



## **ENVIRONMENTAL HEALTH SECTION**

# **REVIEW AND ASSESSMENT OF AIR QUALITY IN THE BOROUGH OF ANTRIM**

THE ENVIRONMENT (NORTHERN IRELAND) ORDER 2002  
LOCAL AIR QUALITY MANAGEMENT

UPDATING AND SCREENING ASSESSMENT  
AUGUST 2009

**Antrim Borough Council - Northern Ireland**

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## **Executive Summary**

Part III of the Environment (NI) Order 2002 requires each district council to periodically review air quality in its area and the Air Quality Regulations (NI) 2003 prescribe the air quality objectives to be achieved. The process of reviewing and assessing air quality represents a cornerstone in the system of local air quality management (LAQM).

The first round of review and assessment for Antrim Borough Council was completed in April 2004. This concluded that, based on available data, the risk of the air quality objectives in respect of carbon monoxide; benzene; 1,3-butadiene; lead; nitrogen dioxide and fine particulates (PM<sub>10</sub>) not being met within the prescribed timescales was negligible.

The review and assessment predicted that the objectives for sulphur dioxide would be exceeded in parts of Antrim town as the result of domestic solid fuel burning, and consequently the Council declared an Air Quality Management Area (AQMA) in October 2004. Subsequently, in July 2007, the Council produced an Air Quality Action Plan (AQAP), which set out the measures to be introduced in pursuit of the air quality objectives within the AQMA. A separate AQAP progress report is being prepared by the Council so measures pertinent to the AQAP are not considered further in this report.

A second round of review and assessment commenced with the submission of an Updating and Screening Assessment in 2006 and ended with a Progress Report in 2008. The second round confirmed that the conclusions of the first round were still valid.

This document is Antrim Borough Council's Updating and Screening Assessment and represents the first step of the next round of review and assessment for the area. It has looked primarily at those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective for one of the seven key pollutants referred to above, being exceeded. It has also looked at areas not fully considered in the first two rounds of review and assessment.

The report has been compiled in accordance with the recently published Technical Guidance LAQM.TG(09), so the assessment has been carried out on a source-by-source basis, as opposed to considering each pollutant in turn as in previous reports. Transport, industrial, commercial and domestic sources have been considered in turn and it has been concluded that there is no requirement to proceed to a detailed assessment for any of these sources in Antrim Borough Council.

Data from the Council's automatic continuous sulphur dioxide monitoring station and passive nitrogen dioxide diffusion tube network have been collated for year 2008 and although none of the air quality objectives were exceeded at any of the sites, the updating and screening exercise has generally confirmed that the existing arrangements for air pollution monitoring within Antrim Borough Council should be continued to cover future review and assessment requirements. Three busy road junctions were identified for inclusion in the nitrogen dioxide diffusion tube network. These are:

- Fountain Street/Fountain Hill/Belfast Road Junction
- Ballymena Road/Stiles Way Junction
- Tully Road/Oldstone Road/Ballyrobin Road Junction

The next step for Antrim Borough Council is the completion of a Review and Assessment Progress report which is due by the end of April 2010.

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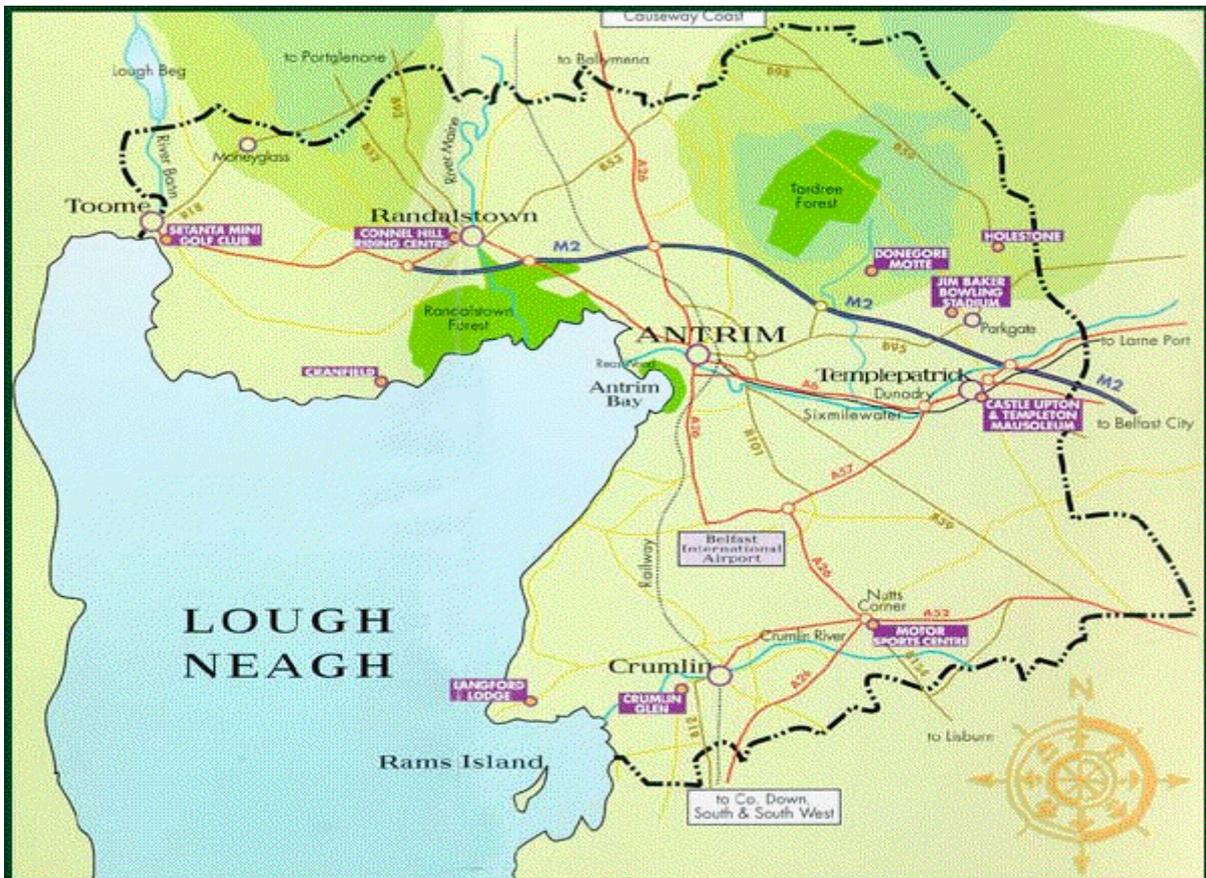
# 1 Introduction

## 1.1 Description of Local Authority Area

Situated about 19 miles (31 km) north-west of Belfast, Antrim Borough Council takes in an area of 220 square miles (570 km<sup>2</sup>) - approximately 4.1% of the total area of Northern Ireland, with a population of 52,600 (2007). Antrim borders the north and east shores of Lough Neagh, the largest fresh water lake in the UK, and includes the towns of Antrim, Toomebridge, Crumlin, Randalstown, Parkgate and Templepatrick. The council headquarters are located on the outskirts of Antrim town.

Originally predominantly rural in nature, new industry, with associated expansion and development, has made the Borough much more urban with the town of Antrim now the main populated centre. The Borough has a strong and diverse industrial base, employment levels are among the best in the Province and the infrastructure already in place will complement economic development throughout the 21<sup>st</sup> century. Today's economic drivers revolve around construction, distribution, transport and hospitality. The area's principal strength literally revolves around a superbly developed transport infrastructure that provides easy access to all the main external gateways for Northern Ireland, as well as easy access to all parts of the Province. Antrim town lies on two of the main transport corridors, the Belfast – Derry corridor and the Southern corridor. Although the borough is not within the Belfast Metropolitan Area, it houses the city's international airport which is located 4 miles from the historic town of Antrim. The importance and benefit of the Borough's central geographical location is emphasised by the strong interest shown by potential investors. Due to its location, businesses are able to access skilled labour from both inside and outside the Borough.

Figure 1.1 Map of Antrim Borough.



## **1.2 Purpose of Report**

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

## **1.3 Air Quality Objectives**

The air quality objectives applicable to LAQM in **Northern Ireland** are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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**Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Northern Ireland.**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
<b>Benzene</b>	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
<b>1,3-Butadiene</b>	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
<b>Carbon monoxide</b>	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
<b>Lead</b>	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
<b>Nitrogen dioxide</b>	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
<b>Particles (PM<sub>10</sub>) (gravimetric)</b>	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
<b>Sulphur dioxide</b>	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## **1.4 Summary of Previous Review and Assessments**

The cornerstone of the LAQM process is the review and assessment of air quality. This is a statutorily required process whereby local air quality monitoring and modelling results are compared to the national air quality standards and objectives. Where objectives are breached or are predicted to be breached, an Air Quality Management Area (AQMA) is declared. An Action Plan must then be produced stating how the district council will drive air quality towards the objective.

The first round of review and assessment which was completed in 2004 concluded that:

1. The risk of the objectives for the following pollutants being exceeded was negligible:

Carbon Monoxide, Benzene, 1,3 butadiene, Lead, Nitrogen Dioxide, PM10

2. As the result of the prevalence of the use of solid fuel for domestic heating, the 15 minute mean objective for sulphur dioxide is likely to be breached in the Greystone and Ballycraig housing estates.

The first round of the Review and Assessment process resulted in the following measures:

1. The declaration of an AQMA
2. The installation of a continuous real-time sulphur dioxide analyser within the AQMA.

The second round of air quality review and assessment commenced with the USA which was completed in June 2006. This updated the review and assessments previously undertaken for all the pollutants identified in the Air Quality Regulations. The USA concluded that, other than within the Air Quality Management Area declared after the first round of review and assessment, there is no risk of exceeding any of the air quality objectives and that a detailed assessment is not required for the current round of review and assessment.

The following actions were recommended:

1. The production of an action plan for the AQMA setting out the measures to be introduced in pursuit of the air quality objectives.
2. Continued monitoring of the road networks for nitrogen dioxide with passive diffusion tubes.
3. Monitoring with diffusion tubes the vicinity of Belfast International Airport to assess the contribution of air traffic to ambient nitrogen dioxide concentrations.

In 2007 and 2008 Progress Reports were submitted which concluded that there had not been any significant changes in local circumstances to indicate possible exceedences of the air quality objectives and that the conclusions of the 2006 USA were still valid.

## 2 New Monitoring Data

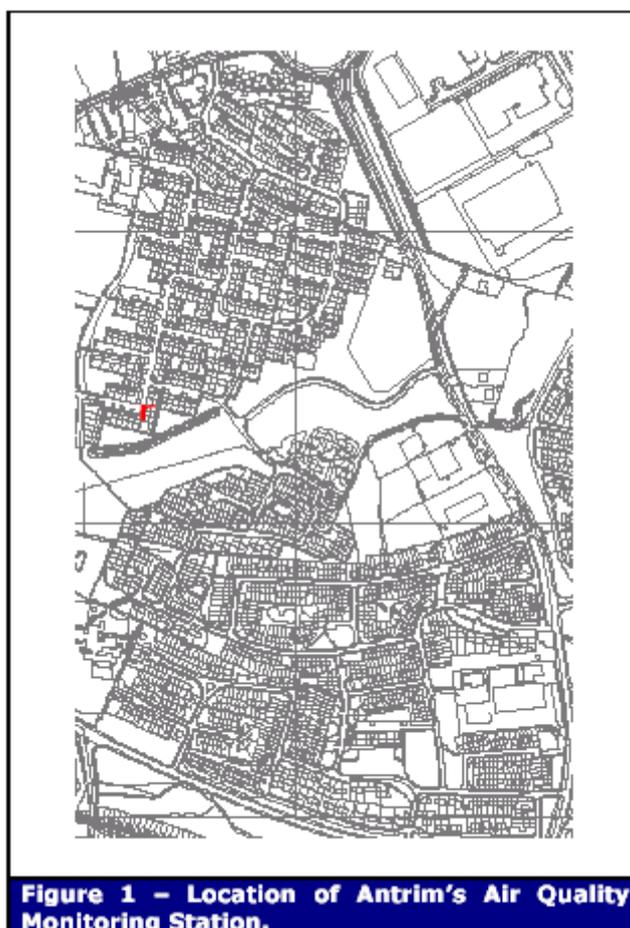
### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Antrim Borough Council has monitored sulphur dioxide on an automatic continuous basis since November 2001 at a site within its Air Quality Management Area (AQMA). The equipment employed uses UV fluorescence for measurement of SO<sub>2</sub> and is located in the back yard of a dwelling house within the Greystone housing estate occupied by Greystone Community Group. Figure 1 shows the location of the monitoring station.

Data management and QA/QC for the monitoring station are managed under contract by AEA Technology. The contract includes six-monthly station audits. All data are ratified to the QA/QC standards used in the Defra network.

Maintenance is carried out under contract by Enviro Technology Services Plc. The service contract includes routine six monthly service visits which generate written instrumentation status reports and guaranteed breakdown call out response of forty eight hours. Routine calibration is carried out in accordance with a written procedure by trained Environmental Health staff on a fortnightly basis.



**Table 2.1 Details of Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
Greystone	Urban background	(NI) 316810 386151	Sulphur dioxide	Y	Y (1m)	N/A	N

### 2.1.2 Non-Automatic Monitoring

Antrim Borough Council currently monitors nitrogen dioxide at 8 sites around the district using passive diffusion tubes. The diffusion tube are supplied and analysed by Bureau Veritas.

Diffusion tubes represent a simple and cost-effective method of monitoring air quality in an area, to give a good general indication of average pollution concentrations. They are particularly useful for assessment against annual mean objectives.

#### QA/QC

The diffusion tubes used are supplied, prepared and analysed by Bureau Veritas UK Ltd. The preparation method used is 10% TEA in Water although the preparation method is changing to the 20% TEA from January 1st 2009 to coincide with the harmonisation method set out in DEFRA's Harmonisation Practical Guidance.

Bureau Veritas has a defined quality system, which forms part of the UKAS accreditation that the laboratory holds. All accredited methods are fully documented. UKAS assessors visit on an annual basis and review all aspects of the analysis, from sample handling to analysis and reporting. As a condition of accreditation, the laboratory is required to participate in any suitable proficiency schemes in operation. Bureau Veritas participates in the WASP scheme organised by the Health and Safety Laboratory. Rounds 100 to 103 which covered the WASP scheme for 2008 were all Category 1 (good) results.

Any result from such a scheme that falls outside the relevant limits is immediately investigated and steps taken to rectify the situation. The Quality Manager also assesses all external proficiency schemes results. The Quality Manager also carries out internal audits.

#### Quality Control at Bureau Veritas

A series of ten quality control check solutions are analysed before any samples in order to check system stability and performance.

A quality control check is run after every ten samples and is assessed against warning and action limits defined in the method. Quality control solutions are prepared from standards supplied by a different vendor to that of the calibration standards.

An external quality control check solution prepared by AEA Group is analysed once per month in order to check internal QC. Results of this check are reported back to AEA Group.

#### Tube Preparation and Analysis

The NO<sub>2</sub> tubes are prepared and analysed in a separate, designated part of the laboratory. Ambient nitrogen dioxide concentrations within the laboratory are monitored routinely. Blanks from each batch of tubes prepared in the laboratory are retained for verification.

Incoming samples are stored in a fridge used solely for this purpose. Calibration standards, QC solutions and other reagents are stored in a separate fridge.

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The analyst checks data as it is generated and QC data is plotted immediately after it is obtained. All raw data and data transfer is checked by the supervisor, data entry into the Laboratory Information Management System is also checked and the final reports are checked before signing.

### Antrim Borough Council's QA/QC.

Our QA/QC procedure is to ensure that diffusion tubes are handled and stored in accordance with the manufacturer's instructions. When a tube batch is received they are immediately placed in a refrigerator in the bag in which they are received. So far as is possible the Council conforms to the calendar of exposure periods supplied by the Bureau Veritas. On the day of sampling they are removed from the fridge and installed. Laboratory blanks are retained in the fridge and are taken out only when the exposed tubes are being returned to the laboratory.

When tubes are collected from sampling sites they are immediately packaged and sent to the laboratory for analysis.

### Selection of Monitoring Sites

Monitoring sites are chosen to provide data on locations that appear to be representative of likely residential exposure and, where possible, are close to the nearest receptor to the busy road or road junction of interest. Where sites do not represent actual relevant public exposure they are located closer to the source than the nearest receptor. The sites are subject to periodic review and where sufficient data has been gathered, some of the diffusion tubes are relocated to new locations.

### Data Adjustment

Results obtained from diffusion tubes need to be corrected for possible over or under reading. Deriving a correction factor by comparing the diffusion tube results with those obtained from a continuous real time analyser can do this. The Council does not operate a continuous analyser and therefore a co-location study has not been undertaken to determine a specific local bias adjustment factor. However, bias adjustment factors for various labs are available on the review and assessment website ( Spreadsheet Version 05/09), and this gives a correction factor of 0.83 for the year 2008. This value has been used in this report. The bias corrected nitrogen dioxide concentration is obtained by multiplying the measured concentration by the correction factor.

The monitoring sites referred to in this report are shown in the following maps. All maps are subject to Ordinance Survey copyright.

**Fig 2. Fountain Street Site**



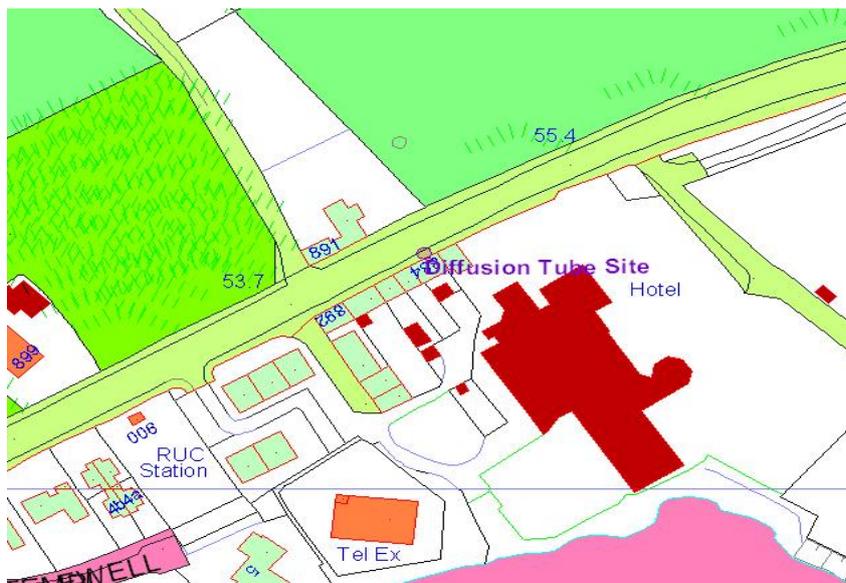
Fountain Street is the main traffic route through Antrim town and has fairly high traffic flows. The site monitors the nearest dwelling to traffic lights.

**Fig 3. A26 Lisnevenagh Road Site**



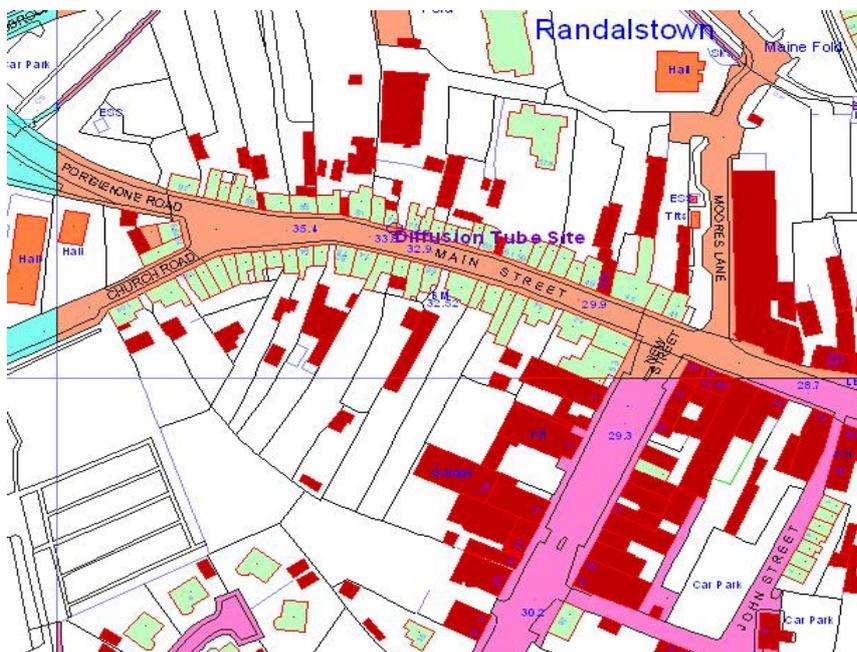
The Lisnevenagh Road is to the North of the Dunsilly roundabout and is a dual carriageway connecting Antrim with Ballymena. This site was set up to monitor concentrations close to the nearest dwelling to this busy road after Design Manual for Roads and Bridges (DMBR) modelling carried out for the Second Stage Review and Assessment predicted an exceedance of the objective at this property. This site is located outside 267 Lisnevenagh Road.

Fig 4. Templepatrick Site



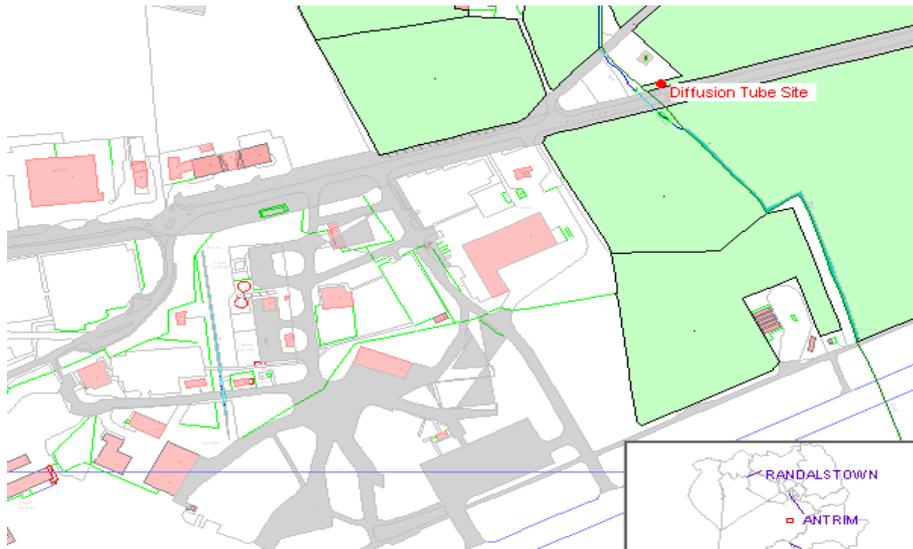
The site in Templepatrick is located on a lamppost in front of the Templeton Hotel. The site is very close to the facade of a residential property. Templepatrick is on the main route between the M2 motorway and Belfast International Airport and experiences high traffic flows. This site has been in operation for 7 years.

Fig 5. Randalstown Site



This site is located in front of a residential property on Main Street. The street is narrow at this location and traffic can be slow moving during periods of the day. This site has been operational for six years. The narrow street and high buildings here could give rise to raised concentrations because of the canyon effect.

**Fig 6. Ballyrobin Road Site**



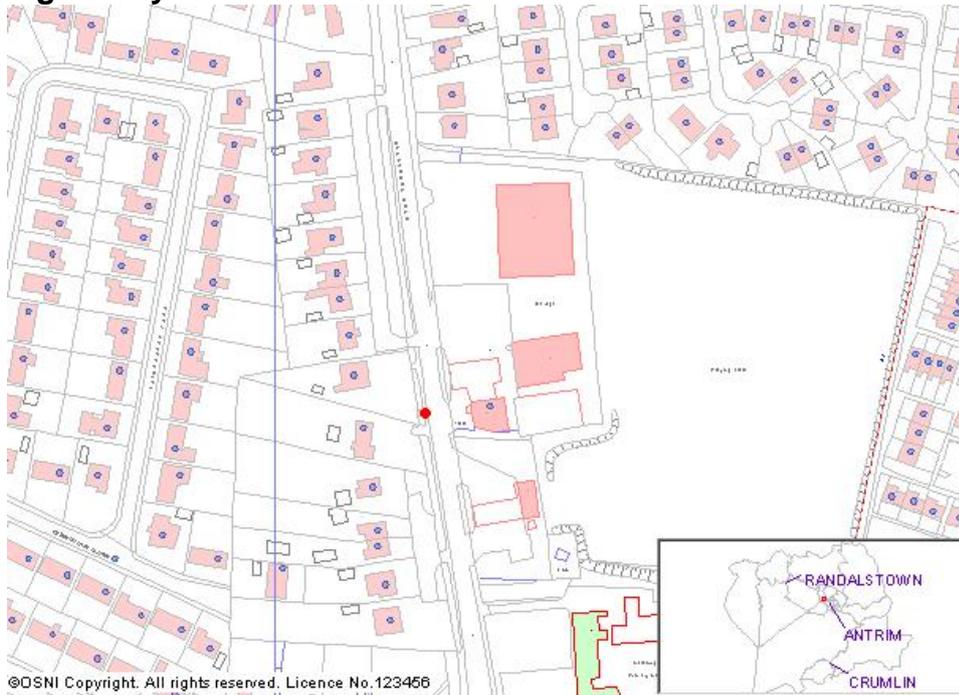
The 2006 USA found that passenger numbers at Belfast International Airport had crossed the 5mppa screening threshold set out in LAQM. TG(03). Although it was concluded that the objective was unlikely to be exceeded it was proposed that monitoring should be carried out to establish a greater picture of the concentrations in this area. This site is near to the nearest property to the airport.

**Fig.7 Greystone Roundabout Site.**



This site is in front of residential properties close to a busy roundabout leading to the M2 motorway.

**Fig.8 Ballymena Road Site.**



The Ballymena road is the main arterial route between Antrim town centre and the new Junction One retail development.

**Fig.9 Tully Road Site.**



Tully Road is a single carriageway with an AADT of 20000 (2005). The monitoring site is close to the nearest roadside receptor.

**Table 2.2 Details of Non- Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
Example 1	Urban background	X 332395 Y 433175	NO <sub>2</sub>	Y	Y (1m)	3m	Y
Fountain St	Kerbside	315197 386539	NO <sub>2</sub>	N	Y (<.5m)	1.5m	Y
Lisnevenagh Rd	Kerbside	313254 391205	NO <sub>2</sub>	N	Y (4m)	3m	Y
Templepatrick	Kerbside	322992 385675	NO <sub>2</sub>	N	Y (<.5m)	1.5m	Y
Randalstown	Kerbside	308113 390461	NO <sub>2</sub>	N	Y(<.5m)	1.5m	Y
Ballyrobin Rd (Airport)	Kerbside	315786 381225	NO <sub>2</sub>	N	N(15m)	1m	Y
Greystone	Kerbside	317036 386681	NO <sub>2</sub>	N	N(15m)	2m	Y
Ballymena Rd	Kerbside	314670 387541	NO <sub>2</sub>	N	N(8m)	2m	Y
Tully Road	Kerbside	318087 379682	NO <sub>2</sub>	N	N (8m)	2.5m	Y

## 2.2 Comparison of Monitoring Results with AQ Objectives

Monitoring results for the year 2008 are considered in the following sub-sections.

### 2.2.1 Nitrogen Dioxide

#### Automatic Monitoring Data

Antrim Borough Council does not operate a continuous nitrogen dioxide analyser.

**Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective**

Site ID	Location	Within AQMA?	Proportion of year with valid data 2008 %	Annual mean concentrations (µg/m <sup>3</sup> )		
				2006 *	2007 *	2008
A1	1 Example Site	N	95	30.1	25.1	26.2

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**Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective**

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean ( $200 \mu\text{g}/\text{m}^3$ )		
				<i>If the period of valid data is less than 90% of a full year, include the 99.8<sup>th</sup> %ile of hourly means in brackets.</i>		
				2006 *	2007 *	2008
A1	1 Example Site	N	95	0	3	15

### Diffusion Tube Monitoring Data

Annual mean concentrations for 2008 are shown in Table 2.4a. The annual mean air quality objective of  $40 \mu\text{g}/\text{m}^3$  was not exceeded at any of the monitoring sites.

**Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes**

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations
				2008 ( $\mu\text{g}/\text{m}^3$ ) Adjusted for bias
A1	1 Example Site	N	95	
1	Fountain St	N	92	31.62
2	Lisnevenagh Rd	N	92	26.79
3	Templepatrick	N	100	34.24
4	Randalstown	N	100	35.9
5	Airport	N	92	15.77
6	Greystone	N	92	21.96
7	Ballymena Rd	N	85	29.80
8	Tully Rd	N	92	28.30

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Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Annual mean concentrations ) Adjusted for bias		
			2006 *	2007 *	2008
			30.1	24.0	25.1
1	Fountain St	N	33.3	35.78	31.62
2	Lisnevenagh Rd	N	23.49	31.28	26.79
3	Templepatrick	N	34.37	37.26	34.24
4	Randalstown	N	32.63	37.05	35.90

### 2.2.2 PM<sub>10</sub>

Antrim Borough Council does not monitor for PM<sub>10</sub>.

Table 2.5a Results of PM<sub>10</sub> Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (µg/m <sup>3</sup> )		
				2006 *	2007 *	2008
A1	1 Example Site	N	98	45	41	44

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Table 2.5b Results of PM<sub>10</sub> Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean (50 µg/m <sup>3</sup> ) <i>If data capture &lt; 90%, include the 90<sup>th</sup> %ile of hourly means in brackets.</i>		
				2006*	2007*	2008
A	1 Example Site	N	95	0	3	2

### 2.2.3 Sulphur Dioxide

Data capture for the year 2008 is high at 99.8%. The 15 minute mean of 226µg/m<sup>3</sup> was exceeded 3 times in the year meaning that air quality objective was not exceeded at the monitoring site. Ratified data for year 2008 are shown below in tabular form and as a graph:

Produced by AEA on behalf of Antrim Borough Council

## ANTRIM GREYSTONE ESTATE 01 January to 31 December 2008

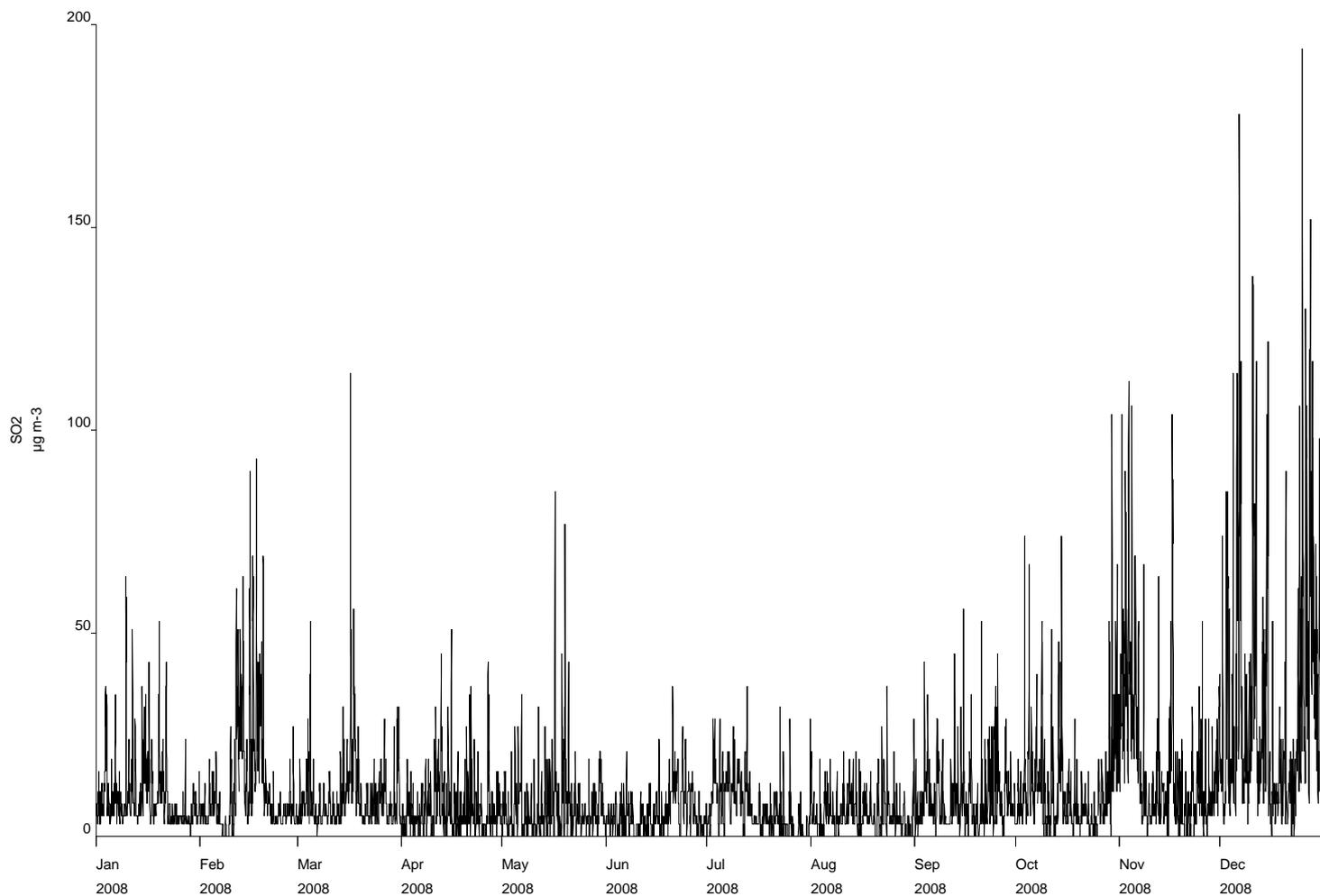
These data have been fully ratified by AEA

POLLUTANT	SO <sub>2</sub>
Number Very High	0
Number High	0
Number Moderate	3
Number Low	34682
Maximum 15-minute mean	325 µgm <sup>-3</sup>
Maximum hourly mean	194 µgm <sup>-3</sup>
Maximum running 8-hour mean	110 µgm <sup>-3</sup>
Maximum running 24-hour mean	80 µgm <sup>-3</sup>
Maximum daily mean	80 µgm <sup>-3</sup>
Average	11 µgm <sup>-3</sup>
Data capture	99.8 %

All mass units are at 20°C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Sulphur Dioxide	15-minute mean > 266 µg m <sup>-3</sup>	3	2
Sulphur Dioxide	Hourly mean > 350 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Daily mean > 125 µg m <sup>-3</sup>	0	0

**Antrim Greystone Estate  
Hourly Mean Data for 01 January to 31 December 2008**



**2.2.4 Benzene**

Antrim Borough Council does not monitor for benzene.

## 3 Road Traffic Sources

### 3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

The only street that meets all the screening criteria given in the guidance and where the 'street canyon' effect could be a factor is Main Street, Randalstown. Traffic in this street is often slow moving and although most of the properties on this street are commercial, there are a number of domestic properties and these are within 2 metres of the kerb. Diffusion tube monitoring has been ongoing at a 'relevant location' in this street since 2001 and results for the last three years from this site are shown above in table 2.4b on page 20.

The monitoring results indicate that the air quality standard is consistently being met at this location and consequently no further assessment is necessary. Although not borderline, the annual mean concentration at this site is, at  $35.9 \mu\text{g m}^{-3}$ , high enough to merit continued monitoring.

Antrim Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

### 3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Shopping facilities in Antrim town are largely restricted to the Castle Mall shopping centre and Junction One Outlet Centre which are located away from any busy roads. The only street with a significant number of shops is High Street which was pedestrianised several years ago.

Antrim Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

### 3.3 Roads with a High Flow of Buses and/or HGVs.

The road with the highest proportion of HGV's is the A57 Ballyrobin Road which leads from Belfast International Airport. The stretch between the airport and Killead Roundabout had a traffic flow of 14,110 in 2006. When adjusted for 2008 using the NRTF Automated Traffic Growth Calculator the predicted traffic flow is 14,886. The proportion of HDVs in 2006 was 20.6% meaning that there are approximately 3000 HDV movements daily. There are no receptors within 10 metres of this road and there has been a diffusion tube monitoring station in place close to the nearest receptor for the last two years. The annual mean concentration at the sampling point for 2008 was  $15.77 \mu\text{g/m}^3$ . No other road has a HGV proportion approaching 20%.

Antrim Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

### **3.4 Junctions**

No new junctions have opened in the last year and there are no busy junctions within the borough that have relevant exposure within 10m of the kerb. Three “busy” junctions have been identified that have relevant exposure within 15 – 20m of the kerb. These are:-

1. The junction of Fountain Street, Fountain Hill and Belfast Road which has a combined flow of 27,320 vehicles per day.
2. The junction of Ballymena Road and Stiles way which has a combined flow of 30,896 vehicles per day
3. The junction of Tully Road, Oldstone Road and Ballyrobin Road which has a combined flow of 28, 784 vehicles per day.

As there is no relevant exposure within 10m of any of these junctions we would not propose to proceed to a detailed assessment for NO<sub>2</sub> or PM<sub>10</sub>, however it is proposed that a years monitoring with NO<sub>2</sub> diffusion tubes will be under taken at these locations to provide further information.

Antrim Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

### **3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment**

No proposed new roads have been constructed or have passed through the planning system in the year under consideration.

Antrim Borough Council confirms that there are no new/proposed roads.

### **3.6 Roads with Significantly Changed Traffic Flows**

There have been no significant changes in traffic flows in the last year. The most recent traffic information available to the Council is the Department for Regional Development (DRD) Roads Service report, Traffic and Travel Information 2006. Information from this document, adjusted for year 2008 using the National Roads Traffic Forecast: Automated Traffic Growth Calculator for Northern Ireland is shown in Appendix 1.

Antrim Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

### **3.7 Bus and Coach Stations**

The largest bus station in the borough is the Ulsterbus station at Railway Street, Antrim. The number of movements of buses at this station is currently in the region of 1400 per week.

Antrim Borough Council confirms that there are no relevant bus stations in the District.

## 4 Other Transport Sources

### 4.1 Airports

The largest airport in the Province, Belfast International Airport, is located within the Borough. In 2008 passenger numbers carried were 5.25 mppa. In addition the airport handled a total of 50,000 tonnes of freight. If it is assumed that all freight arrives in "freight-only" then using the method given in the technical guidance this is equivalent to a further ½ mppa making a total of 5.75mppa. Background NO<sub>x</sub> concentrations are under 25 µg/m<sup>3</sup>.

Concentrations of nitrogen dioxide were monitored close to the nearest receptor to the airport over the last year using a diffusion tube. The annual mean concentration for 2008 at this site was 15.77 µg/m<sup>3</sup>.

Antrim Borough Council confirms that there are no relevant airports in the District.

### 4.2 Railways (Diesel and Steam Trains)

Antrim station was opened in 1848, and was closed for goods traffic in 1965. The passenger station is still open to trains on the Belfast to Derry line.

#### 4.2.1 Stationary Trains

Antrim station is a passenger stop off point on the Belfast to Derry railway line. Under normal circumstances locomotives would never be stationary at the station for as long as 15 minutes.

Antrim Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

#### 4.2.2 Moving Trains

Antrim station is a stop off point on the Belfast to Derry railway line. Typically 28 trains pass through the station daily.

Antrim Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

### 4.3 Ports (Shipping)

Antrim Borough Council has no areas of coastline and no port.

Antrim Borough Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

## 5 Industrial Sources

### 5.1 Industrial Installations

#### 5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

No planning applications for new industrial installations within the Antrim Borough Council area appear on the planning schedule for 2008. Enquiries made with Belfast City Council, Newtownabbey Borough Council, Ballymena Borough Council, Lisburn City Council and with the Department of the Environment Planning Service have confirmed that no such installations have received planning permission in neighbouring boroughs. A new waste to energy plant within the Lisburn area but barely 200m from the borough boundary is currently under consideration by Planning Service. Any decision on this proposed development is likely to be some time away.

Antrim Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

#### 5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Antrim Borough Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

#### 5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Antrim Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

### 5.2 Major Fuel (Petrol) Storage Depots

There are no large scale petrol storage depots within or near to the Antrim Borough Council area.

There are no major fuel (petrol) storage depots within the Antrim Borough Council area.

## **5.3 Petrol Stations**

There are 10 petrol filling stations within the Antrim Borough Council area that have been issued with permits under the Pollution Prevention and Control Regulations (Northern Ireland ) 2003 with an annual throughput in excess of 1000m<sup>3</sup> of petrol. Only one of these, Tannaghmore Filling Station, is located close to a road with more than 30,000 vehicles per day (A26 Lisnevenagh Road) but this filling station does not have any relevant locations within 10 metres of the pumps.

Antrim Borough Council confirms that there are no petrol stations meeting the specified criteria.

## **5.4 Poultry Farms**

There are 9 poultry farms within the Antrim Borough Council area for which permits have been issued by Northern Ireland Environment Agency (NIEA) under the Pollution Prevention and Control Regulations (N.I.) 2003. Three of these farms, although in separate ownership, are in a single block of 9 buildings at Nutts Corner Road, Crumlin. Taken together, these farms are permitted to house a maximum of 285,000 broiler birds. The buildings that house these birds are mechanically ventilated so the criteria for proceeding to a detailed assessment are not met. The next largest farm houses 182,000 chickens and is also mechanically ventilated.

Antrim Borough Council confirms that there are no poultry farms meeting the specified criteria.

## 6 Commercial and Domestic Sources

### 6.1 Biomass Combustion – Individual Installations

There is one industrial process within the Antrim Borough Council area involving biomass combustion. Springfarm Architectural Mouldings Ltd, which is located within the Newpark Industrial Estate on Greystone Road, Antrim, produces architectural mouldings manufactured from medium density fibreboard (MDF) for the construction and DIY industries. MDF dust and chips generated by the manufacturing process are collected and burnt to generate heat and electricity.

The installation consists of 3 boilers. Boilers 1 & 2 are rated at 2.2Mw Thermal and Boiler 3 is rated at 5Mw Thermal.

The installation was screened in accordance with procedure set out in Section D.1a of chapter 5, TG(09) by comparing the background adjusted emission rates of particulate matter (PM10) and NO<sub>2</sub> with the screening target rate for the relevant pollutant. Where the emission rate exceeds the target rate it is deemed that a detailed assessment is required.

#### Boiler 1 Particulate Matter Calculation.

Estimated emission rate E = Max thermal input capacity x emission factor	
Max thermal input capacity Kw -	2320
PM10 Emission Factor for wood pellet boiler g/Gj –	66
Estimated emission rate (E) g/s is	$2320 \times 10^{-6} \times 66 = 0.01$
PM10 Background concentration (G) $\mu\text{g}/\text{m}^3$ –	16.9
Background adjusted emission rate (Ea) g/s Ea = E/(32-G) –	$0.15312/(32-16.9) = 0.01$

Boiler 1 has the following dimensions:

Stack height 15m

Stack diameter 0.6m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.0835 g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the most stringent objective for PM10 will be exceeded.**

#### Annual NO<sub>2</sub> Mean calculation

Estimated emission rate E = Max thermal input capacity x emission factor	
Max thermal input capacity Kw -	2320
NO <sub>2</sub> Emission Factor for wood pellet boiler g/Gj –	150
Estimated emission rate (E) g/s is	$2320 \times 10^{-6} \times 150 = 0.348$
NO <sub>2</sub> Background concentration (G) $\mu\text{g}/\text{m}^3$ –	8.65
Background adjusted emission rate (Ea) g/s Ea = E/(40-G) –	$0.348/(40-8.65) = 0.011$

Boiler 1 has the following dimensions:

Stack height 15m

Stack diameter 0.6m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.5071 g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the annual mean limit value for NO<sub>2</sub> will be exceeded.**

#### Hourly Mean NO<sub>2</sub> calculation.

Estimated emission rate E = Max thermal input capacity x emission factor	
Max thermal input capacity Kw -	2320

## **Antrim Borough Council - Northern Ireland**

NO <sub>2</sub> Emission Factor for wood pellet boiler g/Gj –	150
Estimated emission rate (E) g/s is	$2320 \times 10^{-6} \times 150 = 0.348$
NO <sub>2</sub> Background concentration (G) µg/m <sup>3</sup> –	8.65
Background adjusted emission rate (Ea) g/s	$Ea = 40E/(200-2G) - (40 \times 0.348)/(200-17.3) = 0.076$

Boiler 1 has the following dimensions:

Stack height 15m

Stack diameter 0.6m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.3235 g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the hourly mean limit value for NO<sub>2</sub> will be exceeded.**

### **Boiler 2 Particulate Matter Calculation.**

Boiler 2 has the same thermal rating as Boiler 1 so the background adjusted emission rate (Ea) is same as for Boiler 1 and is 0.01g/s

Boiler 2 has the following dimensions:

Stack height 15m

Stack diameter 0.61m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.0844g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the most stringent objective for PM10 will be exceeded.**

### **Annual NO<sub>2</sub> Mean calculation**

Boiler 2 has the same thermal rating as Boiler 1 so the background adjusted emission rate (Ea) is same as for Boiler 1 and is 0.011g/s

Boiler 2 has the following dimensions:

Stack height 15m

Stack diameter 0.61m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.513g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the annual mean limit value for NO<sub>2</sub> will be exceeded.**

### **Hourly Mean NO<sub>2</sub> calculation.**

Boiler 2 has the same thermal rating as Boiler 1 so the background adjusted emission rate (Ea) is same as for Boiler 1 and is 0.011g/s

Boiler 2 has the following dimensions:

Stack height 15m

Stack diameter 0.61m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.325g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the hourly mean limit value for NO<sub>2</sub> will be exceeded.**

### **Boiler 3 Particulate Matter Calculation.**

Estimated emission rate E = Max thermal input capacity x emission factor

Max thermal input capacity Kw - 5000

PM10 Emission Factor for wood pellet boiler g/Gj – 66

## Antrim Borough Council- Northern Ireland

Estimated emission rate (E) g/s is	$5000 \times 10^{-6} \times 66 = 0.33$
PM10 Background concentration (G) $\mu\text{g}/\text{m}^3$ –	16.9
Background adjusted emission rate (Ea) g/s $E_a = E/(32-G)$ –	$0.33/(32-16.9) = 0.022$

Boiler 3 has the following dimensions:

Stack height 15m

Stack diameter 0.92m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.1179 g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the most stringent objective for PM10 will be exceeded.**

### Annual NO<sub>2</sub> Mean calculation

Estimated emission rate E = Max thermal input capacity x emission factor

Max thermal input capacity Kw -	5000
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NO <sub>2</sub> Emission Factor for wood pellet boiler g/Gj –	150
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Estimated emission rate (E) g/s is	$5000 \times 10^{-6} \times 150 = 0.75$
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NO <sub>2</sub> Background concentration (G) $\mu\text{g}/\text{m}^3$ –	8.65
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Background adjusted emission rate (Ea) g/s $E_a = E/(40-G)$ –	$0.75/(40-8.65) = 0.024$
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Boiler 3 has the following dimensions:

Stack height 15m

Stack diameter 0.92m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.732 g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the annual mean limit value for NO<sub>2</sub> will be exceeded.**

### Hourly Mean NO<sub>2</sub> calculation.

Estimated emission rate E = Max thermal input capacity x emission factor

Max thermal input capacity Kw -	5000
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NO <sub>2</sub> Emission Factor for wood pellet boiler g/Gj –	150
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Estimated emission rate (E) g/s is	$5000 \times 10^{-6} \times 150 = 0.75$
------------------------------------	---

NO <sub>2</sub> Background concentration (G) $\mu\text{g}/\text{m}^3$ –	8.65
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Background adjusted emission rate (Ea) g/s $E_a = 40E/(200-2G)$ –	$(40 \times 0.75)/(200-17.3) = 0.16$
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Boiler 3 has the following dimensions:

Stack height 15m

Stack diameter 0.92m

Height of building 10m

Using the Review and Assessment tool available on the R & A website gives a target emission rate of 0.3753 g/s.

**The adjusted emission rate (EA) is less than the target emission rate and it is therefore unlikely that the hourly mean limit value for NO<sub>2</sub> will be exceeded.**

**Antrim Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.**

## 6.2 Biomass Combustion – Combined Impacts

Antrim Borough Council has identified one commercial biomass combustion installation which has been assessed in Section 6.1 above. This installation is in an industrial park and there are no other commercial installations burning biomass or domestic properties burning solid fuel in the same 500 x 500 m square.

Antrim Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **6.3 Domestic Solid-Fuel Burning**

One of the major findings of the first round of review and assessment was that Antrim town contained areas where significant solid fuel burning took place. It was found that in a number of estates, built by the Northern Ireland Housing Executive (NIHE) in the early 1970s, a significant number of properties still relied on smokeless solid fuel room heaters.

The largest solid fuel burning areas in the Antrim and the outlying villages were fully assessed in the first round with much of Antrim town being modelled for the Stage 3 Review and Assessment. The modelling predicted exceedences of the 15-minute mean objective for sulphur dioxide and resulted in the declaration of an AQMA which takes in two housing estates in Antrim town.

Subsequently, Antrim Borough Council developing an action plan setting out measures designed to reduce emissions of sulphur dioxide within this area. Antrim Borough Council will be submitting a separate progress report relating to the AQMA so this area is not considered further for the purposes of this report.

For the 2006 USA other, smaller, pockets of coal and solid fuel fired homes in Antrim and the larger villages of Crumlin and Randalstown were screened.

Since that time there has been a major development that has the potential to reduce emissions of sulphur dioxide within Antrim town, namely, the availability of natural gas.

During the 1970s and 1980s solid fuel systems were installed in public sector properties. Oil was not used due to the crisis in the worldwide market. The NIHE has been implementing a conversion programme since 1996, to replace central heating systems in properties with oil or gas. Since 2000, only gas and oil (where gas is not available) have been offered as the replacement fuel.

The rate of conversion is 9,000 properties a year (a third of which are gas) and the solid fuel properties are being prioritised for conversion first. This could mean that all solid fuel has been phased out in the public sector housing stock by 2010.

In 2001 the Northern Ireland Executive announced its support for the development of a multi million pound natural gas project. The project involved the construction of a gas pipeline from Greater Belfast to Dublin (known as the South North pipeline), to link with a pipeline from near Carrickfergus to Londonderry (the North West pipeline). The North West pipeline was completed in 2004. Construction began on the South North pipeline in February 2006 and reached Antrim town in late October 2006.

Conversion of NIHE housing stock in Antrim began with the AQMA estates with Ballycraigy being completed in 2007 and Greystone in 2008. The conversion programme is now being rolled out throughout the town.

Whilst it is considered that previous review and assessment findings are still largely relevant, professional judgement was used to identify a single 500 x 500m area that had not previously been assessed and where solid fuel burning might be a problem and where the gas pipeline was unlikely to penetrate in the near future.

The area lies either side of the Dublin road and contains 403 properties. The properties were at one time public sector homes although the majority are now in private ownership. For the purposes of this report this area was assessed against the screening criteria set out in LAQM. TG(09), which states that a detailed assessment will be required where the density of coal burning premises exceeds 100 per 500 x 500m area.

Data from the Northern Ireland Housing Executive was used in conjunction with a fuel use survey to establish the number of houses within these areas relying on solid fuel as the primary source of space heating. A total of 67 houses were found to be burning solid fuel. There are less than 100 houses in the 500m x 500m area likely to be burning coal or solid fuel in any quantities so there is no need to proceed to a detailed assessment on this issue.

**Antrim Borough Council has assessed areas of significant domestic solid fuel use, and concluded that it will not be necessary to proceed to a Detailed Assessment.**

## **7 Fugitive or Uncontrolled Sources**

There are three sites within the borough that have the potential to generate fugitive emissions, a waste transfer and landfill site at Crosshill Road, Crumlin, a quarry at Boghill Road, Belfast and a waste transfer station at Belfast Road, Nutts Corner.

The waste transfer station at Belfast Road is in a grid square with a background level of  $13.29\mu\text{g}/\text{m}^3$  and has relevant exposure in that there is receptor approximately 180m from the proposed site of an activity that has the potential to generate dust, namely the crushing and screening of bricks and concrete. There are no records of recent complaints about dust from the facility and the site operator has made an application for a permit under the Pollution Prevention & Control (NI) Order 2003 to operate mobile crushing and screening equipment at the site. It is thought at this time that fugitive emissions to atmosphere can be adequately controlled through enforcement of permit conditions and we would not propose to proceed to a Detailed Assessment at this time. We would propose to look again at this site in our next Progress Report.

The quarry at Boghill Road has no relevant exposure within 400m and the facility at Crosshill was considered in the last Updating and Screening Report.

Antrim Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the District.

## 8 Conclusions and Proposed Actions

### 8.1 Conclusions from New Monitoring Data

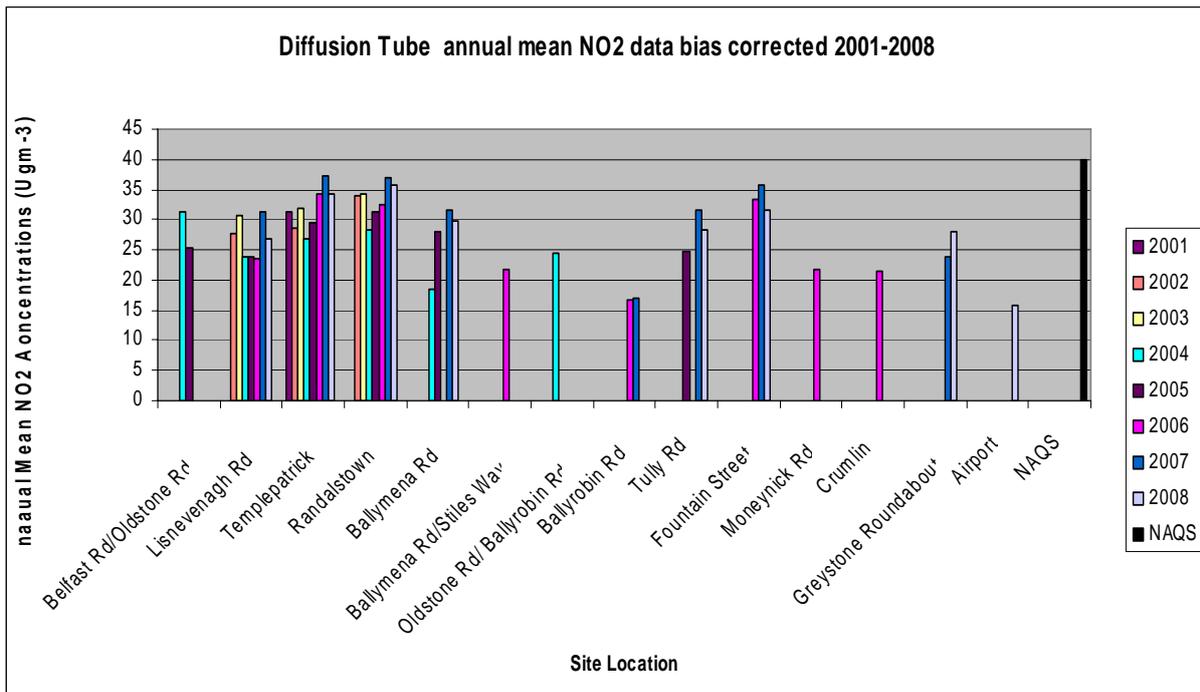
Antrim Borough Council dioxide has monitored sulphur dioxide on an automatic continuous basis since November 2001 at a site within its Air Quality Management Area (AQMA). The equipment employed uses UV fluorescence for measurement of SO<sub>2</sub> and is located in the back yard of a dwelling house within the Greystone housing estate occupied by Greystone Community Group. The council also monitors nitrogen dioxide at 8 locations using passive diffusion tubes.

Data from the real time sulphur dioxide analyser, for the year 2008 shows that, with 3 exceedences of the 15-minute mean of greater than 266 µg m<sup>-3</sup> in the calendar year, all the air quality objectives were met at the monitoring site. Although the monitoring station is in an AQMA, it is not at the worst case location. A separate progress report is being prepared in relation to the AQMA. It is concluded that the

Of the nitrogen dioxide diffusion tube monitoring locations on Antrim, 3 have been in operation since 2002. These are as follows

- Lisnevenagh Rd
- Templepatrick
- Randalstown

Historic results from these and other sites are shown in the graph below:



Although the air quality objectives have yet to be exceeded the overall trend would appear to be an upward at these three sites. This rise would appear to suggest that traffic levels are increasing, possibly reflecting the continuing growth within the population centres of the borough.

Results from the Fountain Street, Templepatrick and Randalstown remain above 30µg/m<sup>3</sup> sites and monitoring will continue at these three sites. Although some of the other existing sites may be discontinued and the tubes relocated the findings have highlighted the need to continue monitoring the roads networks at key locations.

## **8.2 Conclusions from Assessment of Sources**

It is considered that all potential road transport, other transport, industrial, commercial and domestic sources have been considered and it is concluded that there is no need to proceed to a detailed assessment.

No new roads or roads with significantly increased traffic flows have been identified although three road junctions with significant traffic flows have been identified. Although there are no relevant exposure close enough to any of these to warrant Detailed Assessment it is thought that diffusion tube monitoring can be justified for the gathering of further information.

No new industrial processes have been identified and although one significant biomass combustion plant has been considered, screening has ruled out the need to proceed further in relation to it. A possible fugitive source, a proposed crushing and screening installation at a waste recycling facility, has been identified and will be looked at again for the 2009 Progress Report.

The major areas of domestic solid fuel burning had been considered in earlier rounds of review and assessment. The last remaining areas were screened by way of a fuel use survey and the need to proceed to Detailed Assessment has been ruled out.

## **8.3 Proposed Actions**

The Updating and Screening assessment has not identified the need to proceed to a Detailed Assessment for any pollutant.

Consideration of existing road traffic data has thrown up three busy road junctions that, although not requiring detailed assessment when screened in accordance with the technical guidance, are worth a second look. It is proposed that diffusion tube monitoring sites will be established at these junctions in order to monitor nitrogen dioxide concentrations over the next calendar year.

The next air quality report will be a Progress Report which is due in April 2010.

## **9       References**

Defra (2009) Part IV of the Environment Act 1995. Local Air Quality Management. Technical Guidance LAQM.TG(09).

AEA Energy & Environment (2008). Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: A Practical Guide for Laboratories and Users.

DRD Roads Service (Dec 2007). Traffic and Travel Information 2006 incorporating Annual Traffic Census and Vehicle Kilometres of Travel.

# Appendices

## Appendix A: Road Traffic Data

Road Name	Vehicle Count 2005/2006*	2008 Projected traffic flow	% HDV	Average speed (mph)
A522 Fountain Street Antrim	17866	19383	1.8	21.6
Main Street Crumlin	4277	4640	1.8	26.8
A6 Belmont Road Antrim	7851	8518	5.1	48.4
B18 Roguey Road Moneyglass	5124	5559	4.3	48.6
B154 Dundrod Road Nutts Corner	10968	11899	6.3	40.8
Shane Street Randalstown	10065	10920	3.7	41.7
B95 Greystone Road (St. Joseph's Primary)	7997	8676	2.8	30.0
A52 Belfast Road Nutts Corner	5049	5478	7.1	39.4
B518 Stiles Way Antrim	7963	8639	3.4	43.0
A57 Ballyrobin Road (Airport)	14110*	14886	20.6	37.4
A57 Ballyrobin Road (Templepatrick)	10620*	11204	11.5	47.9
A26 Tully Road Nutts Corner	18790*	19823	10.8	48.9
A26 Moira Road Nutts Corner	12720*	13420	17.5	51.4
A26 Lisnevenagh Road	30372	32951	8.0	44.9
A26 Ballymena Road Antrim	17870*	18853	7.2	41.3
A6 Belfast Road Antrim	9170*	9674	5.6	35.2
A6 Moneynick Road Toome	18557	20132	10.8	45.6
A6 Randalstown Road Antrim	9370*	9885	5.7	39.4
B95 Greystone Road Antrim (Daewoo)	9700*	10233	6.4	44.1
M2 Rathbeg-T'patrick	38820*	43867	11.2	66.6
M2 Dunsilly-Rathbeg	33700*	35554	9.6	66.3
M22 Moneynick Road	18670*	19697	11.9	63.4