyl Ether		EO025	0.5		<0.5	ug/L	INAB	
	1,1 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	Acetone		EO025	2.0		<2.0	ug/L		
	Iodomethane/Methyl Iodide		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Disulphide		EO025	0.5		<0.5	ug/L	INAB	
	Dichloromethane		EO025	5.0		<5.0	ug/L	INAB	
	2-Propenenitrile/Acrylonitrile		EO025	2.0		<2.0	ug/L	INAB	
	Chlormethyl Cyanide/Chloroacetonitrile		EO025	0.5		<0.5	ug/L	INAB	
	Nitrobenzene		EO025	0.5		<0.5	ug/L		
	Propanenitrile		EO025	10		<10	ug/L		
	Hexachlorobutadiene		EO025	0.5		<0.5	ug/L	INAB	
	Trans-1,2 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	MtBE		EO025	0.5		<0.5	ug/L	INAB	
	1,1-dichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	2,2-dichloropropane		EO025	0.5		<0.5	ug/L		
	cis-12 Dichloroethene		EO025	0.5		4.6	ug/L	INAB	
	2-Butanone		EO025	5.0		<5.0	ug/L		
	Methyl Acrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromochloromethane		EO025	0.5		<0.5	ug/L	INAB	
	Methacrylonitrile		EO025	5.0		<5.0	ug/L		
	Tetrahydrofuran		EO025	0.5		<0.5	ug/L	INAB	
	Chloroform		EO025	1.0		<1.0	ug/L	INAB	

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**Domenico Giliberti-Technical Manager**

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/001
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3656		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	1,1,1-trichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	1-Chlorobutane		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Tetrachloride		EO025	0.5		<0.5	ug/L	INAB	
	11 Dichloropropene		EO025	0.5		<0.5	ug/L	INAB	
	Benzene		EO025	0.1		<0.1	ug/L	INAB	
	1,2 dicloroethane		EO025	0.1		<0.1	ug/L	INAB	
	Trichloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,2-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	Dibromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Methyl Methacrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromodichloromethane		EO025	2.0		<2.0	ug/L	INAB	
	13 Dichloropropene,cis		EO025	2.0		<2.0	ug/L	INAB	
	MIBK/4 Methyl 2 Pentanone		EO025	2.0		<2.0	ug/L	INAB	
	Toluene		EO025	0.5		<0.5	ug/L	INAB	
	13 Dichloropropene,trans		EO025	2.0		<2.0	ug/L	INAB	
	Ethyl Methacrylate		EO025	2.0		<2.0	ug/L	INAB	
	112 Trichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	Tetrachloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,3-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	2-Hexanone		EO025	1.0		<1.0	ug/L	INAB	
	Dibromochloromethane		EO025	1.0		<1.0	ug/L	INAB	
	1,2-dibromoethane		EO025	0.5		<0.5	ug/L	INAB	
	Chlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,1,2-tetrachloroethane		EO025	2.0		<2.0	ug/L	INAB	
	Ethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Xylene P&M		EO025	0.5		<0.5	ug/L	INAB	
	Xylene -o		EO025	0.5		<0.5	ug/L	INAB	
	Styrene		EO025	2.0		<2.0	ug/L	INAB	
	Bromoform		EO025	1.0		<1.0	ug/L	INAB	
	Isopropylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Bromobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,1,2-tetrachloroethane		EO025	0.5		<0.5	ug/L	INAB	
	1,2,3-trichloropropane		EO025	2.0		<2.0	ug/L	INAB	
	Trans 14 Dichloro 2 Butene, tran		EO025	2.0		<2.0	ug/L	INAB	
	Propylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	2-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	4-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,3,5-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Tert Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	

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email: [info@elsltd.com](mailto:info@elsltd.com)



<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/001
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3656		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	1,2,4-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	sec-butylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,3-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	P Isopropyltoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,4-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	N Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	Hexachloroethane		EO025	5.0		<5.0	ug/L	INAB	
	1,2-dibromo-3-chloropropane		EO025	2.0		<2.0	ug/L	INAB	
	1,2,4-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	Naphthalene		EO025	2.0		<2.0	ug/L	INAB	
	1,2,3-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/002
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3657		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	1,4-Dichlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	2,4,5-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4,6-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dimethylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2,6-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chloronaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylnaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Nitrophenol	*	Default	1.0		<1.0	ug/L	YES	
	3&4-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Bromophenyl Phenyl Ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Chloro-3-methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Chlorophenyl phenyl ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Nitrophenol	*	Default	5.0		<5.0	ug/L	YES	
	Acenaphthene	*	Default	1.0		<1.0	ug/L	YES	
	Acenaphthylene	*	Default	1.0		<1.0	ug/L	YES	
	Anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(b)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(g,h,i)perylene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(k)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzyl Butyl Phthalate	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethoxy)methane	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroisopropyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-ethylhexyl)phthalate	*	Default	5.0		<5.0	ug/L	YES	
	Chrysene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenz(a,h)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenzofuran	*	Default	1.0		<1.0	ug/L	YES	
	Diethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Dimethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	di-n-Butylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Di-n-octylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Diphenylamine	*	Default	1.0		<1.0	ug/L	YES	
	Fluoranthene	*	Default	1.0		<1.0	ug/L	YES	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/002
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3657		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	Fluorene	*	Default	1.0		<1.0	ug/L	YES	
	Hexachlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	Indeno(1,2,3-c,d)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Isophorone	*	Default	1.0		<1.0	ug/L	YES	
	n-Nitrosodi-n-propylamine	*	Default	1.0		<1.0	ug/L	YES	
	Pentachlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	Phenanthrene	*	Default	1.0		<1.0	ug/L	YES	
	Phenol	*	Default	1.0		<1.0	ug/L	YES	
	Pyrene	*	Default	1.0		<1.0	ug/L	YES	
<b>VOC Full Suite</b>									
	Dichlorodifluoromethane		EO025	10.0		<10.0	ug/L		
	Chloromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Chloride/Chloroethane		EO025	0.5		<0.5	ug/L		
	Vinyl Chloride		EO025	0.1		<0.1	ug/L		
	Bromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Trichloromonofluoromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Ether/Diethyl Ether		EO025	0.5		<0.5	ug/L	INAB	
	1,1 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	Acetone		EO025	2.0		<2.0	ug/L		
	Iodomethane/Methyl Iodide		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Disulphide		EO025	0.5		<0.5	ug/L	INAB	
	Dichloromethane		EO025	5.0		<5.0	ug/L	INAB	
	2-Propenenitrile/Acrylonitrile		EO025	2.0		<2.0	ug/L	INAB	
	Chlormethyl Cyanide/Chloroacetonitrile		EO025	0.5		<0.5	ug/L	INAB	
	Nitrobenzene		EO025	0.5		<0.5	ug/L		
	Propanenitrile		EO025	10		<10	ug/L		
	Hexachlorobutadiene		EO025	0.5		<0.5	ug/L	INAB	
	Trans-1,2 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	MtBE		EO025	0.5		<0.5	ug/L	INAB	
	1,1-dichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	2,2-dichloropropane		EO025	0.5		<0.5	ug/L		
	cis-1,2 Dichloroethene		EO025	0.5		5.2	ug/L	INAB	
	2-Butanone		EO025	5.0		<5.0	ug/L		
	Methyl Acrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromochloromethane		EO025	0.5		<0.5	ug/L	INAB	
	Methacrylonitrile		EO025	5.0		<5.0	ug/L		
	Tetrahydrofuran		EO025	0.5		<0.5	ug/L	INAB	
	Chloroform		EO025	1.0		<1.0	ug/L	INAB	
	1,1,1-trichloroethane		EO025	0.5		<0.5	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/002
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3657		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	1-Chlorobutane		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Tetrachloride		EO025	0.5		<0.5	ug/L	INAB	
	11 Dichloropropene		EO025	0.5		<0.5	ug/L	INAB	
	Benzene		EO025	0.1		<0.1	ug/L	INAB	
	1,2 dicloroethane		EO025	0.1		<0.1	ug/L	INAB	
	Trichloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,2-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	Dibromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Methyl Methacrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromodichloromethane		EO025	2.0		<2.0	ug/L	INAB	
	13 Dichloropropene,cis		EO025	2.0		<2.0	ug/L	INAB	
	MIBK/4 Methyl 2 Pentanone		EO025	2.0		<2.0	ug/L	INAB	
	Toluene		EO025	0.5		<0.5	ug/L	INAB	
	13 Dichloropropene,trans		EO025	2.0		<2.0	ug/L	INAB	
	Ethyl Methacrylate		EO025	2.0		<2.0	ug/L	INAB	
	112 Trichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	Tetrachloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,3-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	2-Hexanone		EO025	1.0		<1.0	ug/L	INAB	
	Dibromochloromethane		EO025	1.0		<1.0	ug/L	INAB	
	1,2-dibromoethane		EO025	0.5		<0.5	ug/L	INAB	
	Chlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,1,2-tetrachloroethane		EO025	2.0		<2.0	ug/L	INAB	
	Ethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Xylene P&M		EO025	0.5		<0.5	ug/L	INAB	
	Xylene -o		EO025	0.5		<0.5	ug/L	INAB	
	Styrene		EO025	2.0		<2.0	ug/L	INAB	
	Bromoform		EO025	1.0		<1.0	ug/L	INAB	
	Isopropylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Bromobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,2,2-tetrachloroethane		EO025	0.5		<0.5	ug/L	INAB	
	1,2,3-trichloropropane		EO025	2.0		<2.0	ug/L	INAB	
	Trans 14 Dichloro 2 Butene, tran		EO025	2.0		<2.0	ug/L	INAB	
	Propylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	2-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	4-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,3,5-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Tert Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2,4-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	

*Domenico Giliberti*

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**Domenico Giliberti-Technical Manager**

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/002
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3657		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	sec-butylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,3-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	P Isopropyltoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,4-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	N Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	Hexachloroethane		EO025	5.0		<5.0	ug/L	INAB	
	1,2-dibromo-3-chloropropane		EO025	2.0		<2.0	ug/L	INAB	
	1,2,4-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	Naphthalene		EO025	2.0		<2.0	ug/L	INAB	
	1,2,3-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	



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  - 6.\*\*\* Indicates sub-contract test



<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/003
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3659		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	1,4-Dichlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	2,4,5-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4,6-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dimethylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2,6-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chloronaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylnaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Nitrophenol	*	Default	1.0		<1.0	ug/L	YES	
	3&4-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Bromophenyl Phenyl Ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Chloro-3-methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Chlorophenyl phenyl ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Nitrophenol	*	Default	5.0		<5.0	ug/L	YES	
	Acenaphthene	*	Default	1.0		<1.0	ug/L	YES	
	Acenaphthylene	*	Default	1.0		<1.0	ug/L	YES	
	Anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(b)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(g,h,i)perylene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(k)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzyl Butyl Phthalate	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethoxy)methane	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroisopropyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-ethylhexyl)phthalate	*	Default	5.0		<5.0	ug/L	YES	
	Chrysene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenz(a,h)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenzofuran	*	Default	1.0		<1.0	ug/L	YES	
	Diethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Dimethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	di-n-Butylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Di-n-octylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Diphenylamine	*	Default	1.0		<1.0	ug/L	YES	
	Fluoranthene	*	Default	1.0		<1.0	ug/L	YES	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/003
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3659		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	Fluorene	*	Default	1.0		<1.0	ug/L	YES	
	Hexachlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	Indeno(1,2,3-c,d)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Isophorone	*	Default	1.0		<1.0	ug/L	YES	
	n-Nitrosodi-n-propylamine	*	Default	1.0		<1.0	ug/L	YES	
	Pentachlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	Phenanthrene	*	Default	1.0		<1.0	ug/L	YES	
	Phenol	*	Default	1.0		<1.0	ug/L	YES	
	Pyrene	*	Default	1.0		<1.0	ug/L	YES	
<b>VOC Full Suite</b>									
	Dichlorodifluoromethane		EO025	10.0		<10.0	ug/L		
	Chloromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Chloride/Chloroethane		EO025	0.5		<0.5	ug/L		
	Vinyl Chloride		EO025	0.1		<0.1	ug/L		
	Bromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Trichloromonofluoromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Ether/Diethyl Ether		EO025	0.5		<0.5	ug/L	INAB	
	1,1 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	Acetone		EO025	2.0		<2.0	ug/L		
	Iodomethane/Methyl Iodide		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Disulphide		EO025	0.5		<0.5	ug/L	INAB	
	Dichloromethane		EO025	5.0		<5.0	ug/L	INAB	
	2-Propenenitrile/Acrylonitrile		EO025	2.0		<2.0	ug/L	INAB	
	Chlormethyl Cyanide/Chloroacetonitrile		EO025	0.5		<0.5	ug/L	INAB	
	Nitrobenzene		EO025	0.5		<0.5	ug/L		
	Propanenitrile		EO025	10		<10	ug/L		
	Hexachlorobutadiene		EO025	0.5		<0.5	ug/L	INAB	
	Trans-1,2 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	MtBE		EO025	0.5		<0.5	ug/L	INAB	
	1,1-dichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	2,2-dichloropropane		EO025	0.5		<0.5	ug/L		
	cis-1,2 Dichloroethene		EO025	0.5		4.2	ug/L	INAB	
	2-Butanone		EO025	5.0		<5.0	ug/L		
	Methyl Acrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromochloromethane		EO025	0.5		<0.5	ug/L	INAB	
	Methacrylonitrile		EO025	5.0		<5.0	ug/L		
	Tetrahydrofuran		EO025	0.5		<0.5	ug/L	INAB	
	Chloroform		EO025	1.0		<1.0	ug/L	INAB	
	1,1,1-trichloroethane		EO025	0.5		<0.5	ug/L	INAB	

*Domenico* *J. Gilberti*

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**Domenico Giliberti-Technical Manager**

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email: [info@elsltd.com](mailto:info@elsltd.com)



<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/003
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3659		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	1-Chlorobutane		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Tetrachloride		EO025	0.5		<0.5	ug/L	INAB	
	11 Dichloropropene		EO025	0.5		<0.5	ug/L	INAB	
	Benzene		EO025	0.1		<0.1	ug/L	INAB	
	1,2 dicloroethane		EO025	0.1		<0.1	ug/L	INAB	
	Trichloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,2-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	Dibromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Methyl Methacrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromodichloromethane		EO025	2.0		<2.0	ug/L	INAB	
	13 Dichloropropene,cis		EO025	2.0		<2.0	ug/L	INAB	
	MIBK/4 Methyl 2 Pentanone		EO025	2.0		<2.0	ug/L	INAB	
	Toluene		EO025	0.5		<0.5	ug/L	INAB	
	13 Dichloropropene,trans		EO025	2.0		<2.0	ug/L	INAB	
	Ethyl Methacrylate		EO025	2.0		<2.0	ug/L	INAB	
	112 Trichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	Tetrachloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,3-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	2-Hexanone		EO025	1.0		<1.0	ug/L	INAB	
	Dibromochloromethane		EO025	1.0		<1.0	ug/L	INAB	
	1,2-dibromoethane		EO025	0.5		<0.5	ug/L	INAB	
	Chlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,1,2-tetrachloroethane		EO025	2.0		<2.0	ug/L	INAB	
	Ethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Xylene P&M		EO025	0.5		<0.5	ug/L	INAB	
	Xylene -o		EO025	0.5		<0.5	ug/L	INAB	
	Styrene		EO025	2.0		<2.0	ug/L	INAB	
	Bromoform		EO025	1.0		<1.0	ug/L	INAB	
	Isopropylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Bromobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,2,2-tetrachloroethane		EO025	0.5		<0.5	ug/L	INAB	
	1,2,3-trichloropropane		EO025	2.0		<2.0	ug/L	INAB	
	Trans 14 Dichloro 2 Butene, tran		EO025	2.0		<2.0	ug/L	INAB	
	Propylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	2-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	4-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,3,5-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Tert Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2,4-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/003
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3659		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	sec-butylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,3-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	P Isopropyltoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,4-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	N Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	Hexachloroethane		EO025	5.0		<5.0	ug/L	INAB	
	1,2-dibromo-3-chloropropane		EO025	2.0		<2.0	ug/L	INAB	
	1,2,4-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	Naphthalene		EO025	2.0		<2.0	ug/L	INAB	
	1,2,3-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	




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email: [info@elsltd.com](mailto:info@elsltd.com)



<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/004
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3661		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	1,4-Dichlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	2,4,5-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4,6-Trichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dichlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dimethylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2,4-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2,6-Dinitrotoluene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chloronaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Chlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylnaphthalene	*	Default	1.0		<1.0	ug/L	YES	
	2-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	2-Nitrophenol	*	Default	1.0		<1.0	ug/L	YES	
	3&4-Methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Bromophenyl Phenyl Ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Chloro-3-methylphenol	*	Default	1.0		<1.0	ug/L	YES	
	4-Chlorophenyl phenyl ether	*	Default	1.0		<1.0	ug/L	YES	
	4-Nitrophenol	*	Default	5.0		<5.0	ug/L	YES	
	Acenaphthene	*	Default	1.0		<1.0	ug/L	YES	
	Acenaphthylene	*	Default	1.0		<1.0	ug/L	YES	
	Anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(a)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(b)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(g,h,i)perylene	*	Default	1.0		<1.0	ug/L	YES	
	Benzo(k)fluoranthene	*	Default	1.0		<1.0	ug/L	YES	
	Benzyl Butyl Phthalate	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethoxy)methane	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroethyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-chloroisopropyl)ether	*	Default	1.0		<1.0	ug/L	YES	
	Bis(2-ethylhexyl)phthalate	*	Default	5.0		<5.0	ug/L	YES	
	Chrysene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenz(a,h)anthracene	*	Default	1.0		<1.0	ug/L	YES	
	Dibenzofuran	*	Default	1.0		<1.0	ug/L	YES	
	Diethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Dimethylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	di-n-Butylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Di-n-octylphthalate	*	Default	1.0		<1.0	ug/L	YES	
	Diphenylamine	*	Default	1.0		<1.0	ug/L	YES	
	Fluoranthene	*	Default	1.0		<1.0	ug/L	YES	

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<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/004
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3661		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>SVOC (sub)</b>									
	Fluorene	*	Default	1.0		<1.0	ug/L	YES	
	Hexachlorobenzene	*	Default	1.0		<1.0	ug/L	YES	
	Indeno(1,2,3-c,d)pyrene	*	Default	1.0		<1.0	ug/L	YES	
	Isophorone	*	Default	1.0		<1.0	ug/L	YES	
	n-Nitrosodi-n-propylamine	*	Default	1.0		<1.0	ug/L	YES	
	Pentachlorophenol	*	Default	1.0		<1.0	ug/L	YES	
	Phenanthrene	*	Default	1.0		<1.0	ug/L	YES	
	Phenol	*	Default	1.0		<1.0	ug/L	YES	
	Pyrene	*	Default	1.0		<1.0	ug/L	YES	
<b>VOC Full Suite</b>									
	Dichlorodifluoromethane		EO025	10.0		<10.0	ug/L		
	Chloromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Chloride/Chloroethane		EO025	0.5		<0.5	ug/L		
	Vinyl Chloride		EO025	0.1		<0.1	ug/L		
	Bromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Trichloromonofluoromethane		EO025	0.5		<0.5	ug/L		
	Ethyl Ether/Diethyl Ether		EO025	0.5		<0.5	ug/L	INAB	
	1,1 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	Acetone		EO025	2.0		<2.0	ug/L		
	Iodomethane/Methyl Iodide		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Disulphide		EO025	0.5		<0.5	ug/L	INAB	
	Dichloromethane		EO025	5.0		<5.0	ug/L	INAB	
	2-Propenenitrile/Acrylonitrile		EO025	2.0		<2.0	ug/L	INAB	
	Chlormethyl Cyanide/Chloroacetonitrile		EO025	0.5		<0.5	ug/L	INAB	
	Nitrobenzene		EO025	0.5		<0.5	ug/L		
	Propanenitrile		EO025	10		<10	ug/L		
	Hexachlorobutadiene		EO025	0.5		<0.5	ug/L	INAB	
	Trans-1,2 Dichloroethene		EO025	0.5		<0.5	ug/L	INAB	
	MtBE		EO025	0.5		<0.5	ug/L	INAB	
	1,1-dichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	2,2-dichloropropane		EO025	0.5		<0.5	ug/L		
	cis-1,2 Dichloroethene		EO025	0.5		4.2	ug/L	INAB	
	2-Butanone		EO025	5.0		<5.0	ug/L		
	Methyl Acrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromochloromethane		EO025	0.5		<0.5	ug/L	INAB	
	Methacrylonitrile		EO025	5.0		<5.0	ug/L		
	Tetrahydrofuran		EO025	0.5		<0.5	ug/L	INAB	
	Chloroform		EO025	1.0		<1.0	ug/L	INAB	
	1,1,1-trichloroethane		EO025	0.5		<0.5	ug/L	INAB	

*Domenico* *J. Gilberti*

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**Domenico Giliberti-Technical Manager**

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/004
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3661		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	1-Chlorobutane		EO025	0.5		<0.5	ug/L	INAB	
	Carbon Tetrachloride		EO025	0.5		<0.5	ug/L	INAB	
	11 Dichloropropene		EO025	0.5		<0.5	ug/L	INAB	
	Benzene		EO025	0.1		<0.1	ug/L	INAB	
	1,2 dicloroethane		EO025	0.1		<0.1	ug/L	INAB	
	Trichloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,2-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	Dibromomethane		EO025	0.5		<0.5	ug/L	INAB	
	Methyl Methacrylate		EO025	0.5		<0.5	ug/L	INAB	
	Bromodichloromethane		EO025	2.0		<2.0	ug/L	INAB	
	13 Dichloropropene,cis		EO025	2.0		<2.0	ug/L	INAB	
	MIBK/4 Methyl 2 Pentanone		EO025	2.0		<2.0	ug/L	INAB	
	Toluene		EO025	0.5		<0.5	ug/L	INAB	
	13 Dichloropropene,trans		EO025	2.0		<2.0	ug/L	INAB	
	Ethyl Methacrylate		EO025	2.0		<2.0	ug/L	INAB	
	112 Trichloroethane		EO025	0.5		<0.5	ug/L	INAB	
	Tetrachloroethene		EO025	0.1		<0.1	ug/L	INAB	
	1,3-dichloropropane		EO025	0.5		<0.5	ug/L	INAB	
	2-Hexanone		EO025	1.0		<1.0	ug/L	INAB	
	Dibromochloromethane		EO025	1.0		<1.0	ug/L	INAB	
	1,2-dibromoethane		EO025	0.5		<0.5	ug/L	INAB	
	Chlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,1,2-tetrachloroethane		EO025	2.0		<2.0	ug/L	INAB	
	Ethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Xylene P&M		EO025	0.5		<0.5	ug/L	INAB	
	Xylene -o		EO025	0.5		<0.5	ug/L	INAB	
	Styrene		EO025	2.0		<2.0	ug/L	INAB	
	Bromoform		EO025	1.0		<1.0	ug/L	INAB	
	Isopropylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Bromobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,1,2,2-tetrachloroethane		EO025	0.5		<0.5	ug/L	INAB	
	1,2,3-trichloropropane		EO025	2.0		<2.0	ug/L	INAB	
	Trans 14 Dichloro 2 Butene, tran		EO025	2.0		<2.0	ug/L	INAB	
	Propylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	2-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	4-chlorotoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,3,5-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	Tert Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2,4-trimethylbenzene		EO025	0.5		<0.5	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104287 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104287/004
		<b>Date of Receipt</b>	24/11/2016
		<b>Date Started</b>	24/11/2016
<b>Tel No</b>	066-7183592	<b>Received or Collected</b>	An Post
<b>Customer PO</b>	400387348	<b>Date of Report</b>	14/03/2017
<b>Quotation No</b>	QN006125	<b>Sample Type</b>	Ground Waters
<b>Customer Ref</b>	2016/3661		

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>VOC Full Suite</b>									
	sec-butylbenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,3-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	P Isopropyltoluene		EO025	0.5		<0.5	ug/L	INAB	
	1,4-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	1,2-dichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	N Butyl Benzene		EO025	0.5		<0.5	ug/L	INAB	
	Hexachloroethane		EO025	5.0		<5.0	ug/L	INAB	
	1,2-dibromo-3-chloropropane		EO025	2.0		<2.0	ug/L	INAB	
	1,2,4-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	
	Naphthalene		EO025	2.0		<2.0	ug/L	INAB	
	1,2,3-trichlorobenzene		EO025	0.5		<0.5	ug/L	INAB	

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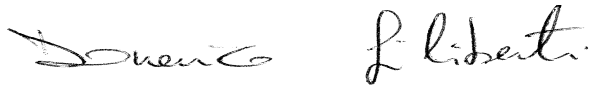
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/001
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3654	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/002
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3655	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/003
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3656	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

Signed :  \_\_\_\_\_ 14/03/2017

**Domenico Giliberti-Technical Manager**

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- 6.\*\*\* Indicates sub-contract test



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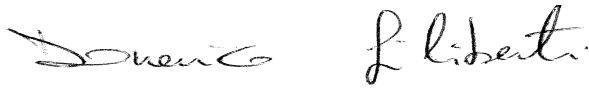
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/004
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3657	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

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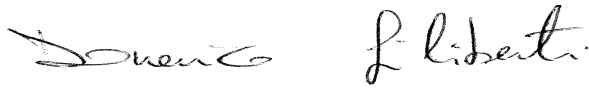
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/005
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3658	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		15.6	ug/L	INAB	

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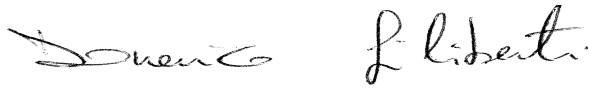
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/006
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3659	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

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  - 6.\*\*\* Indicates sub-contract test



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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/007
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3660	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

Signed :  14/03/2017

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104314 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104314/008
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3661	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Ground Waters

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	1.2		<1.2	ug/L	INAB	

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  - 6.\*\*\* Indicates sub-contract test





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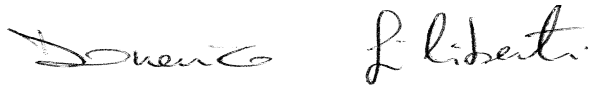
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104317 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104317/001
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3662	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Waste Water

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	6		<6	ug/L	INAB	

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104317 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104317/002
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3663	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Waste Water

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	6		<6	ug/L	INAB	

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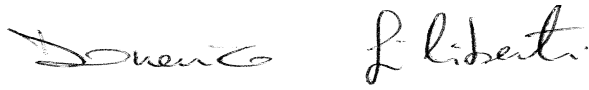
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104317 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104317/003
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3664	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Waste Water

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
Cyanide-Free			EW154M-1	6		<6	ug/L	INAB	

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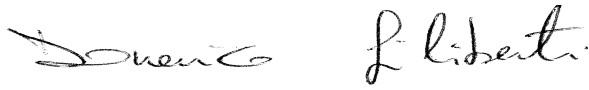
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104317 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104317/004
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3665	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Waste Water

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	6		23	ug/L	INAB	

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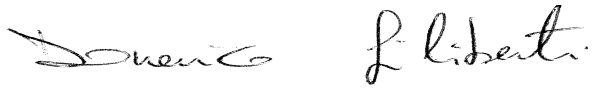
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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104317 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104317/005
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3666	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Waste Water

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	6		14	ug/L	INAB	

Signed :  \_\_\_\_\_ 14/03/2017

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<b>Contact Name</b>	Tim Supple	<b>Report Number</b>	<b>104317 - 1</b>
<b>Address</b>	Kerry County Council County Buildings, Tralee,	<b>Sample Number</b>	104317/006
<b>Tel No</b>	066-7183592	<b>Date of Receipt</b>	24/11/2016
<b>Customer PO</b>	400387348	<b>Date Started</b>	24/11/2016
<b>Quotation No</b>	QN006125	<b>Received or Collected</b>	An Post
<b>Customer Ref</b>	2016/3667	<b>Date of Report</b>	14/03/2017
		<b>Sample Type</b>	Waste Water

**CERTIFICATE OF ANALYSIS**

TEST	ANALYTE	SUB	METHOD	LOQ	SPEC	RESULT	UNITS	ACCRED.	OOS
<b>Cyanide-Free</b>									
	Cyanide-Free		EW154M-1	6		<6	ug/L	INAB	

Signed :  \_\_\_\_\_ 14/03/2017

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## **Ground Water, Surface Water and Leachate Results – North Kerry Landfill 2016**

Kerry County Council - All Laboratory Results Report (Environment)

\* Please note that in accordance with Quality assurance procedures some of this data may be provisional and may be subject to further revision. This data is not validated until issued in report form signed by Senior Executive Chemist or another approved signatory



Product	Product Version	Project	SAMPLING POINT	Sampling Point	SP EPA Code	X-Coordinate	Y-Coordinate	Consumer	Sample No.	COA Link	Sampled Date	Sampled Time	Sampled By	Sample Type	Test List	Comments	Sample Status	Certificate of Authorisation	Analysis						
																			Parameter	003_ODOUR	005A_TEMP_F	022K_AMMO	028K_CHLOR	037_SUSPEN	082_VIS_INS
																			Odour	Temperature	NIA Ammonia	DE Chloride	DED_SOLIDS Suspended Solids	PECTION Visual Inspection	
																			Reported Name						
																			Min. Value		0.0				
																			Max Value		0.0				
																			Units	NONE	DEG_C	MGLN	MGL	MGL	NONE
SURF_WATER	1	North Kerry Landfill	NORTH_KERRY_LANDFILL_SW1	North_Kerry_Landfill Surface water: SW-1					2015/5183	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5183_v1.pdf	21-Dec-15	11:20	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5183_v1.pdf	Not Detected	9.5			2	Brown Colour	
				North_Kerry_Landfill Surface water: SW-1				2016/0073		14-Jan-16	14:33	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	5.0			<1	Brown Colour		
			NORTH_KERRY_LANDFILL_SW2	North_Kerry_Landfill Surface water: SW-2				2015/5184	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5184_v1.pdf	21-Dec-15	11:15	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5184_v1.pdf	Not Detected	9.5			4	Brown Colour		
				North_Kerry_Landfill Surface water: SW-2				2016/0074		14-Jan-16	14:23	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	5.0			<1	Brown Colour		
			NORTH_KERRY_LANDFILL_SW3	North_Kerry_Landfill Surface water: SW-3				2015/5185	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5185_v1.pdf	21-Dec-15	11:05	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5185_v1.pdf	Not Detected	9.8			4	Brown Colour		
				North_Kerry_Landfill Surface water: SW-3				2016/0075		14-Jan-16	14:15	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	5.0			2	Slight Brown Colour		
			NORTH_KERRY_LANDFILL_SW ML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)				2015/5190	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5190_v1.pdf	21-Dec-15	11:53	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5190_v1.pdf	Not Detected	9.0	<0.05		8	Slightly Cloudy		
				North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)				2016/0080		14-Jan-16	15:27	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	5.0	<0.05		4	Clear		
				North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)				2016/0082QA		14-Jan-16	15:27	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	5.0	<0.05	13.2	5	Clear		
			NORTH_KERRY_LANDFILL_SW ML11	North_Kerry_Landfill Surface water: SWML-11				2015/5191	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5191_v1.pdf	21-Dec-15	11:57	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5191_v1.pdf	Not Detected	9.0			6	Slightly Cloudy		
				North_Kerry_Landfill Surface water: SWML-11				2016/0081		14-Jan-16	15:32	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	5.0			6	Clear		
			NORTH_KERRY_LANDFILL_SW ML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)				2015/5186	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5186_v1.pdf	21-Dec-15	11:27	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5186_v1.pdf	Not Detected	9.0	0.08		<1	Clear		
				North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)				2016/0076		14-Jan-16	14:50	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	4.5	<0.05		108	Cloudy		
			NORTH_KERRY_LANDFILL_SW ML3	North_Kerry_Landfill Surface water: SWML-3				2015/5187	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5187_v1.pdf	21-Dec-15	11:32	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5187_v1.pdf	Not Detected	8.5			4	Cloudy		
				North_Kerry_Landfill Surface water: SWML-3				2016/0077		14-Jan-16	14:52	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	5.0			27	Cloudy		
			NORTH_KERRY_LANDFILL_SW ML4	North_Kerry_Landfill Surface water: SWML-4				2015/5188	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5188_v1.pdf	21-Dec-15	11:40	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5188_v1.pdf	Not Detected	10.0			10	Clear		
			NORTH_KERRY_LANDFILL_SW ML5	North_Kerry_Landfill Surface water: SWML-5				2015/5189	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5189_v1.pdf	21-Dec-15	11:45	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5189_v1.pdf	Not Detected	10.0			2	Slightly Cloudy		
				North_Kerry_Landfill Surface water: SWML-5				2016/0079		14-Jan-16	15:07	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	4.0			4	Clear		
			NORTH_KERRY_LANDFILL_SW MLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)				2015/5192	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5192_v1.pdf	21-Dec-15	12:06	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5192_v1.pdf	Not Detected	9.0	<0.05		22	Cloudy		
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)				2015/5193QA	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5193QA_v1.pdf	21-Dec-15	12:06	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5193QA_v1.pdf	Not Detected	9.0	<0.05		20	Cloudy		
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)				2016/0085		14-Jan-16	15:40	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	5.0	<0.05	13.1	12	Cloudy		
			NORTH_KERRY_LANDFILL_W1	North_Kerry_Landfill Surface water: W1				2015/5194	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5194_v1.pdf	21-Dec-15	10:52	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5194_v1.pdf	Not Detected	9.5			2	Brown Colour		
				North_Kerry_Landfill Surface water: W1				2016/0083		14-Jan-16	13:50	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	4.5			4	Brown Colour		
			NORTH_KERRY_LANDFILL_W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)				2015/5195	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5195_v1.pdf	21-Dec-15	10:40	AS	LANDFILL	130_NKL_SURF_MONTH	River in flood	Authorised	\\doc_server\c\OAK\KCC_ENVIR\ON\2016\Jan\2015-5195_v1.pdf	Not Detected	9.5	<0.05		24	Brown Colour		
North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)					2016/0084		14-Jan-16	13:40	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	6.0			4	Clear					





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Product	Product Version	Project	SAMPLING POINT	Sampling Point	Sample No.	COA Link	Sampled Date	Sampled Time	Sampled By	Sample Type	Test List	Sample Status	Certificate of Authorisation	Analysis	003_ODOUR	005A_TEMP_FIELD	022K_AMMONIA	037_SUSPENDED_SOLIDS	082_VIS_INSPECTION	
														Parameter	Odour	Temperature	Ammonia	Suspended Solids	Visual Inspection	
														Reported Name						
														Min. Value						
														Max Value						
														Units	NONE	DEG_C	MGLN	MGLN	MGL	NONE
LEACHATE		1 North Kerry Landfill	NORTH_KERRY_LANDFILL_LL3	North_Kerry_Landfill Leachate: LL3	2016/0930	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0930_v1.pdf	22-Mar-16	17:00	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0930_v1.pdf	Not Detected	9.5	0.08		14	Slightly Cloudy	
				North_Kerry_Landfill Leachate: LL3	2016/0931QA	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0931QA_v1.pdf	22-Mar-16	17:00	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0931QA_v1.pdf	Not Detected	9.5	0.06		14	Slightly Cloudy	
SURF_WATER		1 North Kerry Landfill	NORTH_KERRY_LANDFILL_ICWPOND_1	North_Kerry_Landfill Surface water: ICW Pond 1	2016/0927		22-Mar-16	16:30	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	9.0		0.15		Clear	
				North_Kerry_Landfill Surface water: ICW Pond 2	2016/0928		22-Mar-16	16:26	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	8.0		0.31		Clear	
				North_Kerry_Landfill Surface water: ICW Pond 3	2016/0929		22-Mar-16	16:19	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	8.5		0.06		Clear	
				North_Kerry_Landfill Surface water: SW-1	2016/0915	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0915_v1.pdf	22-Mar-16	15:35	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0915_v1.pdf	Not Detected	8.5			<1	Clear	
				North_Kerry_Landfill Surface water: SW-3	2016/0917	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0917_v1.pdf	22-Mar-16	15:15	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0917_v1.pdf	Not Detected	8.5			<1	Clear	
				North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)	2016/0922	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0922_v1.pdf	22-Mar-16	16:05	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0922_v1.pdf	Not Detected	8.0		0.07	3	Clear	
				North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)	2016/0918	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0918_v1.pdf	22-Mar-16	16:42	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0918_v1.pdf	Not Detected	9.0		<0.05	8	Cloudy	
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)	2016/0926	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0926_v1.pdf	22-Mar-16	15:50	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0926_v1.pdf	Not Detected	9.0		0.08	2	Clear	
				North_Kerry_Landfill Surface water: W1	2016/0924	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0924_v1.pdf	22-Mar-16	14:52	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0924_v1.pdf	Not Detected	7.5			4	Clear	
				North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)	2016/0925	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0925_v1.pdf	22-Mar-16	14:40	AS	LANDFILL	130_NKL_SURF_MONTH	Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Mar\2016-0925_v1.pdf	Not Detected	8.0			4	Clear	

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Product	Product Version	Project	SAMPLING POINT	Sampling Point	Sample No.	COA Link	Sampled Date	Sampled Time	Sampled By	Sample Type	Test List	Sample Status	Certificate of Authorisation	Analysis	003_ODOUR	005A_TEMP_FIELD	022K_AMMONIA	082_VIS_INSPECTION	
														Parameter	Odour	Temperature	Ammonia	Visual Inspection	
														Reported Name					
														Min. Value			0.0		
														Max Value			0.0		
														Units	NONE	DEG_C	MGLN	MGLN	NONE
LEACHATE	1	North Kerry Landfill	NORTH_KERRY_LANDFILL_LL3	North_Kerry_Landfill Leachate: LL3	2016/1103		07-Apr-16	17:03	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	8.0		<0.05	Cloudy	
SURF_WATER	1	North Kerry Landfill	NORTH_KERRY_LANDFILL_ICWPOND_1	North_Kerry_Landfill Surface water: ICW Pond 1	2016/1104		07-Apr-16	16:35	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	8.0		<0.05	Clear	
			NORTH_KERRY_LANDFILL_ICWPOND_2	North_Kerry_Landfill Surface water: ICW Pond 2	2016/1105		07-Apr-16	16:30	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	7.5		0.07	Clear	
			NORTH_KERRY_LANDFILL_ICWPOND_3	North_Kerry_Landfill Surface water: ICW Pond 3	2016/1106		07-Apr-16	16:25	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	8.0		<0.05	Clear	
			NORTH_KERRY_LANDFILL_SW1	North_Kerry_Landfill Surface water: SW-1	2016/1091		07-Apr-16	15:10	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	8.0			Brown Colour	
			NORTH_KERRY_LANDFILL_SW2	North_Kerry_Landfill Surface water: SW-2	2016/1092		07-Apr-16	15:07	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	9.0			Brown Colour	
			NORTH_KERRY_LANDFILL_SW3	North_Kerry_Landfill Surface water: SW-3	2016/1093		07-Apr-16	15:00	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	9.0			Brown Colour	
			NORTH_KERRY_LANDFILL_SWML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)	2016/1098		07-Apr-16	16:52	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	9.5			Cloudy	
			NORTH_KERRY_LANDFILL_SWML11	North_Kerry_Landfill Surface water: SWML-11	2016/1099		07-Apr-16	16:56	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	9.5		<0.05	Cloudy	
			NORTH_KERRY_LANDFILL_SWML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)	2016/1094		07-Apr-16	16:10	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	8.0		<0.05	Cloudy	
			NORTH_KERRY_LANDFILL_SWML3	North_Kerry_Landfill Surface water: SWML-3	2016/1095		07-Apr-16	16:12	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	8.0			Clear	
			NORTH_KERRY_LANDFILL_SWML5	North_Kerry_Landfill Surface water: SWML-5	2016/1097		07-Apr-16	16:20	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	7.5			Clear	
			NORTH_KERRY_LANDFILL_SWMLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)	2016/1102		07-Apr-16	15:20	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	9.5		0.06	Cloudy	
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)	2016/1108QA		07-Apr-16	15:20	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Not Authorised		Not Detected	9.5		0.06	Cloudy	
			NORTH_KERRY_LANDFILL_W1	North_Kerry_Landfill Surface water: W1	2016/1100		07-Apr-16	14:40	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	8.0			Clear	
			NORTH_KERRY_LANDFILL_W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)	2016/1101		07-Apr-16	14:20	AS	LANDFILL	130_NKL_SURF_MONTH	Not Authorised		Not Detected	8.0			Clear	



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Product	Product Version	Project	SAMPLING POINT	Sampling Point	SP EPA Code	X-Coordinate	Y-Coordinate	Consumer	Sample No.	COA Link	Sampled Date	Sampled Time	Sampled By	Sample Type	Test List	Comments	Sample Status	Certificate of Authorisation	Analysis				
																			Parameter	003_ODOUR	005A_TEMP_FIELD	022K_AMMONIA	037_SUSPENDED SOLIDS
																			Reported Name	Min. Value	Max Value	Units	
																			NONE	DEG_C	MGLN	MGL	NONE
SURF_WATER		1 North Kerry Landfill	NORTH_KERRY_LANDFILL_SW1	North_Kerry_Landfill Surface water: SW-1					2016/1900	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1900_v1.pdf	20-Jun-16	12:42	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1900_v1.pdf	Not Detected	15.0		<1	Brown Colour
			NORTH_KERRY_LANDFILL_SW2	North_Kerry_Landfill Surface water: SW-2					2016/1901	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1901_v1.pdf	20-Jun-16	12:33	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1901_v1.pdf	Not Detected	15.0		2	Brown Colour
			NORTH_KERRY_LANDFILL_SW3	North_Kerry_Landfill Surface water: SW-3					2016/1902	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1902_v1.pdf	20-Jun-16	12:27	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1902_v1.pdf	Not Detected	15.5		2	Clear
			NORTH_KERRY_LANDFILL_SW ML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2016/1907	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1907_v1.pdf	20-Jun-16	13:40	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1907_v1.pdf	Not Detected	15.5	<0.05	5	Slightly Cloudy
			NORTH_KERRY_LANDFILL_SW ML11	North_Kerry_Landfill Surface water: SWML-11					2016/1908	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1908_v1.pdf	20-Jun-16	13:43	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1908_v1.pdf	Not Detected	15.5		6	Slightly Cloudy
			NORTH_KERRY_LANDFILL_SW ML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/1903	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1903_v1.pdf	20-Jun-16	13:05	AS	LANDFILL	130_NKL_SURF_SS_AMMO	Taken from Lagoon	Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1903_v1.pdf	Not Detected	16.5	<0.05	10	Cloudy
			NORTH_KERRY_LANDFILL_SW ML3	North_Kerry_Landfill Surface water: SWML-3					2016/1904	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1904_v1.pdf	20-Jun-16	13:01	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1904_v1.pdf	Not Detected	15.5		2	Clear
			NORTH_KERRY_LANDFILL_SW ML4	North_Kerry_Landfill Surface water: SWML-4					2016/1905	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1905_v1.pdf	20-Jun-16	13:24	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1905_v1.pdf	Not Detected	13.5		3	Clear
			NORTH_KERRY_LANDFILL_SW ML5	North_Kerry_Landfill Surface water: SWML-5					2016/1906	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1906_v1.pdf	20-Jun-16	13:32	AS	LANDFILL	130_NKL_SURF_MONTH	New drain south of SWML 5	Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1906_v1.pdf	Not Detected	13.5		4	Clear
			NORTH_KERRY_LANDFILL_SW MLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/1731	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1731_v1.pdf	01-Jun-16	14:30	TOS	LANDFILL	004_AMMON		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1731_v1.pdf			<0.05		
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/1911	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1911_v1.pdf	20-Jun-16	13:50	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1911_v1.pdf	Not Detected	16.5	<0.05	13	Cloudy
			NORTH_KERRY_LANDFILL_SW W1	North_Kerry_Landfill Surface water: W1					2016/1909	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1909_v1.pdf	20-Jun-16	12:12	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1909_v1.pdf	Not Detected	14.0		2	Clear
			NORTH_KERRY_LANDFILL_SW W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)					2016/1910	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1910_v1.pdf	20-Jun-16	14:15	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1910_v1.pdf	Not Detected	15.5		3	Clear
				North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)					2016/1912QA	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1912QA_v1.pdf	20-Jun-16	14:15	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co\AKCC_ENVIRO\N\2016\Jun\2016-1912QA_v1.pdf	Not Detected	15.5		3	Clear

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Product	Product Version	Project	SAMPLING POINT	Sampling Point	SP EPA Code	X-Coordinate	Y-Coordinate	Consumer	Sample No.	COA Link	Sampled Date	Sampled Time	Sampled By	Sample Type	Test List	Comments	Sample Status	Certificate of Authorisation	Analysis						
																			003_ODOUR	005A_TEMP_FIELD	022K_AMMONIA		037_SUSPENDED_SOLIDS	082_VIS_INSPECTION	
																			Odour	Temperature	Ammonia		Suspended Solids	Visual Inspection	
Reported Name	Min. Value	Max Value	Units																						
																				0.0	0.0	MGL	MGL	MGL	NONE
SURF_WATER		North Kerry Landfill	NORTH_KERRY_LANDFILL_SP	North_Kerry_Landfill Surface water: general SP					2016/2192	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2192_v1.pdf	14-Jul-16	16:05 AS		LANDFILL	130_NKL_SURF_SS_AMMO	Below Perimeter fence sth of SWML5	Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2192_v1.pdf	Not Detected	14.0		0.08	14	Clear	
			NORTH_KERRY_LANDFILL_SW1	North_Kerry_Landfill Surface water: SW-1					2016/2178	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2178_v1.pdf	14-Jul-16	15:09 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2178_v1.pdf	Not Detected	14.5			2	Slight Brown Colour	
			NORTH_KERRY_LANDFILL_SW2	North_Kerry_Landfill Surface water: SW-2					2016/2179	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2179_v1.pdf	14-Jul-16	15:00 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2179_v1.pdf	Not Detected	14.0			1	Brown Colour	
			NORTH_KERRY_LANDFILL_SW3	North_Kerry_Landfill Surface water: SW-3					2016/2180	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2180_v1.pdf	14-Jul-16	14:50 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2180_v1.pdf	Not Detected	14.5			1	Brown Colour	
			NORTH_KERRY_LANDFILL_SW ML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2016/2185	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2185_v1.pdf	14-Jul-16	16:14 AS		LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2185_v1.pdf	Not Detected	13.5		<0.05	2	Clear	
			NORTH_KERRY_LANDFILL_SW ML11	North_Kerry_Landfill Surface water: SWML-11					2016/2186	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2186_v1.pdf	14-Jul-16	16:17 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2186_v1.pdf	Not Detected	13.5		<0.05	2	Clear	
			NORTH_KERRY_LANDFILL_SW ML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/2181	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2181_v1.pdf	14-Jul-16	15:28 AS		LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2181_v1.pdf	Not Detected	14.0		<0.05	4	Clear	
			NORTH_KERRY_LANDFILL_SW ML3	North_Kerry_Landfill Surface water: SWML-3					2016/2182	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2182_v1.pdf	14-Jul-16	15:33 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2182_v1.pdf	Not Detected	13.5			<1	Clear	
			NORTH_KERRY_LANDFILL_SW ML4	North_Kerry_Landfill Surface water: SWML-4					2016/2183	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2183_v1.pdf	14-Jul-16	15:40 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2183_v1.pdf	Not Detected	14.5			1	Clear	
			NORTH_KERRY_LANDFILL_SW ML5	North_Kerry_Landfill Surface water: SWML-5					2016/2184	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2184_v1.pdf	14-Jul-16	15:47 AS		LANDFILL	130_NKL_SURF_MONTH	Iron Oxide at location	Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2184_v1.pdf	Not Detected	14.5			6	Clear	
			NORTH_KERRY_LANDFILL_SW MLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/2189	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2189_v1.pdf	14-Jul-16	16:20 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2189_v1.pdf	Not Detected	14.0		<0.05	3	Clear	
			NORTH_KERRY_LANDFILL_W1	North_Kerry_Landfill Surface water: W1					2016/2187	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2187_v1.pdf	14-Jul-16	14:35 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2187_v1.pdf	Not Detected	14.5			2	Slight Brown Colour	
				North_Kerry_Landfill Surface water: W1					2016/2190QA	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2190QA_v1.pdf	14-Jul-16	14:35 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2190QA_v1.pdf	Not Detected	14.5			<1	Slight Brown Colour	
			NORTH_KERRY_LANDFILL_W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R. Lee)					2016/2188	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2188_v1.pdf	14-Jul-16	16:28 AS		LANDFILL	130_NKL_SURF_MONTH		Authorised	\doc_server\co a\KCC_ENVIRO N\2016\Jul\201 6-2188_v1.pdf	Not Detected	14.5			1	Clear	



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																			Parameter	003_ODOUR	005A_TEMP FIELD Temperature	022K_AMMO N/A Ammonia	037_SUSPEN DED SOLIDS Suspended Solids	082_VIS_INS PECTION Visual Inspection	
																			Reported Name	Min. Value	Max Value	Units			
																			NONE	DEG_C	MGL	MGL	NONE		
SURF_WATER		1 North Kerry Landfill	NORTH_KERRY_LANDFILL_SW 1	North_Kerry_Landfill Surface water: SW-1					2016/2931		15-Sep-16	12:41 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	13.3		23	Brown Colour	
			NORTH_KERRY_LANDFILL_SW 2	North_Kerry_Landfill Surface water: SW-2					2016/2932		15-Sep-16	12:34 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	14.3		4	Brown Colour	
			NORTH_KERRY_LANDFILL_SW 3	North_Kerry_Landfill Surface water: SW-3					2016/2933		15-Sep-16	12:22 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	14.4		3	Brown Colour	
			NORTH_KERRY_LANDFILL_SW ML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2016/2938		15-Sep-16	13:24 AS		LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised			Not Detected	13.8	<0.05	1	Clear	
			NORTH_KERRY_LANDFILL_SW ML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/2934		15-Sep-16	12:53 AS		LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised			Not Detected	14.5	<0.05	2	Clear	
			NORTH_KERRY_LANDFILL_SW ML3	North_Kerry_Landfill Surface water: SWML-3					2016/2935		15-Sep-16	12:49 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	13.7		<1	Clear	
			NORTH_KERRY_LANDFILL_SW ML4	North_Kerry_Landfill Surface water: SWML-4					2016/2936		15-Sep-16	13:00 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	15.1		1	Clear	
			NORTH_KERRY_LANDFILL_SW ML5	North_Kerry_Landfill Surface water: SWML-5					2016/2937		15-Sep-16	13:14 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Metallic	16.1		4	Clear	
			NORTH_KERRY_LANDFILL_SW MLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/2942		15-Sep-16	13:45 AS		LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised			Not Detected	16.6	<0.05	4	Cloudy	
			NORTH_KERRY_LANDFILL_W1	North_Kerry_Landfill Surface water: W1					2016/294230A		15-Sep-16	13:45 AS		LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised			Not Detected	16.6	<0.05	5	Cloudy	
			NORTH_KERRY_LANDFILL_W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R. Lee)					2016/2940		15-Sep-16	12:05 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	12.9		6	Clear	
									2016/2941		15-Sep-16	14:10 AS		LANDFILL	130_NKL_SURF_MONTH		Not Authorised			Not Detected	13.6		1	Clear	



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																			Parameter	Odour	FIELD Temperature	E Nitrite	NIA Ammonia
																			Reported Name				
																			Min. Value				0.0
																			Max Value				0.0
																			Units	NONE	DEG_C	MGLN	MGLN
SURF_WATER		1 North Kerry Landfill	NORTH_KERRY_LANDFILL_ICWPOND_1	North_Kerry_Landfill Surface water: ICW Pond 1					2016/3151		05-Oct-16	14:20	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	14.3			0.08
			NORTH_KERRY_LANDFILL_ICWPOND_2	North_Kerry_Landfill Surface water: ICW Pond 2					2016/3152		05-Oct-16	14:16	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	15.0			0.05
			NORTH_KERRY_LANDFILL_ICWPOND_3	North_Kerry_Landfill Surface water: ICW Pond 3					2016/3153		05-Oct-16	14:11	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	14.8			<0.05
			NORTH_KERRY_LANDFILL_SW1	North_Kerry_Landfill Surface water: SW-1					2016/3138		05-Oct-16	13:16	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	13.4			
			NORTH_KERRY_LANDFILL_SW2	North_Kerry_Landfill Surface water: SW-2					2016/3139		05-Oct-16	13:10	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	12.9			
			NORTH_KERRY_LANDFILL_SW3	North_Kerry_Landfill Surface water: SW-3					2016/3140		05-Oct-16	13:00	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	13.5			
			NORTH_KERRY_LANDFILL_SWML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2016/3339		17-Oct-16	11:20	AS	LANDFILL	004_AMMON		Not Authorised				<0.05		<0.05
			NORTH_KERRY_LANDFILL_SWML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/3443		27-Oct-16	15:20	AS	LANDFILL	004_AMMON		Not Authorised						<0.05
			NORTH_KERRY_LANDFILL_SWML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/3141		05-Oct-16	13:40	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	14.0			0.05
			NORTH_KERRY_LANDFILL_SWML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/3338		17-Oct-16	10:55	AS	LANDFILL	004_AMMON		Not Authorised				<0.05		<0.05
			NORTH_KERRY_LANDFILL_SWML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/3444		27-Oct-16	15:00	AS	LANDFILL	004_AMMON		Not Authorised						<0.05
			NORTH_KERRY_LANDFILL_SWML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/3445QA		27-Oct-16	15:00	AS	LANDFILL	004_AMMON		Not Authorised						<0.05
			NORTH_KERRY_LANDFILL_SWML3	North_Kerry_Landfill Surface water: SWML-3					2016/3142		05-Oct-16	13:44	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	14.0			
			NORTH_KERRY_LANDFILL_SWML4	North_Kerry_Landfill Surface water: SWML-4					2016/3143		05-Oct-16	13:52	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	14.5			
			NORTH_KERRY_LANDFILL_SWML5	North_Kerry_Landfill Surface water: SWML-5					2016/3144		05-Oct-16	14:06	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	13.8			
			NORTH_KERRY_LANDFILL_SWMLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/3149		05-Oct-16	14:37	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	14.2			<0.05
			NORTH_KERRY_LANDFILL_SWMLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/3150QA		05-Oct-16	14:37	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Not Authorised		Not Detected	14.2			<0.05
			NORTH_KERRY_LANDFILL_W1	North_Kerry_Landfill Surface water: W1					2016/3147		05-Oct-16	12:42	AS	LANDFILL	130_NKL_SURF_MONTH		Not Authorised		Not Detected	12.8			
			NORTH_KERRY_LANDFILL_W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)					2016/3148	<a href="#">\doc_server\co a\KCC_ENVIRO N\2016\Oct\2016-3148_v1.pdf</a>	05-Oct-16	12:30	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	<a href="#">\doc_server\co a\KCC_ENVIRO N\2016\Oct\2016-3148_v1.pdf</a>	Not Detected	14.1			




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																			Parameter	003_ODOUR	005A_TEMP_FIELD	022K_AMMONIA	037_SUSPENDED_SOLID	082_VIS_INSPECTION
																			Reported Name	Odour	Temperature	Ammonia	Suspended Solids	Visual Inspection
																			Min. Value			0.0		
																			Max Value	NONE	DEG_C	MGLN	MGL	NONE
																			Units					
SURF_WATER		North Kerry Landfill	NORTH_KERRY_LANDFILL_SW1	North_Kerry_Landfill Surface water: SW-1					2016/3789	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3789_v1.pdf	01-Dec-16	15:30	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3789_v1.pdf	Not Detected	4.0		12	Clear	
				North_Kerry_Landfill Surface water: SW-1					2017/0006	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0006_v1.pdf	04-Jan-17	14:10	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0006_v1.pdf	Normal	4.4		5	Sl. coloured/clear	
			NORTH_KERRY_LANDFILL_SW2	North_Kerry_Landfill Surface water: SW-2					2017/0007	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0007_v1.pdf	04-Jan-17	14:05	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0007_v1.pdf	Normal	4.5		<1	coloured/riverlike	
			NORTH_KERRY_LANDFILL_SW3	North_Kerry_Landfill Surface water: SW-3					2016/3791	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3791_v1.pdf	01-Dec-16	15:15	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3791_v1.pdf	Not Detected	4.0		<1	Clear	
				North_Kerry_Landfill Surface water: SW-3					2017/0008	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0008_v1.pdf	04-Jan-17	13:50	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0008_v1.pdf	Normal	4.2		<1	clear	
			NORTH_KERRY_LANDFILL_SW ML10	North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2016/3796	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3796_v1.pdf	01-Dec-16	15:40	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3796_v1.pdf	Not Detected	4.0	<0.05	2	Clear	
				North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2017/0013	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0013_v1.pdf	04-Jan-17	12:55	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0013_v1.pdf	Normal	3.6	<0.05	8	clear	
				North_Kerry_Landfill Surface water: SWML-10(Eastern Lagoon outlet)					2017/0014QA	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0014QA_v1.pdf	04-Jan-17	12:58	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0014QA_v1.pdf	Normal	3.7	<0.05	7	clear	
			NORTH_KERRY_LANDFILL_SW ML11	North_Kerry_Landfill Surface water: SWML-11					2017/0015	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0015_v1.pdf	04-Jan-17	13:05	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0015_v1.pdf	Normal	4.9		10	sl. coloured	
			NORTH_KERRY_LANDFILL_SW ML2	North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2016/3792	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3792_v1.pdf	01-Dec-16	15:52	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3792_v1.pdf	Not Detected	3.0	<0.05	2	Clear	
				North_Kerry_Landfill Surface water: SWML-2(Western Lagoon outlet)					2017/0009	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0009_v1.pdf	04-Jan-17	12:05	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0009_v1.pdf	Normal	2.1	<0.05	6	clear	
			NORTH_KERRY_LANDFILL_SW ML4	North_Kerry_Landfill Surface water: SWML-4					2017/0011	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0011_v1.pdf	04-Jan-17	12:25	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0011_v1.pdf	Normal	7.8		7	clear	
			NORTH_KERRY_LANDFILL_SW ML5	North_Kerry_Landfill Surface water: SWML-5					2016/3795	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3795_v1.pdf	01-Dec-16	16:00	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3795_v1.pdf	Not Detected	4.0		6	Iron Oxide	
			NORTH_KERRY_LANDFILL_SW MLE1	North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/3798	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3798_v1.pdf	01-Dec-16	16:17	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3798_v1.pdf	Not Detected	6.0	<0.05	6	Slightly Cloudy	
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2016/3801QA	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3801QA_v1.pdf	01-Dec-16	16:17	AS	LANDFILL	130_NKL_SURF_SS_AMMO		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3801QA_v1.pdf	Not Detected	6.0	<0.05	3	Slightly Cloudy	
				North_Kerry_Landfill Surface water: SWML-E1(Northern Lagoon)					2017/0018	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0018_v1.pdf	04-Jan-17	13:30	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0018_v1.pdf	Normal	5.2	<0.05	9	clear	
			NORTH_KERRY_LANDFILL_W1	North_Kerry_Landfill Surface water: W1					2016/3799	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3799_v1.pdf	01-Dec-16	15:00	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3799_v1.pdf	Not Detected	5.0		2	Clear	
			NORTH_KERRY_LANDFILL_W2	North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)					2016/3800	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3800_v1.pdf	01-Dec-16	16:40	AS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2016\Dec\20 16-3800_v1.pdf	Not Detected	4.0		<1	Clear	
				North_Kerry_Landfill Surface water: W2(O'Brennan's Br. R.Lee)					2017/0017	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0017_v1.pdf	04-Jan-17	14:50	TS	LANDFILL	130_NKL_SURF_MONTH		Authorised	\\doc_server\co a\KCC_ENVIRO N\2017\Jan\20 17-0017_v1.pdf	Normal	5.2	<0.05	3	clear	

## ***Appendix C: Engine Stack Monitoring Testing***



<b>Report Title</b>	Air Emissions Compliance Monitoring Emissions Report
<b>Company address</b>	Air Scientific Ltd., 32 DeGranville Court, Dublin road, Trim, Co. Meath
<b>Stack Emissions Testing Report Commissioned by</b>	B9 Power
<b>Facility Name</b>	North Kerry Landfill Site, Muingnaminnane, Tralee, Co. Kerry
<b>Contact Person</b>	Ruth Baker
<b>EPA Licence Number</b>	W0001-03
<b>Licence Holder</b>	North Kerry Landfill, E1
<b>Stack Reference Number</b>	E1
<b>Dates of the Monitoring Campaign</b>	20/10/2016
<b>Job Reference Number</b>	NOKETL1201016 / 2016548
<b>Report Written By</b>	Dr. John Casey
<b>Report Approved by</b>	Dr. Brian Sheridan
<b>Stack Testing Team</b>	Dr. John Casey
<b>Report Date</b>	23/11/2016
<b>Report Type</b>	Test Report Compliance Monitoring
<b>Version</b>	1
<b>Signature of Approver</b>	 Brian Sheridan Technical Manager

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## 1. Executive Summary

### I. Monitoring Objectives

#### Overall Aim of the monitoring Campaign

The aim of the monitoring campaign was to demonstrate compliance with a set of emission limit values as specified in the site licence.

#### Special Requirements

There were no special requirements.

#### Target Parameters

Total Particulate Matter (TPM)
Carbon Monoxide (CO)
Oxides of Nitrogen (NOx) as NO <sub>2</sub>
Sulphur Dioxide (SO <sub>2</sub> )
Stack Gas Temperature
Volume (m <sup>3</sup> .h <sup>-1</sup> )

#### Emission Limit Values

Emission Limit Values / Mass Emissions Limit Values	mg.m <sup>-3</sup>	kg.h <sup>-1</sup>
TPM	130	-
CO	-	-
NOx as NO <sub>2</sub>	500	-
SO <sub>2</sub>	-	-
Stack Gas Temperature	-	-
Volume (m <sup>3</sup> .h <sup>-1</sup> )	3,000	-

#### Reference Conditions

Reference Conditions	Value
Oxygen Reference %	5
Temperature °C	273.15
Total Pressure kPa	101.3
Moisture %	Yes



**Executive Summary**

**Overall Results**

Parameter	Concentration	Result	MU +/-	Limit	Compliant	Mass Emission	Result
	Units					Units	
Total Particulate Matter (TPM)	mg.m <sup>-3</sup>	6.34	1.94	130	Yes	kg.h <sup>-1</sup>	0.005
Carbon Monoxide (CO)	mg.m <sup>-3</sup>	1945	116.55	-	N/A	kg.h <sup>-1</sup>	1.436
Oxides of Nitrogen (NOx) as NO <sub>2</sub>	mg.m <sup>-3</sup>	218.36	17.35	500	Yes	kg.h <sup>-1</sup>	0.161
Sulphur Dioxide (SO <sub>2</sub> )	mg.m <sup>-3</sup>	628.33	38.74	-	N/A	kg.h <sup>-1</sup>	0.464
Oxygen (%)	% v/v	7.32	0.14	-	N/A	-	-
Stack Gas Temperature	K	626.15	-	-	N/A	-	-
Stack Gas Velocity	m.s <sup>-1</sup>	19.21	1.47	-	N/A	-	-
Volumetric Flow Rate	m <sup>3</sup> .h <sup>-1</sup>	864	-	-	N/A	-	-
Volumetric Flow Rate (Ref.)	m <sup>3</sup> .h <sup>-1</sup>	738	-	3,000	Yes	-	-

**Accreditation details**

Air Scientific Limited	INAB319T
External Analytical Laboratory	UKAS0605
Other	-

**Executive Summary**

**Monitoring Dates & Times**

Parameter	Run	Location ID	Sampling Dates	Sampling Time On	Sampling Time Off	Duration (mins.)
Total Particulate Matter (TPM)	Run 1	E1	20/10/2016	09:45:00	10:16:00	00:31:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Carbon Monoxide (CO)	Run 1	E1	20/10/2016	10:37:00	11:16:00	00:39:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Oxides of Nitrogen (NOx) as NO <sub>2</sub>	Run 1	E1	20/10/2016	10:37:00	11:16:00	00:39:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Sulphur Dioxide (SO <sub>2</sub> )	Run 1	E1	20/10/2016	10:37:00	11:16:00	00:39:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Oxygen (%)		E1	20/10/2016	10:37:00	11:16:00	00:39:00

### Executive Summary

#### Process details

Parameter	
Process status	Normal
Capacity (per/hour) (if applicable)	N/a
Continuous or Batch Process	Continuous
Feedstock	LFG
Abatement System	No
Abatement Systems Running Status	N/A
Fuel	LFG
Plume Appearance	Yes
Other information	None

**Executive Summary**

**Monitoring, Equipment & Analytical Methods**

	<b>Monitoring</b>				<b>Analysis</b>	
<b>Parameter</b>	<b>Standard</b>	<b>Technical Procedure</b>	<b>Accredited Testing</b>	<b>Testing Lab</b>	<b>Analytical Technique</b>	<b>Analysis Lab</b>
Total Particulate Matter (TPM)	EN13284-1:2002	SOP 2000	Yes	AirSci	Gravimetric	RPS
Carbon Monoxide (CO)	EN15058:2006	SOP 2004	No	AirSci	NCIR By Horiba PG-250	AirSci
Oxides of Nitrogen (NOx)	EN14792:2006	SOP 2002	Yes	AirSci	Chemiluminescence	AirSci
Sulphur Dioxide (SO2)	TGN 21	SOP 2012	Yes	AirSci	NDIR Absorption	AirSci
Oxygen (%)	EN14789:2005	SOP 2008	Yes	AirSci	Paramagnetic	AirSci
Stack Gas Temperature	EN16911:2013	SOP 2005	Yes	AirSci	Thermocouple	AirSci
Stack Gas Velocity	EN16911:2013	SOP 2005	Yes	AirSci	Pitot tubes	AirSci

## List of Equipment

ID	Item of Equipment	Manufacturer	Serial No.
ASLTM12EQ517	Testo 400 Gas Pressure Vacuum and Flow	Testo	00828828/305
ASLTM12EQ520	Buhler Sample Gas Cooler	Buhler Technologies	100063602044367-001
ASLTM13EQ504	Horiba PG2500 Portable Flue Gas Analyser	Horiba	41432840053
ASLTM13EQ506	S TYPE PITOT TUBE	Tecora	0710
ASLTM13EQ509	10 metre industrial heated sample line (Temp controller box 1 & 2)	Neptech	13B088
ASLTM14EQ507	Stanley 5m Measuring Tape	Stanley	30-696
ASLTM14EQ513	ISO Stack Sampling Machine and associated equipment	TCR Tecora	070205976 & 049039P
ASLTM14EQ516	6" Digital Calliper	Stanley	052013w

#### Sampling Deviations

Parameter	Deviation
Standard ID	EN16911 - in accordance with MID6911-1
Standard ID	EN13284-1 - Nozzle size <6mm
Standard ID	EN15058 – Calibration gas not 50 – 90 % of the range
Standard ID	-

#### Reference Documents

Risk Assessment (RA)	SOP1011
Site Review (SR)	SOP1015
Site Specific Protocol (SSP)	SOP1015

**Executive Summary**

**Suitability of sampling location**

General Information	Value
Permanent/Temporary	Temporary
Inside/ Outside	Outside

Platform Details		
Irish EPA Technical Guidance Note AG1 / BS EN 15259 Platform Requirements	Value	Comment
Sufficient Working area to manipulate probe and measuring instruments	Yes	-
Platform has 2 handrails (approx. 0.5m & 1.0 m high)	Yes	-
Platform has vertical base boards (approx. 0.25 m high)	Yes	-
Platform has chains / self closing gates at top of ladders	Yes	-
There are no obstructions present which hamper insertion of sampling equipment	No	-
Safe Access Available	Yes	-
Easy Access Available	Yes	-

Sampling Location / Platform Improvement Recommendations
None

BSEN 15259 Homogeneity Test Requirements
1: There is no requirement to perform a BSEN15259 Homogeneity Test on this stack
<b>E.g. Select Option</b> 1: There is no requirement to perform a BSEN15259 Homogeneity Test on this stack 2: Test results were obtained from previous Homogeneity test carried out by ASL 3: Test results were obtained from previous Homogeneity test carried out by Alternative contractor 4: Other: Enter Description

**Executive Summary**

**Stack diagram**





**APPENDICES**

**II. Appendix I Monitoring Personnel & Equipment**

**Stack Emissions Monitoring Personnel**

<b>Team Leader</b>	<b>Name</b>	John Casey
	<b>Qualifications</b>	PhD. (Eng.), MSc. (Agr.), B. Agr. Sc.
	<b>System approval</b>	Air Scientific Limited Approved
		-

**III. Appendix II Stack Details & flow characteristics**

**Preliminary stack survey calculations**

<b>General Stack Details</b>		
<b>Stack details</b>	<b>Units</b>	<b>Value</b>
Date of survey		20/10/2016
Time of survey		09:15
Type		Circular
Stack Diameter / Depth, D	m	0.20
Stack Width, W	m	-
Average Stack Gas Temp., Ta	C	353
Average Static Pressure, P static	kPa	0.1
Average Barometric Pressure, Pb	kPa	102.1
Type of Pitot		S
Are Water Droplets Present ?		No
Average Pitot Tube Calibration Coeff, Cp		0.85
Negative flow		No
Highly homogeneous flow stream/gas velocity		Yes

Sample Port Size	mm	100
Initial Pitot Leak Check	Pa	850
Final Pitot Leak Check	Pa	820
Orientation of Duct		Vertical
Pitot Tube Cp		0.998
Number of Lines Available		1
Number of Lines Used		1

Document No.: NOKETL1201016 / 2016548  
 Visit No: 1  
 Year: 2016  
 Office: Trim

IPPC Licence No.: W0001-03  
 Licence Holder: North Kerry Landfill, E1  
 Facility Location: North Kerry Landfill Site, Muingnaminnane, Tralee, Co. Kerry  
 Rev.No: 1

<b>Sampling Line A</b>						
<b>Point</b>	<b>Distance to duct (m)</b>	<b>Pa</b>	<b>Temp °C</b>	<b>Velocity (m/s)</b>	<b>Oxygen (%)</b>	<b>Angle of Swirl</b>
1	0.01	-	-	-	-	-
2	0.05	138	350	18.7	-	<15
3	0.15	153	351	19.7	-	<15
4	0.19	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-
Average	-	145.50	350.5	19.21	-	<15
Min	-	138	350	18.71	-	<15
Max	-	153	351	19.70	-	<15

<b>Sampling Line B</b>						
<b>Point</b>	<b>Distance to duct (m)</b>	<b>Pa</b>	<b>Temp °C</b>	<b>Velocity (m/s)</b>	<b>Oxygen (%)</b>	<b>Angle of Swirl</b>
1	-	-	-	-	-	-
2	-	-	-	-	-	<15
3	-	-	-	-	-	<15
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-
Average	-	-	-	-	-	-
Min	-	-	-	-	-	-
Max	-	-	-	-	-	-

Document No.: NOKETL1201016 / 2016548  
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 Rev.No: 1

Component	Conc. ppm	Conc. Dry % v/v	Conc. Wet % v/v	Molar Mass
Carbon Dioxide CO <sub>2</sub>	-	9.9	-	44.01
Oxygen O <sub>2</sub>	-	7.32	-	32
Nitrogen N <sub>2</sub>	-	82.78	-	28.1
Moisture (H <sub>2</sub> O)	-	-	9.6	18.02
<b>Reference Conditions</b>				
	<b>Units</b>	<b>Numbers</b>		
Temperature	°C	273.15		
Total Pressure	kPa	101.3		
Moisture	%	-		
Oxygen (Dry)	%	5		

<b>Stack Gas Composition &amp; Molecular Weights</b>								
<b>Component</b>	<b>Molar Mass M</b>	<b>Density Kg/m<sup>3</sup> p</b>	<b>Conc. Dry % v/v</b>	<b>Dry Volume Fraction r</b>	<b>Dry Conc. kg/m<sup>3</sup> pi</b>	<b>Conc. wet % v/v</b>	<b>Wet Volume Fraction r</b>	<b>Wet Conc.kg/m<sup>3</sup> pi</b>
Carbon Dioxide CO <sub>2</sub>	44.01	1.96	9.9	0.099	0.19	8.95	0.09	0.18
Oxygen O <sub>2</sub>	32	1.43	7.32	0.0732	0.10	6.62	0.07	0.09
Nitrogen N <sub>2</sub>	28.1	1.25	82.78	0.8278	1.04	74.83	0.75	0.94
Moisture (H <sub>2</sub> O)	18.02	0.80	-	-	-	9.6	0.10	0.08
	-	-	-	-	-	-	-	-
where $p=M/22.41$	-	-	-	-	-	-	-	-
$p_i = r \times p$	-	-	-	-	-	-	-	-

<b>Calculation of Stack Gas Densities</b>		
<b>Determinand</b>	<b>Units</b>	<b>Result</b>
Dry Density (STP), P STD	kg.m <sup>-3</sup>	1.337
Wet Density (STP), P STW	kg.m <sup>-3</sup>	1.290
Dry Density (Actual), P Actual	kg.m <sup>-3</sup>	0.588
Average wet Density (Actual), P ActualW	kg.m <sup>-3</sup>	0.567
<b>Where</b>		
P STD = sum of component concentrations, kg/m <sup>3</sup> (excluding water vapour)	-	-
$P_{STW} = (P_{STD} + p_{i \text{ of } H_2O}) / (1 + (p_{i \text{ of } H_2O} / 0.8036))$	-	-
$P_{actual} = P_{STD} \times (T_{STP} / (P_{STP})) \times (P_a / T_a)$	-	-
$P_{actual \ W} \text{ (at each sampling point)} = P_{STW} \times (T_s / P_s) \times (P_a / T_a)$	-	-

Sampling Plane Validation Criteria	Value	Units	Requirement	Compliance	Method
Lowest Differential Pressure	138	Pa	>5 Pa	Yes	EN16911:2013
Lowest Gas Velocity	18.71	m/s	-	N/A	-
Highest Gas Velocity	19.70	m/s	-	N/A	-
Ratio of Above	1.05	:1	<3:1	Yes	EN16911:2013
Mean Velocity	19.21	m/s	-	N/A	-
Angle of flow with regard to duct axis	<15	degrees	< 15	Yes	EN16911:2013
No local negative flow	No	-	-	Yes	-
Homogeneous flow stream/gas velocity	Yes	-	-	Yes	-

Calculation of stack Gas Velocity, V	
Velocity at Traverse Point, $V = K_{cp} * \text{Sqrt}((2 * DP) / \text{Density})$	-
<b>Where</b>	
$K_{pt}$ = Pitot tube calibration coefficient	0.85
Compressibility correction factor, assumed at a constant 0.998	0.998

Gas Volumetric Flowrate	Units	Result
Gas Volumetric Flow Rate (Actual)	m <sup>3</sup> .h <sup>-1</sup>	2173
Gas Volumetric Flow Rate (STP, Wet)	m <sup>3</sup> . h <sup>-1</sup>	956
Gas Volumetric Flowrate (STP, Dry)	m <sup>3</sup> . h <sup>-1</sup>	864
Gas Volumetric Flowrate REF to Oxygen	m <sup>3</sup> . h <sup>-1</sup>	738



**IV. Appendix III Individual parameter sampling details and results**

**Total Particulate Matter : Sampling details and results**

<b>Run 1</b>			<b>Time On</b>	09:45:00	-
<b>Stack ID</b>	E1	-	<b>Time Off</b>	10:16:00	-
<b>Filter ID</b>	138034	-	<b>Uncertainty Data</b>	-	-
<b>Start Dry Gas Meter</b>	-	Nm3	<b>Temperature at Pump</b>	12	Deg C
<b>Finish Dry Gas Meter</b>	-	Nm3	<b>Pressure at Pump</b>	102	kPa
<b>Average Stack Temperature</b>	380	degrees	<b>Air Volume at Pump</b>	0.18	m <sup>3</sup>
<b>Moisture Content</b>	9.60	%	<b>Humidity at Pumps</b>	0.1	%
<b>Stack Flow Rate STP, Dry</b>	864	m <sup>3</sup> .h <sup>-1</sup>	<b>Filter Weight</b>	0.42	mg
<b>Volume of Air Sampled</b>	0.17	m <sup>3</sup> (VgN)	<b>Front End Weight</b>	<0.5	mg
<b>Balance Calibration</b>	<b>Weight</b>				
300.0	-	g	-	-	-
500.0	-	g	-	-	-
1000.0	-	g	-	-	-
<b>Inpinger Weights</b>	<b>Initial</b>	<b>Final</b>	<b>Difference</b>		
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
<b>Volume of Air Sampled</b>	-	Nm3	0	-	-
<b>Moisture Content (EN 14790)</b>	-	%	-	-	-
<b>Leak Check Results</b>	<b>Result</b>	-	<b>% Leak</b>		
<b>Before Blank</b>	0.1	l/min	0.7	-	-
<b>After Blank</b>	0.1	l/min	0.7	-	-
<b>Before Sample 1</b>	0.2	l/min	1.3	-	-
<b>After Sample 1</b>	0.2	l/min	1.3	-	-
<b>Average Flow Rate</b>	15	l/min	1.3	-	-
<b>Standard Maximum</b>	0.3	l/min	2%	-	-
<b>Back Pressure</b>	-	bar	-	-	-
<b>Leak check acceptable</b>	Yes	-	Yes/No	-	-
<b>Water droplets present</b>	No	-	Yes/No	-	-
<b>Standard Criteria to be Met</b>	<b>Result</b>	<b>Standard Requirement</b>			
<b>Angle of Flow</b>	<15	<15 Degrees			
<b>Negative Flow in the Stack</b>	None	None			
<b>Pitot Pressure Difference</b>	>5Pa	>5Pa			
<b>Ratio of Flow Measurement</b>	<3:1	<3:1			
<b>Pitot Tube Leak Check</b>	<b>Result</b>				
<b>Positive Pressure</b>	Pass	-			
<b>Negative Pressure</b>	Pass	-			

<b>Number of Ports</b>	1	2			
<b>Straight length before sample point</b>	> 5	> 5 Hydraulic Diameters			
<b>Straight length after sample point</b>	> 5	> 5 Hydraulic Diameters			
<b>Sample Calculations</b>	-	-			
<b>Blank (Filter and Front Wash Combined)</b>	0.57	mg			
<b>Sample 1 (Filter and Front Combined)</b>	0.92	mg			
<b>Volume of Air Sampled</b>	0.17	m <sup>3</sup>			
<b>Blank Result</b>	3.35	mg.m <sup>-3</sup>			
<b>Sample Result</b>	5.41	mg.m <sup>-3</sup>			
<b>Emission Limit Value</b>	130	mg.m <sup>-3</sup>			
<b>Blank as Percentage of ELV</b>	2.6	%	<b>Standard Requirement</b>	<b>&lt;10% ELV</b>	-
<b>Isokinetic Criterion Compliance</b>					
Isokinetic Variation	%	-0.1	-	-	-
Allowable IsoKinetic Range	%	95-115	-	-	-
Iso Kineticity Acceptable	-	Yes	-	-	-

**Total Particulates Quality Assurance**

<b>Stack ID</b>	E1	-
<b>Parameter</b>	<b>Units</b>	<b>Run 1</b>
Sampling Times	-	09:45:00
Sampling dates	-	20/10/2016
Sampling Device	-	Iso Stack Basic
Volume Sampled (REF.)	m3	0.17
Filter ID Number	-	138034
Probe rinse ID	-	138034W
Total Filter Mass	mg	0.4
Probe Rinse Solids Mass	mg	<0.5
Total Mass Collected	mg	0.92
<b>General information</b>		
Standard	ISEN13284-1	<b>Run 1</b>
Technical Procedure	-	2000
Probe Material	-	SS
Filter Housing	-	SS
Positioning of Filter	-	In-stack
Filter Size and Material	-	47mm filter, 4mm nozzle
Number of Sampling lines used	-	1
Number of Sampling Points used	-	2

**Carbon Monoxide Quality Assurance**

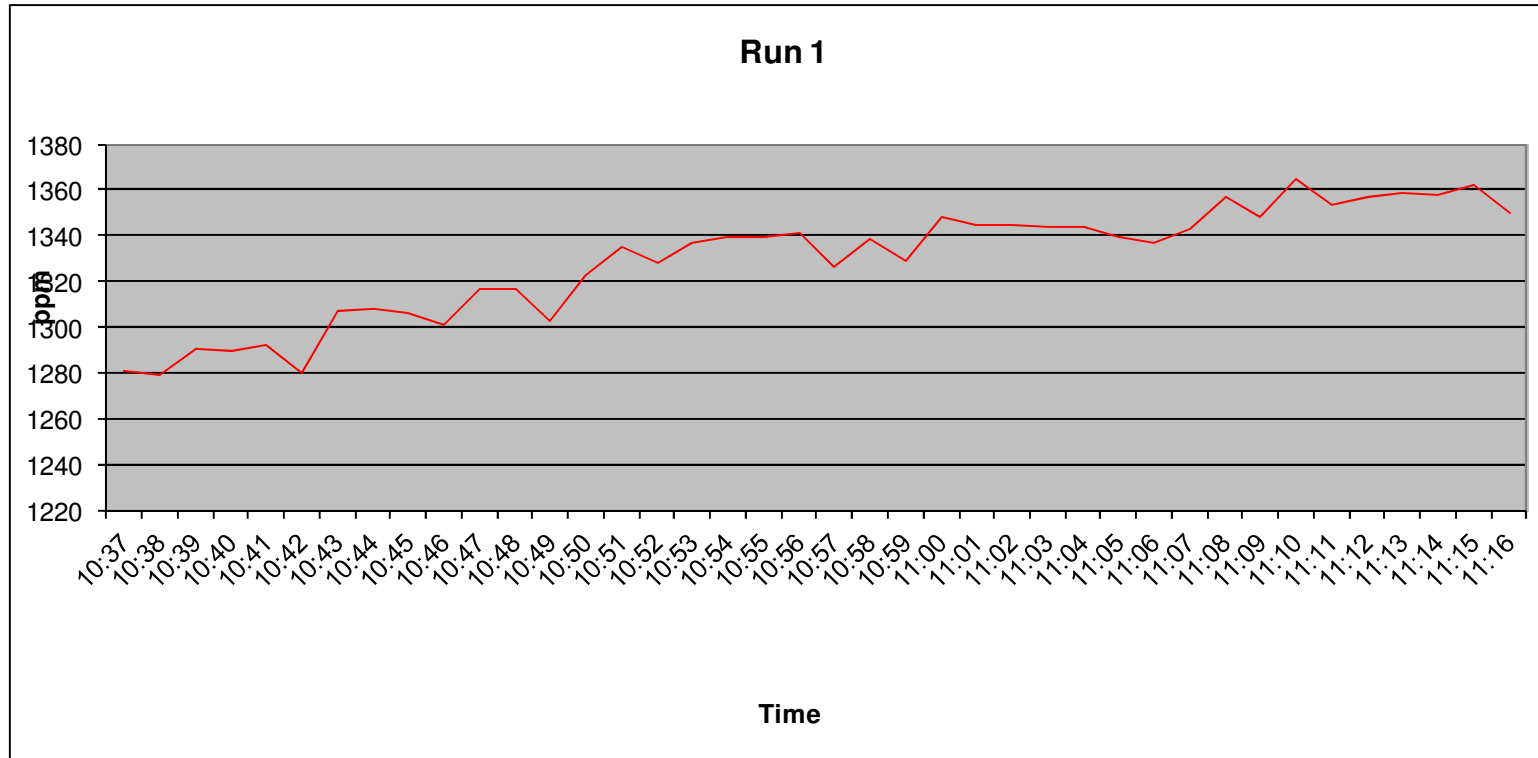
<b>Sampling Details</b>		
<b>Stack ID</b>	E1	-
	<b>Units</b>	<b>Run 1</b>
<i>Parameter</i>		
<b>Sampling Times</b>	-	10:36
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	2000
<b>Span Gas Value</b>	ppm	598
<b>Acceptable Gas Range</b>	-	No
<i>Quality Assurance</i>		
	<b>Units</b>	<b>Run 1</b>
<b>Conditioning Unit Temperature</b>	C	2
<b>Average Temperature</b>	< C	2
<b>Allowable Temperature</b>	-	4
<b>Temperature Acceptable</b>	-	Yes
<b>Pump flow rate</b>	l/min.	0.5
<i>Zero Drift</i>		
	Units	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	1
<b>Zero Down Sampling Line (Post)</b>	ppm	3.5
<b>Zero drift</b>	ppm	2.5
<b>Allowable Zero Drift</b>	ppm	11.94
<b>Zero Drift Acceptable</b>	-	Yes
<i>Span Drift</i>		
	Units	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	597
<b>Span Down Sampling Line (Post)</b>	ppm	593
<b>Span Drift</b>	ppm	-4
<b>Allowable Span Drift</b>	ppm	11.94
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
<i>Leak Check</i>		
<b>Span Gas Conc.</b>	ppm	598
<b>Recorded Conc. down Line</b>	ppm	597
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes
<b>Test Conditions</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Run Ambient Temperature Range</b>	C	8

**Carbon Monoxide Results & Sampling details**

Parameter	Units	Run 1
Concentration	mg.m <sup>-3</sup>	1661.10
Uncertainty	mg.m <sup>-3</sup>	116.55
Mass Emission	kg.h	1.44

General Sampling Information	
Parameter	Value
Standard	EN15058
Technical Procedure	SOP2004
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Span Gas Reference Number	ASLTM14ING522
Span Gas Expiry Date	Jan-17
Span Gas Start Pressure (bar)	40
Gas Cylinder Concentration (ppm)	598
Span Gas Uncertainty (%)	<2
Zero Gas Type	Nitrogen
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	E1
Reference Conditions	
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	5

**Carbon Monoxide Trend**



**Carbon Monoxide Measurement Uncertainty**

	<b>Units</b>	<b>Run 1</b>
Measured Quantities		
Certified Range of Analyser	ppm	1.36 to 1000
Operational Range of Analyser	ppm	2000
Measured Reading	ppm	1328.88
Measured Quantities	<b>Units</b>	<b>Run 1</b>
Nonlinearity	%	0.9
Temperature Dependent Zero drift	%	0.14
Temperature Dependent Span drift	%	-0.12
Cross-sensitivity	%	0.08
Leak	%	0
Calibration Gas Uncertainty	%	<2
<b>Parameter</b>	<b>Units</b>	<b>Run 1</b>
Combined uncertainty	mg.m <sup>-3</sup>	20.94
Expanded uncertainty	mg.m <sup>-3</sup>	41.88
<b>Uncertainty corrected to std conds.</b>	mg.m <sup>-3</sup>	116.55
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	-
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	116.55
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	7.02
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		

**Oxides of Nitrogen Quality Assurance**

<b>Sampling Details</b>		
<b>Stack ID</b>	E1	-
	<b>Units</b>	<b>Run 1</b>
<b>Parameter</b>		
<b>Sampling Times</b>	-	10:36
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	250
<b>Span Gas Value</b>	ppm	158
<b>Acceptable Gas Range</b>	-	Yes
<b>Quality Assurance</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Conditioning Unit Temperature</b>	C	2
<b>Average Temperature</b>	< C	2
<b>Allowable Temperature</b>	-	4
<b>Temperature Acceptable</b>	-	Yes
<b>Pump flow rate</b>	l/min.	0.5
<b>Zero Drift</b>		
	Units	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	0.1
<b>Zero Down Sampling Line (Post)</b>	ppm	0.5
<b>Zero drift</b>	ppm	0.4
<b>Allowable Zero Drift</b>	ppm	3.1
<b>Zero Drift Acceptable</b>	-	Yes
<b>Span Drift</b>		
	Units	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	158.1
<b>Span Down Sampling Line (Post)</b>	ppm	157.3
<b>Span Drift</b>	ppm	-0.8
<b>Allowable Span Drift</b>	ppm	3.1
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
<b>Leak Check</b>		
<b>Span Gas Conc.</b>	ppm	158
<b>Recorded Conc. down Line</b>	ppm	158.1
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes
<b>Test Conditions</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Run Ambient Temperature Range</b>	C	8
<b>NOx Converter Efficiency</b>	%	95.3

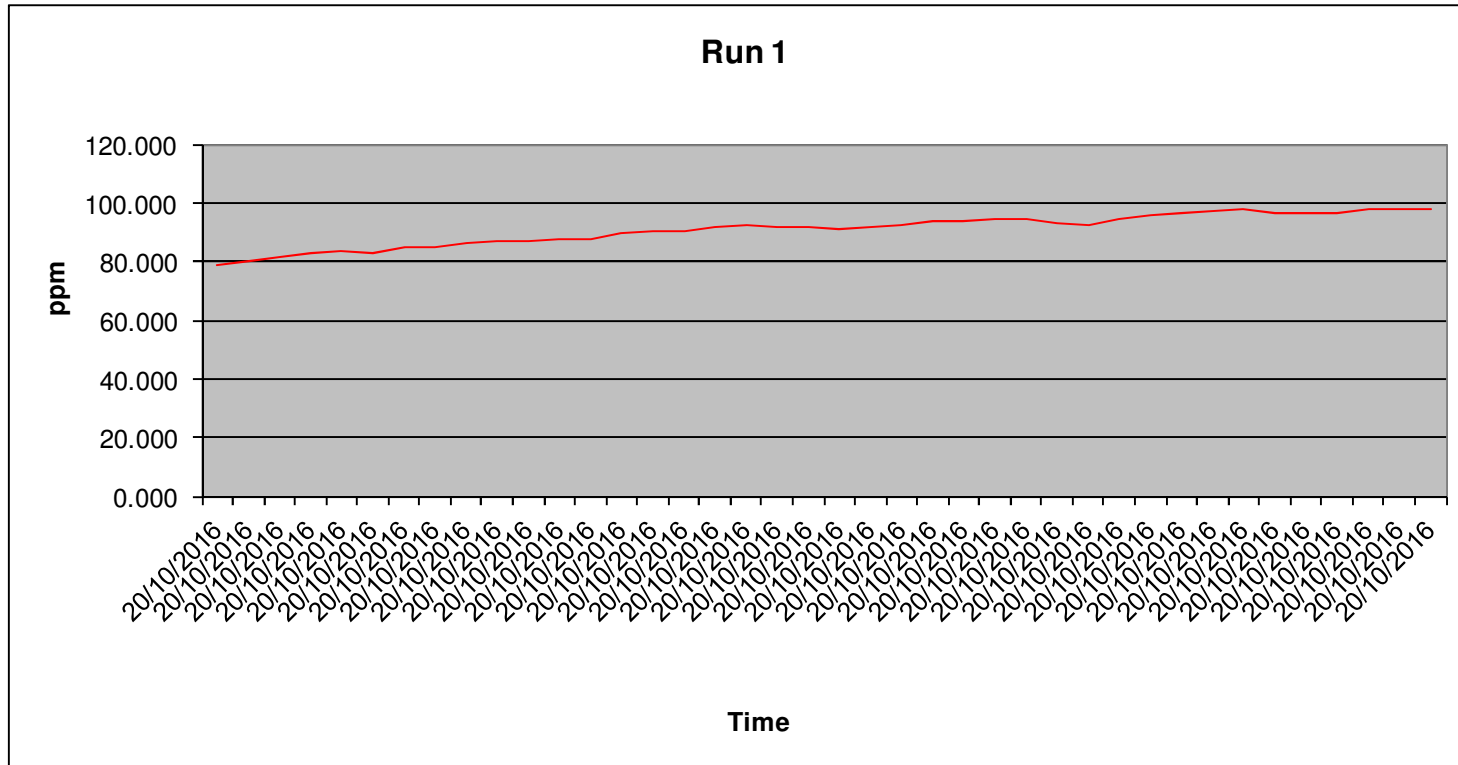


**Oxides of Nitrogen Results & Sampling details**

Parameter	Units	Run 1
Concentration	mg.m <sup>-3</sup>	186.45
Uncertainty	mg.m <sup>-3</sup>	17.35
Mass Emission	kg.h <sup>-1</sup>	0.16

General Sampling Information	
Parameter	Value
Standard	EN14792
Technical Procedure	SOP2002
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Date & Result of last converter check	95.3 18/12/15
Span Gas Reference Number	ASLTM15ING533
Span Gas Expiry Date	Dec-16
Span Gas Start Pressure (bar)	34
Gas Cylinder Concentration (ppm)	158
Span Gas Uncertainty (%)	<2
Zero Gas Type	Nitrogen
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	E1
Reference Conditions	
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	5

Oxides of Nitrogen Trend



**Oxides of Nitrogen Measurement Uncertainty**

Measured Quantities	Units	Run 1
Nonlinearity	%	1.4
Temperature Dependent Zero drift	%	-0.04
Temperature Dependent Span drift	%	-0.25
Cross-sensitivity	%	0.5
Leak	%	0
Calibration Gas Uncertainty	%	<2
Mass Flow Controllers (Dilution) Uncertainty	%	<1
NOx Converter Efficiency	%	95.3
Parameter	Units	Run 1
Combined uncertainty	mg.m <sup>-3</sup>	5.60
Expanded uncertainty	mg.m <sup>-3</sup>	11.21
<b>Uncertainty corrected to std conds.</b>	mg.m <sup>-3</sup>	17.35
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	3.47
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	17.35
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	9.31
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		

**Sulphur Dioxide Quality Assurance**

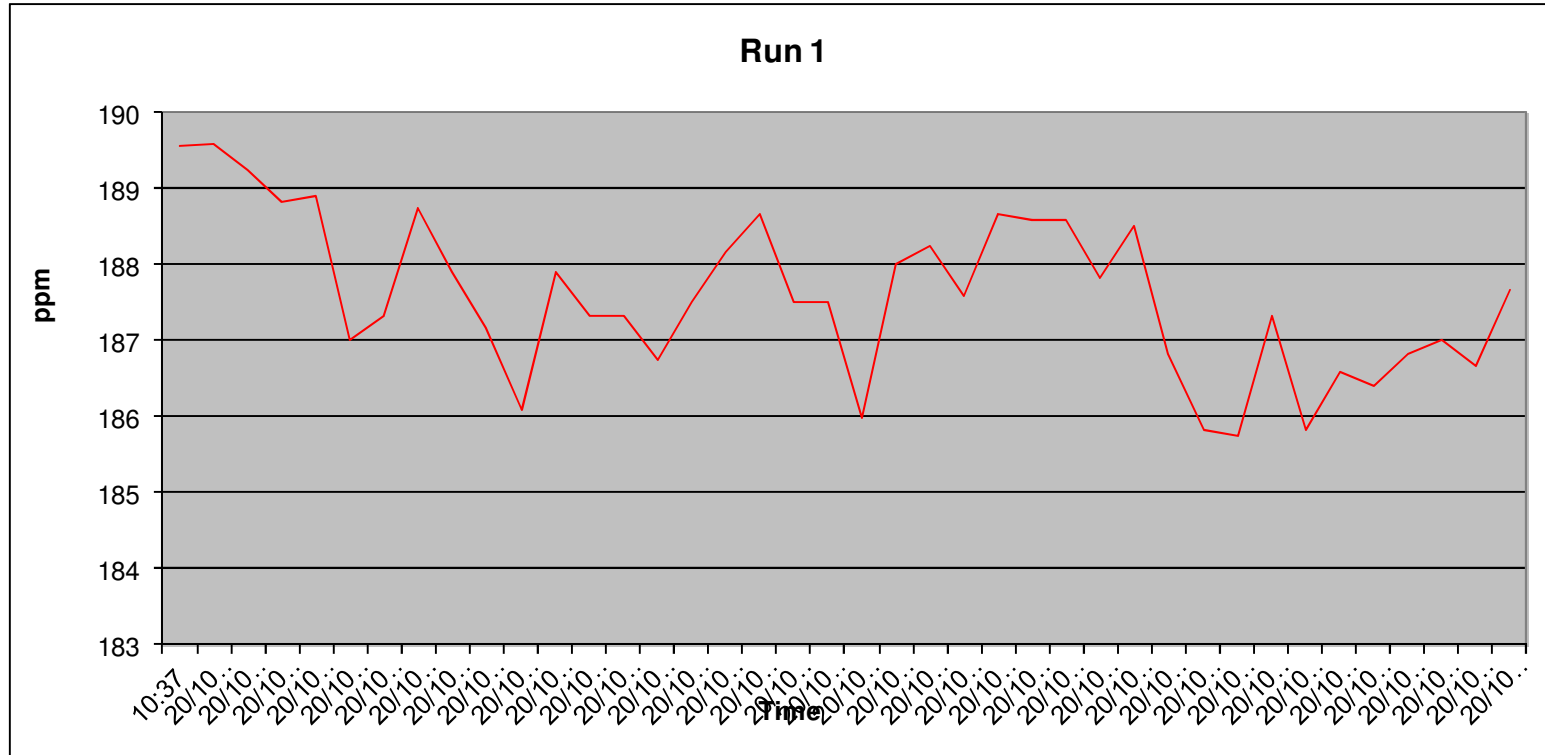
<b>Sampling Details</b>		
<b>Stack ID</b>	E1	-
	<b>Units</b>	<b>Run 1</b>
<b>Parameter</b>		
<b>Sampling Times</b>	-	10:36
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	1000
<b>Span Gas Value</b>	ppm	548
<b>Acceptable Gas Range</b>	-	Yes
	-	-
<b>Quality Assurance</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Conditioning Unit Temperature</b>	C	2
<b>Average Temperature</b>	< C	2
<b>Allowable Temperature</b>	-	4
<b>Temperature Acceptable</b>	-	Yes
<b>Pump flow rate</b>	l/min.	0.5
	-	-
<b>Zero Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	2
<b>Zero Down Sampling Line (Post)</b>	ppm	5
<b>Zero drift</b>	ppm	3
<b>Allowable Zero Drift</b>	ppm	27.2
<b>Zero Drift Acceptable</b>	-	Yes
	-	-
<b>Span Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	544
<b>Span Down Sampling Line (Post)</b>	ppm	553
<b>Span Drift</b>	ppm	9
<b>Allowable Span Drift</b>	ppm	27.2
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
	-	-
<b>Leak Check</b>		
<b>Span Gas Conc.</b>	ppm	548
<b>Recorded Conc. down Line</b>	ppm	544
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes
	-	-
<b>Test Conditions</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Run Ambient Temperature Range</b>	C	8

**Sulphur Dioxide Results & Sampling details**

Parameter	Units	Run 1
Concentration	mg.m <sup>-3</sup>	536.52
Uncertainty	mg.m <sup>-3</sup>	38.74
Mass Emission	kg.h	0.46

General Sampling Information	
Parameter	Value
Standard	TGN 21
Technical Procedure	2012
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Date & Result of last converter check	-
Span Gas Reference Number	ASLTM15ING538
Span Gas Expiry Date	Dec-17
Span Gas Start Pressure (bar)	60
Gas Cylinder Concentration (ppm)	548
Span Gas Uncertainty (%)	<2
Zero Gas Type	N
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	E1
Reference Conditions	
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	5

**Sulphur Dioxide Trend**




**Sulphur Dioxide Measurement Uncertainty**

	<b>Units</b>	<b>Run 1</b>
Measured Quantities		
Certified Range of Analyser	ppm	2.14 to 1000
Operational Range of Analyser	ppm	1000
Measured Reading	ppm	187.60
Measured Quantities	<b>Units</b>	<b>Run 1</b>
Nonlinearity	%	0.8
Temperature Dependent Zero drift	%	0.8
Temperature Dependent Span drift	%	2
Cross-sensitivity	%	1.5
Leak	%	0
Calibration Gas Uncertainty	%	<2 %
<b>Parameter</b>	<b>Units</b>	<b>Run 1</b>
Combined uncertainty	mg.m <sup>-3</sup>	7.80
Expanded uncertainty	mg.m <sup>-3</sup>	15.61
<b>Uncertainty corrected to std conds.</b>	mg.m <sup>-3</sup>	38.74
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	-
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	38.74
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	7.22
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		

## ***Appendix D: Flare Stack Monitoring Results***





<b>Report Title</b>	Air Emissions Compliance Monitoring Emissions Report
<b>Company address</b>	Air Scientific Ltd., 32 DeGranville Court, Dublin road, Trim, Co. Meath
<b>Stack Emissions Testing Report Commissioned by</b>	B9 Power
<b>Facility Name</b>	North Kerry Landfill Site, Muingnaminnane, Tralee, Co. Kerry
<b>Contact Person</b>	Ruth Baker
<b>EPA Licence Number</b>	W0001-03
<b>Licence Holder</b>	North Kerry Landfill, F1
<b>Stack Reference Number</b>	F1
<b>Dates of the Monitoring Campaign</b>	20/10/2016
<b>Job Reference Number</b>	NOKETL1201016 / 2016548
<b>Report Written By</b>	Dr. John Casey
<b>Report Approved by</b>	Dr. Brian Sheridan
<b>Stack Testing Team</b>	Dr. John Casey
<b>Report Date</b>	23/11/2016
<b>Report Type</b>	Test Report Compliance Monitoring
<b>Version</b>	1
<b>Signature of Approver</b>	 <hr/> Brian Sheridan Technical Manager

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## 1. Executive Summary

### I. Monitoring Objectives

#### Overall Aim of the monitoring Campaign

The aim of the monitoring campaign was to demonstrate compliance with a set of emission limit values as specified in the site licence.

#### Special Requirements

There were no special requirements.

#### Target Parameters

Carbon Monoxide (CO)
Oxides of Nitrogen (NOx) as NO <sub>2</sub>
Total Volatile Organic Carbon (TOC)
Sulphur Dioxide (SO <sub>2</sub> )
Stack Gas Temperature
Volume (m <sup>3</sup> .h <sup>-1</sup> )

#### Emission Limit Values

Emission Limit Values / Mass Emissions Limit Values	mg.m <sup>-3</sup>	kg.h <sup>-1</sup>
CO	-	-
NOx as NO <sub>2</sub>	150	-
TOC	10	-
SO <sub>2</sub>	-	-
Stack Gas Temperature	-	-
Volume (m <sup>3</sup> .h <sup>-1</sup> )	-	-

#### Reference Conditions

Reference Conditions	Value
Oxygen Reference %	3
Temperature °C	273.15
Total Pressure kPa	101.3
Moisture %	Yes

### Executive Summary

#### Overall Results

Parameter	Concentration Units	Result	MU +/-	Limit	Compliant
Carbon Monoxide (CO)	mg.m <sup>-3</sup>	9.90	2.82	-	N/A
Oxides of Nitrogen (NOx) as NO <sub>2</sub>	mg.m <sup>-3</sup>	82.88	6.80	150	Yes
Total Volatile Organic Carbon (VOC)	mgC.m <sup>-3</sup>	3.65	0.60	10	Yes
Sulphur Dioxide (SO <sub>2</sub> )	mg.m <sup>-3</sup>	119.57	10.35	-	N/A
Oxygen (%)	% v/v	7.17	0.14	-	N/A
Stack Gas Temperature	K	1283.15	-	-	N/A

#### Accreditation details

Air Scientific Limited	INAB319T
External Analytical Laboratory	-
Other	-

**Executive Summary**

**Monitoring Dates & Times**

Parameter	Run	Location ID	Sampling Dates	Sampling Time On	Sampling Time Off	Duration (mins.)
Carbon Monoxide (CO)	Run 1	F1	20/10/2016	12:36:00	13:16:00	00:40:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Oxides of Nitrogen (NOx) as NO <sub>2</sub>	Run 1	F1	20/10/2016	12:36:00	13:16:00	00:40:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Total Volatile Organic Carbon (VOC)	Run 1	F1	20/10/2016	12:38:06	13:14:06	00:36:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Sulphur Dioxide (SO <sub>2</sub> )	Run 1	F1	20/10/2016	12:36:00	13:16:00	00:40:00
	Run 2	-	-	-	-	-
	Run 3	-	-	-	-	-
Oxygen (%)		F1	20/10/2016	12:36:00	13:16:00	00:40:00

### Executive Summary

#### Process details

Parameter	
Process status	Normal
Capacity (per/hour) (if applicable)	N/a
Continuous or Batch Process	Continuous
Feedstock	LFG
Abatement System	No
Abatement Systems Running Status	N/A
Fuel	LFG
Plume Appearance	Yes
Other information	None

**Executive Summary**

**Monitoring, Equipment & Analytical Methods**

	<b>Monitoring</b>				<b>Analysis</b>	
<b>Parameter</b>	<b>Standard</b>	<b>Technical Procedure</b>	<b>Accredited Testing</b>	<b>Testing Lab</b>	<b>Analytical Technique</b>	<b>Analysis Lab</b>
Carbon Monoxide (CO)	EN15058:2006	SOP 2004	Yes	AirSci	NCIR By Horiba PG-250	AirSci
Oxides of Nitrogen (NOx)	EN14792:2006	SOP 2002	Yes	AirSci	Chemiluminescence	AirSci
Total Volatile Organic Carbon (TOC)	EN12619:2013	SOP 2009	Yes	AirSci	Flame Ionisation Detection	AirSci
Sulphur Dioxide (SO2)	TGN 21	SOP 2012	Yes	AirSci	NDIR Absorption	AirSci
Oxygen (%)	EN14789:2005	SOP 2008	Yes	AirSci	Paramagnetic	AirSci
Stack Gas Temperature	EN16911:2013	SOP 2005	No	AirSci	Thermocouple	AirSci



## List of Equipment

ID	Item of Equipment	Manufacturer	Serial No.
ASLTM12EQ520	Buhler Sample Gas Cooler	Buhler Technologies	100063602044367-001
ASLTM13EQ504	Horiba PG2500 Portable Flue Gas Analyser	Horiba	41432840053
ASLTM13EQ509	10 metre industrial heated sample line (Temp controller box 1 & 2)	Neptech	13B088
ASLTM12EQ511	Signal 3010	Signal	--

#### Sampling Deviations

Parameter	Deviation
Standard ID	EN16911 - Flow measurement not possible
Standard ID	-
Standard ID	-
Standard ID	-

#### Reference Documents

Risk Assessment (RA)	SOP1011
Site Review (SR)	SOP1015
Site Specific Protocol (SSP)	SOP1015

**Executive Summary**

**Suitability of sampling location**

General Information	Value
Permanent/Temporary	Temporary
Inside/ Outside	Outside

Platform Details		
Irish EPA Technical Guidance Note AG1 / BS EN 15259 Platform Requirements	Value	Comment
Sufficient Working area to manipulate probe and measuring instruments	Yes	-
Platform has 2 handrails (approx. 0.5m & 1.0 m high)	Yes	-
Platform has vertical base boards (approx. 0.25 m high)	Yes	-
Platform has chains / self closing gates at top of ladders	Yes	-
There are no obstructions present which hamper insertion of sampling equipment	No	-
Safe Access Available	Yes	-
Easy Access Available	Yes	-

Sampling Location / Platform Improvement Recommendations
None

BSEN 15259 Homogeneity Test Requirements
1: There is no requirement to perform a BSEN15259 Homogeneity Test on this stack
<b>E.g. Select Option</b> 1: There is no requirement to perform a BSEN15259 Homogeneity Test on this stack 2: Test results were obtained from previous Homogeneity test carried out by ASL 3: Test results were obtained from previous Homogeneity test carried out by Alternative contractor 4: Other: Enter Description

### Executive Summary

#### Stack diagram



**APPENDICES**

**II. Appendix I Monitoring Personnel & Equipment**

**Stack Emissions Monitoring Personnel**

<b>Team Leader</b>	<b>Name</b>	John Casey
	<b>Qualifications</b>	PhD. (Eng.), MSc. (Agr.), B. Agr. Sc.
	<b>System approval</b>	Air Scientific Limited Approved
		-

**III. Appendix II Stack Details & flow characteristics**

**Preliminary stack survey calculations**

<b>General Stack Details</b>		
<b>Stack details</b>	<b>Units</b>	<b>Value</b>
Date of survey		20/10/2016
Time of survey		-
Type		Circular
Stack Diameter / Depth, D	m	-
Stack Width, W	m	-
Average Stack Gas Temp., Ta	C	1010
Average Static Pressure, P static	kPa	0.1
Average Barometric Pressure, Pb	kPa	102.1
Type of Pitot		-
Are Water Droplets Present ?		-
Average Pitot Tube Calibration Coeff, Cp		-
Negative flow		-
Highly homogeneous flow stream/gas velocity		Yes

Sample Port Size	mm	25
Initial Pitot Leak Check	Pa	-
Final Pitot Leak Check	Pa	-
Orientation of Duct		Vertical
Pitot Tube Cp		0.998
Number of Lines Available		1
Number of Lines Used		1

Document No.: NOKETL1201016 / 2016548  
Visit No: 1  
Year: 2016  
Office: Trim

IPPC Licence No.: W0001-03  
Licence Holder: North Kerry Landfill, F1  
Facility Location: North Kerry Landfill Site, Muingnaminnane, Tralee, Co. Kerry  
Rev.No: 1

<b>Sampling Line A</b>						
<b>Point</b>	<b>Distance to duct (m)</b>	<b>Pa</b>	<b>Temp °C</b>	<b>Velocity (m/s)</b>	<b>Oxygen (%)</b>	<b>Angle of Swirl</b>
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-
Average	-	-	-	-	-	-
Min	-	-	-	-	-	-
Max	-	-	-	-	-	-

<b>Sampling Line B</b>						
<b>Point</b>	<b>Distance to duct (m)</b>	<b>Pa</b>	<b>Temp °C</b>	<b>Velocity (m/s)</b>	<b>Oxygen (%)</b>	<b>Angle of Swirl</b>
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
6	-	-	-	-	-	-
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-
Average	-	-	-	-	-	-
Min	-	-	-	-	-	-
Max	-	-	-	-	-	-



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IPPC Licence No.: W0001-03  
 Licence Holder: North Kerry Landfill, F1  
 Facility Location: North Kerry Landfill Site, Muingnaminnane, Tralee, Co. Kerry  
 Rev.No: 1

Component	Conc. ppm	Conc. Dry % v/v	Conc. Wet % v/v	Molar Mass
Carbon Dioxide CO <sub>2</sub>	-	10.63	-	44.01
Oxygen O <sub>2</sub>	-	7.17	-	32
Nitrogen N <sub>2</sub>	-	82.2	-	28.1
Moisture (H <sub>2</sub> O)	-	-	9.8	18.02
<b>Reference Conditions</b>				
	<b>Units</b>	<b>Numbers</b>		
Temperature	°C	273.15		
Total Pressure	kPa	101.3		
Moisture	%	-		
Oxygen (Dry)	%	3		

<b>Stack Gas Composition &amp; Molecular Weights</b>								
<b>Component</b>	<b>Molar Mass M</b>	<b>Density Kg/m<sup>3</sup> p</b>	<b>Conc. Dry % v/v</b>	<b>Dry Volume Fraction r</b>	<b>Dry Conc. kg/m<sup>3</sup> pi</b>	<b>Conc. wet % v/v</b>	<b>Wet Volume Fraction r</b>	<b>Wet Conc.kg/m<sup>3</sup> pi</b>
Carbon Dioxide CO <sub>2</sub>	44.01	1.96	10.63	0.1063	0.21	9.59	0.10	0.19
Oxygen O <sub>2</sub>	32	1.43	7.17	0.0717	0.10	6.47	0.06	0.09
Nitrogen N <sub>2</sub>	28.1	1.25	82.2	0.822	1.03	74.14	0.74	0.93
Moisture (H <sub>2</sub> O)	18.02	0.80	-	-	-	9.8	0.10	0.08
	-	-	-	-	-	-	-	-
where $p=M/22.41$	-	-	-	-	-	-	-	-
$p_i = r \times p$	-	-	-	-	-	-	-	-

<b>Calculation of Stack Gas Densities</b>		
<b>Determinand</b>	<b>Units</b>	<b>Result</b>
Dry Density (STP), P STD	kg.m <sup>-3</sup>	1.342
Wet Density (STP), P STW	kg.m <sup>-3</sup>	1.294
Dry Density (Actual), P Actual	kg.m <sup>-3</sup>	0.288
Average wet Density (Actual), P ActualW	kg.m <sup>-3</sup>	0.278
<b>Where</b>		
P STD = sum of component concentrations, kg/m <sup>3</sup> (excluding water vapour)	-	-
$P_{STW} = (P_{STD} + p_{i \text{ of H}_2\text{O}}) / (1 + (p_{i \text{ of H}_2\text{O}} / 0.8036))$	-	-
$P_{\text{actual}} = P_{STD} \times (T_{STP} / (P_{STP})) \times (P_a / T_a)$	-	-
$P_{\text{actual W (at each sampling point)}} = P_{STW} \times (T_s / P_s) \times (P_a / T_a)$	-	-

Sampling Plane Validation Criteria	Value	Units	Requirement	Compliance	Method
Lowest Differential Pressure	-	Pa	>5 Pa	N/A	EN16911:2013
Lowest Gas Velocity	-	m/s	-	N/A	-
Highest Gas Velocity	-	m/s	-	N/A	-
Ratio of Above	-	:1	<3:1	N/A	EN16911:2013
Mean Velocity	-	m/s	-	N/A	-
Angle of flow with regard to duct axis	-	degrees	< 15	N/A	EN16911:2013
No local negative flow	-	-	-	N/A	-
Homogeneous flow stream/gas velocity	-	-	-	N/A	-

Calculation of stack Gas Velocity, V	
Velocity at Traverse Point, $V = K_{cp} * \text{Sqrt}((2 * DP) / \text{Density})$	-
<b>Where</b>	
$K_{pt}$ = Pitot tube calibration coefficient	-
Compressibility correction factor, assumed at a constant 0.998	0.998

Gas Volumetric Flowrate	Units	Result
Gas Volumetric Flow Rate (Actual)	$m^3.h^{-1}$	-
Gas Volumetric Flow Rate (STP, Wet)	$m^3. h^{-1}$	-
Gas Volumetric Flowrate (STP, Dry)	$m^3. h^{-1}$	-
Gas Volumetric Flowrate REF to Oxygen	$m^3. h^{-1}$	-

**IV. Appendix III Individual parameter sampling details and results**

**Carbon Monoxide Quality Assurance**

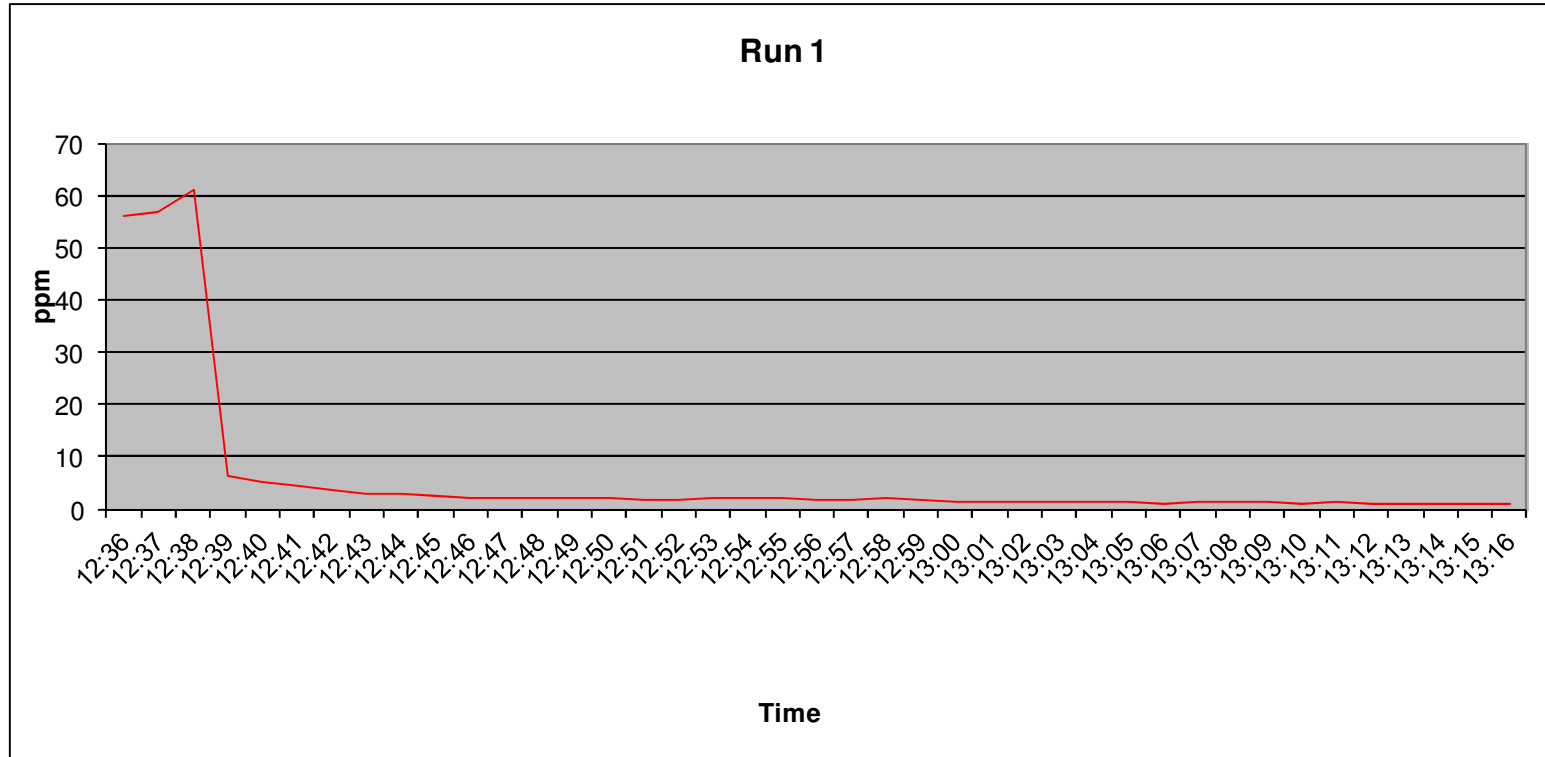
<b>Sampling Details</b>		
<b>Stack ID</b>	F1	-
	<b>Units</b>	<b>Run 1</b>
<b>Parameter</b>		
<b>Sampling Times</b>	-	12:35
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	200
<b>Span Gas Value</b>	ppm	161
<b>Acceptable Gas Range</b>	-	Yes
<b>Quality Assurance</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Conditioning Unit Temperature</b>	C	2
<b>Average Temperature</b>	< C	2
<b>Allowable Temperature</b>	-	4
<b>Temperature Acceptable</b>	-	Yes
<b>Pump flow rate</b>	l/min.	0.5
<b>Zero Drift</b>		
	Units	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	0.2
<b>Zero Down Sampling Line (Post)</b>	ppm	0.8
<b>Zero drift</b>	ppm	0.6
<b>Allowable Zero Drift</b>	ppm	3.2
<b>Zero Drift Acceptable</b>	-	Yes
<b>Span Drift</b>		
	Units	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	160
<b>Span Down Sampling Line (Post)</b>	ppm	161
<b>Span Drift</b>	ppm	1
<b>Allowable Span Drift</b>	ppm	3.2
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
<b>Leak Check</b>		
<b>Span Gas Conc.</b>	ppm	161
<b>Recorded Conc. down Line</b>	ppm	160
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes
<b>Test Conditions</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Run Ambient Temperature Range</b>	C	8

**Carbon Monoxide Results & Sampling details**

Parameter	Units	Run 1
Concentration	mg.m <sup>-3</sup>	7.60
Uncertainty	mg.m <sup>-3</sup>	2.82
Mass Emission	kg.h	-

General Sampling Information	
Parameter	Value
Standard	EN15058
Technical Procedure	SOP2004
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Span Gas Reference Number	ASLTM15ING534
Span Gas Expiry Date	Dec-18
Span Gas Start Pressure (bar)	60
Gas Cylinder Concentration (ppm)	161
Span Gas Uncertainty (%)	<2
Zero Gas Type	Nitrogen
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	F1
Reference Conditions	
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	3

**Carbon Monoxide Trend**



**Carbon Monoxide Measurement Uncertainty**

	<b>Units</b>	<b>Run 1</b>
Measured Quantities		
Certified Range of Analyser	ppm	1.36 to 1000
Operational Range of Analyser	ppm	200
Measured Reading	ppm	6.08
Measured Quantities	<b>Units</b>	<b>Run 1</b>
Nonlinearity	%	0.9
Temperature Dependent Zero drift	%	0.14
Temperature Dependent Span drift	%	-0.12
Cross-sensitivity	%	0.08
Leak	%	0
Calibration Gas Uncertainty	%	<2
<b>Parameter</b>	<b>Units</b>	<b>Run 1</b>
Combined uncertainty	mg.m <sup>-3</sup>	1.06
Expanded uncertainty	mg.m <sup>-3</sup>	2.12
<b>Uncertainty corrected to std conds.</b>	mg.m <sup>-3</sup>	2.82
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	-
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	2.82
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	37.16
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		



**Oxides of Nitrogen Quality Assurance**

<b>Sampling Details</b>		
<b>Stack ID</b>	F1	-
	<b>Units</b>	<b>Run 1</b>
<b>Parameter</b>		
<b>Sampling Times</b>	-	12:35
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	250
<b>Span Gas Value</b>	ppm	158
<b>Acceptable Gas Range</b>	-	Yes
<b>Quality Assurance</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Conditioning Unit Temperature</b>	C	2
<b>Average Temperature</b>	< C	2
<b>Allowable Temperature</b>	-	4
<b>Temperature Acceptable</b>	-	Yes
<b>Pump flow rate</b>	l/min.	0.5
<b>Zero Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	0.1
<b>Zero Down Sampling Line (Post)</b>	ppm	0.4
<b>Zero drift</b>	ppm	0.3
<b>Allowable Zero Drift</b>	ppm	3.1
<b>Zero Drift Acceptable</b>	-	Yes
<b>Span Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	158.1
<b>Span Down Sampling Line (Post)</b>	ppm	158.9
<b>Span Drift</b>	ppm	0.8
<b>Allowable Span Drift</b>	ppm	3.1
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
<b>Leak Check</b>		
<b>Span Gas Conc.</b>	ppm	158
<b>Recorded Conc. down Line</b>	ppm	158.1
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes
<b>Test Conditions</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Run Ambient Temperature Range</b>	C	8
<b>NOx Converter Efficiency</b>	%	95.3

### Oxides of Nitrogen Results & Sampling details

Parameter	Units	Run 1
Concentration	mg.m <sup>-3</sup>	63.59
Uncertainty	mg.m <sup>-3</sup>	6.80
Mass Emission	kg.h <sup>-1</sup>	-

General Sampling Information	
Parameter	Value
Standard	EN14792
Technical Procedure	SOP2002
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Date & Result of last converter check	95.3 18/12/15
Span Gas Reference Number	ASLTM15ING533
Span Gas Expiry Date	Dec-16
Span Gas Start Pressure (bar)	30
Gas Cylinder Concentration (ppm)	158
Span Gas Uncertainty (%)	<2
Zero Gas Type	Nitrogen
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	F1
Reference Conditions	
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	3



**Oxides of Nitrogen Measurement Uncertainty**

Measured Quantities	Units	Run 1
Nonlinearity	%	1.4
Temperature Dependent Zero drift	%	-0.04
Temperature Dependent Span drift	%	-0.25
Cross-sensitivity	%	0.5
Leak	%	0
Calibration Gas Uncertainty	%	<2
Mass Flow Controllers (Dilution) Uncertainty	%	<1
NOx Converter Efficiency	%	95.3
Parameter	Units	Run 1
Combined uncertainty	mg.m <sup>-3</sup>	2.03
Expanded uncertainty	mg.m <sup>-3</sup>	4.06
<b>Uncertainty corrected to std conds.</b>	mg.m <sup>-3</sup>	6.80
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	4.53
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	6.80
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	10.69
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		

**Total Volatile Organic Carbon Quality Assurance**

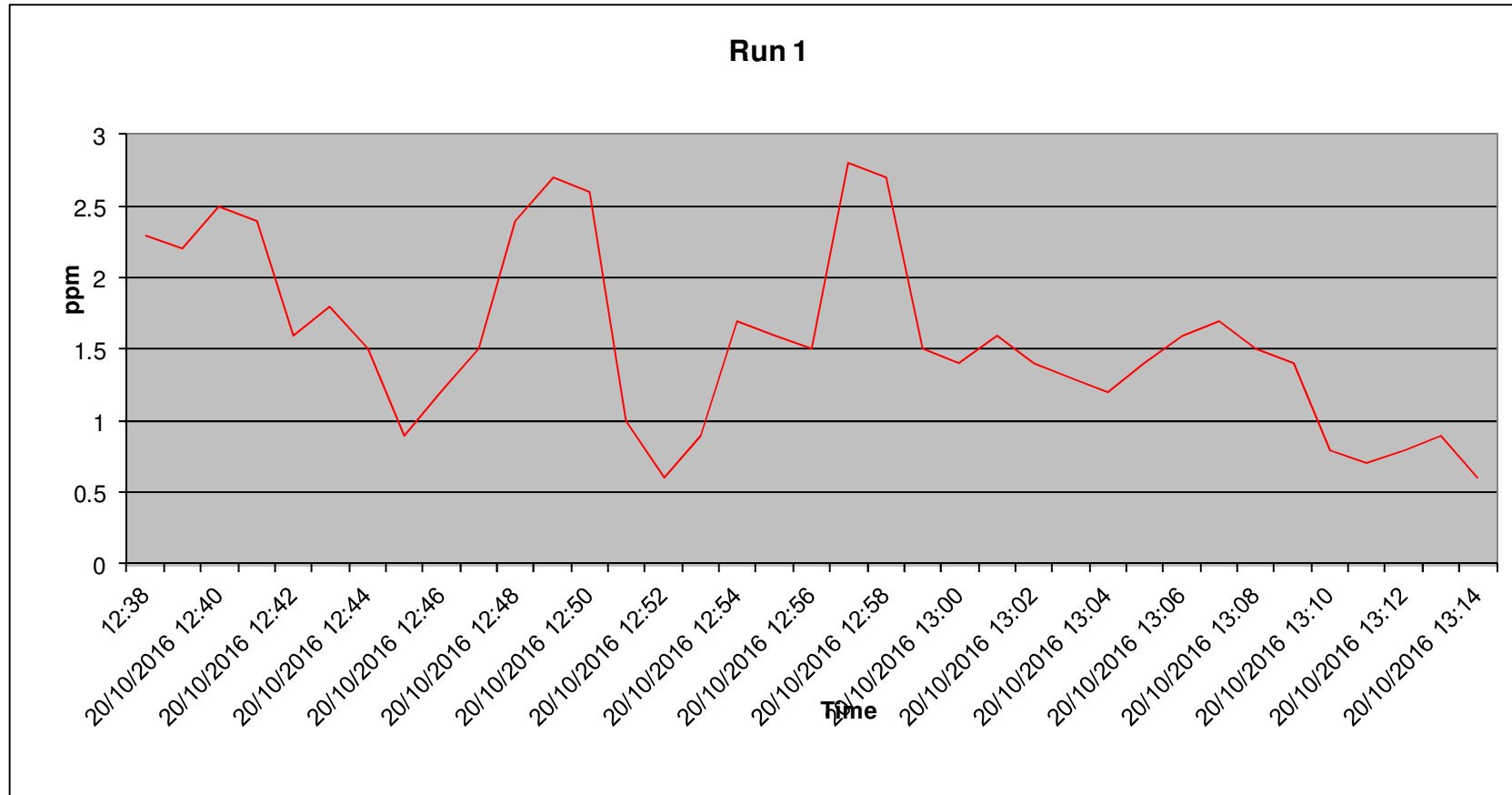
<b>Sampling Details</b>		
<b>Stack ID</b>	F1	-
	<b>Units</b>	<b>Run 1</b>
<b>Parameter</b>		
<b>Sampling Times</b>	-	12:38
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	100
<b>Span Gas Value</b>	ppm	80.7
<b>Acceptable Gas Range</b>	-	Yes
<b>Quality Assurance</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Oven Temperature</b>	C	190
<b>Average Temperature</b>	< C	190
<b>Temperature Acceptable</b>	-	Yes
<b>Sample line temperature</b>	C	190
<b>Zero Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	0.2
<b>Zero Down Sampling Line (Post)</b>	ppm	0.9
<b>Zero drift</b>	ppm	0.7
<b>Allowable Zero Drift</b>	ppm	1.6
<b>Zero Drift Acceptable</b>	-	Yes
<b>Span Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	80.8
<b>Span Down Sampling Line (Post)</b>	ppm	80.4
<b>Span Drift</b>	ppm	-0.4
<b>Allowable Span Drift</b>	ppm	1.6
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
<b>Leak Check</b>		
<b>Span Gas Conc.</b>	ppm	80.7
<b>Recorded Conc. down Line</b>	ppm	80.8
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes

**Total Volatile Organic Carbon Results and Sampling Details**

Parameter	Units	Run 1
Concentration	mgC.m <sup>-3</sup>	2.80
Uncertainty	mgC.m <sup>-3</sup>	0.60
Mass Emission	kg.h <sup>-1</sup>	-

General Sampling Information	
Parameter	Value
Standard	EN12619
Technical Procedure	SOP2009
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Span Gas Reference Number	ASLTM16ING501
Span Gas Expiry Date	01/08/2021
Span Gas Start Pressure (bar)	20
Gas Cylinder Concentration (ppm)	80.7
Span Gas Uncertainty (%)	<2
Zero Gas Type	Zero Air
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	F1
Reference Conditions	-
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	3

Total Volatile Organic Carbon Trend



**Total Volatile Organic Carbon Measurement Uncertainty**

	<b>Units</b>	<b>Run 1</b>
<b>Measured Quantities</b>		
Certified Range of Analyser	ppm	0.5 to 1000
Operational Range of Analyser	ppm	100
Measured Reading	ppm	1.57
<b>Measured Quantities</b>	<b>Units</b>	<b>Run 1</b>
Nonlinearity	%	0.068
Temperature Dependent Zero drift	%	0.3
Temperature Dependent Span drift	%	0.3
Cross-sensitivity	%	-
Leak	%	<2
Calibration Gas uncertainty	%	<2
<b>Parameter</b>	<b>Units</b>	<b>Run 1</b>
Combined uncertainty	mg.m <sup>-3</sup>	2.80
Expanded uncertainty	mg.m <sup>-3</sup>	0.30
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	10.63
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	21.26
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	0.60
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		



**Sulphur Dioxide Quality Assurance**

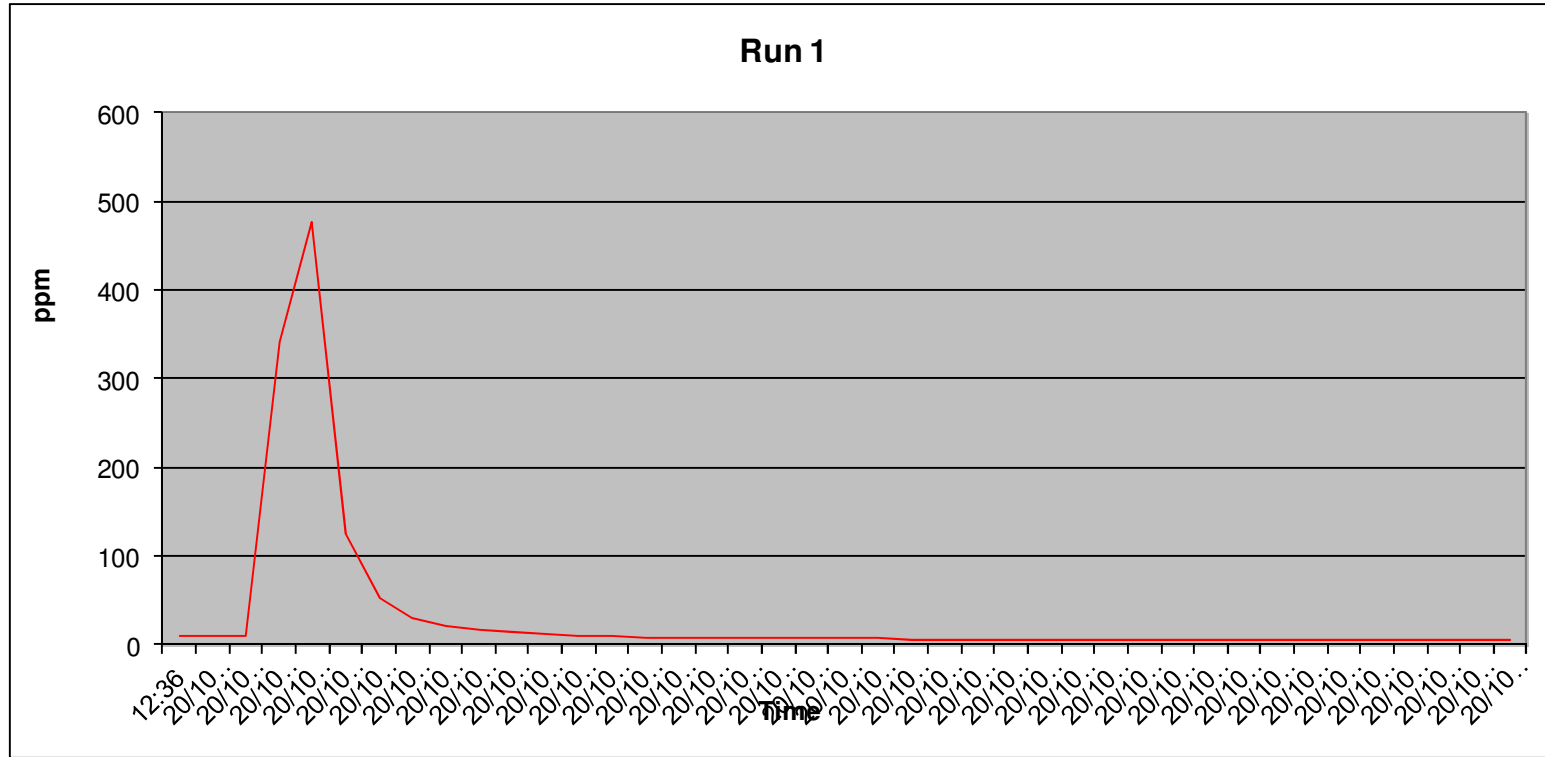
<b>Sampling Details</b>		
<b>Stack ID</b>	F1	-
	<b>Units</b>	<b>Run 1</b>
<b>Parameter</b>		
<b>Sampling Times</b>	-	12:35
<b>Sampling Dates</b>	-	20/10/2016
<b>Instrument Range</b>	ppm	1000
<b>Span Gas Value</b>	ppm	548
<b>Acceptable Gas Range</b>	-	Yes
	-	-
<b>Quality Assurance</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Conditioning Unit Temperature</b>	C	2
<b>Average Temperature</b>	< C	2
<b>Allowable Temperature</b>	-	4
<b>Temperature Acceptable</b>	-	Yes
<b>Pump flow rate</b>	l/min.	0.5
	-	-
<b>Zero Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Zero Down Sampling Line (Pre)</b>	ppm	1
<b>Zero Down Sampling Line (Post)</b>	ppm	7
<b>Zero drift</b>	ppm	6
<b>Allowable Zero Drift</b>	ppm	27.4
<b>Zero Drift Acceptable</b>	-	Yes
	-	-
<b>Span Drift</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Span Down Sampling Line (Pre)</b>	ppm	549
<b>Span Down Sampling Line (Post)</b>	ppm	540
<b>Span Drift</b>	ppm	9
<b>Allowable Span Drift</b>	ppm	27.4
<b>Span Drift Acceptable (Y/N)</b>	-	Yes
	-	-
<b>Leak Check</b>		
<b>Span Gas Conc.</b>	ppm	548
<b>Recorded Conc. down Line</b>	ppm	549
<b>Leak check acceptable (&lt; 2%)</b>	(Y/N)	Yes
	-	-
<b>Test Conditions</b>		
	<b>Units</b>	<b>Run 1</b>
<b>Run Ambient Temperature Range</b>	C	8

**Sulphur Dioxide Results & Sampling details**

Parameter	Units	Run 1
Concentration	mg.m <sup>-3</sup>	91.73
Uncertainty	mg.m <sup>-3</sup>	10.35
Mass Emission	kg.h	-

General Sampling Information	
Parameter	Value
Standard	TGN 21
Technical Procedure	2012
Probe material	SS
Filtration Type/Size	PTFE
Heated Head Filter Used	Yes
Heated Line Temperature	190
Date & Result of last converter check	-
Span Gas Reference Number	ASLTM15ING538
Span Gas Expiry Date	Dec-17
Span Gas Start Pressure (bar)	60
Gas Cylinder Concentration (ppm)	548
Span Gas Uncertainty (%)	<2
Zero Gas Type	N
Number of Sampling Lines Used	1
Number of Sampling Points Used	1
Sample Point I.D's	F1
Reference Conditions	
Temperature (K)	273.15
Pressure (kPa)	101.3
Gas (Wet or Dry)	Dry
Oxygen	3

**Sulphur Dioxide Trend**



**Sulphur Dioxide Measurement Uncertainty**

	<b>Units</b>	<b>Run 1</b>
Measured Quantities		
Certified Range of Analyser	ppm	2.14 to 1000
Operational Range of Analyser	ppm	1000
Measured Reading	ppm	32.07
Measured Quantities	<b>Units</b>	<b>Run 1</b>
Nonlinearity	%	0.8
Temperature Dependent Zero drift	%	0.8
Temperature Dependent Span drift	%	2
Cross-sensitivity	%	1.5
Leak	%	0
Calibration Gas Uncertainty	%	<2 %
<b>Parameter</b>	<b>Units</b>	<b>Run 1</b>
Combined uncertainty	mg.m <sup>-3</sup>	3.12
Expanded uncertainty	mg.m <sup>-3</sup>	6.24
<b>Uncertainty corrected to std conds.</b>	mg.m <sup>-3</sup>	10.35
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of ELV	-
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	mg.m <sup>-3</sup>	10.35
<b>Expanded uncertainty expressed with a level of confidence of 95%</b>	% of value	11.29
<b>Requirement in standard is for uncertainty to be &lt; 10% at ELV at standard conditions</b>		

## ***Appendix E: Monthly Balancing Records – Gas field***

**NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING**



Model Serial No GM09053  
 Date: 30/01/2016  
 Weather: Dry/Cool 986

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/f lowline/manifold (w/f/m)	Comments
Cells 1	1.3	59	24	1.9	16	0	-1	2%	w	
	1.4	58	18	1.8	22	0	-1	5%	w	
Cells 2	2.1	12	15	1.5	71	0	-1	5%	W	Over extracted - gas depleted
	2.2	22	16	1.3	60	0	-1	2%	w	Over extracted - gas depleted
	2.3	31	20	1	49	0	-1	2%	w	Over extracted - gas depleted
Cells 3	3.2	48	23	0.2	29	0	-1	5%	w	
	3.4	61	18	0.7	20	0	-1	5%	w	
Cells 4	4.2	52	27	0.6	20	0	-6	60%	w	KCC to address issues
	4.3	57	27	0.6	15	0	0	2%	w	No suction B9 to investigate this issue
	4.4	64	31	0.5	4.1	0	-1	5%		
Cells 5	5.1	65	29	0.4	5.7	0	-1	2%	w	Excavated gas well all surface pipe work ok
	5.2	12	15	5	67	0	-1	2%	W	
	5.3	29	14	9	47	0	-1	2%	W	KCC design perforated pipe close to surface drawing in air ingress
	5.4	69	30	0	0.3	0	-1	2%	W	Excavation needs to be back filled by KCC
Cells 6	6.1	9	13	7	71	0	-1	5%	W	Over extracted - gas depleted
	6.2	42	21	0.7	36	0	-1	2%	w	
	6.3	59	9	1.5	29	0	-1	2%	W	
	6.4	6	4	19	71	0	-1	1%	W	Well needs excavated for further investigation. Possible cap defect - KCC contractor to repair
Cells 7	7.1	0	0.7	22	77	0	0	0	W	Cap damaged perforated pipe above ground level
	7.2	16	5	14	66	0	0	0	W	Cap damaged
	7.3	15	5	11	69	0	0	0	W	Cap damaged
	7.4	32	6	5	56	0	-1	2	W	Cap damaged
	7.5									
Cells 8	8.1	46	30	1	24	0	-1	15%	W	
	8.2	39	24	2	35	1	-13	5%	M	
	8.3	40	26	0.7	33	0	-1	5%	W	
	8.4	0	1.1	22	76	0	0	0	W	Requires wellhead repair. KCC contractor to repair as the well is in a deep excavation
Cells 9	9.1	22	14	4	60	0	-4	1%	W	Over extracted - gas depleted
	9.2	65	27	0.5	7	0	-12	30%	w	
	9.3	21	9	4	66	0	0	0%	w	Well location flooded
	9.4	38	9	10	0	0	-10	15%	W	Well location flooded
	9.6	39	22	1	38	0	-2	2%	W	
Cells 10	10.2	64	5	0.3	41	0	-1	1%	w	Cap damaged perforated pipe above ground level
	10.3	76	10	1	12	0	-3	40%	w	
	10.4	74	22	0.1	3	0	-8	10%	w	
	10.5	72	22	1	5	0	-8	30%	w	
	10.6	8	3	19	69	0	-2	2%	w	
Cells 11	1	52	26	3	17	0	-12	20	W	
	2	15	8	14	62	0	0	0%	w	To excavate well would require digging up road
	3	57	28	2	13	0	-11	20%	w	
Cells 12	1	0.5	1.6	21	76	0	0	0	M	KCC design perforated pipe close to surface drawing in air ingress
	2	32	22	0.7	45	0	-4	2	M	Over extracted gas well
	3	20	19	1.7	59	0	-9	30	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	65	21	2	12	0	-12	20	M	
	2	42	18	0.2	40	0	-13	25	M	
	3	54	15	0.6	31	0	-6	15	M	
	4	61	25	0.4	14	0	-12	50	M	
	5	61	20	0.5	18	0	-8	10	M	
	6	48	19	0.5	31	0	12	50	M	
Cells 14	1	20	17	13	49	0	-1	4	M	Well over extracted need to check this well for air ingress
	2	45.5	22	0.4	32	0	-6	70	M	
	3	63	16	0.4	21	0	-10	20	M	
	4	56	26	0.5	16	0	-11	15	M	
	5	55	23	1.3	20	0	-12	12	M	
	6	69	30	0.6	0	2	-9	6	M	
Cells 15/16	1	70	32	0.5	0	0	-19	60	W	
	2	64	29	0.9	6	0	-18	60	W	
	3	64	33	1	1.4	0	-19	60	W	
	4	62	28	0.1	10	0	-17	60	W	
	5	68	35	0.2	0	0	-19	60	W	
	6	8	5	19	68	0	-1	10	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	50	20	0.5	30	0	-1	10	W	
	8	73	29	0.3	0	0	-19	60	W	
	9	59	28	0.1	12	0	-18	60	W	
	10	61	26	0.5	0	0	-19	60	W	
	11	63	24	0.2	12	0	-19	60	W	
	12	48	29	0.5	23	0	-18	60	W	

Cells 17	1	57	34	0.9	0	0	-2	50	W	KCC to carry out remedial works on the liner cap around the wells on Cells 15/16
	2	56	36	0.7	0	0	-16	60	W	
	3	34	29	5	31	1	-16	80	W	Gas well over extracted
	4	62	40	0.8	0	0	-16	80	W	
	5	41	32	2.8	23	0	-15	60	W	
	6	41	35	1.9	24	0	-16	90	W	
Cells 18	1	52	35	1.5	11	0	-15	50	M	
	2	50	37	1	12	0	-15	40	M	
	3	46	35	2.2	18	0	-14	60	M	
	4	61	43	0.4	0	0	-15	60	M	
	5	42	32	2	24	0	-15	60	M	
Valves	1	39	20	3	38	1	-1	1%		Line 1
	2	36	16	4	44	0	-1	1%		Line 2
	3	44	28	2	26	1	-24	40%		Line 3
	4	30	18	3	49	1	-18	30%		Manifold 11/12
	5	58	33	0.3	7	0	-14	60%		Manifold 13
	6	45	24	3	28	1	-15	80%		Manifold 14
	7	56	36	1	7	0	-18	30%		Mainline cell 15
	8	42	26	3	29	0	-19	80%		Cell 9&10
	9	43	28	2	27	2	-16	60%		Mainline 17
	10	52	36	1	11	0	-15	100%		Manifold 18
Flare/Engine	Before	38	27	3	32	2	-30	370m3hr		Over extraction evident with depletion of gas quality
Flare/Engine	After	42	31	2	25	2	-19	230m3hr		Flare shutdown as over extraction is evident
<b>Comments:</b>										

**NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING**



Model Serial No Fehilly Timony Gas Analyser  
 Date: 22/03/2016  
 Weather: Dry/Cool 978

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/f lowline/manifold (w/f/m)	Comments
Cells 1	1.3	54	22	3.7	20	0	-9	2%	w	
	1.4	75	22	0.6	1.9	1	-10	5%	w	
Cells 2	2.1	0	0.1	21	78	1	-3	30%	W	
	2.2	22	17	0.8	59	0	-2	60%	w	Well over pulled
	2.3	38	20	0.4	42	1	-5	2%	w	
Cells 3	3.2	69	28	0.5	1.7	2	-10	20%	w	
	3.4	60	28	0	10.8	1	-16	30%	w	
Cells 4	4.2	48	25	0.5	28	2	-4	60%	w	KCC to address issues
	4.3	57	27	0.6	15	1	0	2%	w	No suction Everton. To investigate this issue
	4.4	60	28	0.6	11	2	-5	20%		
Cells 5	5.1	73	29	0.3	0	5	-9	2%	w	Excavated gas well all surface pipe work ok
	5.2	27	19	1.6	52	4	0	0%	W	Valve seized suction on main line
	5.3	1.9	1.2	20	76	1	-9	100%	W	KCC design perforated pipe close to surface drawing in air ingress
	5.4	66	27	0.8	6	3	-9	2%	W	Excavation needs to be back filled by KCC
Cells 6	6.1	2.7	8	13	76	1	-6	5%	W	Well over pulled - Poor cap
	6.2	70	31	0.2	0	2	-1	2%	w	
	6.3	56	12	5	27	1	-1	2%	W	
	6.4	4	3	18	74	1	-7	1%	W	Well needs excavated for further investigation. Possible cap defect - KCC contractor to repair
Cells 7	7.1	0	0.7	22	77	0	0	0	W	Cap damaged perforated pipe above ground level
	7.2	12	5	14	68	8	0	0	W	Cap damaged
	7.3	17	6	8	69	0	0	0	W	Cap damaged
	7.4	0.3	0.3	21	78	1	-6	2	W	Cap damaged
	7.5									
Cells 8	8.1	65	33	0.8	0.8	1	-6	15%	W	
	8.2	10	4	17	68	1	-5	5%	M	
	8.3	10	6	17	66	2	-5	5%	W	
	8.4	0	1.1	22	76	2	0	0	W	Gas well damaged and flooded
Cells 9	9.1	30	15	5	49	3	-6	10%	W	
	9.2	66	27	0.3	6	4	-14	25%	w	
	9.3	0.1	0.6	21	78	3	-3	0%	w	Well location flooded
	9.4	28	9	13	50	4	-14	25%	W	Well location flooded
	9.6	67	24	2	7	5	-14	2%	W	
Cells 10	10.2	52	3	0.9	44	4	-8	1%	w	Cap damaged perforated pipe above ground level
	10.3	23	7	14	54	2	-15	15%	w	
	10.4	80	21	0.3	0	3	-15	10%	w	
	10.5	28	9	13	49	1	-8	30%	w	
	10.6	17	7	14	62	2	-2	10%	w	
Cells 11	1	35	16	8	39	2	-13	20	W	
	2	0	0.1	20	79	1	-1	0%	w	To excavate well would require digging up road
	3	47	25	0.5	27	1	-14	20%	w	
Cells 12	1	0.4	0.2	20	78	0	-1	10	M	Under ground well issue pipe work ok
	2	23	20	0.3	57	2	-1	20	M	Over pulled gas well
	3	26	21	0.2	52	1	-11	40	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	62	23	3	12	5	-14	100	M	
	2	70	25	1	4	3	-14	25	M	
	3	48	21	1	30	2	-14	90	M	
	4	73	27	0.3	0	4	-13	95	M	
	5	75	23	0.3	1.8	2	-14	20	M	
	6	30	13	12	45	2	-14	80	M	
Cells 14	1	28	14	11	45	2	-5	10	M	Well over pulled need to check this well for problems
	2	64	30	1.5	5	3	-14	20	M	
	3	77	24	0.2	0	4	-14	30	M	
	4	65	29	1.6	4	4	-14	30	M	
	5	66	25	2	6	4	-14	20	M	
	6	62	27	2	7	4	-14	30	M	
Cells 15/16	1	69	26	1.3	3	6	-15	60	W	
	2	71	28	0.3	1	6	-15	60	W	
	3	69	32	0.2	0	6	-15	60	W	
	4	72	31	0.1	0	5	-15	60	W	
	5	70	32	0.1	0	5	-15	60	W	
	6	9	5	19	67	6	-2	10	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	73	28	0.4	0	5	-2	10	W	
	8	72	28	0.5	0	6	-15	60	W	
	9	68	27	0.5	0	6	-15	60	W	
	10	65	28	0.5	6	6	-15	60	W	



	11	75	27	0.2	0	6	-15	60	W	
	12	61	30	0.2	8	5	-15	60	W	
Cells 17	1	1	2	20	77	2	-1	15	W	
	2	56	34	0.2	10	3	-12	75	W	
	3	45	32	2.8	21	3	-12	100	W	Gas well over pulled
	4	64	38	0.5	0	6	-12	75	W	
	5	51	34	2	13	4	-12	60	W	
	6	47	33	2	21	3	-12	90	W	
Cells 18	1	56	36	1.2	7	2	-12	50	M	
	2	61	38	0.1	12	4	-12	50	M	
	3	55	35	1.8	8	3	-12	30	M	
	4	64	39	0.5	0	18	-12	50	M	
	5	54	35	1.7	9	3	-9	50	M	
Valves	1	13	9	13	64	2	-1	5%		Line 1
	2	26	17	3.5	53	2	-1	5%		Line 2
	3	45	27	2	26	1	-24	40%		Line 3
	4	29	20	2.5	48	2	-18	30%		Manifold 11/12
	5	62	20	3	15	4	-14	60%		Manifold 13
	6	39	20	8	33	3	-15	80%		Manifold 14
	7	81	20	0.2	0	5	-18	30%		Mainline cell 15
	8	68	26	0.3	5	1	-19	80%		Cell 9&10
	9	48	30	2	20	3	-16	60%		Mainline 17
	10	52	54	35	1.4	4	-15	100%		Manifold 18
Flare/Engine	Before	44	28	3	25	2	-30	325m3hr		
Flare/Engine	After	46	32	2	22	2	-19	300m3hr		
<b>Comments:</b>										

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 24/03/2016  
 Weather: Dry/Cool 984mb

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/f lowline/manifold (w/f/m)	Comments
Cells 1	1.3	58	23	3	15	0	-8	2%	w	
	1.4	76	22	0.9	0.6	2	-7	5%	w	
Cells 2	2.1	16	13	7	62	2	-4	30%	W	
	2.2	1.7	7	11	79	0	-1	60%	w	Well over pulled
	2.3	27	18	0.9	52	1	-3	2%	w	
Cells 3	3.2	24	20	1.7	54	3	-8	20%	w	
	3.4	10	15	7	68	1	-12	30%	w	
Cells 4	4.2	40	25	1.5	34	1	-5	60%	w	KCC to address issues
	4.3	38	19	0.6	42	2	0	2%	w	Investigate this issue
	4.4	24	21	1.2	54	1	-6	20%		
Cells 5	5.1	61	22	0.5	16	4	-10	2%	w	Excavated gas well all surface pipe work ok
	5.2	26	18	1.5	54	3	0	0%	W	Valve seized suction on main line
	5.3	58	23	0.5	17.5	1	-7	100%	W	KCC design perforated pipe close to surface drawing in air ingress
	5.4	38	16	0.8	45	2	-7	2%	W	Excavation needs to be back filled by KCC
Cells 6	6.1	4	6	15	75	1	-5	5%	W	Well over pulled - Poor cap
	6.2	47	24	0.8	28	1	-2	2%	w	
	6.3	4	2	21	74	1	-1	2%	W	
	6.4	6	4	18	71	2	-5	1%	W	Well needs excavated for further investigation. Possible cap defect - KCC contractor to repair
Cells 7	7.1	0.2	1.2	22	77	1	0	0	W	Cap damaged perforated pipe above ground level
	7.2	0.2	1.6	22	77	5	0	0	W	Cap damaged
	7.3	37	20	14	29	0	0	0	W	Cap damaged
	7.4	62	22	1.7	14	2	-5	2	W	Cap damaged
	7.5									
Cells 8	8.1	58	31	1	9	2	-5	15%	W	
	8.2	15	8	13	64	1	-3	5%	M	
	8.3	18	9	12	61	2	-2	2%	W	
	8.4	0.8	3	21	75	1	0	0	W	Gas well damaged and flooded
Cells 9	9.1	64	18	0.5	17	2	-7	10%	W	
	9.2	77	26	0.2	0	3	-12	25%	w	
	9.3	52	9	5	32	2	-2	0%	w	Well location flooded
	9.4	48	17	0.4	34	3	-11	25%	W	Well location flooded
	9.6	51	25	1	23	3	-10	2%	W	
Cells 10	10.2	68	19	0.4	35	2	-9	1%	w	Cap damaged perforated pipe above ground level
	10.3	62	25	0.1	13	3	-8	15%	w	
	10.4	49	15	0.4	35	2	-10	10%	w	
	10.5	70	20	0.3	8	2	-9	30%	w	
	10.6	58	20	1.7	20	3	-1	10%	w	
Cells 11	1	62	24	0.5	13	2	-11	20	W	
	2	19	9	13	59	2	-2	0%	w	To excavate well would require digging up road
	3	40	17	9	33	1	-11	20%	w	
Cells 12	1	0.6	1.5	21	76	1	-2	10	M	Under ground well issue pipe work ok
	2	40	24	0.7	35	2	-2	20	M	Over pulled gas well
	3	41	23	1.7	35	1	-9	40	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	24	11	14	51	3	-11	100	M	
	2	71	25	1	2	2	-10	25	M	
	3	42	21	1.3	36	2	-11	90	M	
	4	71	27	1.4	0	3	-10	95	M	
	5	23	19	1.5	56	1	-11	20	M	
	6	13	6	18	63	1	-2	3	M	
Cells 14	1	29	18	11	41	3	-2	2	M	Well over pulled need to check this well for problems
	2	74	30	2	0	4	-11	20	M	
	3	54	20	0.6	24	2	-10	30	M	Important not to over pull gas well
	4	62	28	0.4	9	2	-9	30	M	
	5	65	24	1	11	3	-10	20	M	
	6	63	25	0.3	11	2	-11	30	M	
Cells 15/16	1	58	22	1.5	19	4	-11	60	W	
	2	64	25	0.1	13	3	-11	60	W	
	3	61	30	2.4	6	5	-10	60	W	
	4	58	19	0.6	22	5	-11	60	W	
	5	58	27	0.7	14	4	-11	60	W	
	6	52	26	5	16	6	-4	10	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	61	26	0.1	13	3	-4	10	W	
	8	59	24	0.3	16	6	-11	60	W	
	9	64	23	0.4	12	4	-11	60	W	
	10	66	28	2	3	4	-10	60	W	
	11	55	21	2.4	21	4	-11	60	W	
	12	41	20	0.7	14	4	-11	60	W	

Cells 17	1	2	3	21	75	3	-1	15	W	To investigate
	2	62	36	0.5	0.8	4	-9	75	W	
	3	38	31	3	28	3	-10	100	W	Gas well over pulled
	4	64	41	0.3	0	4	-9	75	W	
	5	42	32	3	22	3	-9	60	W	
	6	49	37	1.9	12	4	-9	90	W	
Cells 18	1	58	37	1.2	4	3	-10	50	M	
	2	56	39	1.2	3	5	-10	50	M	
	3	51	36	1.8	11	3	-9	30	M	
	4	64	41	0.7	0	11	-10	50	M	
	5	47	34	3	16	4	-9	50	M	
Valves	1	15	7	11	67	1	-1	2%		Line 1
	2	21	14	2	63	1	-1	1%		Line 2
	3	43	25	3	31	1	-15	40%		Line 3
	4	34	23	2	41	1	-13	30%		Manifold 11/12
	5	59	26	2	13	3	-12	60%		Manifold 13
	6	41	24	5	30	2	-11	80%		Manifold 14
	7	68	32	0.2	1	3	-13	30%		Mainline cell 15
	8	65	28	0.6	6	1	-12	80%		Cell 9&10
	9	46	31	2.8	19	3	-10	60%		Mainline 17
	10	54	35	2	9	4	-11	100%		Manifold 18
Flare/Engine	Before	43	29	2.8	21	1	-16	300m3hr		
Flare/Engine	After	47	32	1.3	19	2	-14	280m3hr		

**Comments:**

KCC contractor commencing remedial works on the cap

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 26/04/2016  
 Weather: Dry/Sunny 996

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/manifold (w/f/m)	Comments
Cells 1	1.3	57.7	17	2	22	0	-2	2%	w	
	1.4	63	17	0.9	18	1	-2	5%	w	
Cells 2	2.1	38	21	1.7	39	3	-3	30%	W	
	2.2	60	21	0.7	18	0	-1	60%	w	Well over pulled
	2.3	43	18	0.7	38	1	-2	2%	w	
Cells 3	3.2	58	20	0.4	21	3	-3	20%	w	
	3.4	46	15	0.9	38	1	-2	30%	w	
Cells 4	4.2	53	27	1.3	18	1	-2	60%	w	KCC to address issues
	4.3	47	22	0.6	31	1	0	2%	w	Investigate this issue
	4.4	42	16	0.6	42	1	-2	20%		
Cells 5	5.1	44	17	1	38	2	-2	2%	w	Excavated gas well all surface pipe work ok
	5.2	16	15	5	63	1	0	0%	W	Valve seized suction on main line
	5.3	30	13	12	45	1	-3	100%	W	KCC design perforated pipe close to surface drawing in air ingress
	5.4	52	27	1	19	2	-2	2%	W	Excavation needs to be back filled by KCC
Cells 6	6.1	18	10	12	60	1	-2	5%	W	Well over pulled
	6.2	54	24	1	21	1	1	2%	w	
	6.3	43	10	3	43	1	-1	2%	W	
	6.4	0.3	2	21	76	0	0	1%	W	
Cells 7	7.1	19	6	15	60	1	0	0	W	Cap damaged perforated pipe above ground level
	7.2	59	23	2	16	5	0	0	W	Cap damaged
	7.3	34	13	3	48	0	0	0	W	Cap damaged
	7.4	1	5	9	85	2	-1	2	W	Cap damaged
	7.5									
Cells 8	8.1	51	26	2	21	1	-3	15%	W	
	8.2	31	21	2	46	1	-3	5%	M	
	8.3	0.3	2.4	21	76	2	-2	2%	W	
	8.4	1.2	5	9	85	1	0	0	W	Gas well damaged and flooded
Cells 9	9.1	53	20	2	24	2	-10	10%	W	
	9.2	60	26	0.4	13	1	-11	25%	w	
	9.3	44	8	1.6	47	2	-1	0%	w	Well location flooded
	9.4	61	17	2	19	3	-8	25%	W	Well location flooded
	9.6	47	22	2	29	1	-4	2%	W	
Cells 10	10.2	51	10	2	38	3	-7	1%	w	Cap damaged perforated pipe above ground level
	10.3	57	24	1.6	17	3	-9	15%	w	
	10.4	53	17	0.9	30	1	-8	10%	w	
	10.5	68	15	0.4	16	2	-6	30%	w	
	10.6	56	16	3	23	1	-1	10%	w	
Cells 11	1	47	18	0.6	34	1	-7	20	W	
	2	24	11	10	54	3	-1	0%	w	To excavate well would require digging up road
	3	54	22	2	21	1	-8	20%	w	
Cells 12	1	46	16	0.5	38	1	-5	10	M	Under ground well issue pipe work ok
	2	34	22	0.7	43	2	-5	20	M	Over pulled gas well
	3	41	23	1.9	34	1	-10	40	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	49	16	1	34	2	-13	100	M	
	2	64	22	2	10	1	-12	25	M	
	3	41	19	1.5	38	2	-13	90	M	
	4	65	25	2	6	2	-12	95	M	
	5	22	18	1.7	59	1	-12	20	M	
	6	16	7	16	60	1	-1	3	M	
Cells 14	1	37	21	5	36	2	-1	2	M	Well over pulled need to check this well for problems
	2	65	27	1.8	6	2	-12	20	M	
	3	43	15	0.9	41	2	-9	30	M	Important not to over pull gas well
	4	61	28	2	9	1	-11	30	M	
	5	63	23	2	9	1	-11	20	M	
	6	38	17	8	38	3	-2	2	M	
Cells 15/16	1	58	23	1.8	17	2	-13	60	W	
	2	64	22	0.4	14	2	-13	60	W	
	3	63	33	0.3	3	3	-13	60	W	
	4	66	26	0.5	7	2	-13	60	W	
	5	61	31	0.7	7	3	-12	60	W	
	6	42	19	0.4	39	3	-5	10	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	61	24	0.6	15	2	-5	10	W	
	8	68	25	0.3	6	2	-14	60	W	
	9	52	22	0.4	25	3	-13	60	W	
	10	55	23	1.8	17	2	-13	60	W	
	11	48	20	0.4	32	2	-13	60	W	
	12	55	29	2	13	2	-13	60	W	

Cells 17	1	57	36	0.8	6	2	-1	3	W	
	2	52	32	1	15	3	-9	75	W	
	3	44	33	2	21	2	-12	100	W	Gas well over pulled
	4	65	41	0.2	0	2	-11	75	W	
	5	51	35	2	11	1	-11	60	W	
	6	46	34	2	18	3	-10	90	W	
Cells 18	1	55	36	1	6	1	-12	50	M	
	2	54	36	0.4	9	3	-11	50	M	
	3	55	37	1.8	6	2	-10	30	M	
	4	52	36	0.4	11	6	-11	50	M	
	5	48	37	2	14	3	-11	50	M	
Valves	1	25	16	1	55	1	-4	2%		Line 1
	2	31	18	1	50	1	-4	1%		Line 2
	3	45	27	2	26	2	-18	40%		Line 3
	4	41	23	2	31	1	-11	30%		Manifold 11/12
	5	51	24	2	23	4	-13	60%		Manifold 13
	6	43	25	3	29	3	-12	80%		Manifold 14
	7	58	38	1	3	4	-15	30%		Mainline cell 15
	8	62	31	2	5	1	-16	80%		Cell 9&10
	9	44	29	3	24	3	-13	60%		Mainline 17
	10	51	36	1	12	5	-14	100%		Manifold 18
Flare/Engine	Before	45	30	2	77	1	-20	320m3hr		Gas quality sustaining.
Flare/Engine	After	48	33	2	17	3	-17	305m3hr		Gas flow has improved slightly due to the dry weather
<b>Comments:</b>										

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 31/05/2016  
 Weather: Dry/Sunny 987

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/manifold (w/l/m)	Comments
Cells 1	1.3	54	14	1	30	0	0	0%	w	KCC gasfield works
	1.4	53	16	1	30	1	0	0%	w	KCC gasfield works
Cells 2	2.1	53	21	0.4	26	1	0	0%	W	KCC gasfield works
	2.2	54	19	1	26	0	0	0%	w	KCC gasfield works
	2.3	40	17	1.5	41	1	0	0%	w	KCC gasfield works
Cells 3	3.2	66	22	1.1	11	1	0	0%	w	KCC gasfield works
	3.4	64	22	1	12	1	0	0%	w	KCC gasfield works
Cells 4	4.2	1	2	20	77	1	0	0%	w	KCC gasfield works
	4.3	50	30	1	19	0	0	0%	w	KCC gasfield works
	4.4	53	21	0.7	25	0	0	0%		KCC gasfield works Well over pulled
Cells 5	5.1	59	23	1	17	1	0	0%	w	KCC gasfield works
	5.2	28	17	0.7	54	0	0	0%	W	KCC gasfield works
	5.3	37	16	3	43	0	0	0%	W	KCC gasfield works
	5.4	58	23	0.6	18	0	0	0%	W	KCC gasfield works
Cells 6	6.1	15	8	14	63	0	0	0%	W	Excavated needs to be back filled KCC gasfield works
	6.2	45	20	0.4	34	0	0	0%	w	KCC gasfield works
	6.3	54	34	1	11	0	0	0%	W	KCC gasfield works
	6.4	2	3	19	76	0	0	0%	W	KCC gasfield works
Cells 7	7.1	1	2	20	77	1	0	0%	W	KCC gasfield works
	7.2	1	3	19	77	0	0	0%	W	KCC gasfield works
	7.3	2	5	19	74	0	0	0%	W	KCC gasfield works
	7.4	1	5	16	76	0	0	0%	W	KCC gasfield works
	7.5									
Cells 8	8.1	54	32	1	13	0	0	0%	W	KCC gasfield works
	8.2	38	24	1	38	0	0	0%	M	KCC gasfield works
	8.3	1	5	20	74	0	0	0%	W	KCC gasfield works
	8.4	0.2	6	21	72	0	0	0%	W	KCC gasfield works
Cells 9	9.1	54	20	1.6	25	0	-4	5%	W	
	9.2	53	16	1.8	30	2	-12	25%	w	
	9.3	65	17	1	14	4	-1	0%	w	Well location flooded
	9.4	51	18	2	22	3	-11	25%	W	Well location flooded
	9.6	42	23	1	36	1	-4	2%	W	
Cells 10	10.2	70	12	1.5	16	2	-3	1%	w	Cap damaged perforated pipe above ground level
	10.3	45	25	0.8	30	3	-4	15%	w	
	10.4	54	18	0.7	27	1	-7	10%	w	
	10.5	56	12	0.8	31	3	-7	30%	w	
	10.6	52	19	0.7	29	2	-3	10%	w	
Cells 11	1	44	22	3	31	1	-9	20%	W	
	2	19	9	12	60	3	-1	1%	w	To excavate well would require digging up road
	3	56	25	1	17	1	-7	20%	w	
Cells 12	1	63	21	0.3	6	2	-6	10%	M	Under ground well issue pipe work ok
	2	38	19	0.8	42	2	-4	20%	M	Over pulled gas well
	3	38	21	1.9	39	0	-9	40%	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	53	17	0.7	30	1	-10	100%	M	
	2	55	19	1	25	2	-11	25%	M	
	3	40	19	0.3	40	1	-10	90%	M	
	4	55	21	1	22	1	-11	95%	M	
	5	25	19	0.9	55	2	-10	20%	M	
	6	24	12	13	51	1	-1	2%	M	
Cells 14	1	43	29	4	24	1	-1	2%	M	Well over pulled need to check this well for problems
	2	51	21	3	21	2	-10	20%	M	
	3	49	16	1	35	3	-11	30%	M	Important not to over pull gas well
	4	55	26	1	17	2	-9	30%	M	
	5	61	23	1	15	1	-10	20%	M	
	6	24	9	14	53	2	-1	1%	M	
Cells 15/16	1	53	22	1.9	23	1	-11	60%	W	
	2	58	22	0.6	19	2	-12	60%	W	
	3	52	28	1.7	18	2	-11	60%	W	
	4	55	25	1.2	19	1	-12	60%	W	
	5	51	27	0.9	22	2	-13	60%	W	
	6	48	25	3	24	1	-4	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	59	26	0.4	14	3	-4	10%	W	
	8	45	21	1.3	34	2	-12	60%	W	
	9	60	26	0.9	13	2	-11	60%	W	
	10	64	26	2	7	3	-10	60%	W	
	11	47	18	1.4	34	3	-11	60%	W	
	12	64	28	0.7	7	2	-12	60%	W	

Cells 17	1	54	36	0.1	9	1	-1	2%	W	
	2	52	36	0.4	13	2	-11	75%	W	
	3	58	42	2	0	3	-10	100%	W	Gas well over pulled
	4	47	35	1	17	1	-9	75%	W	
	5	58	42	2	0	2	-9	60%	W	
	6	59	40	1	0	1	-10	90%	W	
Cells 18	1	57	37	0.6	5	1	-11	50%	M	
	2	62	40	0.4	0	2	-10	50%	M	
	3	56	41	1	2	3	-9	30%	M	
	4	47	36	0.4	11	6	-11	50%	M	
	5	58	40	0.6	0.5	3	-9	50%	M	
Valves	1	15	13	6	64	1	0	0%		Line 1 valve closed due to KCC gasfield works
	2	42	21	2	35	0	0	0%		Line 2 valve closed due to KCC gasfield works
	3	44	28	1	27	2	-16	40%		Line 3
	4	39	27	1	33	2	-13	30%		Manifold 11/12
	5	49	25	1	25	3	-11	60%		Manifold 13
	6	41	24	3.5	32	1	-12	80%		Manifold 14
	7	57	31	1	11	4	-13	30%		Mainline cell 15
	8	55	23	2	21	2	-13	80%		Cell 9&10
	9	46	31	2	21	4	-11	60%		Mainline 17
	10	56	38	1	5	3	-11	100%		Manifold 18
Flare/Engine	Before	44	28	2.8	25	2	-16	280m3hr		Gas quality holding flare running approx 7 hours each day Monday to Friday
Flare/Engine	After	46	31	1	22	3	-15	270m3hr		Gas flow has improved slightly as dry weather has made some difference
<b>Comments:</b>										

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 30/06/2016  
 Weather: Heavy Rain 984

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/f lowline/manifold (w/f/m)	Comments
Cells 1	1.3	58	17	0.8	24.2	0	0	0%	w	KCC gasfield works
	1.4	50	19	1	30	1	0	0%	w	KCC gasfield works
Cells 2	2.1	55	23	1	21	2	0	0%	W	KCC gasfield works
	2.2	49	23	1	27	0	0	0%	w	KCC gasfield works
	2.3	43	19	1	37	1	0	0%	w	KCC gasfield works
Cells 3	3.2	61	25	1.1	12.9	2	0	0%	w	KCC gasfield works
	3.4	57	26	1.7	15.3	1	0	0%	w	KCC gasfield works
Cells 4	4.2	2	3	19	76	1	0	0%	w	KCC gasfield works
	4.3	48	31	0.6	20.4	0	0	0%	w	KCC gasfield works
	4.4	50	23	1	26	0	0	0%	w	KCC gasfield works
Cells 5	5.1	55	24	1	20	1	0	0%	w	KCC gasfield works
	5.2	32	19	1.5	47.5	0	0	0%	W	KCC gasfield works
	5.3	41	21	2	36	0	0	0%	W	KCC gasfield works
	5.4	52	25	0.4	22.6	0	0	0%	W	KCC gasfield works
Cells 6	6.1	5	6	17	72	1	0	0%	W	KCC gasfield works
	6.2	36	17	2	45	0	0	0%	w	KCC gasfield works
	6.3	44	29	1	26	1	0	0%	W	KCC gasfield works
	6.4	1	5	18	76	0	0	0%	W	KCC gasfield works
Cells 7	7.1	0.9	3	19	77.1	1	0	0%	W	KCC gasfield works
	7.2	2	2	20	76	0	0	0%	W	KCC gasfield works
	7.3	1	3	18	78	1	0	0%	W	KCC gasfield works
	7.4	0.6	2	19	78.4	0	0	0%	W	KCC gasfield works
	7.5									
Cells 8	8.1	48	34	0.7	17.3	2	0	0%	W	KCC gasfield works
	8.2	41	25	1.6	32.4	1	-2	0%	M	KCC gasfield works
	8.3	1	2	19	78	0	0	0%	W	KCC gasfield works
	8.4	0.8	4	18	77.2	0	0	0%	W	KCC gasfield works
Cells 9	9.1	49	21	2	28	0	-2	5%	W	
	9.2	47	19	1.3	32.7	1	-13	25%	w	
	9.3	62	19	1.5	17.5	2	-1	0%	w	
	9.4	43	19	2.6	35.4	1	-13	25%	W	Well head needed to be tightened
	9.6	40	22	1.6	35.4	1	-2	2%	W	
Cells 10	10.2	62	14	1.3	22.8	1	-2	1%	w	Cap damaged perforated pipe above ground level
	10.3	47	27	1	25	1	-3	15%	w	
	10.4	46	19	1.4	33.6	1	-9	10%	w	
	10.5	58	13	1.4	27.6	3	-9	30%	w	
	10.6	48	21	1.1	29.9	2	-3	10%	w	
Cells 11	1	49	29	2	20	2	-7	20%	W	
	2	16	11	10	63	2	-1	1%	w	To excavate well would require digging up road
	3	48	26	2	24	2	-8	20%	w	
Cells 12	1	48	23	2	27	1	-7	10%	M	Under ground well issue pipe work ok
	2	40	21	1	38	2	-2	20%	M	Over pulled gas well
	3	41	24	1.4	33.6	0	-10	40%	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	50	20	1	29	2	-11	100%	M	
	2	52	21	2	25	1	-10	25%	M	
	3	43	21	0.9	35.1	1	-11	90%	M	
	4	46	23	1.6	29.4	1	-10	95%	M	
	5	31	22	1.4	45.6	1	-9	20%	M	
	6	45	24	2	29	2	-1	2%	M	
Cells 14	1	44	27	3	26	2	-1	2%	M	Well over pulled need to check this well for problems
	2	53	26	2	20	1	-6	20%	M	
	3	46	19	1.6	33.4	2	-9	30%	M	Important not to over pull gas well
	4	57	29	1.5	12.5	1	-7	30%	M	
	5	59	26	0.7	14.3	1	-9	20%	M	
	6	26	13	7	54	1	-0.5	1%	M	
Cells 15/16	1	50	26	1.2	22.8	2	-13	60%	W	
	2	59	26	1	14	1	-12	60%	W	
	3	55	29	1.4	14.6	1	-13	60%	W	
	4	57	28	1.5	13.5	1	-13	60%	W	
	5	53	28	1.3	17.7	1	-14	60%	W	
	6	43	23	3.2	30.8	2	-6	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	57	28	0.9	14.1	2	-6	10%	W	
	8	48	24	1.1	63.1	2	-14	60%	W	
	9	58	28	1.4	12.6	1	-13	60%	W	
	10	61	28	2.2	8.8	2	-14	60%	W	
	11	45	23	1.7	30.3	2	-14	60%	W	
	12	59	31	1.2	8.8	1	-14	60%	W	



Cells 17	1	46	29	2.2	22.8	1	-1	2%	W	
	2	49	33	1.4	16.6	3	-14	75%	W	
	3	51	36	0.8	12.2	1	-13	100%	W	Gas well over pulled
	4	46	31	2	21	2	-11	75%	W	
	5	54	38	1	7	1	-12	60%	W	
	6	57	38	1.4	3.6	1	-12	90%	W	
Cells 18	1	53	35	1	11	2	-13	50%	M	
	2	58	38	0.8	3.2	1	-12	50%	M	
	3	57	40	1.4	1.6	2	-13	30%	M	
	4	49	34	1.2	15.8	3	-14	50%	M	
	5	54	38	1.2	6.8	2	-13	50%	M	
Valves	1	12	14	7	67	1	0	0%		Line 1 valve closed due to KCC gasfield works
	2	39	23	5	33	0	0	0%		Line 2 valve closed due to KCC gasfield works
	3	43	30	1.7	25.3	1	-14	40%		Line 3
	4	43	28	1	28	1	-13	30%		Manifold 11/12
	5	47	29	1.4	22.6	2	-12	60%		Manifold 13
	6	46	26	2.5	25.5	2	-11	80%		Manifold 14
	7	55	35	1	9	3	-15	30%		Mainline cell 15
	8	49	28	1.7	21.3	1	-13	80%		Cell 9&10
	9	51	33	1	15	3	-14	60%		Mainline 17
	10	55	36	0.5	9.5	2	-14	100%		Manifold 18
Flare/Engine	Before	45	30	2.5	22.5	2	-18	275m3hr		Gas quality holding flare running approx 7 hours each day Monday to Friday
Flare/Engine	After	48	31	1.6	19.4	1	-16	265m3hr		Gas flow will have to be monitored as there has been heavy rain over the last few days.
<b>Comments:</b>										

**NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING**



Model Serial No GM09053  
 Date: 28/07/2016  
 Weather: Mild/Wet 993

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/manifold (w/l/m)	Comments
Cells 1	1.3	44	21	1.2	34	1	-2	3%	w	
	1.4	47	24	2	27	1	-2	3%	w	
Cells 2	2.1	19	15	2	64	1	-2	3%	W	
	2.2	36	21	3	40	2	-2	3%	w	
	2.3	36	21	1	42	1	-2	3%	w	
Cells 3	3.2	31	22	2	45	1	-2	3%	w	
	3.4	21	15	2	62	1	-2	3%	w	
Cells 4	4.2	44	24	2	30	2	-4	10%	w	
	4.3	41	24	2	33	1	-2	3%	w	
	4.4	22	19	3	56	2	-2	3%		
Cells 5	5.1	56	26	1	17	1	-2	3%	w	
	5.2	30	17	2	51	2	-2	3%	W	
	5.3	51	28	1	20	1	-2	3%	W	
	5.4	41	25	1	33	2	-2	3%	W	
Cells 6	6.1	22	15	2	61	2	-2	3%	W	
	6.2	48	27	1	24	1	-2	3%	w	
	6.3	17	12	3	68	2	-2	3%	W	
	6.4	3	8	17	72	1	-2	3%	W	
Cells 7	7.1	24	16	3	57	1	-2	3%	W	
	7.2	16	13	2	69	2	-2	3%	W	
	7.3	48	31	1	20	2	-2	3%	W	
	7.4	0.6	4	18	77	1	0	0%	W	KCC gasfield works well not connected as pumping of gas well in progress
	7.5									
Cells 8	8.1	46	28	2	24	2	-2	3%	W	
	8.2	38	24	2	36	1	-5	6%	M	
	8.3	34	19	3	44	2	-2	3%	W	
	8.4	1	3	21	75	1	0	0%	W	Gas well poor will investigate further
Cells 9	9.1	47	29	1	23	1	-1	3%	W	
	9.2	51	25	2	22	2	-14	25%	w	
	9.3	41	21	1.5	36	1	-1	0%	w	
	9.4	46	24	1	29	2	-13	25%	W	
	9.6	38	23	2	37	2	-1	1%	W	
Cells 10	10.2	54	17	2	27	2	-2	1%	w	Cap damaged perforated pipe above ground level
	10.3	44	24	2	30	1	-5	15%	w	
	10.4	49	16	1	34	1	-7	10%	w	
	10.5	62	16	1	21	2	-8	30%	w	
	10.6	51	24	2	23	1	-4	15%	w	
Cells 11	1	42	26	1	31	1	-9	20%	W	
	2	18	13	8	61	3	-1	1%	w	To excavate well would require digging up road
	3	44	27	3	26	1	-11	20%	w	
Cells 12	1	44	24	2	30	2	-8	10%	M	Under ground well issue pipe work ok
	2	37	19	2	42	1	-2	20%	M	Over pulled gas well
	3	43	25	1	31	0	-12	40%	M	Flooded gas field was a productive well but gas quality has reduced significantly
	4									
Cells 13	1	53	23	2	22	1	-12	100%	M	
	2	49	22	1	28	2	-12	25%	M	
	3	39	23	1	37	2	-12	90%	M	
	4	43	24	2	31	2	-12	95%	M	
	5	34	26	2	38	1	-7	15%	M	
	6	40	22	3	35	1	-1	1%	M	
Cells 14	1	42	28	3	27	2	-1	1%	M	Well over pulled need to check this well for problems
	2	48	23	2	27	2	-9	20%	M	
	3	42	19	2	37	1	-11	30%	M	Important not to over pull gas well
	4	59	33	1	7	2	-11	30%	M	
	5	48	23	1	28	1	-11	20%	M	
	6	32	16	4	48	1	-0.5	1%	M	Need to investigate this gas well
Cells 15/16	1	52	28	1	19	2	-15	60%	W	
	2	57	27	1	15	1	-16	60%	W	
	3	50	31	1	18	2	-16	60%	W	
	4	54	31	1	14	2	-16	60%	W	
	5	57	34	1	8	2	-15	60%	W	
	6	45	26	2	27	1	-5	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	55	29	1	15	2	-5	10%	W	
	8	46	26	1	27	3	-16	60%	W	
	9	52	31	1	16	1	-16	60%	W	
	10	62	32	1	5	2	-16	60%	W	
	11	47	26	2	25	1	-16	60%	W	
	12	56	29	1	14	2	-16	60%	W	

Cells 17	1	42	26	3	29	1	-1	2%	W	Gas well over pulled
	2	46	30	2	22	2	-16	75%	W	
	3	49	34	1	16	2	-15	100%	W	Gas well over pulled
	4	48	29	1	22	1	-15	75%	W	
	5	50	34	1	15	2	-15	60%	W	
	6	53	33	2	12	1	-15	90%	W	
Cells 18	1	55	36	1	8	2	-16	50%	M	
	2	56	38	1	5	2	-15	50%	M	
	3	59	41	1	0	1	-16	30%	M	
	4	53	32	1	14	3	-16	50%	M	
	5	58	38	1	3	2	-15	50%	M	
Valves	1	39	19	3	39	1	-3	3%		Line now under suction after KCC works
	2	41	25	2	32	1	-3	3%		Line now under suction after KCC works
	3	41	31	1	27	3	-16	40%		Line 3
	4	44	26	2	28	1	-15	30%		Manifold 11/12
	5	46	32	2	20	2	-16	60%		Manifold 13
	6	43	24	3	30	2	-15	80%		Manifold 14
	7	56	38	1	5	2	-17	30%		Mainline cell 15
	8	46	27	3	24	2	-17	80%		Cell 9&10
	9	46	31	2	21	3	-16	60%		Mainline 17
	10	57	39	1	3	3	-17	100%		Manifold 18
Flare/Engine	Before	43	26	2.5	29	2	-22	280m3hr		Gas quality has reduced on gasfield
Flare/Engine	After	46	33	1	20	3	-19	270m3hr		Gas flow will have to be monitored so not to over pull gasfield
<b>Comments:</b>										
No significant improvement on the gas recovery since KCC works.										

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 30/08/2016  
 Weather: Cool/Wet 0989mb

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/manifold (w/f/m)	Comments
Cells 1	1.3	39	18	2.5	40.5	1	-1	3%	w	
	1.4	41	22	2	35	1	-1	3%	w	
Cells 2	2.1	16	14	3	67	1	-1	3%	W	
	2.2	38	22	3	37	2	-2	3%	w	
	2.3	39	24	2	35	1	-1	3%	w	
Cells 3	3.2	35	24	1	40	1	-1	3%	w	
	3.4	25	18	3	54	1	-2	3%	w	
Cells 4	4.2	49	28	1	22	2	-4	10%	w	
	4.3	44	26	1	29	1	-1	3%	w	
	4.4	18	16	3	63	2	-1	3%		
Cells 5	5.1	46	24	1	29	1	-1	3%	w	
	5.2	34	20	3	43	2	-1	3%	W	
	5.3	44	23	2	31	1	-1	3%	W	
	5.4	38	24	3	35	2	-1	3%	W	
Cells 6	6.1	14	13	3	70	1	-1	3%	W	
	6.2	44	24	1	31	1	-1	3%	w	
	6.3	23	18	2	57	2	-1	3%	W	
	6.4	6	5	14	75	1	-1	3%	W	
Cells 7	7.1	30	19	2	49	1	-1	3%	W	
	7.2	42	25	2	31	1	0	3%	W	Needs new valve at well head valve seized
	7.3	51	33	1	15	2	0	3%	W	Needs new valve at well head valve seized
	7.4	36	25	3	36	1	-1	3%	W	Well pumped out and now connected to extraction system
	7.5									
Cells 8	8.1	42	23	2	33	1	-1	3%	W	
	8.2	34	19	3	44	1	-4	6%	M	
	8.3	39	24	2	35	2	-1	3%	W	
	8.4	42	29	2	27	1	-1	1%	W	
Cells 9	9.1	44	26	2	28	1	-1	3%	W	
	9.2	54	32	1	13	2	-12	25%	w	
	9.3	38	21	3	38	1	-1	0%	w	
	9.4	42	22	2	34	2	-11	25%	W	
	9.6	42	26	2	30	1	-3	1%	W	
Cells 10	10.2	46	23	1	30	2	-3	1%	w	Cap damaged perforated pipe above ground level
	10.3	39	20	2	39	1	-7	15%	w	
	10.4	45	21	3	31	1	-7	10%	w	
	10.5	51	23	2	24	1	-6	30%	w	
	10.6	43	22	3	32	1	-6	15%	w	
Cells 11	1	46	29	1	24	1	-8	20%	W	
	2	19	15	9	57	4	-1	1%	w	To excavate well would require digging up road
	3	48	29	2	21	1	-11	20%	w	
Cells 12	1	39	22	3	36	2	-4	10%	M	Under ground well issue pipe work ok
	2	35	21	2	42	1	-1	20%	M	Over pulled gas well
	3	45	27	1	27	0	-13	40%	M	Gas quality starting to recover will monitor closely
	4									
Cells 13	1	45	21	2	32	1	-14	100%	M	
	2	53	25	1	21	1	-14	25%	M	
	3	41	25	1	33	2	-13	90%	M	
	4	39	22	2	37	1	-14	95%	M	
	5	37	28	2	33	1	-5	15%	M	
	6	44	25	2	29	1	-2	1%	M	
Cells 14	1	36	25	3	37	1	-1	1%	M	Well over pulled need to check this well for problems
	2	45	22	2	31	2	-11	20%	M	
	3	39	21	2	38	1	-13	30%	M	Important not to over pull gas well
	4	57	36	1	6	2	-13	30%	M	
	5	44	25	1	30	2	-14	20%	M	
	6	35	21	3	41	1	-0.5	1%	M	Need to investigate this gas well
Cells 15/16	1	50	31	3	16	1	-18	60%	W	
	2	54	33	1	12	1	-18	60%	W	
	3	53	34	2	11	2	-17	60%	W	
	4	52	33	1	14	1	-18	60%	W	
	5	52	35	2	11	2	-17	60%	W	
	6	42	25	3	30	1	-6	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	57	34	1	8	1	-6	10%	W	
	8	45	24	1	30	4	-18	60%	W	
	9	49	33	1	17	1	-17	60%	W	
	10	58	34	1	7	2	-18	60%	W	
	11	48	29	2	21	1	-18	60%	W	
	12	57	33	1	9	2	-18	60%	W	

Cells 17	1	36	25	3	36	1	-1	2%	W	Gas well over pulled
	2	44	27	3	26	2	-19	75%	W	
	3	51	33	1	15	2	-19	100%	W	Gas well over pulled
	4	46	27	2	25	2	-18	75%	W	
	5	47	35	2	16	3	-19	60%	W	
	6	49	35	1	15	1	-18	90%	W	
Cells 18	1	52	34	1	13	2	-19	50%	M	
	2	58	39	1	2	3	-18	50%	M	
	3	56	40	1	3	1	-19	30%	M	
	4	49	34	3	14	3	-18	50%	M	
	5	56	36	2	6	2	-18	50%	M	
Valves	1	32	17	3	48	2	-2	3%		Line now under suction after KCC works
	2	38	22	3	37	1	-1	3%		Line now under suction after KCC works
	3	44	29	2	25	4	-18	40%		Line 3
	4	42	28	2	28	1	-19	30%		Manifold 11/12
	5	44	30	2	24	3	-14	60%		Manifold 13
	6	40	22	3	35	2	-15	80%		Manifold 14
	7	54	36	2	8	3	-19	30%		Mainline cell 15
	8	44	29	2	25	1	-14	80%		Cell 9&10
	9	43	33	2	22	3	-20	60%		Mainline 17
	10	55	37	2	6	3	-20	100%		Manifold 18
Flare/Engine	Before	45	30	2	23	3	-24	310m3hr		Gas quality has reduced on gasfield
Flare/Engine	After	48	34	2	16	4	-23	290m3hr		Gas flow will have to be monitored so not to over pull gasfield
<b>Comments:</b>										

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 28/09/2016  
 Weather: Cool/Dry 0985mb

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/manifold (w/l/m)	Comments
Cells 1	1.3	29	17	3	51	0	-2	3%	w	
	1.4	39	22	2	37	2	-2	3%	w	
Cells 2	2.1	41	25	1	33	0	-2	3%	W	Fixed pipe work
	2.2	36	23	2	39	2	-2	3%	w	
	2.3	42	26	1	31	1	-2	3%	w	
Cells 3	3.2	38	25	1	36	1	-2	3%	w	
	3.4	31	22	2	45	2	-2	3%	w	
Cells 4	4.2	45	25	1	29	2	-6	10%	w	
	4.3	41	23	1	35	0	-2	3%	w	
	4.4	44	21	1	34	1	-2	3%		fixed pipe work
Cells 5	5.1	41	23	2	35	2	-2	3%	w	
	5.2	37	22	2	39	1	-2	3%	W	
	5.3	46	25	1	28	2	-2	3%	W	
	5.4	35	21	3	41	3	-1	3%	W	
Cells 6	6.1	16	15	4	65	2	-2	3%	W	
	6.2	40	22	1	37	2	-2	3%	w	
	6.3	25	22	1	52	1	-2	3%	W	
	6.4	3	7	13	77	1	-2	3%	W	
Cells 7	7.1	34	22	3	41	1	-2	3%	W	
	7.2	39	23	3	35	1	0	3%	W	Needs new valve at well head valve seized
	7.3	47	29	1	23	3	0	3%	W	Needs new valve at well head valve seized
	7.4	41	26	2	31	1	-2	3%	W	Well pumped out and now connected to extraction system
	7.5									
Cells 8	8.1	45	26	1	28	1	-2	3%	W	
	8.2	36	23	2	39	2	-4	6%	M	
	8.3	35	24	1	40	2	-2	3%	W	
	8.4	36	25	3	36	2	-2	1%	W	
Cells 9	9.1	46	26	1	27	2	-0.5	3%	W	
	9.2	57	34	1	8	2	-9	25%	w	
	9.3	41	24	2	33	1	-1	1%	w	
	9.4	44	24	1	31	2	-9	25%	W	
	9.6	40	27	1	32	2	-1	1%	W	
Cells 10	10.2	43	25	2	30	2	-4	1%	w	Cap damaged perforated pipe above ground level
	10.3	41	23	2	34	1	-8	15%	w	
	10.4	42	23	2	33	2	-9	10%	w	
	10.5	47	25	1	27	3	-7	30%	w	
	10.6	41	25	2	32	2	-9	15%	w	
Cells 11	1	42	30	2	26	2	-9	20%	W	
	2	16	13	11	60	2	-1	1%	w	To excavate well would require digging up road
	3	46	31	2	21	3	-10	20%	w	
Cells 12	1	35	24	2	39	2	-3	10%	M	Under ground well issue pipe work ok
	2	32	19	1	48	2	-1	20%	M	Over pulled gas well
	3	44	25	1	30	1	-11	40%	M	Gas quality starting to recover will monitor closely
	4									
Cells 13	1	47	23	2	28	2	-12	100%	M	
	2	49	27	1	23	2	-11	25%	M	
	3	45	27	1	27	1	-11	90%	M	
	4	37	23	2	38	2	-12	95%	M	
	5	39	27	2	32	2	-3	15%	M	
	6	47	27	3	23	2	-1	1%	M	
Cells 14	1	34	21	4	41	2	-1	1%	M	Well over pulled need to check this well for problems
	2	47	25	1	27	3	-13	20%	M	
	3	41	24	3	32	1	-11	30%	M	Important not to over pull gas well
	4	59	38	1	2	3	-11	30%	M	
	5	48	26	1	25	4	-12	20%	M	
	6	39	23	3	35	1	-0.5	1%	M	Need to investigate this gas well
Cells 15/16	1	48	31	2	19	3	-15	60%	W	
	2	51	35	1	13	2	-14	60%	W	
	3	55	36	1	8	3	-15	60%	W	
	4	54	36	1	9	1	-15	60%	W	
	5	54	33	2	11	2	-14	60%	W	
	6	45	28	2	25	2	-4	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	58	36	1	5	2	-4	10%	W	
	8	47	28	1	24	2	-14	60%	W	
	9	53	35	1	11	2	-15	60%	W	
	10	56	32	1	12	3	-14	60%	W	
	11	52	33	2	10	1	-15	60%	W	
	12	52	33	2	13	3	-14	60%	W	

Cells 17	1	41	22	3	34	2	-1	1%	W	Gas well over pulled
	2	47	31	1	21	3	-16	75%	W	
	3	49	31	2	18	3	-15	100%	W	Gas well over pulled
	4	44	30	1	25	3	-15	75%	W	
	5	43	32	3	22	2	-14	60%	W	
	6	46	33	2	19	2	-15	90%	W	
Cells 18	1	54	35	2	9	2	-14	50%	M	
	2	55	37	1	7	3	-15	50%	M	
	3	51	38	1	10	2	-15	30%	M	
	4	50	37	2	11	1	-14	50%	M	
	5	52	37	1	10	3	-15	50%	M	
Valves	1	34	21	3	42	3	-3	3%		Line now under suction after KCC works
	2	36	24	2	38	1	-3	3%		Line now under suction after KCC works
	3	46	31	2	21	3	-16	40%		Line 3
	4	44	29	2	25	2	-13	30%		Manifold 11/12
	5	46	29	2	23	3	-13	60%		Manifold 13
	6	44	25	3	28	3	-14	80%		Manifold 14
	7	50	38	1	11	4	-17	30%		Mainline cell 15
	8	41	26	3	27	2	-17	80%		Cell 9&10
	9	45	36	1	18	2	-16	60%		Mainline 17
	10	54	39	2	5	4	-15	100%		Manifold 18
Flare/Engine	Before	43	31	2	24	3	-22	300m3hr		Gas quality has reduced on gasfield
Flare/Engine	After	46	32	1	21	3	-18	280m3hr		Gas flow will have to be monitored so not to over pull gasfield
<b>Comments:</b>										

**NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING**



Model Serial No GM09053  
 Date: 28/10/2016  
 Weather: Cool/Dry 1001mb

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/manifold (w/f/m)	Comments
Cells 1	1.3	21	15	3	60	0	-6	3%	w	
	1.4	28	22	2	47	2	-7	3%	w	
Cells 2	2.1	15	19	2	64	0	-5	3%	W	Fixed pipe work
	2.2	6	14	4	75	1	-6	3%	w	
	2.3	6	14	3	75	1	-6	3%	w	
Cells 3	3.2	52	24	2	21	1	-6	3%	w	
	3.4	62	34	1	3	3	-5	3%	w	
Cells 4	4.2	29	23	1	46	2	-7	10%	w	
	4.3	41	23	1	35	0	-2	3%	w	
	4.4	54	26	1	19	2	-6	3%		Fixed pipe work
Cells 5	5.1	47	28	1	24	2	-5	3%	w	
	5.2	32	22	2	43	3	-6	3%	W	
	5.3	24	10	13	52	1	-1	3%	W	
	5.4	32	27	1	42	2	-1	3%	W	
Cells 6	6.1	16	15	4	65	2	-2	3%	W	
	6.2	48	19	1	31	2	-5	3%	w	
	6.3	66	16	2	15	1	-1	3%	W	
	6.4	41	25	1	33	2	-1	3%	W	
Cells 7	7.1	44	24	1	32	2	-5	3%	W	
	7.2	45	26	1	28	2	0	3%	W	Needs new valve at well head valve seized
	7.3	44	24	3	28	2	0	3%	W	Needs new valve at well head valve seized
	7.4	0.3	2.6	21	76	1	-1	3%	W	Well pumped out and now connected to extraction system
	7.5									
Cells 8	8.1	45	26	1	28	1	-2	3%	W	
	8.2	36	23	2	39	2	-4	6%	M	
	8.3	33	23	3	41	1	-5	3%	W	
	8.4	53	30	1	16	2	-5	1%	W	
Cells 9	9.1	44	18	1	38	1	-1	3%	W	
	9.2	58	22	1	19	3	-11	25%	w	
	9.3	37	22	2	39	1	-1	1%	w	
	9.4	54	18	1	27	2	-11	25%	W	
	9.6	41	28	1	30	1	-1	1%	W	
Cells 10	10.2	44	11	1	44	1	-11	1%	w	Cap damaged perforated pipe above ground level
	10.3	53	25	3	18	2	-10	15%	w	
	10.4	51	9	1	39	1	-11	10%	w	
	10.5	52	18	1	29	2	-11	30%	w	
	10.6	49	19	3	29	3	-11	15%	w	
Cells 11	1	58	31	0.3	11	2	-12	20%	W	
	2	16	9	12	61	1	-1	1%	w	To excavate well would require digging up road
	3	67	32	1	1	1	-12	20%	w	
Cells 12	1	4	3	19	73	2	-1	10%	M	Under ground well issue pipe work ok
	2	19	18	1	60	2	-1	20%	M	Over pulled gas well
	3	19	19	2	61	1	-13	40%	M	Very important gas well has lost flow and quality pipe work is ok with loss of flow at this well, gasfield under pressure
	4									
Cells 13	1	51	25	1	24	2	-17	100%	M	
	2	62	25	2	11	2	-6	25%	M	
	3	43	21	1	35	1	-16	90%	M	
	4	53	22	1	25	3	-16	95%	M	
	5	32	22	1	45	3	-7	15%	M	
	6	41	20	5	33	1	-1	1%	M	
Cells 14	1	62	34	1	4	1	-4	1%	M	Well over pulled need to check this well for problems
	2	50	30	2	18	2	-18	20%	M	
	3	56	20	1	23	2	-17	30%	M	Important not to over pull gas well
	4	42	28	3	27	2	-18	30%	M	
	5	48	24	3	24	3	-18	20%	M	



	6	37	22	3	36	1	-0.5	1	M	Need to investigate this gas well
Cells 15/16	1	48	21	3	28	2	-18	60	W	
	2	64	25	1	11	3	-17	60	W	
	3	48	24	1	26	2	-17	60	W	
	4	55	26	1	18	1	-18	60	W	
	5	42	23	3	31	2	-17	60	W	
	6	56	31	1	12	3	-6	10	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	48	24	1	30	1	-6	10	W	
	8	56	20	1	24	1	-18	60	W	
	9	49	22	0.4	29	2	-17	60	W	
	10	61	26	1	12	2	-18	60	W	
	11	64	25	1	11	2	-18	60	W	
	12	55	28	0.4	17	2	-18	60	W	
Cells 17	1	52	31	1	15	1	-1	1	W	Gas well over pulled
	2	52	33	1	14	2	-22	75	W	
	3	42	32	4	22	4	-22	100	W	Gas well over pulled
	4	56	38	1	5	3	-23	75	W	
	5	47	34	1	17	1	-21	60	W	
	6	48	34	2	16	2	-22	90	W	
Cells 18	1	56	36	1	6	2	-20	50	M	
	2	57	39	1	3	1	-21	50	M	
	3	50	34	1	15	2	-20	30	M	
	4	56	37	1	6	2	-21	50	M	
	5	47	34	1	17	1	-20	50	M	
Valves	1	27	19	4	50	2	-8	3%		Line now under suction after KCC works
	2	26	18	6	50	3	-7	3%		Line now under suction after KCC works
	3	41	26	1	32	3	-27	40%		Line 3
	4	20	18	3	59	1	-16	30%		Manifold 11/12
	5	42	26	3	29	4	-19	60%		Manifold 13
	6	43	26	3	29	3	-19	80%		Manifold 14
	7	48	37	2	13	3	-20	30%		Mainline cell 15
	8	45	27	2	26	2	-20	80%		Cell 9&10
	9	42	29	3	26	3	-23	60%		Mainline 17
	10	49	36	3	13	2	-22	100%		Manifold 18
Flare/Engine	Before	35	25	3.5	35	3	-26	240m3hr		Gas quality has reduced on gasfield. Insufficient gas to run the gas flare
Flare/Engine	After	39	29	2	30	2	-24	225m3hr		Gasfield under pressure reduced flow and quality from cell 12,13,14.
<p><b>Comments:</b> There is reduced flow from cells 12,13,14. This is putting pressure on the rest of the gasfield. Gas well 12.3 which is the best gas producing well has deteriorated considerably. Suction has increased considerably. The flare hasn't been running since Tuesday the 25th October</p>										

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 28/11/2016  
 Weather: Cool/Dry 995mb

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/f lowline/m anifold (w/f/m)	Comments
Cells 1	1.3	17	12	4	67	0	-1	3%	w	
	1.4	22	16	3	59	2	-1	3%	w	
Cells 2	2.1	18	17	2	63	0	-1	3%	W	
	2.2	9	15	4	72	1	-1	3%	w	
	2.3	15	15	2	68	2	-1	3%	w	
Cells 3	3.2	42	18	3	37	1	-1	3%	w	
	3.4	46	29	2	23	2	-1	3%	w	
Cells 4	4.2	32	25	1	42	2	-8	10%	w	
	4.3	39	23	2	36	0	-1	3%	w	
	4.4	41	23	3	33	2	-1	3%		
Cells 5	5.1	41	25	2	32	3	-1	3%	w	
	5.2	28	16	4	52	1	-1	3%	W	
	5.3	26	12	10	52	2	-1	3%	W	
	5.4	34	26	2	38	2	-1	3%	W	
Cells 6	6.1	19	17	3	61	1	-1	3%	W	
	6.2	40	18	3	39	2	-1	3%	w	
	6.3	52	18	2	28	2	-1	3%	W	
	6.4	36	19	3	42	3	-1	3%	W	
Cells 7	7.1	41	21	3	35	1	-1	3%	W	
	7.2	40	22	2	36	3	0	3%	W	Needs new valve at well head valve seized
	7.3	45	27	2	26	1	0	3%	W	Needs new valve at well head valve seized
	7.4	4	6	17	73	1	-1	3%	W	Well pumped out and now connected to extraction system
	7.5									
Cells 8	8.1	42	24	1	33	2	-1	3%	W	
	8.2	39	26	1	34	3	-8	6%	M	
	8.3	36	25	2	37	1	-1	3%	W	
	8.4	46	26	2	26	3	-1	1%	W	
Cells 9	9.1	48	28	1	27	2	-1	3%	W	
	9.2	47	26	2	23	2	-22	25%	w	
	9.3	0.2	1	21	78	1	0	1%	w	
	9.4	55	18	2	24	3	-22	25%	W	
	9.6	39	25	1	35	1	-6	1%	W	
Cells 10	10.2	6	5	13	75	2	-3	1%	w	Cap damaged perforated pipe above ground level
	10.3	48	26	1	25	2	-21	15%	w	
	10.4	6	6	11	77	1	-3	10%	w	
	10.5	42	24	2	31	2	-22	30%	w	
	10.6	60	27	1	12	2	-21	15%	w	
Cells 11	1	16	9	13	62	2	-6	20%	W	
	2	15	9	13	62	1	-1	1%	w	To excavate well would require digging up road
	3	50	30	2	18	1	-9	20%	w	
Cells 12	1	11	19	1	68	2	-1	10%	M	Under ground well issue pipe work ok
	2	11	19	2	67	1	-1	20%	M	Over pulled gas well
	3	11	20	1	69	1	-11	40%	M	Very important gas well has lost flow and quality
Cells 13	1	63	30	2	4	1	-23	100%	M	
	2	31	19	4	45	3	-7	25%	M	
	3	31	19	2	48	1	-22	90%	M	
	4	33	17	4	46	2	-23	95%	M	
	5	19	18	1	61	2	-10	15%	M	
	6	49	22	3	25	2	-15	1%	M	
Cells 14	1	27	14	11	47	2	-7	1%	M	Well over pulled need to check this well for problems
	2	25	14	10	50	2	-6	20%	M	
	3	64	15	1	20	1	-23	30%	M	Important not to over pull gas well
	4	31	19	7	43	3	-23	30%	M	
	5	46	26	1	26	2	-20	20%	M	
	6	30	19	7	43	2	-2	1%	M	
Cells 15/16	1	54	26	2	17	3	-21	60%	W	
	2	53	25	2	6	2	-22	60%	W	
	3	66	32	2	0	1	-23	60%	W	
	4	60	27	3	10	2	-23	60%	W	
	5	54	32	3	10	3	-22	60%	W	
	6	47	28	1	24	3	-8	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	53	28	1.5	18	2	-8	10%	W	
	8	25	20	2	52	2	-21	60%	W	
	9	26	20	2	51	1	-22	60%	W	
	10	19	14	7	60	1	-21	60%	W	
	11	66	25	2	5	3	-20	60%	W	
	12	35	25	2	37	2	-21	60%	W	

Cells 17	1	30	26	2	42	2	-1	1	W	Gas well over pulled
	2	28	17	12	43	1	-25	75	W	
	3	27	17	12	44	2	-26	100	W	Gas well over pulled
	4	57	38	1	4	2	-26	75	W	
	5	32	18	11	38	2	-26	60	W	
	6	39	30	3	28	1	-25	90	W	
Cells 18	1	45	33	2	21	2	-26	50	M	
	2	39	32	2	27	1	-27	50	M	
	3	44	31	3	22	1	-27	30	M	
	4	56	37	2	4	3	-27	50	M	
	5	43	32	2	23	1	-27	50	M	
Valves	1	24	17	3	56	1	-1	3%		Line now under suction after KCC works
	2	24	16	3	55	3	-1	3%		Line now under suction after KCC works
	3	39	25	3	33	2	-29	40%		Line 3
	4	12	18	2	68	1	-8	30%		Manifold 11/12
	5	36	24	4	36	3	-25	60%		Manifold 13
	6	31	21	4	44	4	-26	80%		Manifold 14
	7	44	22	3	31	4	-24	30%		Mainline cell 15
	8	39	23	3	25	3	-26	80%		Cell 9&10
	9	34	19	5	42	4	-27	60%		Mainline 17
	10	46	32	2	20	3	-28	100%		Manifold 18
Flare/Engine	Before	36	24	3.5	36	2	-31	240m3hr		Gas quality has reduced on gasfield. Flare has been off
	After	37	28	2.5	35	3	-29	230m3hr		Gasfield under pressure reduced flow and quality from cell 12,13,14,17,15.

**Comments:** There is reduced flow from Cells 11,12,13,14,15

This is putting pressure on the rest of the gasfield. Gas well 12.3 which is the best gas producing well has deteriorated considerably.

Suction has increased considerably also

Engine load has been reduced

It is evident that there is a loss of gas production & consequently the gasfield is over extracted

NORTH KERRY LANDFILL GAS EXTRACTION WELL MONITORING



Model Serial No GM09053  
 Date: 22/12/2016  
 Weather: Cool/Dry 1016

Cell	Well	CH4 (%)	CO2 (%)	O2 (%)	Balance (%)	CO (ppm)	Static Pressure (mb)	Valve Pos (%)	Monitor at wellhead/lowline/m anifold (w/f/m)	Comments
Cells 1	1.3	15	13	3	56	0	-1	3%	w	
	1.4	20	13	3	64	1	-1	3%	w	
Cells 2	2.1	17	15	2	66	1	-1	3%	W	Fixed pipe work
	2.2	14	14	4	67	1	-1	3%	w	
	2.3	17	14	2	67	2	-1	3%	w	
Cells 3	3.2	40	17	2	41	2	-1	3%	w	
	3.4	42	27	2	29	1	-1	3%	w	
Cells 4	4.2	30	23	1	46	3	-8	10%	w	
	4.3	36	24	2	38	1	-1	3%	w	
	4.4	38	24	3	35	3	-1	3%		Fixed pipe work
Cells 5	5.1	40	26	2	32	2	-1	3%	w	
	5.2	30	17	3	50	1	-1	3%	W	
	5.3	21	14	6	59	3	-1	3%	W	
	5.4	37	24	2	37	2	-1	3%	W	
Cells 6	6.1	23	19	3	55	1	-1	3%	W	
	6.2	38	16	2	44	3	-1	3%	w	
	6.3	44	17	2	37	2	-1	3%	W	
	6.4	32	19	3	46	3	-1	3%	W	
Cells 7	7.1	38	19	4	39	2	-1	3%	W	
	7.2	37	24	2	36	3	0	3%	W	Needs new valve at well head valve seized
	7.3	42	25	2	31	1	0	3%	W	Needs new valve at well head valve seized
	7.4	6	8	14	72	2	-1	3%	W	Well pumped out and now connected to extraction system
	7.5									
Cells 8	8.1	40	22	2	36	3	-1	3%	W	
	8.2	34	22	2	42	4	-8	6%	M	
	8.3	32	23	3	42	1	-1	3%	W	
	8.4	39	22	3	36	3	-1	1%	W	
Cells 9	9.1	43	23	2	32	2	-1	3%	W	
	9.2	44	25	2	29	2	-24	25%	w	
	9.3	0.2	3	19	77	3	0	1%	w	
	9.4	46	22	2	30	3	-25	25%	W	
	9.6	37	23	1	39	3	-3	1%	W	
Cells 10	10.2	9	8	12	71	3	-5	1%	w	Cap damaged perforated pipe above ground level
	10.3	42	21	3	34	2	-26	15%	w	
	10.4	13	12	6	69	1	-5	10%	w	
	10.5	36	20	1	43	2	-27	30%	w	
	10.6	50	25	2	23	2	-27	15%	w	
Cells 11	1	22	16	4	58	3	-9	20%	W	
	2	14	8	14	64	1	-1	1%	w	To excavate well would require digging up road
	3	44	28	3	25	1	-12	20%	w	
Cells 12	1	13	18	2	67	1	-2	10%	M	Under ground well issue pipe work ok
	2	23	19	2	56	2	-3	20%	M	Over pulled gas well
	3	13	23	1	63	1	-13	40%	M	Very important gas well has lost flow and quality. Pipe work is ok
	4									
Cells 13	1	47	28	2	23	1	-27	100%	M	
	2	29	21	4	46	3	-11	25%	M	
	3	29	18	3	50	1	-27	90%	M	
	4	31	18	3	48	3	-28	95%	M	
	5	22	18	2	58	2	-14	15%	M	
	6	44	20	3	33	2	-20	1%	M	
Cells 14	1	31	15	9	45	3	-11	1%	M	Well over pulled need to check this well for problems
	2	22	11	10	50	2	-2	20%	M	
	3	54	17	1	28	1	-27	30%	M	Important not to over pull gas well
	4	29	18	4	49	3	-27	30%	M	
	5	42	23	1	34	2	-27	20%	M	
	6	34	21	5	40	3	-1	1%	M	Need to investigate this gas well
Cells 15/16	1	42	22	2	34	2	-28	60%	W	
	2	44	23	3	30	3	-29	60%	W	
	3	45	29	2	25	1	-28	60%	W	
	4	40	23	3	34	2	-29	60%	W	
	5	39	23	2	36	3	-29	60%	W	
	6	42	24	1	33	3	-10	10%	W	Well needs further investigation damaged well when pumping wells pump got stuck in well casing
	7	45	26	2	27	3	-10	10%	W	
	8	28	20	2	50	2	-29	60%	W	
	9	29	21	2	48	1	-29	60%	W	
	10	23	17	4	57	1	-29	60%	W	
	11	46	23	2	29	3	-29	60%	W	
	12	33	23	3	41	1	-28	60%	W	

Cells 17	1	24	21	3	52	2	-1	1%	W	Gas well over pulled
	2	24	15	12	49	1	-27	75%	W	
	3	25	18	10	53	3	-29	100%	W	Gas well over pulled
	4	46	32	2	20	3	-29	75%	W	
	5	29	20	6	45	2	-29	60%	W	
	6	32	23	4	41	1	-29	90%	W	
Cells 18	1	42	28	2	28	2	-29	50%	M	
	2	36	29	2	33	2	-29	50%	M	
	3	41	26	3	30	2	-29	30%	M	
	4	43	31	2	24	3	-29	50%	M	
	5	39	24	3	34	1	-29	50%	M	
Valves	1	20	15	3	62	2	-1	3%		Line now under suction after KCC works
	2	21	16	3	60	3	-1	3%		Line now under suction after KCC works
	3	37	24	3	36	3	-35	40%		Line 3
	4	15	19	3	63	1	-13	30%		Manifold 11/12
	5	31	22	4	43	2	-30	60%		Manifold 13
	6	26	19	4	51	4	-31	80%		Manifold 14
	7	41	24	3	32	4	-31	30%		Mainline cell 15
	8	31	20	3	36	3	-30	80%		Cell 9&10
	9	32	20	4	44	4	-30	60%		Mainline 17
	10	43	27	2	28	3	-30	100%		Manifold 18
Flare/Engine	Before	34	22	3.5	40.5	2	-42	260m3hr		Gas quality has reduced on gasfield flare has been off
Flare/Engine	After	36	28	2.5	33.5	4	-39	240m3hr		Gasfield under pressure reduced flow and quality from cell 12,13,14,17,15.
<p><b>Comments:</b> There is reduced flow from Cells 12,13,14.  Suction has increased considerably also      The flare hasn't been running since Tuesday 25th of October  Engine load reduced to take pressure off the gasfield  It is evident that there is a loss of gas production &amp; consequently the gasfield is over extracted</p>										

## ***Appendix F: Noise Monitoring***



**southern scientific  
services ltd**

**ENVIRONMENTAL NOISE SURVEY**

**NORTH KERRY LANDFILL**

**MUINGNAMINNANE**

**TRALEE**

**CO. KERRY**

**W0001-04**

<b>Requested By:</b>	David Donegan Kerry County Council
<b>Surveyed By:</b>	Sinead Fagan M.A. Env. Res. Management
<b>Reported By:</b>	Sinead Fagan M.A. Env. Res. Management
<b>Date Reported:</b>	01/02/2017
<b>Our Reference:</b>	16P 024

<b>Issue Date</b>	<b>Revision</b>	<b>Checked</b>	<b>Comment</b>
01/02/2017	00	P. Byrne (B.Sc; Ph.D) Cert. Env. Noise (IOA)	Final Report

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## **1. Introduction**

Southern Scientific Services Ltd was commissioned by Kerry County Council to conduct a daytime environmental noise survey at North Kerry Landfill, Muingnaminnane, Tralee, Co. Kerry. The landfill is located approximately 9km north-west of Castleisland town in a rural setting. The site is bounded by a windfarm, bogland and forestry.

Six noise monitoring locations are listed in Schedule D.1 of the EPA Waste Licence (W0001-04) for the site. Schedule C.3 of the licence stipulates a daytime noise limit of 55dB(A) at noise sensitive locations, measured over a 30-minute period. The EPA Guidance Note for Noise (NG4) 2016 stipulates three noise surveys at each monitoring location for day-time assessments. Three noise surveys at each monitoring location were undertaken to fulfill and assess compliance with these licence conditions.

## **2. Site Location and Activities**

The landfill is located at Muingnaminnane, Tralee, Co. Kerry. The facility closed for waste acceptance on Friday the 11<sup>th</sup> of July 2014. Sources of noise within the site include machinery (some with reversing alarms), vehicle movements and the pumping of leachates. The facility is closed at night-time.

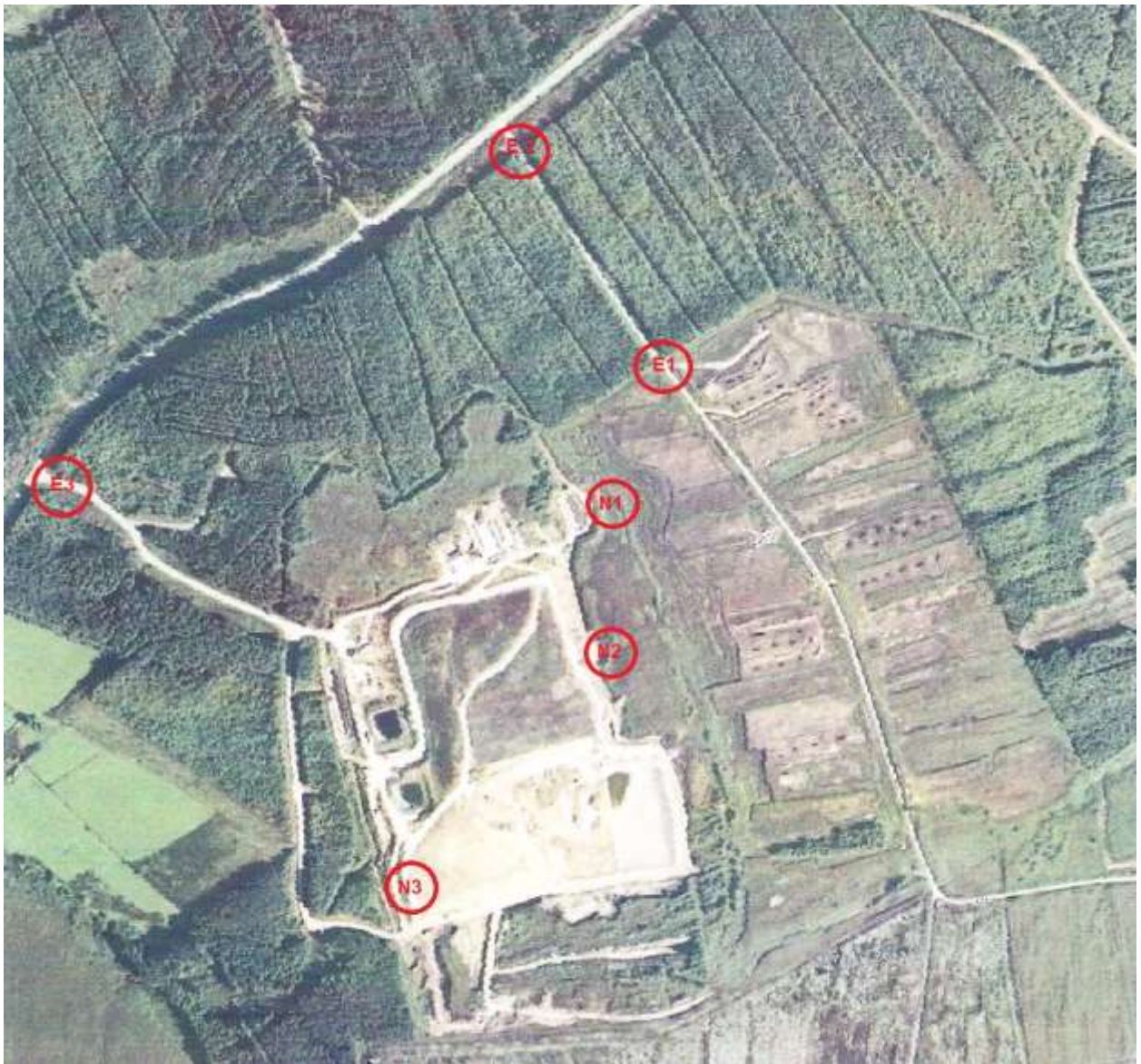
### 3. Survey Details and Methodology

#### 3.1 Survey Details

The noise surveys were undertaken on the 25<sup>th</sup> February, 23<sup>rd</sup> June and 6<sup>th</sup> October 2016 to assess the noise levels at predetermined locations (N1, N2, N3, E1, E2, E3) provided by Kerry County Council. The monitoring locations are described in Table 1 and illustrated in Figure 1. A thirty minute monitoring period was employed for each survey conducted at each monitoring location.

**Table 1: Noise Monitoring Locations**

<b>I.D.</b>	<b>Location</b>	<b>Surrounding ground features</b>
N1	Site boundary at lagoon adjacent to public recycling area	Hardcore, lagoon, some earthen mounds
N2	Adjacent to Gas Detection Well No. 8	Hardcore, some earthen mounds
N3	On access road to forestry plantation	Hardcore, some earthen mounds
E1	Access road to windfarm	Rough grass & trees
E2	Junction of access road to windfarm and the public road	Conifer plantation
E3	At entrance to landfill	Roadway, conifer plantation



**Figure 1: Map showing monitoring locations (refer to Table 1 for description)**

### 3.2 Equipment

Instrument: Brüel & Kjaer (Type 2250-L with Type 4950 microphone).  
Instrument Serial No: 2654679  
Microphone Serial No: 2652929  
Instrument Last Calibrated: 16/11/2015

This instrument conforms to the following standards:

IEC 61672-1, Class 1  
IEC 61260 1/3 Oct. Band Class 0  
IEC 60651, Type 1  
IEC 60804, Type 1

Sound Calibrator: Brüel & Kjaer Type 4231  
Sound Calibrator Serial No.: 3001116  
Sound Calibrator Calibration Date: 09/11/2015  
Utility Software: BZ – 5298 Version 4.5

### 3.3 Monitoring Methodology

Noise monitoring was carried out in accordance with:

- International Standard ISO 1996 – Acoustics – Description, measurement and assessment of environmental noise
- Guidance Note for Noise (NG 4) – EPA, 2016

Briefly, these standards recommend calibration of instruments before and after the survey (this was undertaken on-site using the Bruel & Kjaer Type 4231 acoustic calibrator detailed above); measurement at least 3.5m from any reflecting structure (other than the ground) and 1.2m - 1.5m above ground level. The microphone was fitted with a windshield (Brüel & Kjaer Type UA-0237). Tonal analysis was undertaken following Annex D of ISO 1996 (Part 2), 2007. In this method, a prominent discrete tone is identified as present when the sound pressure level in the one-third-octave band of interest exceeds the sound pressure levels of both adjacent one-third-octave bands as follows:

1. 15 dB in the low frequency one-third-octave bands (25Hz – 125Hz)
2. 8dB in the middle frequency bands (160Hz – 400Hz)
3. 5dB in the high frequency bands (500Hz – 10, 000Hz)

### 3.4 Measurement Parameters/Terminology

A-weighted:	The adjustment applied to sound level recordings to approximate the non-linear frequency response of the human ear. The A-weighting is denoted by the suffix A in the parameters listed below such as $L_{Aeq}$ , $L_{A10}$ .
Decibel (dB):	The scale in which sound pressure level is expressed, which is based on a logarithmic scale.
Impulsive Noise:	A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.
Tonal Noise:	Noise caused by the dominance of one or more frequencies which may result in increased noise nuisance.
Interval:	The time period, $t$ , over which noise monitoring is carried out.
$L_{Aeq,t}$ :	The equivalent continuous sound level during a measurement interval, effectively representing the average A-weighted noise level.
$L_{AF10}$ :	The A-weighted sound level with Fast time weighting (F) which is exceeded for 10% of the measurement interval, usually used to quantify traffic noise.
$L_{AF90}$ :	The A-weighted sound level with Fast time weighting (F) which is exceeded for 90% of the measurement interval, usually used to quantify background noise.
1/3 Octave Band Analysis:	Frequency Analysis of sound such that the frequency spectrum is subdivided into bands of one-third of an octave each. An octave is taken to be a frequency interval, the upper limit of which is twice the lower limit.

## 4. Results

### 4.1 Environmental Conditions on the 25<sup>th</sup> February 2016

Cloud Cover	Precipitation	Wind Direction	Av. wind speed @2m	Av. temperature
60%	0mm	South Westerly	Variable <0.5 – 1.7/s	3°C

### 4.2 Noise Survey Results on the 25<sup>th</sup> February 2016

I.D.	Start Time	L <sub>Aeq</sub> (30 mins) dB	L <sub>AF10</sub> (30 mins) dB	L <sub>AF90</sub> (30 mins) dB
N1	11:44	35.3	32.9	25.2
<p><b>Noise Sources:</b> Background noise included water flow from lagoon, this was most dominant noise source. Birdsong and rustling vegetation, traffic faintly audible from main road, occasional traffic on adjacent local road were also detected in background. An airplane was noted overhead at 12:00. Noise associated with the adjacent windfarm turbines was continuous but very faint in the background. No site activity was noted.</p>				
N2	12:19	32.6	32.9	28.9
<p><b>Noise Sources:</b> Noise associated with turbines on adjacent windfarm was continuous and most dominant noise source at this location. Background noise included birdsong. No site activity was noted at this location.</p>				
N3	12:55	36.8	39.2	33.2
<p><b>Noise Sources:</b> Internal site traffic was noted at this monitoring location. Leachate was being pumped for 10minutes into tankard and then truck engine started up and truck exited vicinity. Noise associated with the adjacent windfarm turbines was continuous in the background. Other background noise included birdsong. External road traffic in the distance to the west of site could be heard.</p>				
E1	09:47	33.1	34.1	31.0
<p><b>Noise Sources:</b> Main noise source at this monitoring location was flowing water in adjacent stream. Main road traffic was faintly audible. Local road traffic included 1 No. van. Background noise included birdsong and rustling vegetation in breeze. Noise associated with the adjacent windfarm turbines was faint but continuous in the background.</p>				
E2	10:23	54.2	39.8	29.8
<p><b>Noise Sources:</b> Passing traffic on the public road included 7No. Cars, 2 No. vans and 1 No. jeep. Background noise included, rustling vegetation in breeze, flowing water in nearby ditch and birdsong. Intermittently a chainsaw was noted in the background at a distance.</p>				
E3	10:58	53.0	48.0	31.9
<p><b>Noise Sources:</b> Passing traffic on the public road included 11No. Cars, 4No. Vans and 1No. Jeep. No traffic entered or exited the landfill during this monitoring event. Background noise included wind-derived noise from adjacent forestry trees, other rustling vegetation and birdsong. Noise associated with the adjacent windfarm turbines was faint but continuous and louder than at point E1.</p>				

### 4.3 Environmental Conditions on the 23<sup>rd</sup> June 2016

Cloud Cover	Precipitation	Wind Direction	Av. wind speed @2m	Av. temperature
90%	0mm	South Westerly	Variable 0.0 – 3.8m/s	14°C

### 4.4 Noise Survey Results on the 23<sup>rd</sup> June 2016

I.D.	Start Time	L <sub>Aeq</sub> (30 mins) dB	L <sub>AF10</sub> (30 mins) dB	L <sub>AF90</sub> (30 mins) dB
N1	11:30	41.1	42.9	38.5
<b>Noise Sources:</b> Wind turbines were the most dominant noise source at this monitoring location. Background noise included birdsong, bees and rustling vegetation, as well as the occasional sheep and dog barking. No audible sources of noise could be heard from the facility. Occasional water flowing in the lagoon and local road traffic were faintly noted.				
N2	12:06	43.9	45.2	42.2
<b>Noise Sources:</b> Wind turbines were the most dominant noise source at this monitoring location also. Background noise included birdsong, rustling vegetation and bees. Very faint road traffic noise was noted at this location also.				
N3	12:55	47.9	49.9	45.6
<b>Noise Sources:</b> Noise associated with the adjacent windfarm turbines was the prevailing noise at this location. Background noise included birdsong, bees and rustling vegetation. Squeaking noises from the forestry was also noted. Local road traffic could be faintly heard in the distance. Internal site traffic included 1 No. car and 1 No. van.				
E1	09:40	42.0	42.7	39.3
<b>Noise Sources:</b> Wind farm noise was the most dominant at this monitoring location. Local road network traffic was faintly audible. Local traffic directly passing monitor included 1No. Car. Background noise included birdsong, rustling vegetation and stream flowing alongside to the monitoring location. Noise from the facility was not audible.				
E2	10:14	52.6	46.7	32.0
<b>Noise Sources:</b> Wind turbines were fainter at this monitoring location. Passing traffic on the public road included 3No. Cars and 2No. Vans. Background noise included birdsong, water flowing in a ditch and rustling vegetation. No noise from the facility was noted at this location.				
E3	10:49	49.4	51.1	38.1
<b>Noise Sources:</b> Wind turbines were the most dominant noise source at this monitoring point. Passing traffic on the local road included 2No. Cars, 3No. Vans and 2No. Cyclists. Background noise included rustling vegetation and birdsong. An airplane passed overhead at 10:51. No noise from the facility was noted at this location.				

#### 4.5 Environmental Conditions on the 6<sup>th</sup> October 2016

Cloud Cover	Precipitation	Wind Direction	Av. wind speed @2m	Av. temperature
70%	0mm	E to SE	Variable 0.0 – 4.5m/s	13°C

#### 4.6 Noise Survey Results on the 6<sup>th</sup> October 2016

I.D.	Start Time	L <sub>Aeq</sub> (30 mins) dB	L <sub>AF10</sub> (30 mins) dB	L <sub>AF90</sub> (30 mins) dB
N1	11:44	48.1	49.6	45.6
<p><b>Noise Sources:</b> Noise associated with turbines on adjacent windfarm was most audible in the background at this location. Background noise included birdsong and rustling vegetation, traffic faintly audible from main road and water flow from lagoon. Excavator working at lagoon splashing sounds noted, occasional warning siren noted. Work men talking. Internal site traffic included 1No. Jeep.</p>				
N2	12.18	48.8	50.6	46.4
<p><b>Noise Sources:</b> Noise associated with turbines on adjacent windfarm was most audible in the background. Local road network traffic could also be heard intermittently. Background noise included birdsong and rustling vegetation. No site activity was noted at this location.</p>				
N3	12:57	51.4	54.0	48.0
<p><b>Noise Sources:</b> Noise associated with turbines on adjacent windfarm was clearly audible at this location. Trickle of water flowing nearby monitor was faintly noted. Background noise included birdsong and rustling vegetation. No site activity was heard at this location.</p>				
E1	09:58	47.5	50.0	43.8
<p><b>Noise Sources</b> Noise associated with turbines on adjacent windfarm was most audible in the background. Breeze in vegetation and nearby forestry was clearly noted. Water flowing in stream along with birdsong formed the background noise at this location. No noise emanating from the landfill was noted. Local road traffic included 1No. Van.</p>				
E2	10:31	58.2	50.3	36.8
<p><b>Noise Sources:</b> Passing traffic on the public road included 11No. Cars, 1No. Jeep, 2No. Tractors and 5No. Vans. One car turned onto local road directly passing monitor. Background noise included, wind-derived noise from adjacent forestry trees, other rustling vegetation, flowing water in ditch and birdsong. Noise associated with turbines was also audible in the background. No noise associated with facility could be heard at this location.</p>				
E3	11.04	53.6	53.4	42.5
<p><b>Noise Sources:</b> Noise associated with turbines on adjacent windfarm was most audible in the background at this location. Passing traffic on the public road included 7No. Cars, 3No. Vans, 1 No. truck and 2No. Jeeps. Background noise included wind-derived noise from adjacent forestry trees, other rustling vegetation and birdsong. No noise associated with facility could be heard at this location.</p>				



**4.7 Summary of results**

<b>Station</b>	<b>Date</b>	<b>Start Time</b>	<b>L<sub>Aeq</sub> (30mins)</b>	<b>L<sub>AF10</sub></b>	<b>L<sub>AF90</sub></b>
<b>N1</b>	25.02.16	11:44	35.3	32.9	25.2
	23.06.16	11:30	41.1	42.9	38.5
	06.10.16	11:44	48.1	49.6	45.6
<b>N2</b>	25.02.16	12:19	32.6	32.9	28.9
	23.06.16	12:06	43.9	45.2	42.2
	06.10.16	12:18	48.8	50.6	46.4
<b>N3</b>	25.02.16	12:55	36.8	39.2	33.2
	23.06.16	12:55	47.9	49.9	45.6
	06.10.16	12:57	51.4	54.0	48.0
<b>E1</b>	25.02.16	09:47	33.1	34.1	31.0
	23.06.16	09:40	42.0	42.7	39.3
	06.10.16	09:58	47.5	50.0	43.8
<b>E2</b>	25.02.16	10:23	54.2	39.8	29.8
	23.06.16	10:14	52.6	46.7	32.0
	06.10.16	10:31	58.2	50.3	36.8
<b>E3</b>	25.02.16	10:58	53.0	48.0	31.9
	23.06.16	10:49	49.4	51.1	38.1
	06.10.16	11:04	53.6	53.4	42.5

## 5. Discussion & Conclusion

The  $L_{AF10}$  &  $L_{AF90}$  noise parameters along with the audible noise sources recorded during the survey assist in providing an understanding of the sources and nature of the noise in the area. The  $L_{A10}$  is the A-weighted sound level, which is exceeded for 10% of the measurement interval and is usually used to quantify traffic noise or other short duration/passing events. In contrast, the  $L_{A90}$  is the A-weighted sound level that is exceeded for 90% of the measurement interval and is usually used to quantify background noise. The  $L_{Aeq}$  is the equivalent continuous sound level during a measurement interval, effectively representing the average A-weighted noise level. The site waste licence specifies a day-time limit of 55dB (A)  $L_{Aeq (30 \text{ min})}$  at noise sensitive locations.

The noise levels measured were below 55dB (A)  $L_{Aeq (30 \text{ min})}$  during all survey periods at five of the six monitoring locations. All three on-site locations (N1-N3) were within the 55dB (A)  $L_{Aeq (30 \text{ min})}$  limit during all survey periods. Likewise, at two of the off-site locations (E1 & E3) results were within the 55dB (A)  $L_{Aeq (30 \text{ min})}$  limit during all survey periods. The single elevated noise level measured at the roadside position (E2) on October 6<sup>th</sup> (58dB(A)) was primarily attributed to traffic on the public road and in particular one vehicle which turned off the road and passed immediately adjacent to the monitor. Background noise is given by the  $L_{A90}$  and was recorded well below 55dB (A) at location E2 (37 dB(A)) on the same occasion. The 1/3 Octave Frequency Spectra show that there was no prominent tonal noise present during any of the surveys when assessed following the criteria in Annex D of ISO 1996 (Part 2), 2007.

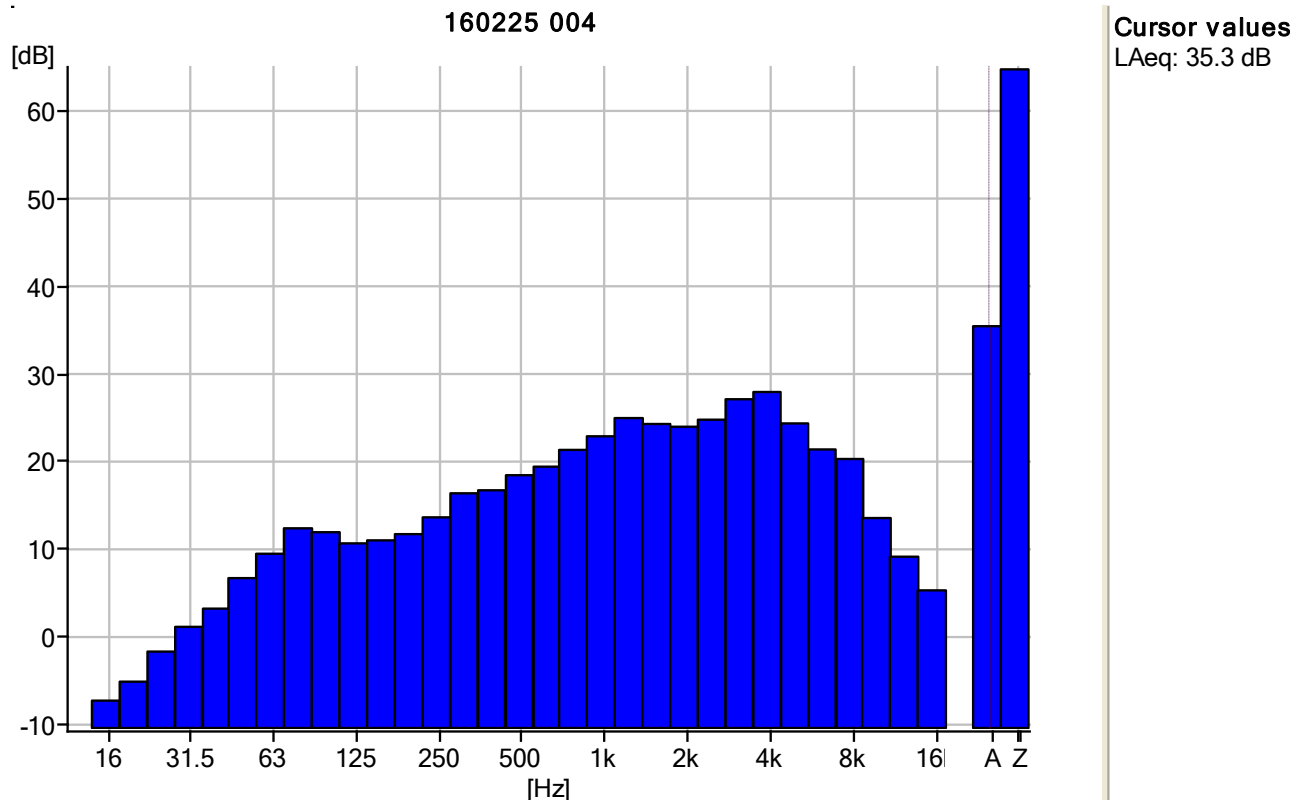
Having regard to the monitoring results obtained in these surveys, it is concluded that the very limited activities now occurring at the landfill site are unlikely to adversely impact upon the noise environment at noise sensitive receptors in the locality.

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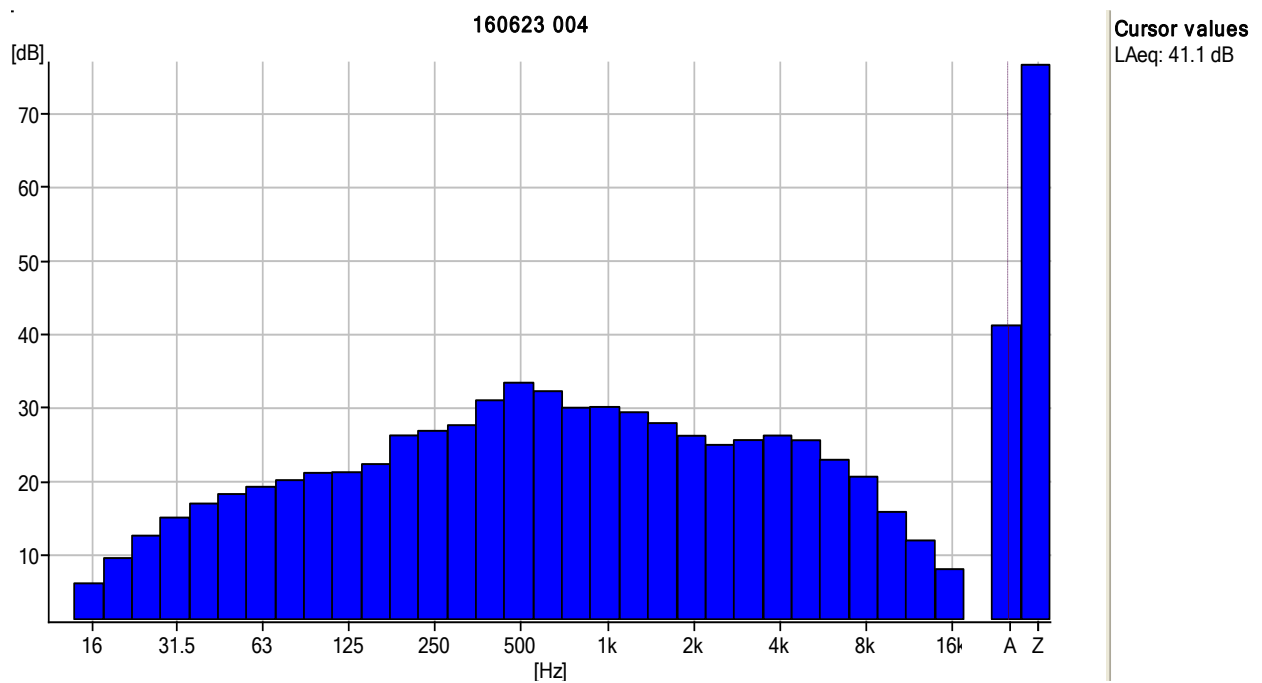
**Appendix 1**

1/3 Octave Frequency Spectra

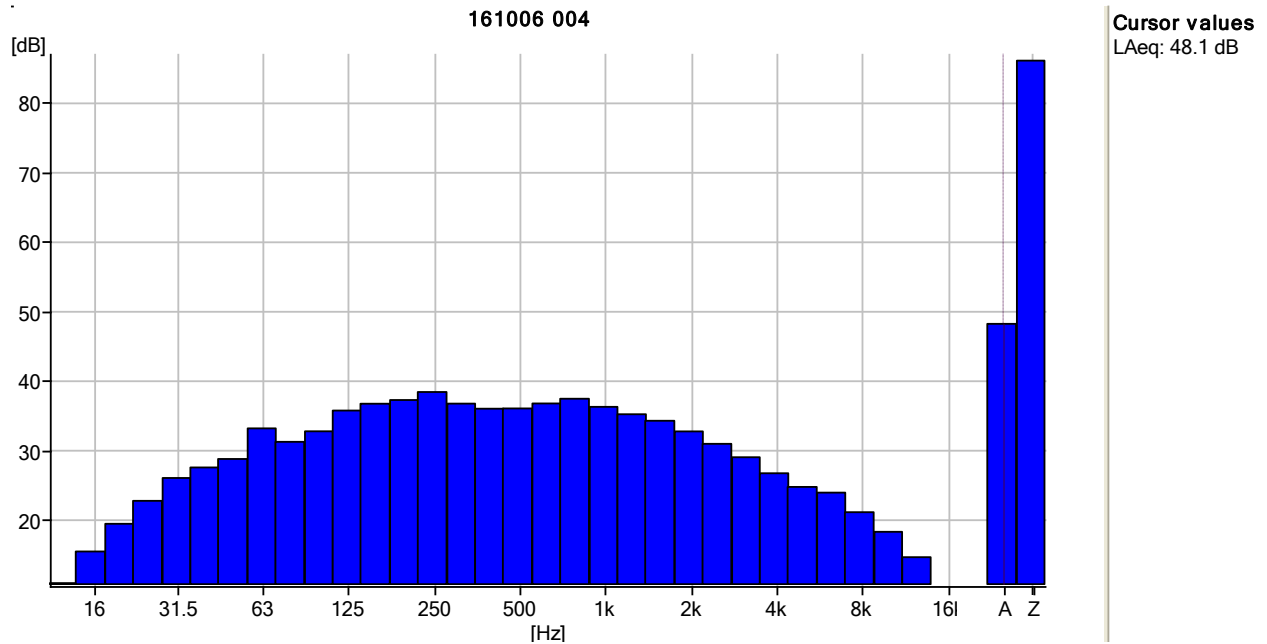
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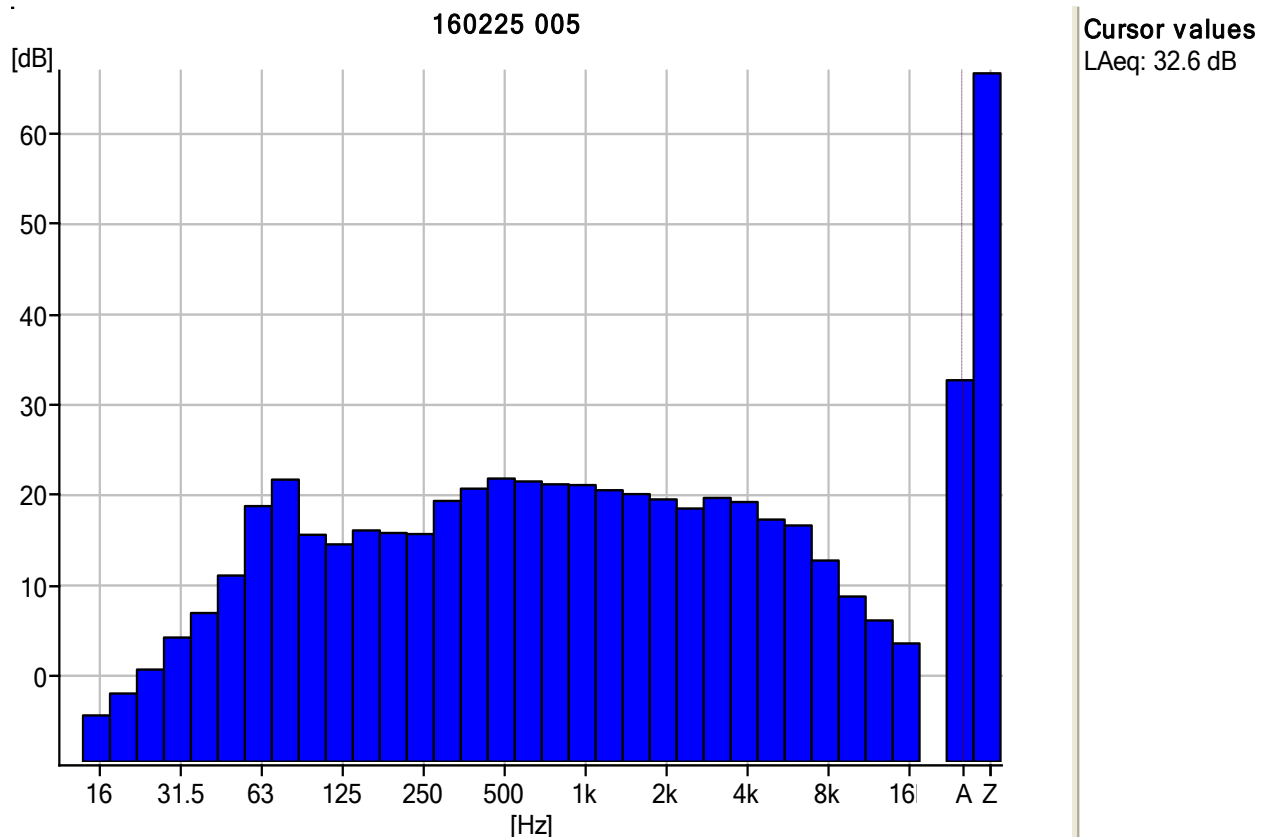
**Figure A.1: 1/3 Octave Frequency Graph for N 1 on the 25<sup>th</sup> February 2016**



**Figure A.2: 1/3 Octave Frequency Graph for N 1 on the 23<sup>rd</sup> June 2016**



**Figure A.3: 1/3 Octave Frequency Graph for N 1 on the 6<sup>th</sup> October 2016**



**Figure A.4: 1/3 Octave Frequency Graph for N 2 on the 25<sup>th</sup> February 2016**

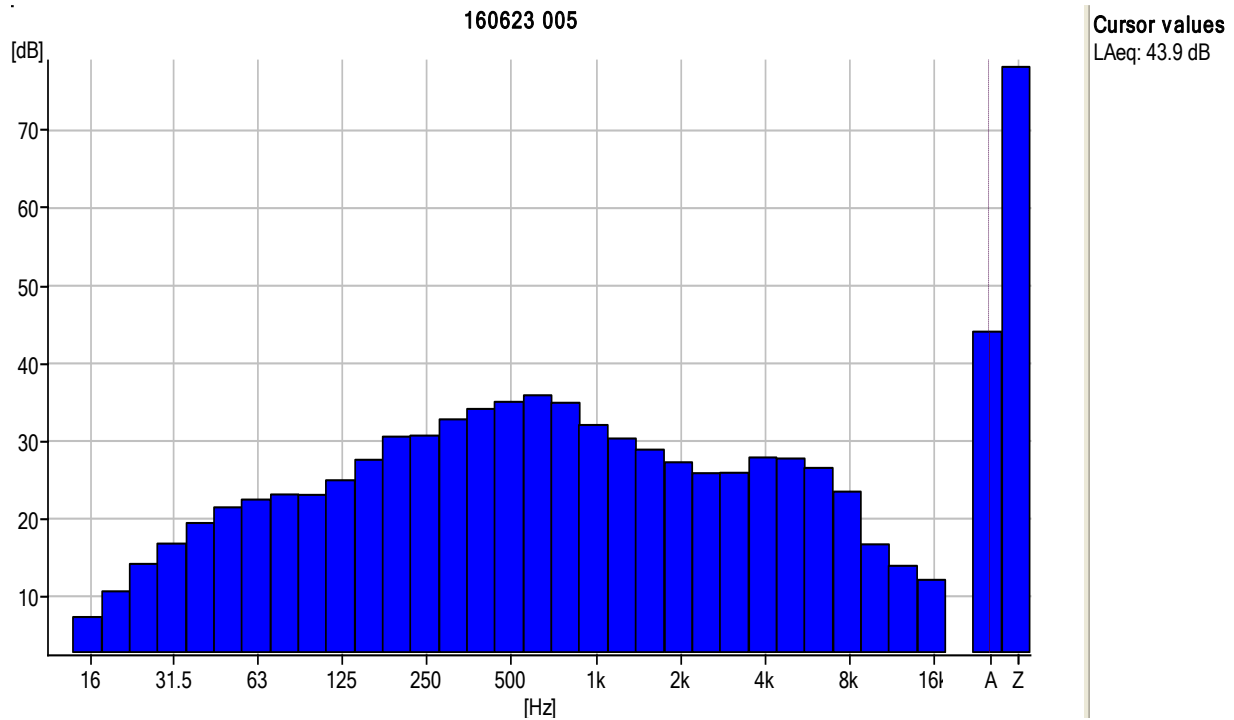


Figure A.5: 1/3 Octave Frequency Graph for N 2 on the 23<sup>rd</sup> June 2016

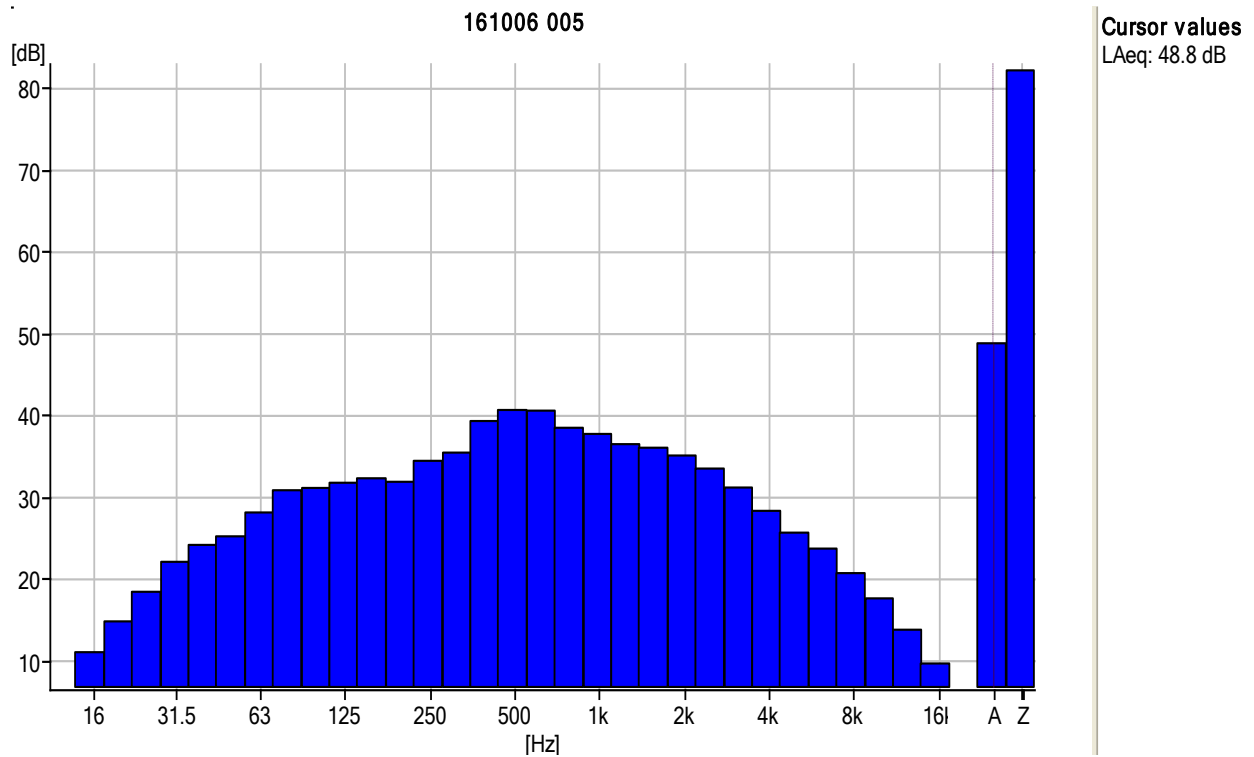


Figure A.6: 1/3 Octave Frequency Graph for N 2 on the 6<sup>th</sup> October 2016

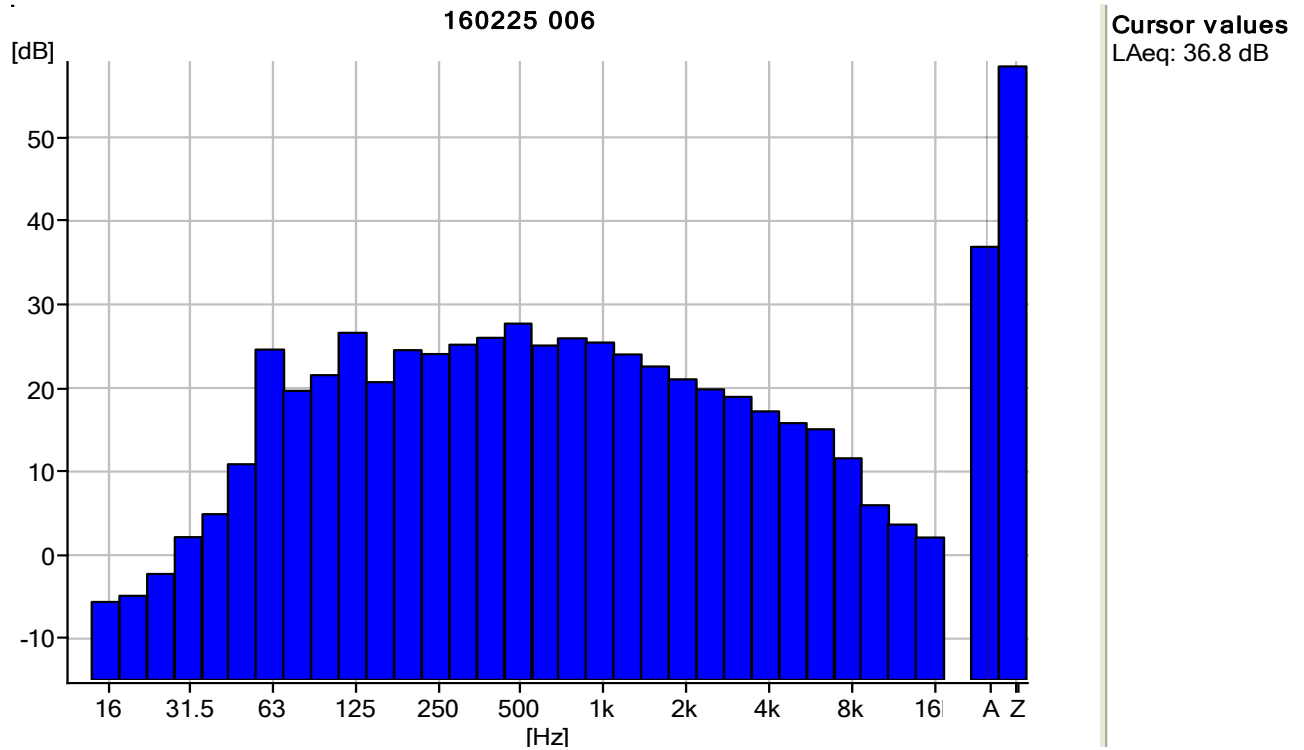


Figure A.7: 1/3 Octave Frequency Graph for N 3 on the 25<sup>th</sup> February 2016

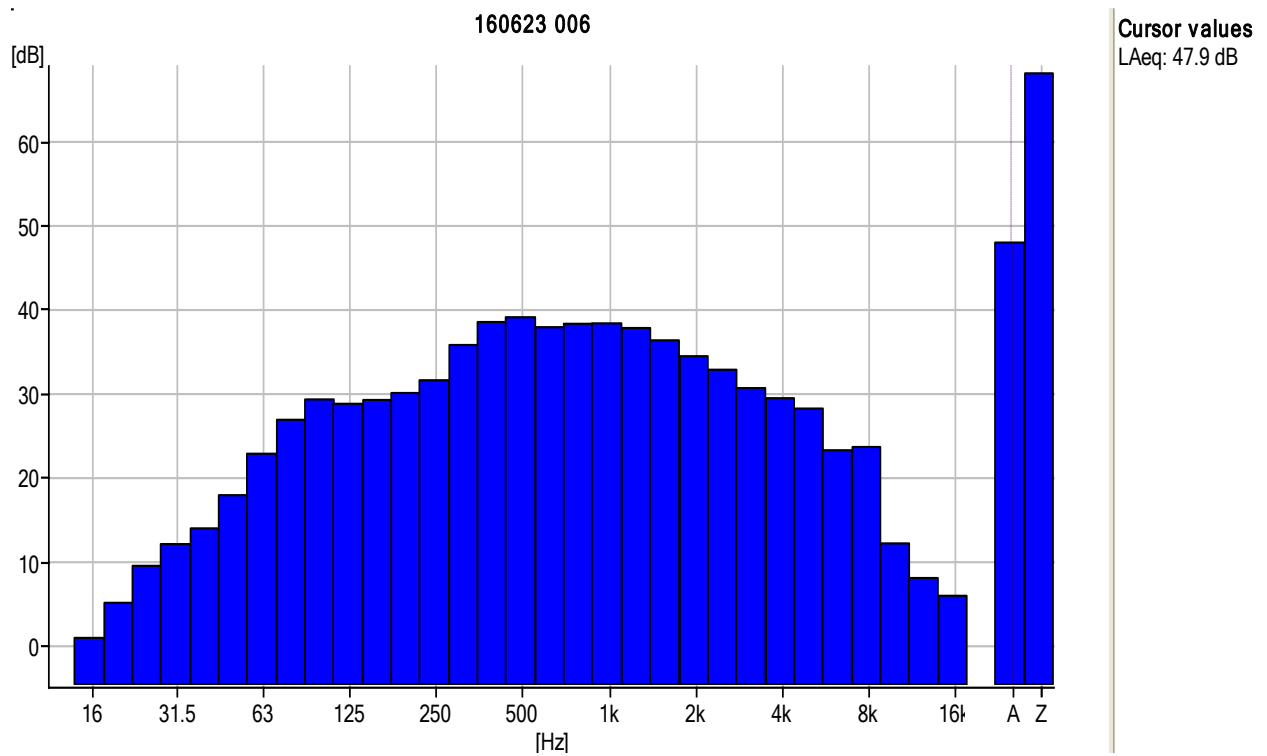


Figure A.8: 1/3 Octave Frequency Graph for N 3 on the 23<sup>rd</sup> June 2016

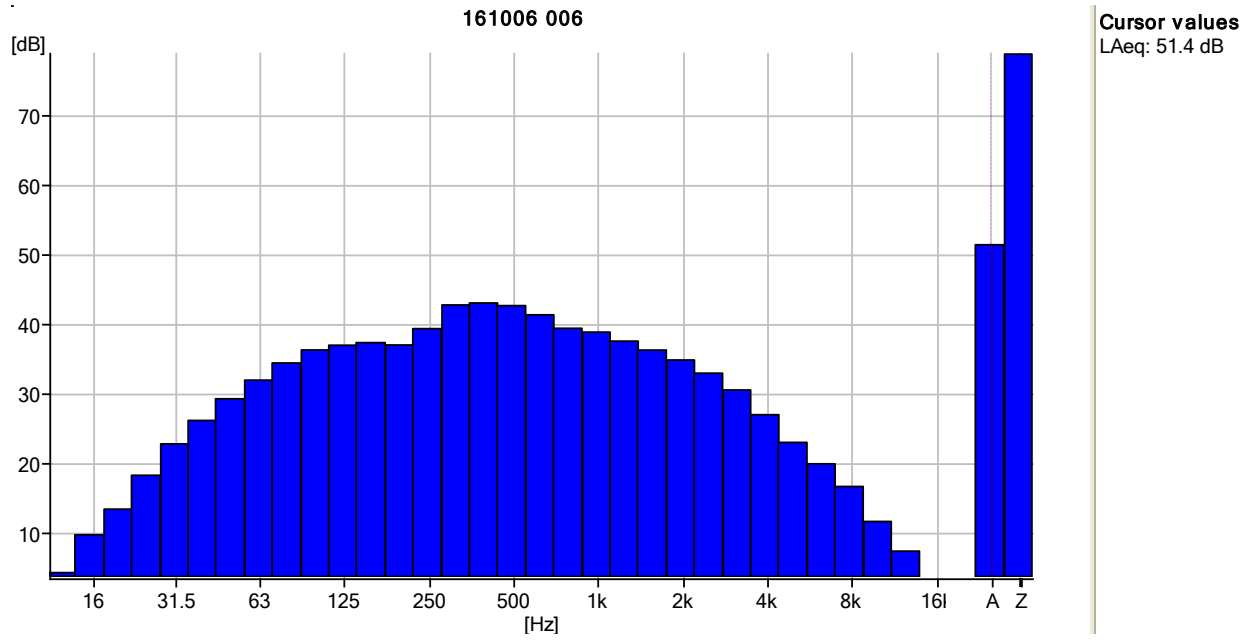


Figure A.9: 1/3 Octave Frequency Graph for N 3 on the 6<sup>th</sup> October 2016

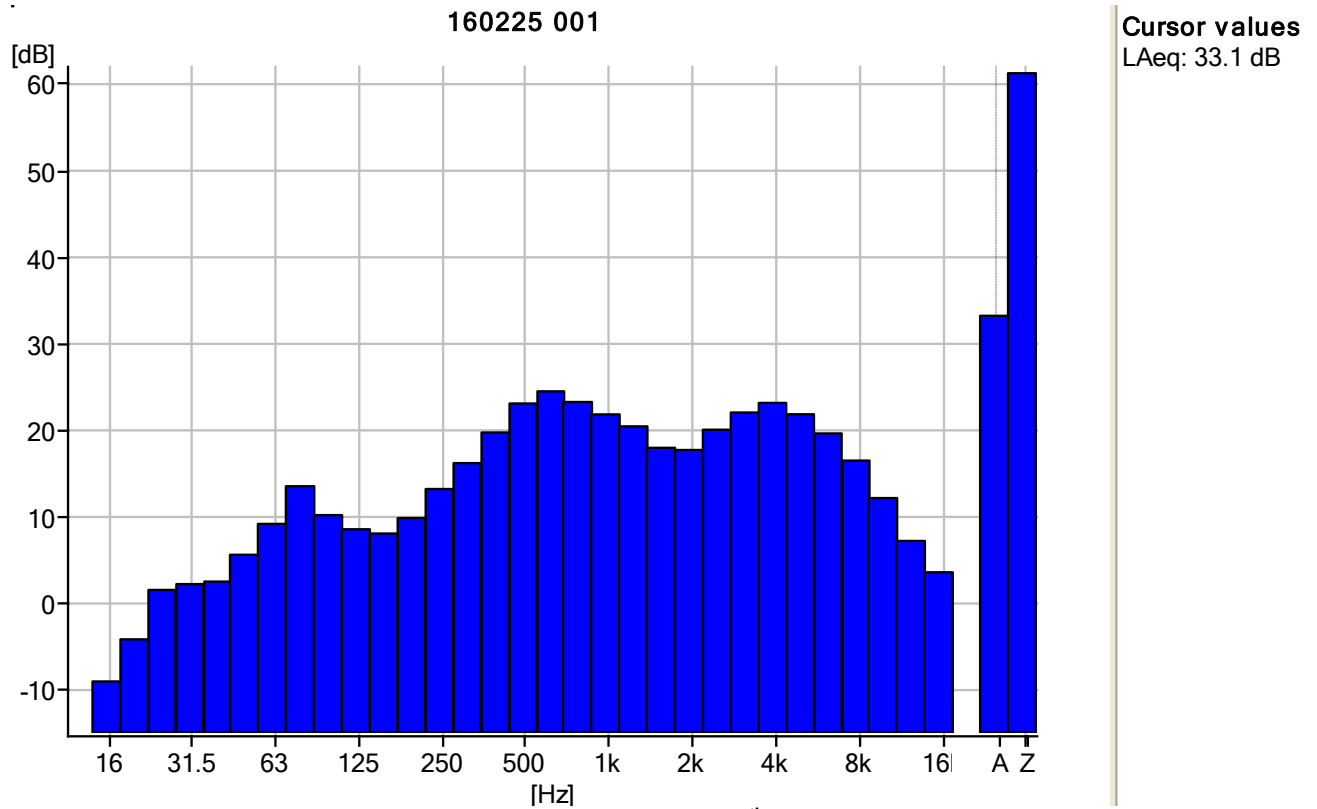


Figure A.10: 1/3 Octave Frequency Graph for E 1 on the 25<sup>th</sup> February 2016



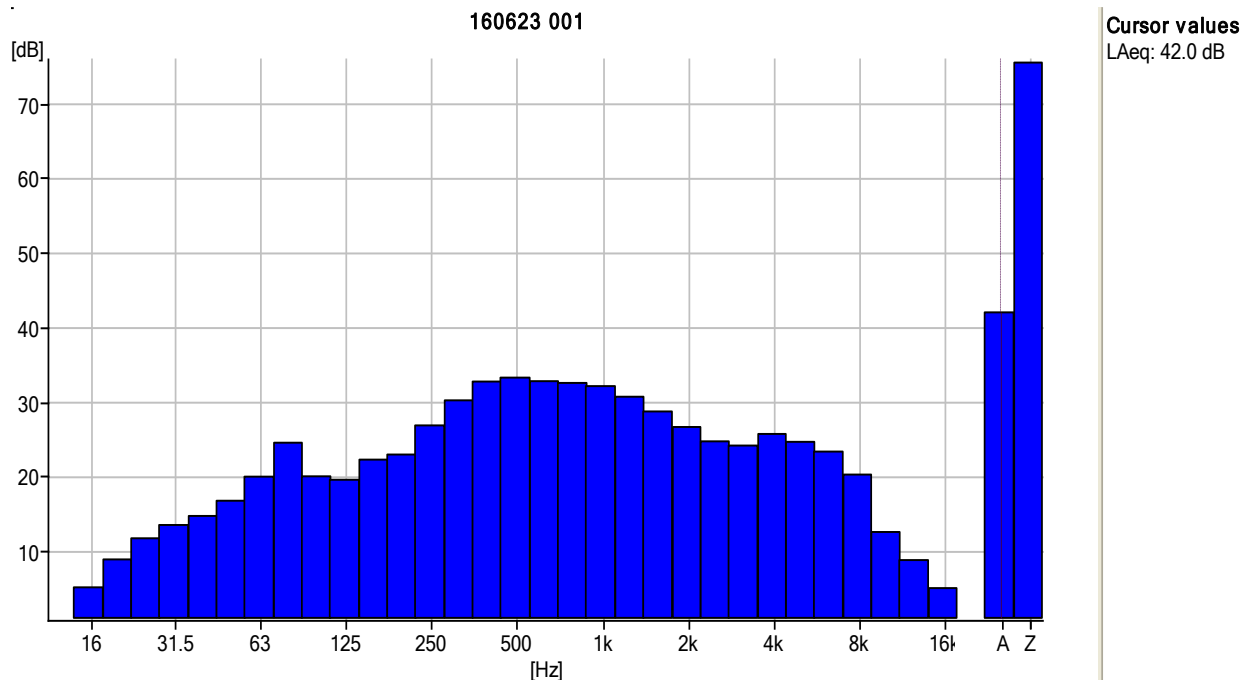


Figure A.11: 1/3 Octave Frequency Graph for E 1 on the 23<sup>rd</sup> June 2016

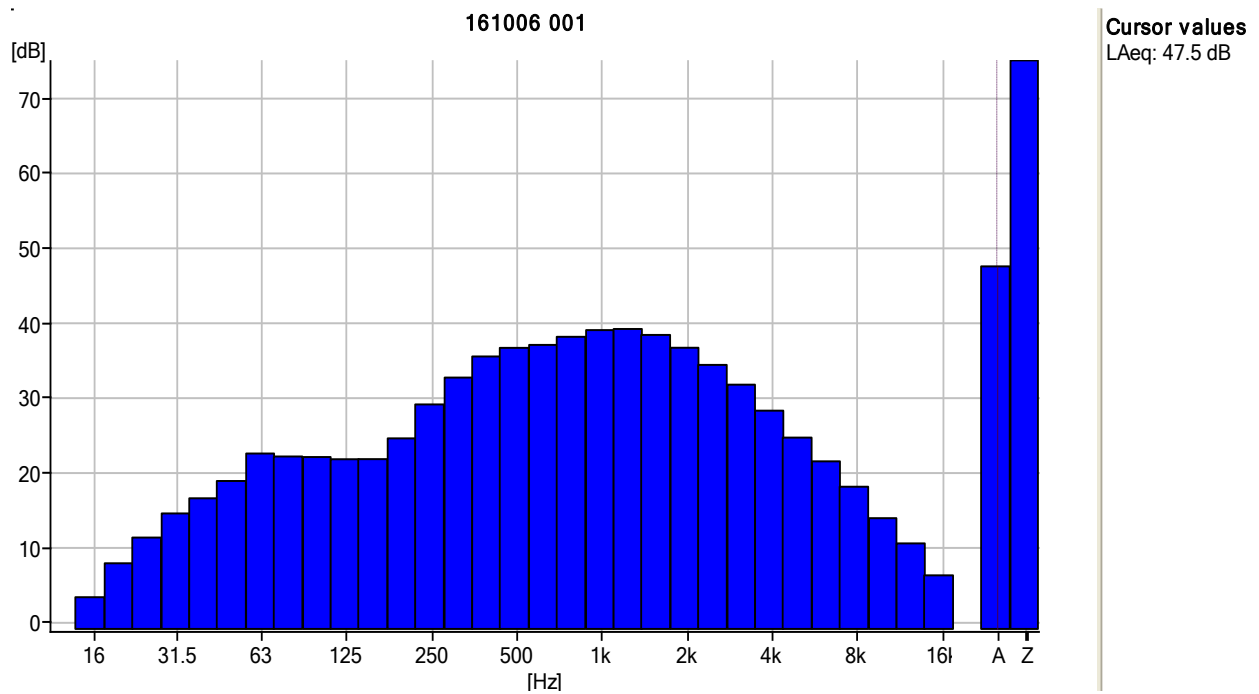
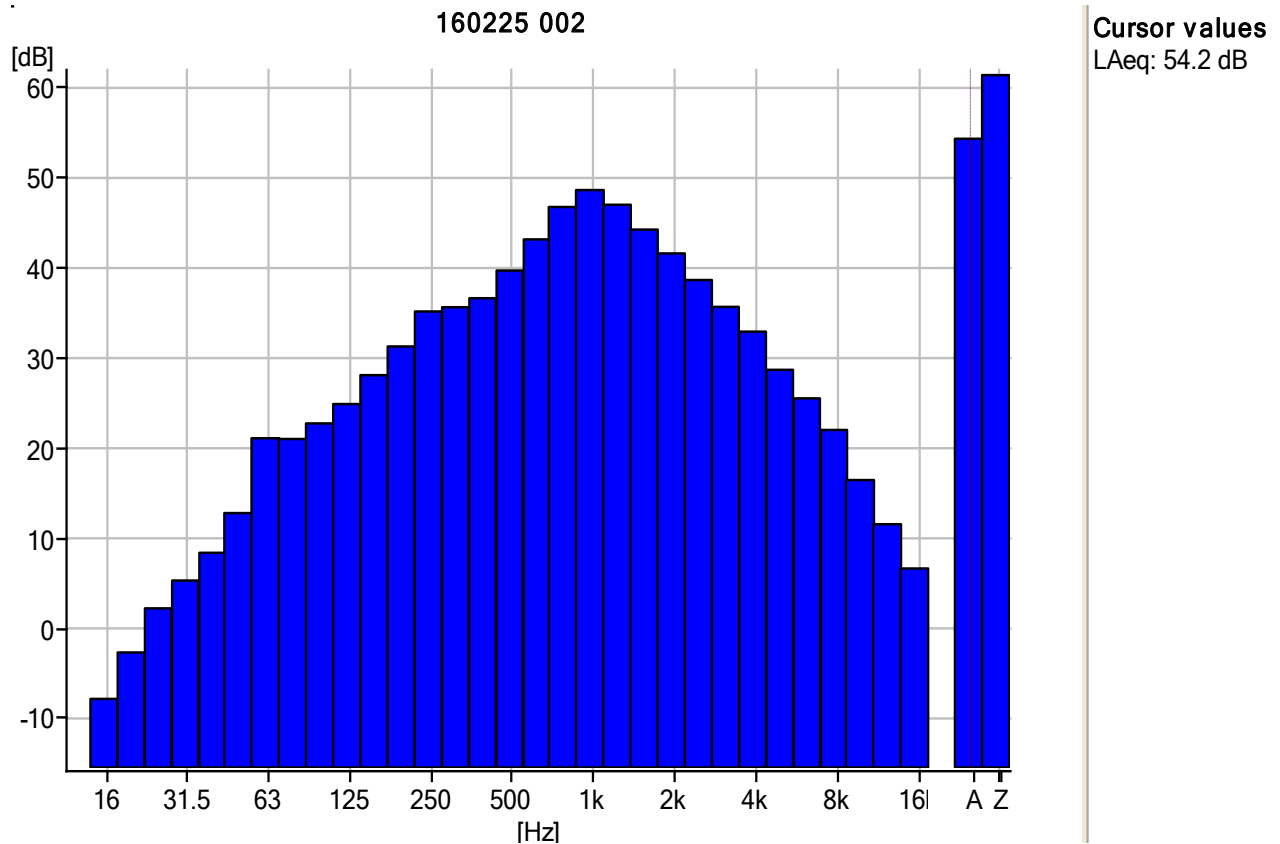
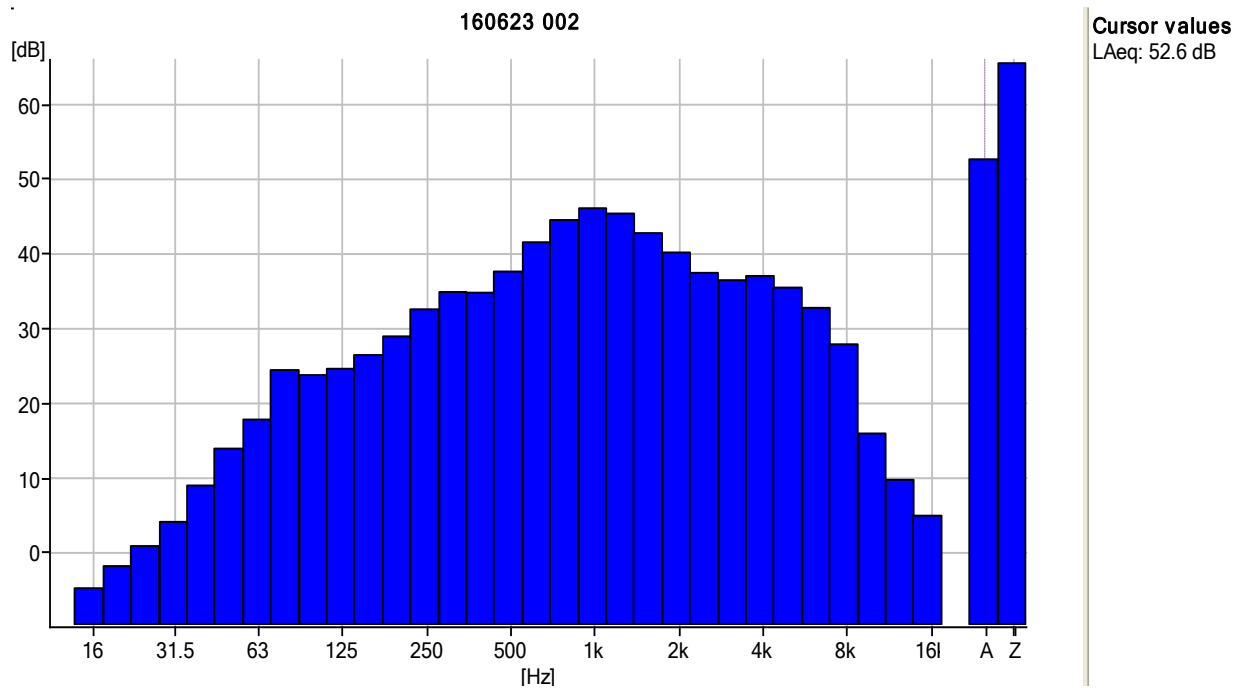


Figure A.12: 1/3 Octave Frequency Graph for E 1 on the 6<sup>th</sup> October 2016



**Figure A.13: 1/3 Octave Frequency Graph for E 2 on the 25<sup>th</sup> February 2016**



**Figure A.14: 1/3 Octave Frequency Graph for E 2 on the 23<sup>rd</sup> June 2016**

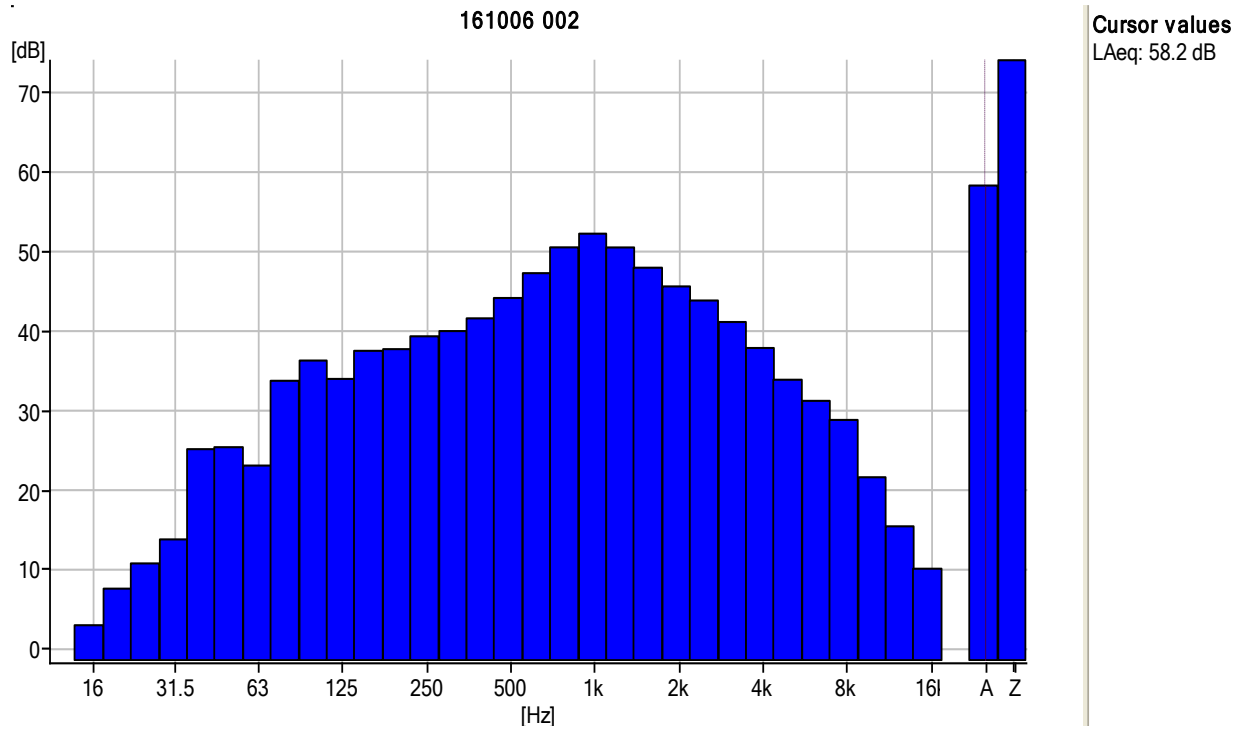


Figure A.15: 1/3 Octave Frequency Graph for E 2 on the 6<sup>th</sup> October 2016

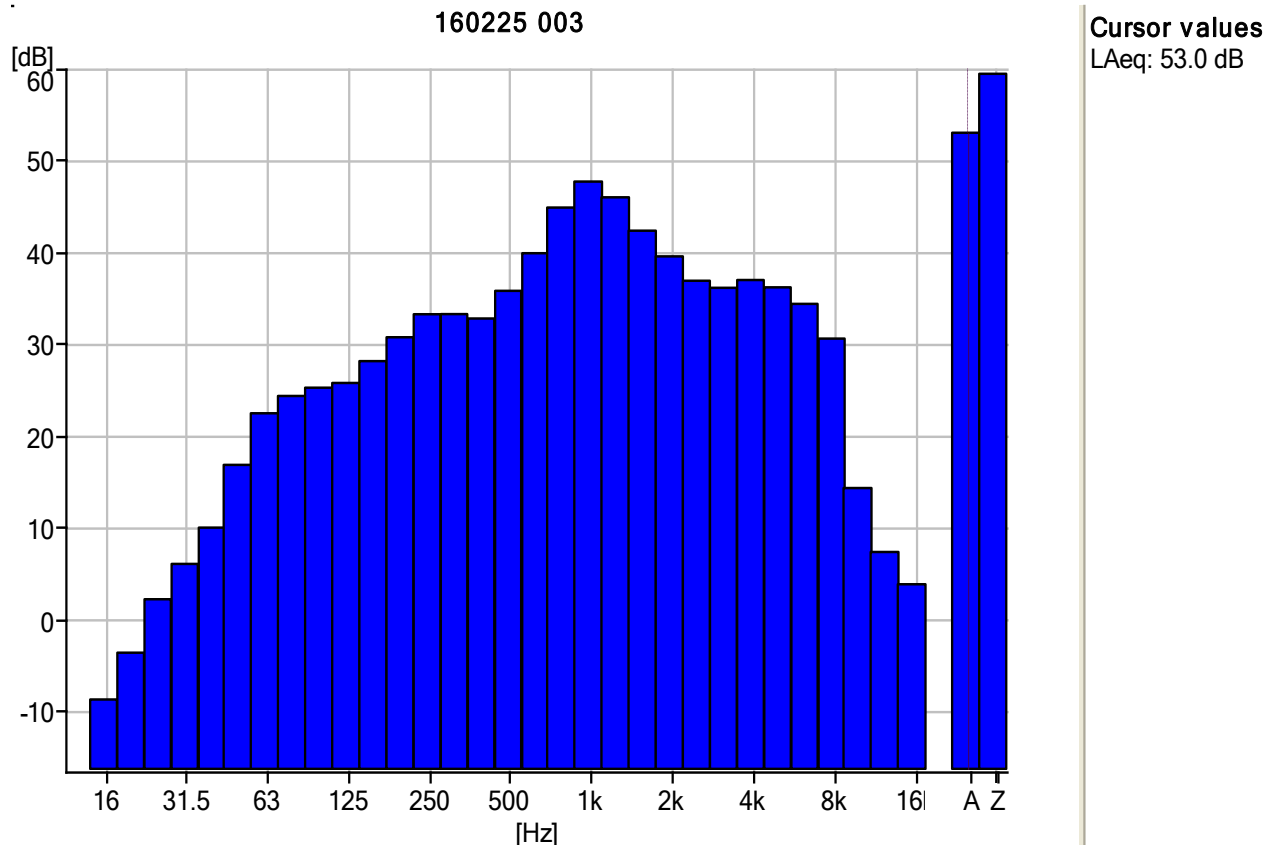


Figure A.16: 1/3 Octave Frequency Graph for E 3 on the 25<sup>th</sup> February 2016

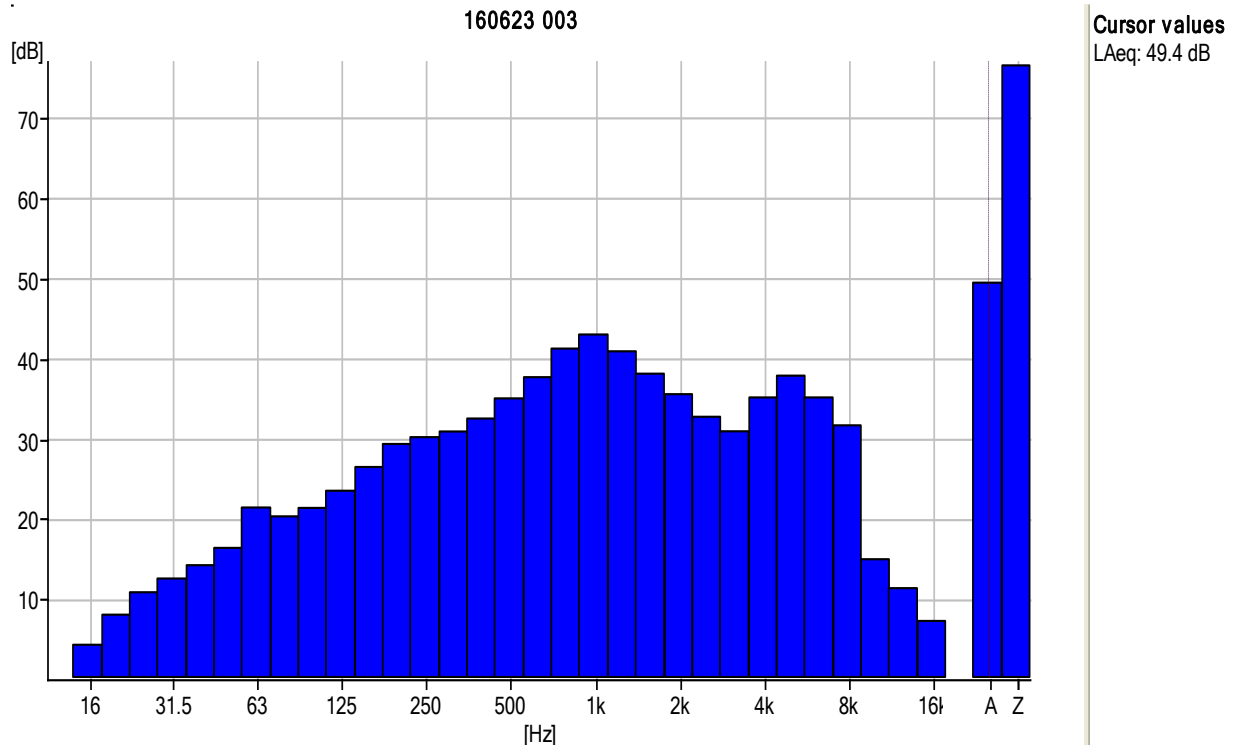


Figure A.17: 1/3 Octave Frequency Graph for E 3 on the 23<sup>rd</sup> June 2016

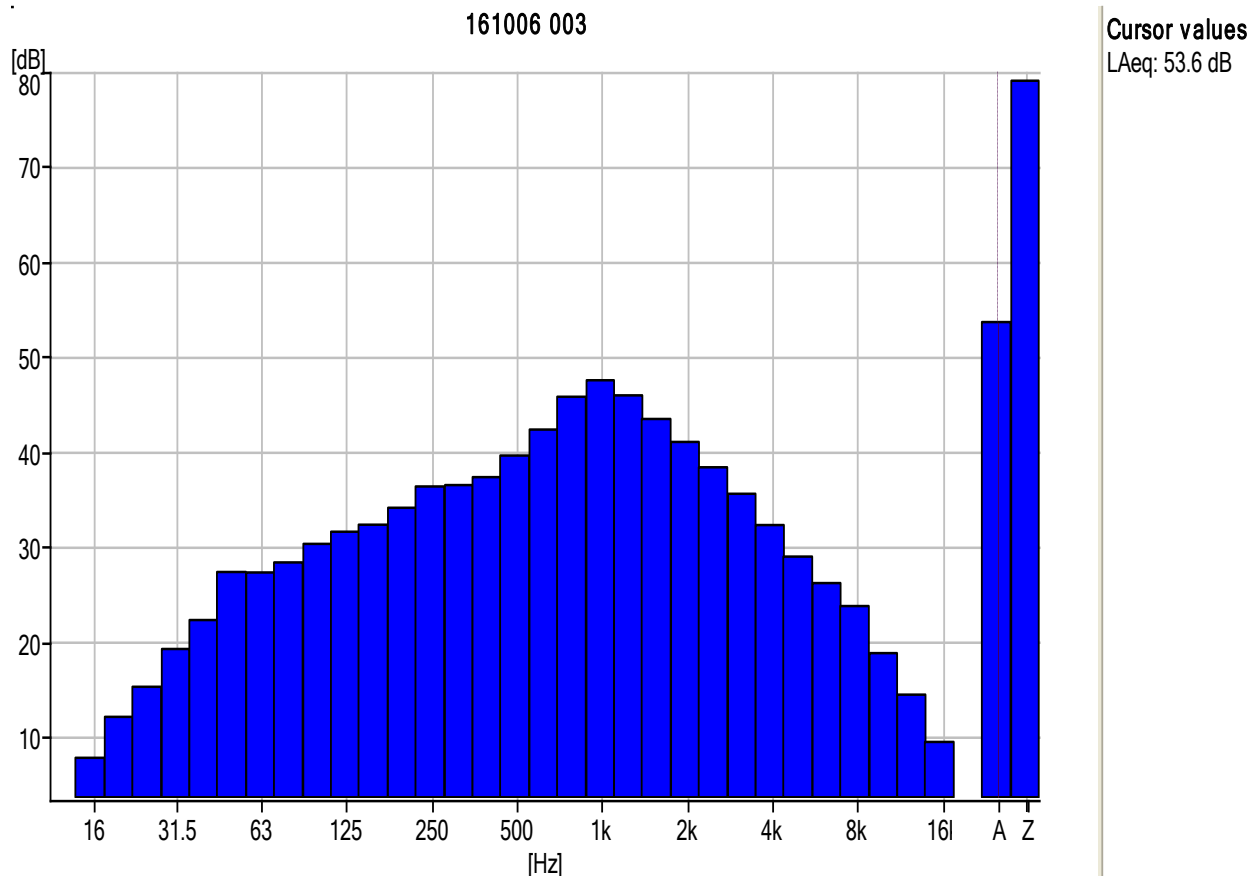







Figure A.18: 1/3 Octave Frequency Graph for E 3 on the 6<sup>th</sup> October 2016




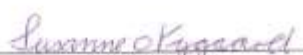

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**Appendix 2**

Calibration Certificates

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 The Calibration Laboratory Skodsborgvej 307, DK-2850 Narsrum, Denmark				 CAL Reg. No. 307 Member of EA MLA	
<b>CERTIFICATE OF CALIBRATION</b>			No: CDK1508295		Page 1 of 10
<b>CALIBRATION OF</b>					
Sound Level Meter:	Brüel & Kjær Type 2250 Light	No: 2654679	Id: -		
Microphone:	Brüel & Kjær Type 4950	No: 2652929			
Preamplifier:	Brüel & Kjær Type ZC-0032	No: 23415			
Supplied Calibrator:	Brüel & Kjær Type 4231	No: 3006120			
Software version:	BZ7130 Version 2.4	Pattern Approval:	PTB1.63-4061063		
Instruction manual:	BE1853-11				
<b>CUSTOMER</b>					
Southern Scientific Services Ltd Durrine Killarney Kerry, Ireland					
<b>CALIBRATION CONDITIONS</b>					
Preconditioning:	4 hours at 23°C ± 3°C				
Environment conditions:	See actual values in <i>Environmental conditions</i> sections.				
<b>SPECIFICATIONS</b>					
The Sound Level Meter Brüel & Kjær Type 2250 Light has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.					
<b>PROCEDURE</b>					
The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.1 - DB: 5.10) by using procedure B&K proc 2250-L-4950 (IEC61672).					
<b>RESULTS</b>					
Calibration Mode: <b>Calibration after repair/adjustment.</b>					
The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.					
Date of calibration: 2015-11-16			Date of issue: 2015-11-16		
 Lene Petersen Calibration Technician			 Jonas Johannessen Approved Signatory		
Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission.					

<b>Brüel &amp; Kjær</b>  The Calibration Laboratory Skodsborgvej 397, DK-2850 Nærum, Denmark		 CAL. Reg. No. 307 Member of EA MLA
<b>CERTIFICATE OF CALIBRATION</b>	No: CDK1508125	Page 1 of 4
<b>CALIBRATION OF</b>		
Calibrator: Brüel & Kjær Type 4231 1/5 Inch adaptor: Brüel & Kjær Type UC-0210 Pattern Approval: PTB-1.61-4057176	No: 3006120 Id: -	
<b>CUSTOMER</b>		
Southern Scientific Services Ltd Dunrine Kilarney Kerry, Ireland		
<b>CALIBRATION CONDITIONS</b>		
Preconditioning: 4 hours at 23°C ± 3°C Environment conditions: Pressure: 100.57 kPa. Humidity: 44 % RH. Temperature: 22.8 °C.		
<b>SPECIFICATIONS</b>		
The Calibrator Brüel & Kjær Type 4231 has been calibrated in accordance with the requirements as specified in IEC60942:2003 Annex B Class 1. The accreditation assures the traceability to the international units system SI.		
<b>PROCEDURE</b>		
The measurements have been performed with the assistance of Brüel & Kjær acoustic calibrator calibration application software Type 7794 (version 2.5) by using procedure P_4231_D07.		
<b>RESULTS</b>		
Calibration Mode: <b>Calibration after repair/adjustment.</b> The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.		
Date of calibration: 2015-11-09	Date of issue: 2015-11-09	
 Susanne Nygaard Calibration Technician	 Susanne Jørgensen Approved Signatory	
Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission.		

## ***Appendix G: Landfill Gas Survey 2016***



## A survey of landfill sites to determine the quantity of methane flared and or recovered in utilisation plants for 2016

Please choose from the drop down menu the license number for your site	W0004
Please choose from the drop down menu the name of the landfill site	North Kerry
Please enter the number of flares operational at your site in 2016	1
Please enter the number of engines operational at your site in 2016	1
Total methane flared	149,258 kg/year
Total methane utilised in engines	416,382 kg/year

**Please note that the closing date for receipt of completed surveys is 31/03/2017**

### Introduction

The Office of Environmental Sustainability (OES) of the Environmental Protection Agency acts as the inventory agency in Ireland with responsibility for compiling and reporting national greenhouse gas inventories to the European Commission and the United Nations Framework Convention on Climate Change. In addition to meeting international commitments Ireland's national greenhouse gas inventory informs national agencies and Government departments as they face the challenge to curb emissions and meet Ireland's emission reduction targets under the Effort Sharing Decision (No. 406/2009/EC). The national inventory also informs data suppliers, making them aware of the importance of their contributions to the inventory process and a means of identifying areas where input data may be improved.

It is on this basis that the Environmental Protection Agency is asking landfill operators to partake in this survey so that the most up to date information on methane flaring and recovery in utilisation plants at landfill sites is used in calculating the contribution of the landfill sector to national greenhouse gas emissions

The Environmental Protection Agency wishes to thank you for partaking in this survey. If you have any questions about the survey and how to complete it please view the "Help sheet" worksheet. If however, your query is not answered by viewing the "Help sheet" worksheet please contact:

[LFGProject@epa.ie](mailto:LFGProject@epa.ie)

Once completed please send the completed file as an attachment clearly stating the name and or license number of the landfill site (e.g. W000 Xanadu landfill\_2015) to:

[LFGProject@epa.ie](mailto:LFGProject@epa.ie)

to be filled in by licensee      calculated by spreadsheet

**Flare No. 1**

Flare type ?  If "other" enter flare description here

Is the flare an open or enclosed flare ?  Rated flare capacity ?  m3/hr

Month /year comissioned ?

Month decomissioned if decomissioned in 2016 ?

What is the function of the flare ?  If "other" enter flare function here

Monthly	Method M/C/E	Runtime days/month	Runtime hrs/day	Downtime hrs	Total runtime hrs/month	Average Inlet Pressure (mbg)	Average Inlet Temp ° C	Average Flow Rate (m <sup>3</sup> /hr)	Average CH <sub>4</sub> %v/v	Average CO <sub>2</sub> %v/v	Average O <sub>2</sub> %v/v	Combustion efficiency (%)	Total CH <sub>4</sub> m <sup>3</sup>	Total CH <sub>4</sub> kgs
January	M	31	24.0	250.0	494	-30	10	116	45.30	31.30	2.20	98.0	25,440	17,045
February	M	29	24.0	438.0	258	-30	10	125	38.00	26.00	1.20	98.0	12,010	8,047
March	M	31	24.0	480.0	264	-30	10	100	36.00	24.00	1.80	98.0	9,314	6,240
April	M	30	24.0	97.0	623	-30	10	135	46.00	31.00	1.40	98.0	37,915	25,403
May	M	31	24.0	194.0	550	-30	10	130	48.00	33.00	1.20	98.0	33,634	22,535
June	M	30	24.0	174.0	546	-20	10	105	45.00	30.00	2.50	98.0	25,283	17,112
July	M	31	24.0	148.0	596	-22	10	105	44.10	29.10	1.50	98.0	27,046	18,268
August	M	31	24.0	174.0	570	-24	10	155	48.00	31.00	1.00	98.0	41,560	28,015
September	M	30	24.0	632.0	88	-22	10	150	47.00	31.00	1.40	98.0	6,080	4,107
October	M	30	24.0	650.0	70	-26	10	100	45.40	29.60	1.50	98.0	3,114	2,095
November	M	30	24.0	707.0	13	-31	10	110	41.70	27.30	1.80	98.0	584	391
December	M	31	24.0	744.0	0		10					98.0	0	#N/A
<b>Total</b>					<b>4,072</b>								<b>221,978</b>	<b>149,258</b>

Please note: Only fill the "Yearly" table if data is not available or cannot be calculated nor estimated on a monthly basis

Yearly	Method M/C/E	Runtime days/year	Runtime hrs/day	Downtime hrs	Total runtime hrs/year	Average Inlet Pressure (mbg)	Average Inlet Temp ° C	Average Flow Rate m <sup>3</sup> /hr	Average CH <sub>4</sub> %v/v	Average CO <sub>2</sub> %v/v	Average O <sub>2</sub> %v/v	Combustion efficiency (%)	Total CH <sub>4</sub> m <sup>3</sup>	Total CH <sub>4</sub> kgs
<b>2016</b>					<b>0</b>		<b>10</b>					<b>98.0</b>	<b>0</b>	<b>0</b>

to be filled in by licensee      calculated by spreadsheet

**Engine No. 1**

Engine type ?      Other       **Jenbacher J208 GS**

Month /year comissioned ?      November       2011

Month decomissioned if decomissioned in 2016 ?      Select

Monthly	Method M/C/E	Runtime days/month	Runtime hrs/day	Downtime hrs	Total runtime hrs/month	Average Inlet Pressure (mbg)	Average Inlet Temp ° C	Average Flow Rate (m <sup>3</sup> /hr)	Average CH <sub>4</sub> %v/v	Average CO <sub>2</sub> %v/v	Average O <sub>2</sub> %v/v	Combustion efficiency (%)	Total CH <sub>4</sub> m <sup>3</sup>	Total CH <sub>4</sub> kgs
January	M	31	24	52	692	-30	10	160	45.30	31.30	2.20	98.0	49,153	32,933
February	M	29	24	13	683	-30	10	210	38.00	26.00	1.20	98.0	53,413	35,787
March	M	31	24	5	739	-30	10	200	36.00	24.00	1.80	98.0	52,144	34,937
April	M	30	24	36	685	-30	10	165	46.00	31.00	1.40	98.0	50,914	34,113
May	M	31	24	47	697	-30	10	150	48.00	33.00	1.20	98.0	49,180	32,951
June	M	30	24	2	719	-20	10	165	45.00	30.00	2.50	98.0	52,282	35,385
July	M	31	24	5	739	-22	10	150	44.10	29.10	1.50	98.0	47,907	32,359
August	M	31	24	16	728	-24	10	145	48.00	31.00	1.00	98.0	49,655	33,472
September	M	31	24	8	736	-22	10	150	47.00	31.00	1.40	98.0	50,850	34,347
October	M	31	24	4	740	-26	10	165	45.40	29.60	1.50	98.0	54,325	36,546
November	M	30	24	23	697	-31	10	185	41.70	27.30	1.80	98.0	52,695	35,270
December	M	31	24	14	730	-42	10	210	38.50	26.00	2.20	98.0	57,840	38,280
Total					8,584								620,359	416,382

Please note: Only fill the "Yearly" table if data is not available or cannot be calculated nor estimated on a monthly basis

Yearly	Method M/C/E	Runtime days/year	Runtime hrs/day	Downtime hrs	Total runtime hrs/year	Average Inlet Pressure (mbg)	Average Inlet Temp ° C	Average Flow Rate m <sup>3</sup> /hr	Average CH <sub>4</sub> %v/v	Average CO <sub>2</sub> %v/v	Average O <sub>2</sub> %v/v	Combustion efficiency (%)	Total CH <sub>4</sub> m <sup>3</sup>	Total CH <sub>4</sub> kgs
2016					0	Select	10					98.0	0	0

## ***Appendix H: PRTR Report 2016***



[Guidance to completing the PRTR workbook](#)

# PRTR Returns Workbook

Version 1.1.19

<b>REFERENCE YEAR</b>	2016
-----------------------	------

## 1. FACILITY IDENTIFICATION

Parent Company Name	Kerry County Council
Facility Name	North Kerry Landfill Site
PRTR Identification Number	W0001
Licence Number	W0001-04

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

Address 1	Muingnaminnane
Address 2	Tralee
Address 3	
Address 4	
	Kerry
Country	Ireland
Coordinates of Location	-6.85099 54.1736
River Basin District	IEGBNISH
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
<b>AER Returns Contact Name</b>	David Donegan
<b>AER Returns Contact Email Address</b>	david.donegan@kerrycoco.ie
<b>AER Returns Contact Position</b>	Assistant Engineer
<b>AER Returns Contact Telephone Number</b>	0667162000
<b>AER Returns Contact Mobile Phone Number</b>	0879218946
<b>AER Returns Contact Fax Number</b>	
<b>Production Volume</b>	0.0
<b>Production Volume Units</b>	
<b>Number of Installations</b>	0
<b>Number of Operating Hours in Year</b>	0
<b>Number of Employees</b>	2
<b>User Feedback/Comments</b>	Methane Emission Point was in m3 rather than kg/year in 2015. Correction made in 2016. Leachate reducing slightly due to capping remediation works year on year.
<b>Web Address</b>	

## 2. PRTR CLASS ACTIVITIES

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

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

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

## 4. WASTE IMPORTED/ACCEPTED ONTO SITE

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

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

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

4.1 RELEASES TO AIR

[Link to previous years emissions data](#)

| PRTR# : W0001 | Facility Name : North Kerry Landfill Site | Filename : w0001\_2016.xlsx | Return Year : 2016 |

29/03/2017 11:25

**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		QUANTITY			
			Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	E	ESTIMATE	Calculated	0.0	0.0	0.0	0.0
03	Carbon dioxide (CO2)	E	ESTIMATE	Calculated	130798.52	130798.52	0.0	0.0
					1117.0	1117.0	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**

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

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

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

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

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

**Additional Data Requested from Landfill operators**

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

Landfill:	North Kerry Landfill Site				
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
	Total estimated methane generation (as per site model)	E	oth	Landgen	N/A
	Methane flared	C	oth	Calculated	500.0 (Total Flaring Capacity)
	Methane utilised in engine/s	M	oth	Calculated	200.0 (Total Utilising Capacity)
	Net methane emission (as reported in Section A above)	E	oth	Calculated	N/A

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR#: W0001 | Facility Name : North Kerry Landfill Site | Filename : w0001\_2016.xlsx | Return Year : 2016 |

29/03/2017 11:25

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	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 Haz Waste: Address of Recover/Disposer				
Within the Country	19 07 03	No	39480.86 in 19 07 02	Landfill leachate other than those mentioned	D8	M	Weighed	Offsite in Ireland	Finucane Burke Haulage,WCP-CK-09-0691-01		Tralee Wastewater Treatment Plant,The Kerries,Tralee ,Co Kerry,Ireland			

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

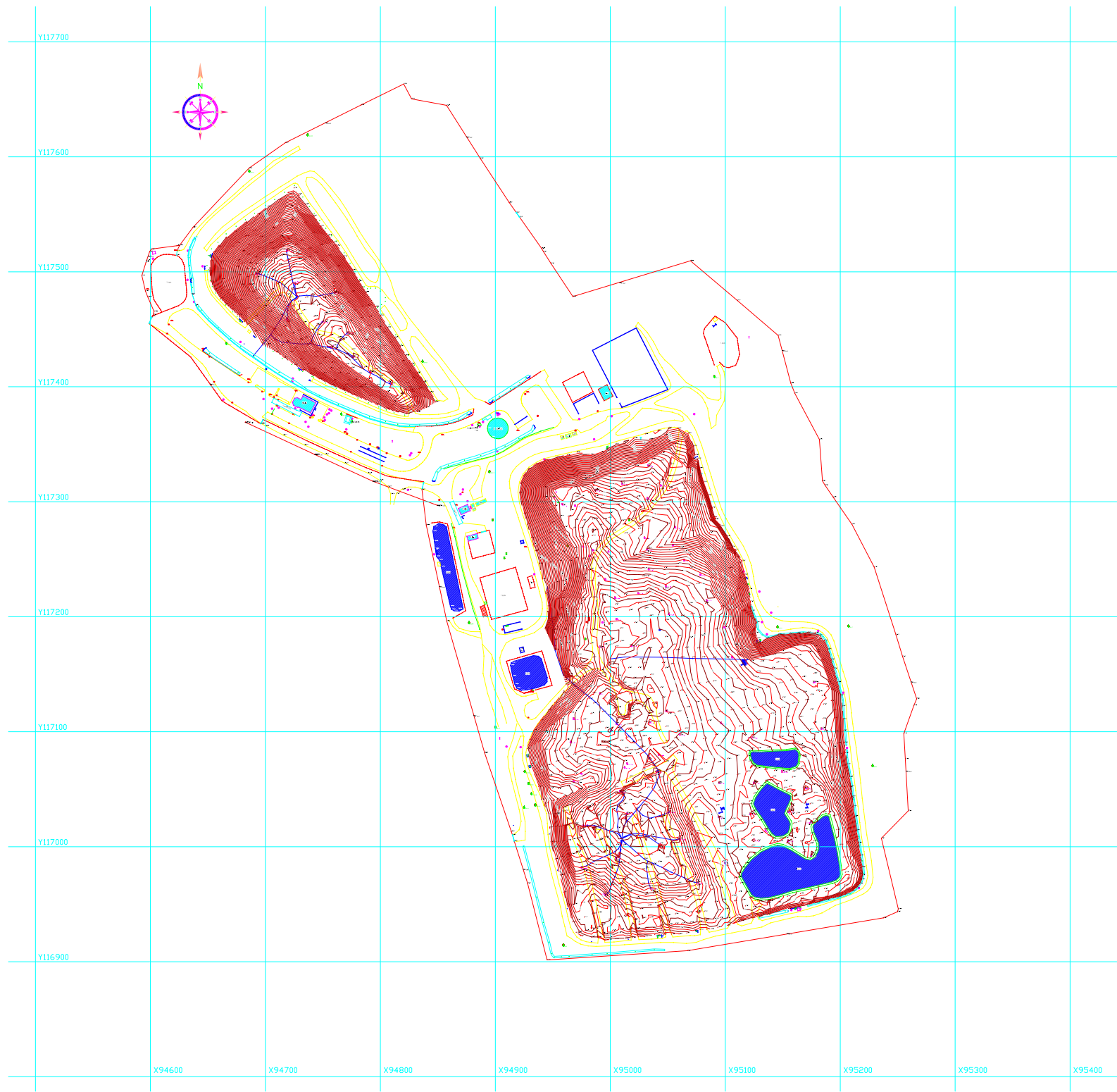
[Link to previous years waste data](#)

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

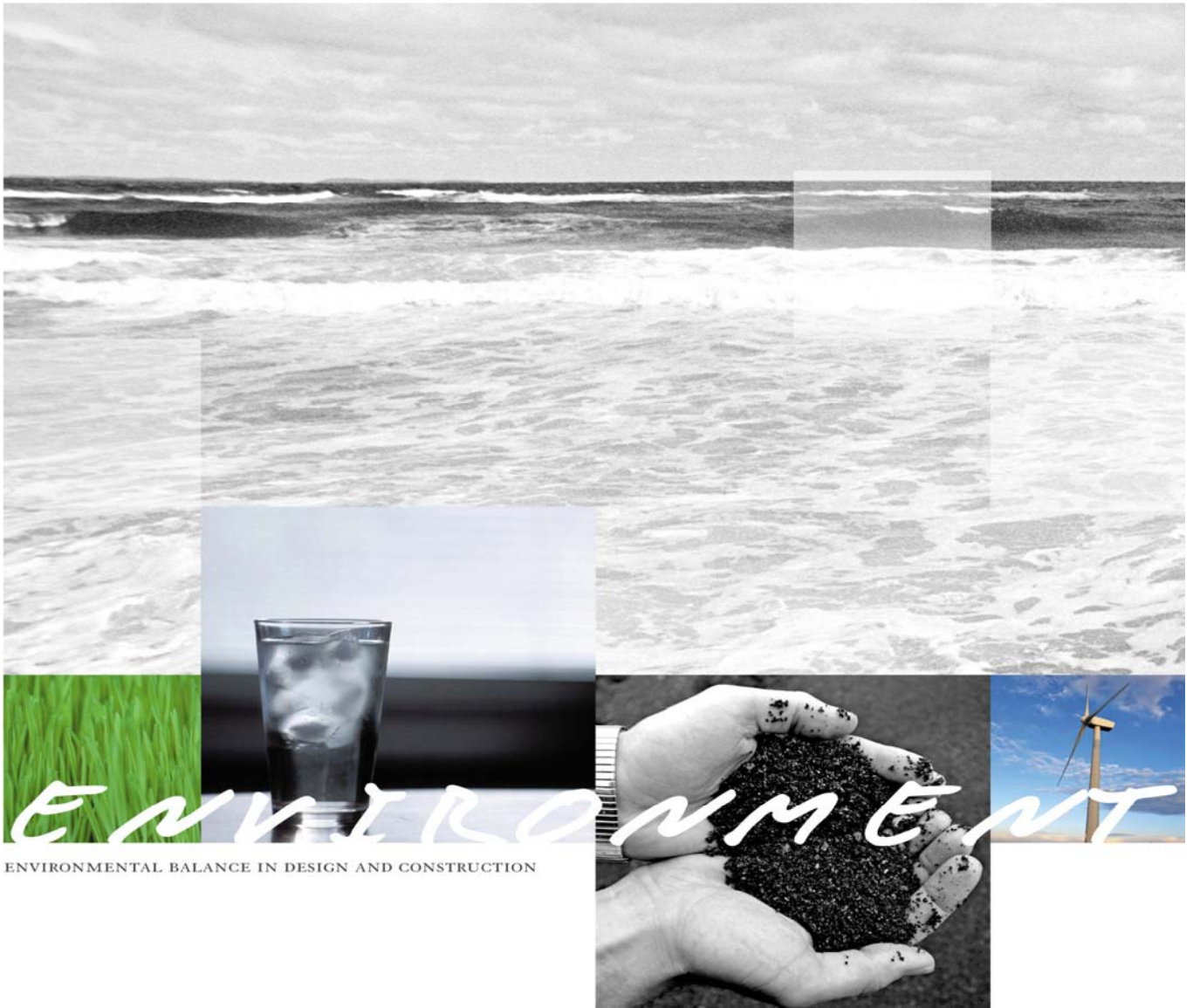
[Link to Waste Guidance](#)

## ***Appendix I: Topographical Survey 2016***





## ***Appendix J: Side Slope Assessment 2017***



# SLOPE STABILTY ASSESSMENT FOR NORTH KERRY LANDFILL

KERRY COUNTY COUNCIL

MARCH 2017



# SLOPE STABILTY ASSESSMENT FOR NORTH KERRY LANDFILL

## User is Responsible for Checking the Revision Status of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
A	Issue to Client	JD/MG	TC	JN	14.03.2017

**Client:** Kerry County Council

**Keywords:** Slope, Stability, Assessment, Muingnaminnane, Kerry.

**Abstract:** Kerry County Council retained Fehily Timoney & Company (FT) to carry out a slope stability assessment of the landfill side slopes at North Kerry Landfill in order to comply with Condition 8.11.1 of Waste Licence W0001-04 (IED).

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## LIST OF APPENDICES

Appendix 1: Slope Location Plan

## 1 INTRODUCTION

### 1.1 Background

Fehily Timoney and Company (FT) was appointed by Kerry County Council to undertake a slope stability assessment of North Kerry Landfill, Muingnaminnane, Tralee Co. Kerry. FT undertook the previous slope stability assessments for the landfill during March 2016.

This 2017 assessment is in accordance with Condition 8.11.1 of the EPA waste licence issued to the site (Current IED Licence No: W0001-04)

### 1.2 Site Description

The facility is situated in north County Kerry, approximately 11 km west of the town of Tralee in the townland of Muingnaminnane.

The site was developed as a municipal landfill facility and recycling centre. The site ceased receiving waste for deposition in 2014. Kerry County Council is currently undertaking various works associated with the sites aftercare.

FT completed a site walkover of the site on 8<sup>th</sup> March 2017 to examine the existing landfill slopes at North Kerry Landfill. All slopes within the site were inspected as part of the visual assessment with written and photographic notes taken. Slopes were inspected on foot generally traversing from toe to crest across the entire length of the slope.

The landfill cap at Cells 1 - 16 is overgrown and vegetated with long grasses, scrubland and rushes with some trees and larger bushes. The topography of the cap at these cells is undulating and difficult to traverse on foot. At capped cells 17, 18 & 19 the slopes were generally lighted vegetated and as such were accessible on foot.

No visibly unstable slopes were observed on the site and no tension cracks were observed in any of the slopes which may have suggested potential instability. Some ponding was noted over cells 1-16 (Photos 5 and 6), particularly in the west of the capped area. Evidence of historical ground movement as highlighted in the previous FT Slope Stability Assessment, March 2016 (Photos 36 – 38) was noted with no evidence of recent movement observed.

### 1.3 Previous Slope Stability Assessments

FT undertook the previous slope stability assessments for the landfill during March 2016. The reported issues noted during the visual assessment undertaken in March 2016 are outlined below:

1. Waterlogged area of cap adjacent constructed wetland at southeast corner of Cells 1 to 16 (eastern slope);
2. Apparent ground movement on the western slope adjacent to haul road on cap; and
3. Some minor issues were noted such as areas of bare vegetation which may result in erosion or waterlogging of slopes.

### 1.4 Site Walkover

FT completed a site walkover of the site on the 8<sup>th</sup> March 2017. All slopes within the site were inspected as part of the visual assessment with written and photographic notes taken. Slopes were inspected on foot generally traversing from toe to crest across the entire length of the slope.

All slopes were assessed for signs of instability or identification of potential factors which may impact the future stability of the landfill slopes.

A Site Layout Plan is included in Appendix 1 to this document.

## 2 CONDITIONS OF SURVEY

The condition survey completed was limited to a visual inspection of the exposed elements of the landfill slopes only and limited to readily accessible areas. The purpose of the condition survey was to assess and advise of issues relating to the stability of the landfill slopes as required by Waste License W0001-04 (IED).

No intrusive investigations or prolonged monitoring of defective areas were carried out. FT did not undertake any work of a specific engineering nature such as engineering calculations, structural analyses, testing or measurements. This report reflects FT's interpretation of the site condition from visual inspections only. Recommendations in this report define where more detailed investigations maybe appropriate.

While issues relating to public safety and issues relevant for the safe use of the site may be raised in this report they should not be taken as an exhaustive list of all operational issues. A review of site operations is beyond the scope of this report.

This report is not a certification, a warranty or a guarantee and was scoped in accordance with the instructions given and the time allowed.

This report may not be relied upon by a third party for any purpose without the written consent of Fehily Timoney and Company. Furthermore, this report has been prepared and issued for the purposes of the addressee and no responsibility will be extended to any third party for the whole or any part of its contents.



### 3 SLOPE STABILITY OBSERVATIONS

#### 3.1 CELLS 17, 18 and 19

Cells 17, 18 and 19 are shown in the Appendix 1: Site Layout Plan. These cells are the most recently filled cells to be completed and capped.

The main slopes were observed to be vegetated by grass, slopes at the north of the cells were sparsely vegetated although grass coverage is developing.

No indications of translational or rotational instabilities were observed. In FT's opinion the slopes are stable.



Photo 1 – Cells 17, 18 & 19



Photo 2 – Southwest Slope



Photo 3 – Southwest Slope



Photo 4 – Southwest Slope



Photo 5 – Northwest Slope



Photo 6 – Northwest Slope





Photo 7 – Northwest Slope



Photo 8 – Northeast Slope



Photo 9 – Northeast Slope



Photo 10 – Northeast Slope



Photo 11 – Northeast Slope



Photo 12 – Northeast Slope



Photo 13 – Southeast Slope



Photo 14 – Southeast Slope



Photo 15 – Southeast Slope



Photo 16 – Ridge along Cell 17



### 3.2 CELLS 1 to 16

Cells 1 to 16, the oldest in the landfill, are shown in Appendix A: Site Layout Plan. All cells in this area have been capped. The slopes to cells 1 to 16 vary in steepness from 1:1 to 1:10 approximately. The slopes are vegetated with scrubland, rushes and some small trees and bushes.

Whilst the slopes are considered to be generally stable. There are areas where remedial works may be required at the following locations described below:

- Waterlogging of cap across cells 1 -16 is evident in Photos No 33 to 35 inclusive. FT advises that surface water is being contained in a localised depressions in the ground across the landfill cap across cells particularly in the vicinity of Cells 2 & 6 and Cells 4 and 9 at the central and western portions of the landfill.
- The capping surface is generally undulating (Photos 21 – 23 and Photos 33 – 34) with localised depressions were noted across the capping in Cells 1 – 16 and may have been caused by settlement following waste degradation or additional surcharge loading caused by the waterlogging of the capping material; and
- The capping at Cells 1 – 16 was observed to be heavily vegetated with trees having being established at the northern slopes of the cells (Photos 17 – 18) with the remainder of the capping covered by grasses and rushes.
- Evidence of historical ground movement was noted at the western slopes at Cells 4 & 9 (Photos 36 – 38) as noted in the previous FT Slope Stability Assessment (March 2016). No evidence of recent movement was noted during the site walkover



Photo 17: Northern slope



Photo 18: Northern slope



Photo 19: Northern Slope



Photo 20: Western Slope





Photo 21: Western Slope



Photo 22: Western Slope



Photo 23: Western Slope



Photo 24: Southern Slope



Photo 25: Southern Slope



Photo 26: Former ICW



Photo 27: Former ICW



Photo 28: Former ICW





Photo 29: Eastern Slope



Photo 30: Eastern Slope



Photo 31: Eastern Slope



Photo 32: North-eastern Slope



Photo 33: Eastern Slope



Photo 34: Eastern Slope



Photo 35: Eastern Slope



Photo 36: Historical ground movement



Photo 37: Historical ground movement



Photo 38: Historical ground movement



## 4 SUMMARY AND CONCLUSIONS

FT completed a site walkover and visual slope stability assessment of North Kerry Landfill on the 8<sup>th</sup> March 2017. All slopes were walked in a toe to crest survey, photographed and examined for indications of instability.

The results of this visual assessment indicate that the landfill body main slopes are considered to be stable, with the exception of the issues outlined below. However, the accuracy of the visual assessment was restricted by the abundance of overgrown vegetation on the landfill cap. Therefore, FT cannot be sure that other areas of the landfill slopes are free from defects.

FT recommends actions as follows at locations listed below:

1. Vegetation growth on slopes be cut back and maintained such that more effective visual inspections can be completed on the landfill slopes for future annual inspections as required by the conditions attached to IED Licence No. W0001-04.
2. Re-profiling and installation of drainage within the landfill cap across Cells 1 to 16 to shed runoff, improve trafficability and reduce surcharge loading. The localised depressions noted across the capping may have been caused by settlement following waste degradation or additional surcharge loading caused by the waterlogging of the capping material.

Where areas are noticeably waterlogged waste below the liner may also be saturated in the event that the cap liner has been compromised. If materials above the cap liner remain saturated there is an increased risk of a translational failures. If the waste is saturated there is an increased risk of a rotational failure within the waste body as any tension cracks that develop become water filled allowing water ingress deeper into the slope.

3. The ground movements noted at the western slopes of Cell 4 appear to have occurred at some time in the past or over a prolonged period given the extent of vegetation growth in the area and absence of tension cracks, shear planes or similar. The movement may also be in equilibrium at this point.

FT reviewed the ground profile in 2016 from two separate topographical surveys completed by Kerry County Council in 2012 and 2015. Both show similar ground contours for the landfill slope in this area. It is also noted that this area has a steeper gradient than other adjacent landfill slopes which may contribute to ground movement. FT notes that we do not have any As-Built information on the type of capping material or the type of geomembrane used in the cap construction at the time of writing of this report.

It is recommended that:

- ground movements as may be present at this location are investigated and monitored using topographic surveys (xyz) of fixed point (peg delineated) locations perpendicular to the shear plane along the slope at intervals not exceeding 10.0m and removed from the slope at top and bottom for a distance not less than 20m. The survey should be carried out quarterly for a time interval not less than 12 months with a view to establishing whether translational or rotational failures are evident.
- Trial pits are excavated and or as-built records reviewed to determine whether geogrids are in place
- If no geogrids are present, a translational stability assessment be carried out to determine if the slopes are theoretically stable.
- Surcharge loading from machinery be avoided on these slopes and vegetation management as may be required to facilitate visual inspections and surveying should be carried out using a strimmer or similar.

From a Health & Safety perspective, the undulating nature of the cap profile and hidden hazards such as gas well enclosures below ground level, hidden by vegetation and without protective covers are a concern and should be addressed by the Licensee at the earliest possible opportunity.



# APPENDIX 1

## Site Location Plan



