



**CORK COUNTY COUNCIL  
WESTERN DIVISION**

**ANNUAL ENVIRONMENTAL REPORT 2009  
1<sup>st</sup> Jan 2009 - 31<sup>st</sup> DEC 2009**

**BENDUFF LANDFILL SITE  
ROSSCARBERY CO. CORK  
EPA LICENCE REF No. W0070-01**

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CLONAKILTY,  
CO. CORK.

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## **1.0 Introduction**

### **1.1 Scope and Purpose of the Report**

The Environmental Protection Agency (EPA) issued Cork County Council with a Waste Licence (Waste Licence No. 70-1) for Benduff Landfill site on 21<sup>st</sup> December 2000. In July 2006, in accordance with a revised EPA numbering system, the Waste Licence at Benduff Landfill was renumbered W00070-01. In accordance with the requirement of Condition 2.8.1 of the waste licence,

*'The licensee shall submit to the Agency for its agreement, within thirteen months from the date of grant of this licence, and within one month of the end of each year thereafter, an Annual Environmental Report (AER).'*

### **1.2 Reporting Period**

This is the eight AER to be submitted under Condition 2.8 of the licence and covers the reporting period 1<sup>st</sup> January 2009 to 31<sup>st</sup> December 2009.

### **1.3 Site Location**

The facility address is:

Benduff Landfill,  
Rosscarbery,  
Co. Cork.

The National Grid Reference for the site is E126000, N38300.

### **1.4 Closure of Site**

On April 23<sup>rd</sup> 2004, Benduff Landfill ceased acceptance of waste. Restoration and aftercare has continued from that date.

### **1.5 Management and Staffing Structure of the Facility**

Following closure of the facility (Apr 2004), there has been no full time County Council presence on the site. The Management of the facility is undertaken from the Divisional Offices, Hume House, Wolfe Tone St., Clonakilty.

Management structure is shown in Table 1.5.1 below.

<b>Table 1.5.1: Managerial Staff</b>		
<b>Position.</b>	<b>Contact Details.</b>	<b>Duties.</b>
<b>Ms Grainne O'Mahony</b> Senior Executive Officer.	Cork County Council, Hume House, Wolfe Tone St., Clonakilty, Co. Cork. Telephone No: 023- 8858812 Fax No: 023-8858814	Management of Cork County Council Environment & Waste Operations, Western Division.
<b>Mr. Paudie Hegarty, BE.</b> Senior Executive Engineer.	As above.	Management of Cork County Council Environment & Waste Operations, Western Division.
<b>Ms. Mairead Hales, BE.</b> Executive Engineer.	As above.	Management of Cork County Council Environment & Waste Operations, Western Division.
<b>Mr. Patrick Duggan, BSc.</b> Facility Manager	Clonakilty Recycling Centre, Clogheen Industrial Estate, Clonakilty, Co. Cork Telephone No: 023- 8850982 Fax No: 023-885016	Monitoring/inspection/ sampling at Benduff landfill site.

## 1.6 Environmental monitoring and reporting

Cork County Council personnel carried out environmental monitoring and recording throughout 2009.

## **2.0 Description of the site**

### **2.1 Waste Management Activities at the Facility**

Benduff Landfill was closed in 2004 and capped immediately. Therefore no waste has been accepted on site since that date.

Waste Activities at the Benduff landfill site are restricted to those outlined below:-

#### Waste Management Act, 1996: Third Schedule

Class 1: Deposit on, in or under land (including landfill)

Class 2: Land treatment, including biodegradation of liquid or sludge discards in soils

Class 4: The storage of leachate and contaminated water pending its disposal at another appropriate facility.

Class 13: Temporary storage of waste, which is unsuitable for deposit at the facility and which has been duly notified to the Agency.

### **2.2 Remaining capacity**

The site has been capped and there remains no capacity in the site. A topographical survey of the facility is included in the Appendices.

### **3.0 Site Development Works**

#### **3.1 Development works during 2009**

No major or minor works took place in Benduff Landfill Site in 2009 with all development works complete.

There are no major developments planned for the site in 2010.

## 4.0 Summary of Monitoring and Emissions

In compliance with Condition 9 and Schedule E of the waste licence the following monitoring is carried out on site:

Landfill gas;  
Landfill gas flare;  
Groundwater;  
Surface water;  
Leachate;  
Dust.

Four groundwater boreholes (MW1, MW2, MW3 and MW4) were replaced in 2004 and the new wells were placed immediately adjacent to the existing boreholes. Two additional wells (MW5 and MW6) were also installed at that time. An additional well, (MW7) was installed in July 2006.

Two new leachate wells (LW1 and LW2) were installed in 2005 as part of the capping contract. The old wells (L1, L2 & L3) were made redundant and filled in.

All monitoring locations are identified on a Monitoring Locations Drawing attached in the Appendices.

### 4.1 Landfill Gas

Schedule E.1 of EPA licence W00070-01 specifies that gas monitoring is to be undertaken at groundwater stations, leachate stations, the site office and the landfill gas flare.

The site office was removed following closure of the site in 2004 and thus gas monitoring was discontinued at that location.

Schedule E.1 notes that monitoring is to be undertaken monthly at all stations. However in a report prepared on behalf of Cork County Council by Fehily Timoney and Company in February 2009, a change to the monitoring requirements was requested. According to the correspondence received from the Agency on 21<sup>st</sup> April 2009 (Ref: W0070-01/ap03ld) Landfill gas emissions are now to be monitored biannually. This states that monitoring is to be undertaken at groundwater stations MW1 – MW7, and at leachate wells LW1 and LW2. . Measurement of the following parameters is specified: methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>), atmospheric pressure and temperature. The gas is monitored using a GA94 infra-red gas analyser, which detects levels of carbon dioxide methane and oxygen. Schedule F.2 of the licence specifies methane and carbon dioxide limits of 20% LEL (1% v/v) and 1.5% v/v respectively in any building on or adjacent to the landfill.

#### Groundwater stations MW1-MW7

No methane was detected at groundwater stations MW1 - MW7. Low levels of carbon dioxide were detected at all groundwater stations and the highest level of 0.6% was



recorded at MW3 in December 2009. The licence specifies methane and carbon dioxide limits of 20% LEL (1% v/v) and 1.5% v/v respectively in any building on or adjacent to the landfill, including the site office. Thus the levels detected do not breach the conditions of the licence. It can be inferred that large-scale lateral migration of landfill gases is not occurring outside of the landfill area.

### Gas monitoring – leachate wells LW1 & LW2

Results indicate that methane and carbon dioxide are being produced within the landfill area and that there was considerable variation in values throughout the year. The range of values detected at the two leachate wells are detailed in Tables 4.1.1 and 4.1.2.

**Table 4.1.1 Range of values for methane**

Methane gas (% v/v)	LW1	LW2
Maximum conc.	27.3	44
Minimum conc.	5.2	0.6

**Table 4.1.2 Range of values for carbon dioxide**

Carbon dioxide (% v/v)	LW1	LW2
Maximum conc.	17.0	37.5
Minimum conc.	0.5	1.3

## 4.2 Surface water

Schedule E.5 of licence W00070-01 specifies that monitoring of surface water quality is to be undertaken at five locations: SW1, SW2, SW3, SW4 and SW5. The local topography is such that stations SW2 and SW4 are down gradient of the landfill, although located to the east and west of the site respectively. Following completion of capping at Benduff, a new surface water monitoring station (SW5) was located upstream of SW2.

In a report prepared on behalf of Cork County Council by Fehily Timoney and Company in February 2009, a change to the monitoring requirements was requested. According to the correspondence received from the Agency on 21<sup>st</sup> April 2009 (Ref: W0070-01/ap031d) surface water is now to be monitored biannually and only at monitoring points SW1, SW4 and SW5. The parameters to be measured are ammoniacal nitrogen (NH<sub>3/4</sub>-N), biochemical oxygen demand (BOD), chemical

oxygen demand (COD), chloride (Cl), dissolved oxygen (DO), electrical conductivity, pH, total suspended solids, and temperature. Table E.5.2 of the licence states additional parameters which are to be monitored annually. Licence W00070-01 does not specify maximum concentrations of these parameters and accordingly, data presented below are discussed with reference to relevant legislation:

(i) Council Directive 75/440/EEC of 16 June 1975 concerning the quality of surface water intended for the abstraction of drinking water, incorporated into Irish law by the European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (S.I. No. 294 of 1989). The directive divides waters into three categories - A1, A2 and A3 – depending on the increasing level of treatment required.

(ii) Council Directive 78/659/EEC of 18 July 1978 on the quality of fresh waters needing protection in order to support fish life, given Irish effect by the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988). Notwithstanding the absence of any fisheries designation on the streams surrounding the landfill site, the Freshwater Fish Directive carries some weight due to its strict limits and the consequent suitability of a watercourse for other uses should it meet these limits. These limits have been quoted in preference to the Surface Water limits where available.

It is noted that there are no drinking water abstraction points or fisheries designations on the watercourses on which the sampling stations are located, however comparisons with the limits specified by the above legislation is useful for comparative purposes.

Water samples were taken on the following dates:

- 18<sup>th</sup> June 2009 – SW1, SW4 and SW5
- 15<sup>th</sup> December 2009 – SW1, SW4 and SW5

All surface water monitoring points were sampled on both sampling occasions. The results recorded for these monitoring points indicated that the water present was of a very good quality and was not affected by the presence of the landfill. Overall the results have improved slightly during 2009.

### **4.3 Groundwater**

Under schedule E.5 of licence W00070-01, monitoring of groundwater quality is to be undertaken at six locations. Four of these are boreholes (MW1, MW2, MW3 and MW4) while two stations consist of tapped private wells – SPJ1 and SPM2 located 300m southwest and 250m southeast of the site respectively. Borehole MW3 is located up gradient of the landfill site, while stations MW1, MW2 and MW4 are down gradient. MW1 and MW2 lie on the same groundwater corridor. Two new groundwater stations MW5 and MW6 were put in place at the northeast and southeast corners of the landfill respectively. A further groundwater monitoring location, MW7, was installed at a location to the west of the landfill site in July of 2006.

In a report prepared on behalf of Cork County Council by Fehily Timoney and Company in February 2009, a change to the monitoring requirements was requested.

According to the correspondence received from the Agency on 21<sup>st</sup> April 2009 (Ref: W0070-01/ap031d) groundwater is now to be monitored quarterly at monitoring points MW1-MW7 and SPJ1 and SPM2. The parameters to be measured are groundwater level, ammoniacal nitrogen (NH<sub>3/4</sub>-N), electrical conductivity, pH, and temperature. Table E.5.2 of the licence states additional parameters that are to be monitored annually.

Groundwater samples were taken on the following dates:

- 3<sup>rd</sup> February 2009
- 6<sup>th</sup> March 2009
- 16<sup>th</sup> April 2009
- 18<sup>th</sup> June 2009
- 9<sup>th</sup> September 2009
- 15<sup>th</sup> December 2009

Licence W00070-01 does not specify maximum concentrations of parameters and accordingly, levels presented below are discussed with reference to relevant legislation/standards:

(i) Council Directive 98/83/EC on the quality of water intended for human consumption repealed the similarly titled Council Directive 80/778/EEC. The directive specifies maximum limits with respect to a large number of parameters and is of particular relevance to groundwater.

(ii) The Netherlands Department of Soil Protection published its *Circular on target values and intervention values for soil remediation* in February 2000. The circular specifies general target and intervention concentrations of parameters (chiefly metals and organics) in soils and groundwater, which it deems necessary to allow the return of contaminated land to any potential use. The target value is the baseline concentration value below which compounds and/or elements are known or assumed not to affect the natural properties of the soil. The intervention value is the maximum tolerable concentration above which remediation is required and is applied where one or more compounds, in concentrations equal to or higher than the intervention value, is found in more than 1000m<sup>3</sup> of groundwater.

A review of the monthly data for the groundwater wells for quarter 1 of 2009 indicated that levels of ammoniacal nitrogen at MW1 and MW3 were elevated during some of their sampling occasions in this first quarter of 2009. MW1 is located adjacent to S1 from which leachate is removed on an ongoing basis following an incident in 2004. It is considered probable that the elevated levels of ammoniacal nitrogen at MW1 are related to its proximity to the landfill and this was addressed in a report prepared by O Neill Groundwater Engineering in 2005. MW3 is located outside the grounds of the landfill and results may be influenced by the surrounding environment.

The data for the groundwater wells for quarter 2 of 2009 indicated that levels of ammoniacal nitrogen at MW1 were again elevated. All other results from groundwater monitoring wells were generally consistent with previous results.

The quarterly data for the groundwater wells for quarter 3 of 2009 indicated that levels of ammoniacal nitrogen at MW1 were reduced in comparison to the previous quarter. All other results from groundwater monitoring wells were generally consistent with previous results.

Annual sampling was carried out in December 2009 at Benduff and a greater range of parameters was therefore assessed. The levels of ammoniacal nitrogen at MW1 were significantly reduced when compared to the previous quarter results and were below the 0.5 mg/l limit specified by the Drinking Water Directive. Conductivity was slightly elevated at MW1 but was generally consistent with previous results. For all other monitoring points MW2 – MW7 and SPJ1 and SPM2 Ammonia as N, Conductivity and pH all remained relatively consistent with previous monitoring results. A comparison of temporal data indicates that most results remain consistent. Manganese values were found to be generally consistent with previous years results. Iron values were found to be high at MW2 with a value of 867ug/l and at MW3 with a value of 5282ug/l. All the remaining groundwater wells remained low in Iron during this sampling period. The microbiological samples showed that there is in general a low presence of faecal coliforms in the groundwater wells at Benduff landfill. For the total coliforms counts it shows that there is high values of coliforms at the groundwater wells. These results are generally consistent with the previous years.

#### **4.4 Leachate**

Schedule E.5 of licence W00070-01 specifies that monitoring of leachate is to be undertaken at station L1 and any other stations, which may be designated. A second station – L2 – was subsequently agreed. Both L1 and L2 were relocated and renamed LW1 and LW2 in the last quarter of 2005. Schedule E.5 provides a list of parameters, which are to be monitored at weekly, quarterly and annual intervals at all leachate stations. Licence W00070-01 does not specify maximum concentrations of parameters. There are no relevant standards available for leachate quality and reference is usually made to observations by a number of authors. Due to low volumes of leachate during 2009 no samples were taken in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> quarters of 2009 at Benduff. Samples were taken on 15<sup>th</sup> December for quarter 4. LW1 and LW2 shared similar values for Ammoniacal N, BOD, COD, Conductivity, TON, Phosphate, Total Cyanide, Fluoride, Alkalinity, Boron, Cadmium, Calcium, Chromium, Calcium, Copper, Lead, Mercury and Faecal coliforms. There were significant differences between values for Chloride, Iron, Potassium, Sodium, Sulphate, Magnesium, Zinc, Manganese and Total coliforms. In general values were found to be high at leachate well LW2. All values for the lagoon were significantly lower than LW1 and LW2.

**Table 4.4.1 Range of concentrations for leachate**

	LW1	LW2	Typical values
<b>pH</b>	6.8	6.8	6.4-8.0
<b>Conductivity us/cm</b>	837	1548	503-19,200
<b>Ammonia as N</b>	42.9	48	<0.2-1,700
<b>COD</b>	52	45	<10-33,700
<b>BOD</b>	4	3	<0.5->4,800
<b>Calcium</b>	76.8	117.2	43-1,440
<b>Cadmium ug/l</b>	<0.1	<0.1	<10-30
<b>Chromium ug/l</b>	1.7	1.4	40-560
<b>Chloride</b>	38.7	155	27-3,410
<b>Copper ug/l</b>	<0.003	0.004	20-160
<b>Cyanide (total)</b>	<10	<10	0.05-0.16
<b>Iron ug/l</b>	1047	1785	0.4-664
<b>Lead ug/l</b>	<0.3	<0.3	<40-280
<b>Mercury ug/l</b>	<0.02	<0.02	<0.1-1.0
<b>Potassium mg/l</b>	20.3	45.8	///
<b>Sodium</b>	33.1	107	12-3,000
<b>Zinc</b>	12.6	6.1	<0.01-6.7
<b>Boron</b>	0.2	0.29	<0.02-116

\* all parameters as mg/l unless stated otherwise

Reference: The technical aspects of controlled waste management – A review of the composition of leachate from domestic wastes in landfill sites- Aspinall and Co.

#### 4.5 Additional monitoring at station S1.

Following contamination of a watercourse adjoining the landfill in February 2004 additional monitoring points were specified as follows: *Monthly monitoring at sites S1 (pond) and S4 (corresponding to SW4) for the following parameters COD, BOD, ammoniacal nitrogen, pH, conductivity, chloride, temperature, dissolved oxygen, total suspended solids, total coliforms and faecal coliforms.* Following on from the build up of water at S1 a programme of removal has been put in place. Due to the improvement in water quality at SW4 the Agency no longer require sampling at this location. However, SW4 is monitored as part of the biannual and annual monitoring programmes.

In a report prepared on behalf of Cork County Council by Fehily Timoney and Company in February 2009, a change to the monitoring requirements was requested. According to the correspondence received from the Agency on 21<sup>st</sup> April 2009 (Ref: W0070-01/ap031d) the water at monitoring point S1 is now to be monitored biannually. The parameters to be measured are BOD, COD, ammoniacal nitrogen (NH<sub>3/4</sub>-N), electrical conductivity, pH, chloride, DO, TSS, total coliforms, faecal coliforms and temperature.

Monitoring undertaken during the first quarter at S1 showed that there was some variation in results for Ammonia as N, Conductivity, Chloride, and DO. Ammoniacal nitrogen varied from 0.319mg/l in February to 23.6mg/l in March. BOD, COD,

suspended solids and faecal coliforms remained low during this period. Total coliforms varied from 89MPN/100mls to 248MPN/100mls in April 2009.

The first biannual monitoring under the new monitoring conditions showed that there was again some variation in results for Ammonia as N, Conductivity, Chloride, and DO when compared to the previous months results. Ammoniacal nitrogen increased from 17mg/l on 16/04/09 to 26.9mg/l on 30/04/09. BOD, COD, Conductivity, Chloride and suspended solids increased slightly but remained low during this period. Total coliforms varied from 248MPN/100mls to 488MPN/100mls in April 2009.

A significant improvement was noted at monitoring point S1 after the second biannual tests, which were undertaken in December 2009. Almost all parameters showed an improvement. Conductivity, Chloride, BOD and COD all showed significant improvements when compared to the previous results on 30/04/09. Total coliforms decreased from 488 MPN/100mls to 122 MPN/100mls. Overall the results are quiet good considering this sample is a leachate sample from the site.

#### **4.6 Noise.**

As Benduff landfill is no longer active noise monitoring was not required during 2009.

#### **4.7 Dust.**

Schedule E.3 of licence W00070-01 specifies that monitoring of dust levels is to be undertaken at three locations: ST1, ST2 and ST3. Dust monitoring is required three times per year, twice during the period May to September and once between October and April. However in a report prepared on behalf of Cork County Council by Fehily Timoney and Company in February 2009, a change to the monitoring requirements was requested. According to the correspondence received from the Agency on 21<sup>st</sup> April 2009 (Ref: W0070-01/ap03ld) dust monitoring is to be discontinued.

#### **4.8 Biological survey.**

Schedule E.5 of licence W00070-01 notes that an annual biological assessment is to be undertaken at two stations in proximity to the landfill site: WQ1 and WQ2. The schedule specifies that an appropriate biological method is to be used such as the EPA Q-rating system.

Station WQ1 no longer exists as an open watercourse, and therefore it was not possible to take a sample at this location. Accordingly a sample was taken at SW2 and WQ2 was relocated to SW4.

The method employed was the Q-rating system used nationally by the EPA and the survey was carried out in September 2009. The biological survey was undertaken at stations WQ2 (relocated to SW4) and SW2. Volumes at these monitoring points were fairly low when the survey was successfully carried out. This may have had an impact on invertebrate diversity and density at these monitoring locations. On the basis of macro-invertebrate diversity, a provisional Q-value of 2 was awarded to both sites. However as the stream dried up during the summer months at SW4 the low values are

probably not related to nutrient enrichment and these results may be misleading. It is also noted that the watercourse on which SW2 is located was cleaned during 2006 which still may influence the results found.

#### 4.9 Landfill Gas Quantities.

A software programme was previously used by Fehily Timoney to predict the total gas generated from the input of waste at Benduff landfill. Modelling was carried out using a Landfill Gas Emissions Model (LandGEM-verison 2.01) and the CAA site of default values were used in the Benduff landfill gas prediction model. The predicted peak rate of gas production for the site occurred in 2002. As estimated by the model the total amount of gas generated to date is shown in Table 4.9.1.

**Table 4.9.1. Predicted gas yield.**

<b>Year</b>	<b>Gas Yield (m3/year)</b>
1995	1,296,400
1996	1,365,600
1997	1,432,200
1998	1,496,000
1999	1,557,200
2000	1,696,200
2001	1,713,800
2002	1,726,600
2003	1,702,200
2004	1,663,600
2005	1,598,400
2006	1,535,800
2007	1,475,600
2008	1,417,600
2009	1,362,000

#### 4.10 Emissions to Groundwater

The facility is unlined and acts as a dilute and disperse landfill. Although there is no barrier to prevent leachate reaching groundwater it does not appear that the landfill is causing significant contamination of groundwater. Results from 2009 indicate that the quality of groundwater is improving when compared to 2008 values for most of the parameters tested. It is noted however that levels of ammoniacal nitrogen at borehole MW1 were still found to be high during 2009 but again this is probably due to its location adjacent to S1 from which leachate is removed on an ongoing basis following an incident in 2004.

#### 4.11 SCADA results.

SCADA results are presented graphically in the Appendices. Results are shown for:

- Methane CH<sub>4</sub>,
- Carbon Dioxide CO<sub>2</sub>,
- Oxygen O<sub>2</sub>,
- Carbon Monoxide CO,
- Flow
- Flare Operating Pressure
- Flare Operating Temperature

#### 4.12 Landfill gas flare – monitoring of emissions.

Monitoring results for the landfill gas flare indicate that the flare is performing efficient combustion of landfill gas. The levels determined for Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO) and Sulphur Dioxide (SO<sub>2</sub>) were within the emission limit values. Organic compounds were within the limits of TA Luft Classes I, II, and III. The sum of the concentration for the three classes were within the limits of the licence and do not exceed the Class III limit. The levels determined for Hydrofluoric acid (HF) and Hydrochloric acid (HCL) and also the results for Particulate Matter were all within the emission limits. The results of the Landfill Gas Flare monitoring are included in the tables below.

**Table 4.12.1 Results for Flue Gas monitoring from the Flare System at Benduff Landfill**

Parameter	Emission Value <sup>1</sup> (mg/Nm <sup>3</sup> )	Emission Limit <sup>2</sup> (mg/Nm <sup>3</sup> )
Nitrogen Oxides (NO <sub>x</sub> ) as NO <sub>2</sub>	51	150
Carbon Monoxide (CO)	29	50
Sulphur Dioxide (SO <sub>2</sub> )	4	N/A
Temperature (°C)	1002	N/A

<sup>1</sup>Normalised to 273K, 101.3Pa and 5% O<sub>2</sub> reference

<sup>2</sup>As stated in Schedule F of WL W0070/01



**Table 4.12.2 Results of TA Luft Organics monitoring from the Flare System at Benduff Landfill**

Parameter	Emission Value (mg/m <sup>3</sup> )	Emission Limit (mg/m <sup>3</sup> )
<b>TA Luft Class I</b> Dichloromethane Tetrachloroethane	<1.71	20 (at mass flow >0.1kg/hr)
<b>TA Luft Class II</b> Acetonitrile	<1.71	100 (at mass flow >2kg/hr)
<b>TA Luft Class III</b> Vinyl Chloride	<1.71	150 (at mass flow >3kg/hr)
<b>Total TA Luft Organic Compounds (class I-III)</b>	<1.71	150 (at mass flow >3kg/hr)

< denotes that the measured parameter was below the laboratory's level of detection

**Table 4.12.3 Results of the HCL and HF monitoring from the Flare System at Benduff Landfill**

Parameter	Emission Value (mg/m <sup>3</sup> )	Emission Limit (mg/m <sup>3</sup> )
HCL	<0.17	50
HF	0.78	5

< denotes that the measured parameter was below the laboratory's level of detection of inorganic acids in the gas stream

**Table 4.12.4 Results of the Particulate monitoring from the Flare System at Benduff Landfill**

Parameter	Emission Value (mg/m <sup>3</sup> )	Emission Limit (mg/m <sup>3</sup> )
Particulate	<0.01	130

< denotes that the measured parameter was below the laboratory's level of detection

#### 4.13 Leachate disposal off-site

Leachate arising at the facility is transported to, and disposed of, at Clonakilty Waste Water Treatment Plant. No leachate was transported away from the site during 2009.

## 5.0 Energy consumption.

As there was no plant or machinery on site in 2009, there was no consumption of diesel.

The electricity supply caters for the flare and leachate collection system. Recording of electricity usage is now recorded as part of the weekly flare inspections and is shown in table 5.0.1 below.

<b>Month</b>	<b>Electricity Usage (KwHr)</b>
January	148.6
February	156.4
March	184.5
April	173.5
May	176.6
June	195.8
July	224.2
August	202.7
September	189.7
October	204.7
November	184.7
<u>December</u>	<u>152.4</u>
<b>Total:</b>	<b>2193.8</b>

## **6.0 Environmental incidents, non-compliances and complaints**

### **6.1 Reported Incidents.**

No reported incidents were recorded in 2009

### **6.2 Non-Compliances.**

No non-compliances occurred at Benduff landfill during 2009.

### **6.3 Complaints.**

No complaints were received by the facility during the reporting period.

### **6.4 Review of nuisance controls.**

Since cessation of landfilling all nuisance controls for litter, birds, vermin and flies have been removed. Weekly inspections however still monitor nuisance and should nuisance become an issue, adequate resources will be deployed.

### **6.5 Programme for Public Information.**

#### **6.5.1 Information Available to the Public.**

Information regarding the facility is held at the County Council Divisional Office, Hume House, Wolfe Tone St., Clonakilty, Co. Cork.

Personnel associated with the facility are also available by appointment to meet with members of the public and answer queries regarding the facility if requested. The following information is held in a public file at these offices available for the public to inspect:-

- copy of the waste licence application.
- copy of the waste licence.
- correspondence from the Agency relating to the facility.
- correspondence from Cork County Council (West) to the Agency relating to the facility.
- copies of quarterly monitoring reports.

## 7.0 Environmental management programme report.

### 7.1 Schedule of Objectives and Targets for Year 2009.

Progress in implementation of 2009 Objectives and Targets is shown in Table 7.1.1 below.

<b>Table 7.1.1 Schedule of Objectives and Targets for Year 2009.</b>		
<b>2009 Objective</b>	<b>Description.</b>	<b>Progress in implementing objectives.</b>
Objective 1.	Maintain/improve site infrastructure (fencing, monitoring wells and equipment, gas flare, leachate extraction system, etc).	Maintenance ongoing. All site infrastructure functional and adequate at time of report.
Objective 2.	Operate landfill gas system to licence conditions.	Objective achieved.
Objective 3.	Continue aftercare obligations to the waste licence conditions.	On going.
Objective 4.	Review emissions and environmental impacts.	On going monitoring and assessment & close inspection of quarterly reports.
Objective 5.	Investigate possibility of relaxing monitoring requirements	Report prepared by Fehily Timoney and Co. and forwarded to the Agency. The Agency agreed with a reduction in the amount of monitoring required

### 7.2 Proposed Objectives & Targets for 2010.

Proposed Objectives & Targets for 2010 are shown in Table 7.2.1 below.

<b>Table 7.2.1 Schedule of Objectives and Targets for Year 2010.</b>	
<b>2010 Objective.</b>	<b>Description.</b>
Objective 1.	Maintain/improve site infrastructure (fencing, monitoring wells and equipment, gas flare, leachate extraction system, etc).
Objective 2.	Operate landfill gas system to licence conditions.
Objective 3.	Continue aftercare obligations to the waste licence conditions.
Objective 4.	Review emissions and environmental impacts.

### **7.3 Financial Provision.**

Cork County Council has the ability to meet any financial commitments or liabilities incurred by the maintenance of Benduff Landfill. These commitments include compliance with the waste management licence (No. W00070-01) and aftercare of the site as specified in Condition 8 of the licence.

Cork County Council annually, in the preparation of the 'Book of Estimates' and the passing of these estimates, shall make provision for any capital works required to fulfil conditions of the waste licence for Benduff Landfill.

## **APPENDICES**

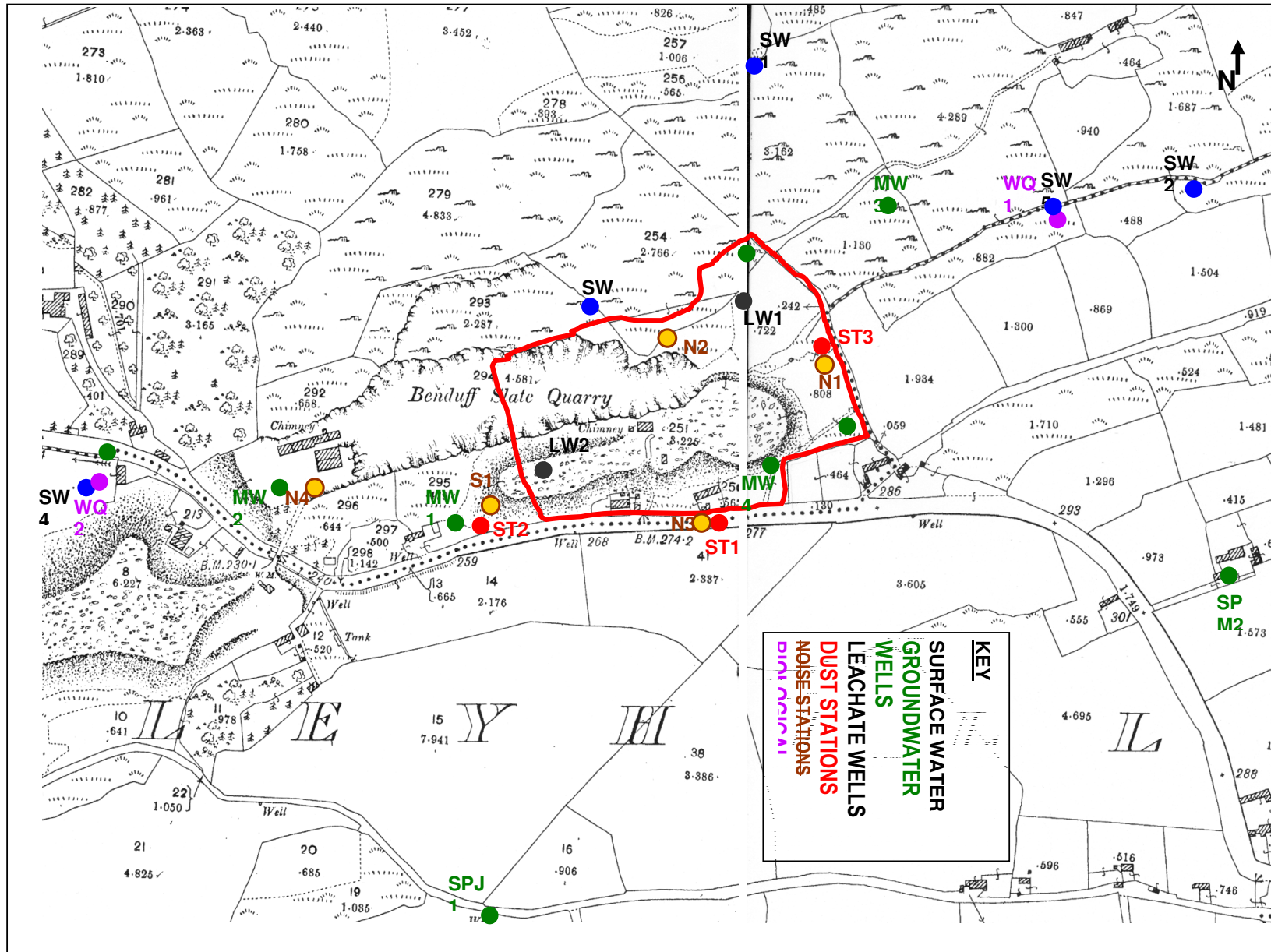


Figure 1. Benduff landfill monitoring stations

—2009

SCALE 1:3600





**GAS FLARE DATA**

<b>Date</b>	<b>Ambient Temp</b>	<b>Atm Pressure</b>	<b>CO<sub>2</sub></b>	<b>CO</b>	<b>Flow</b>	<b>CH<sub>4</sub></b>	<b>O<sub>2</sub></b>	<b>Flare Pressure</b>	<b>Flare Temp</b>
12/01/2009	9.45	993.73	22.48	0.18	101.25	23.88	6.60	26.39	1005.63
26/01/2009	8.15	992.38	13.72	0.08	122.83	15.84	11.57	10.24	1013.60
12/02/2009	9.33	1015.76	16.07	0.14	41.65	22.24	7.48	27.67	1020.26
26/02/2009	9.13	1016.33	15.81	0.10	42.65	22.76	7.72	27.07	1015.37
12/03/2009	11.00	1012.28	14.70	0.07	37.10	18.53	9.41	27.18	1381.29
26/03/2009	14.40	1017.63	15.21	0.09	39.80	18.54	8.56	28.65	1218.50
12/04/2009	15.92	996.79	13.55	0.12	89.46	22.25	9.26	27.96	1056.94
26/04/2009	13.50	998.60	15.65	0.08	101.36	19.58	9.65	26.56	1008.34
12/05/2009	14.80	1020.60	14.89	0.06	98.34	18.47	9.31	28.51	908.30
26/05/2009	12.65	1010.97	20.55	0.17	111.41	25.41	2.42	10.78	1017.35
12/06/2009	15.89	1011.45	21.10	0.20	112.45	32.25	1.71	10.53	1017.40
26/06/2009	21.25	1017.22	22.48	0.16	107.60	38.27	1.70	10.26	1021.41
12/07/2009	15.34	998.23	22.07	0.01	107.68	50.21	1.77	9.55	1008.96
26/07/2009	16.57	1002.40	22.46	0.08	115.29	37.15	1.68	25.25	1010.37
12/08/2009	17.36	1014.96	23.66	0.44	100.48	37.18	1.69	26.85	1026.41
26/08/2009	15.53	1009.77	22.85	0.42	107.95	47.29	1.17	26.24	1026.83
12/09/2009	15.53	1003.30	22.85	0.42	111.03	34.96	1.82	10.19	1026.83
26/09/2009	8.50	1000.87	21.34	0.36	58.51	45.14	1.49	25.79	696.79
12/10/2009	12.24	1019.59	21.54	0.26	127.75	45.26	2.32	27.70	446.79
26/10/2009	13.59	1006.66	20.66	0.26	105.41	44.71	8.11	26.42	557.60
12/11/2009	10.64	974.66	23.15	1.55	108.00	45.05	1.47	8.71	1021.72
26/11/2009	7.92	993.73	14.89	0.28	107.08	45.11	6.92	37.18	1008.91
12/12/2009	11.10	999.46	19.45	0.43	101.81	41.23	3.80	34.83	1002.36
26/12/2009	8.00	978.54	21.23	0.38	106.62	40.73	1.97	28.64	998.57

