LISBURN
CITY COUNCIL

2009 Air Quality Updating and Screening Assessment for Lisburn City Council

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

June 2009

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Executive Summary

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.

The USA identified no exceedences of the Air Quality Strategy objectives for 2010, at any location of relevant exposure, for any of the pollutants assessed. No AQMAs are currently declared in the Lisburn City Council area, and it is not envisaged that this situation will change before 2010.

Lisburn City Council identified a proposed biomass boiler to be constructed as part of the 'eco-village' of Woodbrook on the western edge of the city. An assessment of PM_{10} and NO_2 emissions from the installation did not suggest that local air quality would be significantly affected. Therefore there is no requirement to proceed to a Detailed Assessment for any sources assessed as part of this USA. However a Progress Report will need to be complete by the end of April 2010.

Table of contents

Appendices

1 Introduction

1.1 Description of Local Authority Area

The Lisburn City Council area is located southwest of Belfast and is the second largest Council area in Northern Ireland, it covers 174 square miles and has a population of over 113,500. Spanning parts of southwest County Antrim and northwest County Down, the Council area stretches from Glenavy and Dundrod in the north to Dromara and Hillsborough in the south, and from Drumbo in the east to Moira and Aghalee in the west.

The M1 motorway passes through the Council southwest from Dunmurry to Moira on the South side of the City of Lisburn, whilst a number of major A-roads pass through Lisburn itself. The majority of air pollution from road transport therefore occurs in the City of Lisburn, and hence a number of non-automatic NO_2 monitoring sites are located throughout the city. Lisburn City's automatic air quality monitoring sites are located at Lagan Valley Hospital on the A1, at the Council Island Civic Centre and at Dunmurry High School.

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 micrograms per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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	
Benzene			
	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

1.4.1 First Round of Review and Assessment

Lisburn City Council completed their first round of Review and Assessment in 2003, concluding that a stage 2 assessment was necessary for NO_2, PM_{10}, CO and SO_2. Initial screening prior to the assessment however indicated that assessment of carbon monoxide was not necessary. The 2004 stage 2/3 report therefore investigated NO_2 and PM_{10} from road transport and PM_{10} and SO_2 from domestic solid fuel combustion. Modelling and monitoring data indicated there would be no exceedences of the objectives for the pollutants studied, hence no further assessment was required and no AQMAs have been declared.

1.4.2 Second Round of Review and Assessment

Lisburn City Council carried out an Updating and Screening Assessment (USA) in 2006 for benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, PM_{10} and sulphur dioxide. The report concluded that no exceedences of the objectives occurred in 2005, and hence a Detailed Assessment was not required for any of these pollutants. It was also noted that the SO_2 monitor at Lisburn Island Civic Centre had indicated low concentrations for the previous three years, suggesting that the Council may therefore wish to remove the monitor from this site, and move it to a different location.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Automatic monitoring has been carried out at 3 locations in the Lisburn City Council area since 2003; monitoring is undertaken by AEA on behalf of Lisburn City Council. Since the previous report in 2006 the continuous monitor for SO_2 has been moved from Lagan Valley to Dunmurry High School; details of all three sites are provided in Table 2.1 below:

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 ?
Dunmurry High School	Urban background	X 328595 Y 367325	PM_{10} $PM_{2.5}$ SO_2	N	Y	3 m	N
Island Civic Centre	Urban background	X 327202 Y 364336	PM_{10}	N	Y	6 m	N
Lagan Valley Hospital	Roadside	X 326537 Y 363700	PM_{10} NO_2	N	Y	2 m	Y

2.1.2 Non-Automatic Monitoring

Lisburn City Council carry out diffusion tube NO_2 monitoring at nine locations throughout the Council area. Locations are mapped in figure 2.2 and details are provided in table 2.2 below:

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OSI 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 ?
Northern Bank	Roadside	X 326507 Y 364415	NO_2	N	Y	2 m	Y
Antrim Road	Roadside	X 326313 Y 364621	NO_2	N	Y	1 m	Y
Ventnor	Urban Background	X 326900 Y 362013	NO_2	N	Y	1 m	Y
Edgewater	Urban Background	X 327202 Y 363718	NO_2	N	Y	1 m	Y
Main Street Moira	Roadside	X 315100 Y 360621	NO_2	N	Y	1 m	Y
King's way Dunmurry	Roadside	X 329502 Y 386915	NO_2	N	Y	1 m	Y
Beechlawn Park	Urban Background	X 329610 Y 369105	NO_2	N	Y	7 m	Y
Sprucefield Court	Urban Background	X 326165 Y 362491	NO_2	N	Y	7 m	Y
Benford Park	Urban Background	X 327586 Y 363586	NO_2	N	Y	-	Y

Figure 2.2 Diffusion Tube Site Locations

License number DCOU018

2.2 Comparison of Monitoring Results with AQ Objectives

No exceedences of the AQS objectives at locations of relevant public exposure have been identified from monitoring data collected during 2008. The highest NO_2 concentrations, recorded by the diffusion tube the Northern Bank site, equalled the air quality objective with a concentration of 40.4 $\mu g/m^3$; since there is no relevant public exposure at this site, a detailed assessment is not required for NO_2. All other monitored pollutant concentrations were well below their respective air quality objective limits.

Lisburn City Council

2.2.1 Nitrogen Dioxide

Annual mean nitrogen dioxide concentrations for 2008 from Lisburn City Council's automatic monitoring at Lagan Valley hospital are shown below in table 2.3a. Measured concentrations do not exceed the annual mean or 1-hour mean objectives for NO_2.

Automatic Monitoring Data

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 ($\mu g/m^3$)		
				2005	2007	2008
n/a	Lagan Valley Hospital	N	97.7	27	25	26

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 µg/m^3) *If the period of valid data is less than 90% of a full year, include the 99.8th %ile of hourly means in brackets.*		
				2005	2007	2008
n/a	Lagan Valley Hospital	N	97.7	1	0	0

Diffusion Tube Monitoring Data

Monitoring of Nitrogen Dioxide has been undertaken at eight locations across the Lisburn City Council area using the preparation method 10% TEA in water, analysed by Eurofins Laboratories Ltd (using Casella). No bias adjustment factor is supplied in the UWE national survey of diffusion tube bias. A co-location study has therefore been carried out at the Lagan Valley Hospital site, and its results used to derive a bias adjustment factor of 0.82 for the data shown in table 2.4a below:

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations 2008 (µg/m^3) Adjusted for bias
n/a	Northern Bank	N	91.7	40
n/a	Antrim Road	N	91.7	28
n/a	Ventnor Park	N	91.7	16
n/a	Edgewater	N	91.7	15
n/a	Moira	N	91.7	36
n/a	Kingsway	N	91.7	30
n/a	Beechlawn	N	91.7	24
n/a	Benford Park	N	88.9	22
n/a	Sprucefield Court	N	91.7	35

Lisburn City Council

Table 2.4b Historical results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Annual mean concentrations (µg/m^3) Adjusted for bias		
			2003[1]	2005[2]	2008
n/a	Northern Bank	N	26	38	40
n/a	Antrim Road	N	19	24	28
n/a	Ventnor Park	N	12	13	16
n/a	Edgewater	N	13	15	15
n/a	Moira	N	27	34	36
n/a	Kingsway	N	23	29	30
n/a	Beechlawn	N	n/a	23	24
n/a	Benford Park	N	n/a	23	22
n/a	Sprucefield Court	N	n/a	32	35

Whilst the Northern Bank monitoring site shows exceedence of the annual mean objective for NO_2, it is a historical kerbside site without relevant exposure, and a detailed assessment is therefore unnecessary. This is stated in the most recent 'Eastern Group Air Quality Progress Report', and confirmed by Lisburn City Council.

2.2.2 PM_{10}

Automatic monitoring of PM_{10} in 2008 was undertaken at three sites in the Lisburn City Council area and ratified by AEA. Summaries of these data, with regard to annual and hourly mean objectives, are presented in tables 2.5a and 2.5b. When comparing Lagan Valley and Civic Island with previous year data, it is important to consider that 2008 data were scaled using the new Volatile Correction Method (values in brackets). The 90% percentile concentration after the VCM correction was 26 µg/m^3 in Civic Island and µg/m^3 29 in Lagan Valley. At all three sites, annual means were significantly below the objective of 40 µg/m^3 and the number of exceedences of the hourly mean objective of 50 µg/m^3 was well below the limit of 35.

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (µg/m^3)		
				2003	2007	2008
n/a	Dunmurry High School FDMS	N	85.4	27	18	16
n/a	Lagan Valley TEOM - Grav. **(VCM scaling)**	N	97.4 **(72.4)**	n/a	20	22 **(20)**
n/a	Civic Island TEOM Grav. **(VCM Scaling)**	N	97.3 **(72.1)**	18	20	19 **(17)**

[1] Bias adjustment factor for 2003: 1.035
[2] Bias adjustment factor for 2005: 0.84

Table 2.5b Results of PM_{10} 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^3) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*		
				2003	2007	2008
n/a	Dunmurry High School	N	85.4	11	5	2 (23.45)
n/a	Lagan Valley	N	97.5	n/a	18	10
n/a	Civic Island	N	97.2	15	4	6

2.2.3 Sulphur Dioxide

Automatic monitoring of SO_2 in 2008 was undertaken at Lisburn Dunmurry High School and ratified by AEA. No exceedences of the 266 µg/m^3 15 minute mean objective, 350 µg/m^3 1 hour mean objective, or 125 µg/m^3 24 hour mean objective were found to have occurred in the monitoring period. Data capture was 98.8%, the annual mean was calculated to be 3 µg/m^3 and the maximum 15 minute mean to be 88 µg/m^3.

2.2.4 Benzene

No monitoring of benzene has been undertaken in Lisburn City Council area.

2.2.5 Other pollutants monitored

Automatic monitoring of NO and NO_x was carried out at Lagan Valley hospital site, and of $PM_{2.5}$ at Dunmurry High School site. Annual means at Lagan Valley were 22 µg/m^3 and 59 µg/m^3, and maximum daily means 204 µg/m^3 and 392 µg/m^3 for NO and NO_x respectively. $PM_{2.5}$ annual mean was 14 µg/m^3 and maximum daily mean 70 µg/m^3.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

As per the previous Review and Assessment, completed in 2006, there are no relevant locations requiring assessment in the Lisburn City Council area.

Lisburn City 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

The 2006 Review and Assessment identified 3 sections of road with traffic flows exceeding 10,000 vehicles per day, but concluded that exceedences of the Air Quality objectives were unlikely at any relevant location.

Lisburn City 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.

In 2006 no roads in the Lisburn City Council area had traffic consisting more than 10% HGVs. The Council has confirmed that no change in this situation has been identified for 2008.

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

3.4 Junctions

Two busy junctions in the Lisburn City Council area were assessed in 2006, both were considered to have NO_2 concentrations well below the limit of 40 µg/m^3. The Council has confirmed that the situation at these locations has not changed for 2008.

Lisburn City 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

Lisburn City Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

Lisburn City Council confirms that there are no relevant bus stations in the District.

4 Other Transport Sources

4.1 Airports

The closest airports to the Lisburn City Council area are George Best City and Belfast International. Since both are approximately 20 km from Lisburn City centre there is no need to consider their emissions in this USA.

Lisburn City Council confirms that there are no airports in the District.

4.2 Railways (Diesel and Steam Trains)

New evidence has come to light that NO_2 concentrations alongside busy rail lines carrying coal or diesel locomotives can be elevated to a similar extent as on a busy road. Where background NO_2 concentrations exceed 25 µg/m^3, and there is relevant exposure within 15 m of the tracks, an assessment may be necessary if volumes of rail traffic are considered large enough.

4.2.1 Stationary Trains

Lisburn City 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

The highest annual average background concentration of NO_2 in the Lisburn City Council area is 15.8 µg/m^3, occurring in the northeast extent of Lisburn City. This is well below the threshold requiring assessment for locomotives, and hence no locations require assessment.

Lisburn City 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)

Lisburn is located approximately 15 km inland with no major rivers or estuaries, therefore there is no requirement for assessment of shipping in the area.

Lisburn City 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

No indication has been given of relevant emissions from industrial sources in the Lisburn city area which have not previously been assessed.

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

Lisburn City 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

Lisburn City 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

Lisburn City 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 major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

There are two large petrol stations in Lisburn, one of which has an annual throughput exceeding 2,000 m^3. This station has no relevant exposure within 10 m of the pumps, therefore a detailed assessment for Benzene is not necessary as it is expected that the 2010 objective will be met at this location. However, stage 2 recovery systems must be fitted to all stations with annual petrol throughput greater than 500 m^3 by January 1st 2010.

Lisburn City Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Lisburn City council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Planning permission has been granted for the construction of four biomass burners in the new eco-village of Woodbrook in the west of the Council area, each with a rated output of 500 kW. It is assumed that PM_{10} and NO_2 emission rates are approximately 0.152 g/s and 0.180 g/s respectively; maximum average annual background concentrations in the area are 7.3 µg/m^3 for NO_2 and 14.2 µg/m^3 for PM_{10}.

Using a building height of 12.78 m, stack diameter of 460 mm and stack height of 26 m, the installation was assessed with respect to the maximum permissible emission rate that would not result in an exceedence of Air Quality objectives at ground level. The results of this assessment are tabulated below (table 6.1); since expected emission rates from the Woobrook biomass installation are an order of magnitude lower than permissible maxima, it is concluded that the installation will not cause an exceedence of Air Quality objectives at ground level.

Pollutant	Objective	Maximum ground level concentration / µg·m^{-3}	Maximum permissible emission rate / g·s^{-1}	Maximum expected emission rate / g·s^{-1}
PM_{10}	90th percentile of 24-hr mean	1	0.559	0.152
NO_2	99.8th percentile of 1-hr mean	200	1.794	0.180
NO_2	Annual mean	1	3.022	0.180

Lisburn City 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

The 2004 Detailed Assessment considered emissions from domestic and service sector solid fuel combustion in Lisburn City. Modelling results indicated that annual mean concentrations were below 25 µg/m^3 at all locations, and that consequently there was little chance of the annual mean or 24-hour mean objectives being exceeded for PM_{10}.

Lisburn City 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

Lisburn City Council confirms that there are no areas of significant domestic fuel use in the District.

7 Fugitive or Uncontrolled Sources

No new relevant exposure to particulates from quarries, landfills, cargo depots or unpaved roads has been identified by Lisburn City Council in 2008.

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

8 New Developments

8.1 Residential, Commercial and Public Developments

Lisburn City Council has not identified any new relevant residential, commercial or public developments in 2008.

9 Air Quality Plans and Policies

9.1 AQMA Action Plan

No AQMAs have been declared in the Lisburn City Council area.

9.2 Local Transport Plan

Lisburn City Council does not operate a Local Transport Plan.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

Lisburn City Council undertakes both continuous and diffusion tube monitoring at a number of locations throughout their area for NO_2. The only exceedence of AQ objectives in 2008 was at the Northern Bank diffusion tube site, where bias adjusted annual mean NO_2 concentration equalled the objective limit of 40 µg/m^3. Since this site is a kerbside site with no relevant exposure, exceedence at this location does not require a detailed assessment for NO_2.

Automatic monitoring of PM_{10}, undertaken at 3 sites in the Lisburn area, shows no exceedences of the 2010 air quality objectives. Concentrations of PM_{10} are sufficiently low that it may be considered highly unlikely that the objectives for PM_{10} will be exceeded.

Automatic monitoring of SO_2 at the Dunmurry High School monitoring station showed no exceedences of the 15-minute, 1-hour, or 24-hour mean air quality objectives.

Additional monitoring of NO and NO_x was carried out at Lagan Valley hospital site, and of $PM_{2.5}$ at Dunmurry High School site. Whilst there are no existing air quality objectives for these pollutants, the concentrations measured may be considered to be within reasonably acceptable limits.

No AQMAs are currently declared in the Lisburn City Council area, and monitoring data for 2008 do not imply a need to declare any AQMAs in the area.

10.2 Conclusions from Assessment of Sources

10.2.1 Road Traffic Sources

The results of the USA carried out for road traffic sources concluded that there is no requirement to proceed to a Detailed Assessment for the following sources:

- Narrow Congested Streets with Residential Properties Close to the Kerb;
- Busy Streets Where People May Spend 1-hour or More Close to Traffic;
- Roads with a High Flow of Buses and/or HGVs;
- Junctions;
- New Roads Constructed or Proposed Since the Last Round of Review and Assessment;
- Roads with Significantly Changed Traffic Flows; and
- Bus and Coach Stations.

10.2.2 Other Transport Sources

There is no requirement to proceed to a Detailed Assessment for the following sources:

- Airports;
- Railways (Diesel and Steam Trains); and
- Ports (Shipping).

10.2.3 Industrial Sources

There is no requirement to proceed to a Detailed Assessment for the following sources:

- Industrial Installations;
- New or Significantly Changed Installations with No Previous Air Quality Assessment;
- Major Fuel (Petrol) Storage Depots;
- Petrol Stations; and
- Poultry Farms.

10.2.4 Commercial and Domestic Sources

There is no requirement to proceed to a Detailed Assessment for the following sources:

- Biomass Combustion – Individual Installations
- Biomass Combustion – Combined Impacts; and
- Domestic Solid-Fuel Burning.

10.2.5 Fugitive or Uncontrolled Sources

There is no new, or newly identified, source or potential sources of fugitive particulate matter, therefore there is no requirement to proceed to a Detailed Assessment.

10.3 Proposed Actions

On the basis of information supplied for this assessment by Lisburn City Council, there is no need to proceed to a Detailed Assessment for any pollutants. No AQMAs are required, and the monitoring currently undertaken is considered sufficient and appropriate. The next action required is, therefore, the submission of a Progress Report, to be complete before the end of April 2010.

11 References

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Appendices

Appendix A: QA/QC Data

Diffusion tubes may systematically under or over-read NO_2 concentrations when compared to the reference chemiluminescence analyser. This is described as bias and can be corrected for to improve the accuracy of the diffusion tube results using a suitable bias adjustment factor.

Lisburn City Council's diffusion tubes are prepared by Eurofins Laboratories Ltd, which uses Casella for the tubes analysis. This laboratory is not listed in the national database of co-location studies, therefore a single co-location study at the Lagan Valley Hospital site has been used to derive bias a adjustment factor as shown below. This factor of 0.8 has been applied to all diffusion tube results from the Lisburn City Council area in 2008.

Appendix A: QA:QC Data

Factor from Local Co-location Studies

Checking Precision and Accuracy of Triplicate Tubes

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	01/01/2008	31/01/2008	73.0	74.0	54.0	67	11.3	17	28.0
2	01/02/2008	29/02/2008	34.0	35.0	34.0	34	0.6	2	1.4
3	01/03/2008	31/03/2008	29.0	29.0	29.0	29	0.0	0	0.0
4	01/04/2008	30/04/2008	24.0	30.0	28.0	27	3.1	11	7.6
5	01/05/2008	31/05/2008	10.0	21.0	19.0	17	5.9	35	14.6
6	01/06/2008	30/06/2008	19.0	23.0	23.0	22	2.3	11	5.7
7	01/07/2008	31/07/2008	20.0	18.0	19.0	19	1.0	5	2.5
8	01/08/2008	31/08/2008	24.0	24.0	23.0	24	0.6	2	1.4
9	01/09/2008	30/09/2008	26.0	31.0	29.0	29	2.5	9	6.3
10	01/10/2008	31/10/2008	34.0	33.0	44.0	37	6.1	16	15.1
11	01/11/2008	30/11/2008	37.0	36.0	36.0	36	0.6	2	1.4
12									
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method

Period Mean	Data Capture (% DC)
27.2	98.3
34.8	98.7
22.5	75.3
23.9	99.6
20.2	99.7
23.3	99.0
15.9	98.9
29.1	98.4
24.9	99.7
28.5	98.7
29.1	97.6
38.2	100.0

Data Quality Check

Tubes Precision Check	Automatic Monitor Data Capture Check
Good	Good
Good	Good
Good	Good
Good	Good
Poor Precision	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
	Good
Good precision	Good Overall DC

Overall survey -->

Site Name/ ID: Lagan Valley Hospital

Precision: 10 out of 11 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A 0.8 (0.63 - 1.08)
Bias B 25% (-8% - 58%)
Diffusion Tubes Mean: 32 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 26 µgm^{-3}
Data Capture for periods used: 96%
Adjusted Tubes Mean: 26 (20 - 35) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A 0.82 (0.66 - 1.09)
Bias B 22% (-8% - 52%)
Diffusion Tubes Mean: 31 µgm^{-3}
Mean CV (Precision): 10 caution
Automatic Mean: 25 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 25 (20 - 34) µgm^{-3}

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Version 03 - November 2006

The bias factor for NO_2 diffusion tubes in the Lisburn City Council area is calculated from the co-location study at Lagan Valley Hospital, resulting in a factor of 0.82. Adjusted means and raw means from all sites are shown in the table below.

Site Name	Raw mean	Bias adjustment factor	Adjusted mean
Northern Bank	49.3	0.82	40
Antrim Road	34.4	0.82	28
Ventnor	19.7	0.82	16
Edgewater	18.2	0.82	15
Moira	44.3	0.82	36
Kingsway Dun.	36.4	0.82	30
Beechlawn	29.0	0.82	24
Benford Park	26.8	0.82	22
Sprucefield Ave.	42.5	0.82	35

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements

Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
Northern Bank	61.0	65.0	53.0	37.0	37.0	31.0	33.0	43.0	49.0	63.0	70.0			49.3	11
Antrim Road	79.0	38.0	30.0	27.0	36.0	24.0	21.0	22.0	33.0	29.0	39.0			34.4	11
Ventnor	24.0	32.0	14.0	11.0	17.0	12.0	9.0	9.0	29.0	35.0	25.0			19.7	11
Edgewater	21.0	23.0	17.0	17.0	14.0	15.0	14.0	21.0	23.0	14.0	21.0			18.2	11
Moira	49.0	58.0	30.0	39.0	51.0	31.0	43.0	39.0	52.0	45.0	50.0			44.3	11
Kingsway Dun.	38.0	55.0	42.0	32.0	42.0	28.0	25.0	27.0	23.0	37.0	51.0			36.4	11
Beechlawn	36.0	43.0	28.0	24.0	38.0	23.0	24.0	23.0	19.0	21.0	40.0			29.0	11

Adjusted measurement (95% confidence interval) with all the data 11 periods used in this calcuations
Bias Factor A 0.82 (0.66 - 1.09)
Bias B 22% (-8% - 52%)
Tube Precision: 10 Automatic DC: 98%

Adjusted with 95% CI	40	(33 - 54)
Adjusted with 95% CI	28	(23 - 37)
Adjusted with 95% CI	16	(13 - 22)
Adjusted with 95% CI	15	(12 - 20)
Adjusted with 95% CI	36	(29 - 48)
Adjusted with 95% CI	30	(24 - 40)
Adjusted with 95% CI	24	(19 - 32)

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.

LISBURN DUNMURRY HIGH SCHOOL

Automatic Monitoring Data
1st January to 31st December 2008

These data have been fully ratified by AEA

POLLUTANT	PM_{10} *	PM_{25} #	SO_2
Number Very High	0	-	0
Number High	0	-	0
Number Moderate	11	-	0
Number Low	7499	-	34344
Maximum 15-minute mean	166 μgm^{-3}	179 μgm^{-3}	88 μgm^{-3}
Maximum hourly mean	155 μgm^{-3}	167 μgm^{-3}	48 μgm^{-3}
Maximum running 8-hour mean	116 μgm^{-3}	125 μgm^{-3}	28 μgm^{-3}
Maximum running 24-hour mean	65 μgm^{-3}	76 μgm^{-3}	19 μgm^{-3}
Maximum daily mean	59 μgm^{-3}	70 μgm^{-3}	18 μgm^{-3}
Average	16 μgm^{-3}	14 μgm^{-3}	3 μgm^{-3}
Data capture	85.4 %	83.3 %	98.8 %

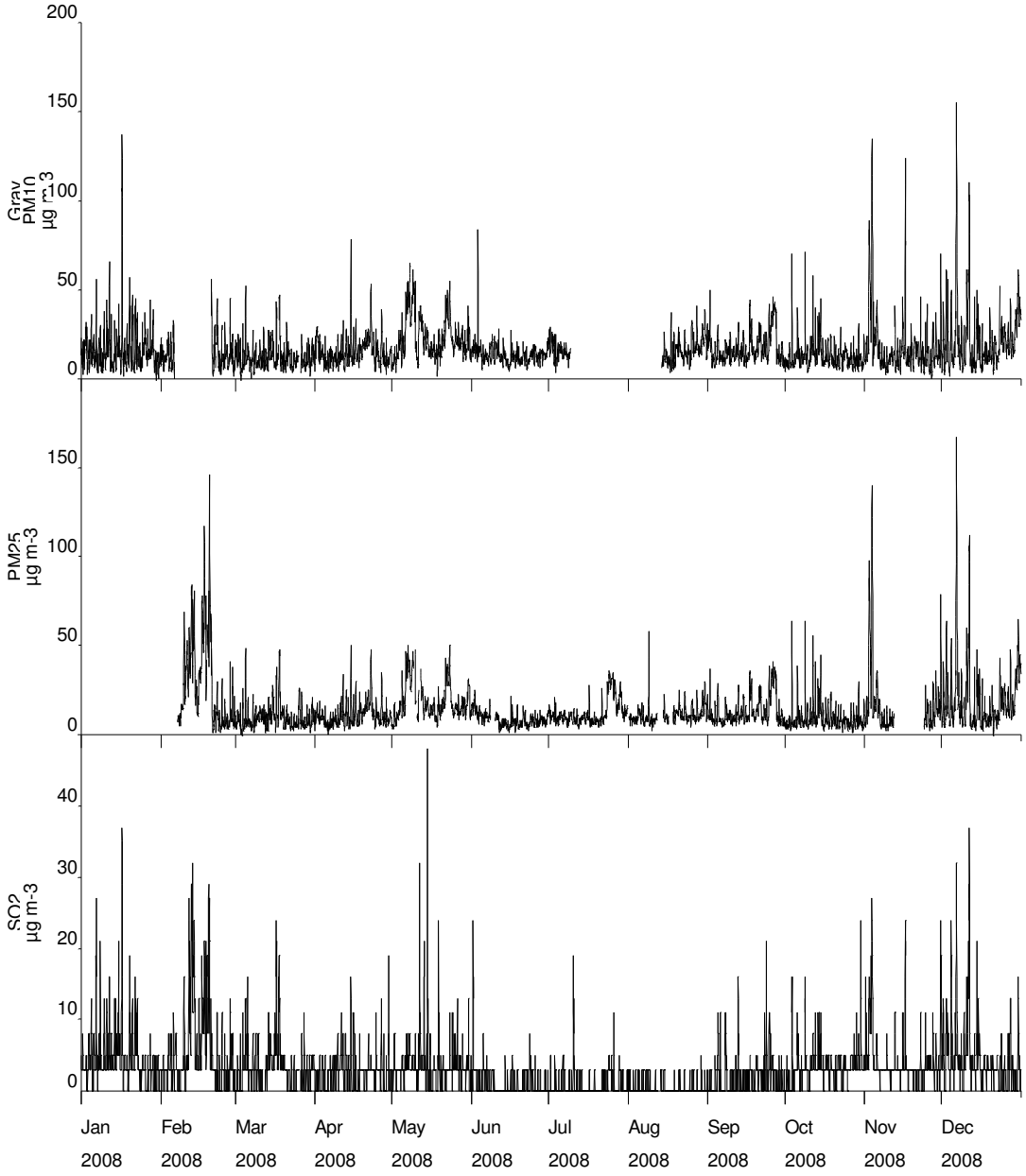
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 μgm^{-3}	2	2
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 μgm^{-3}	0	-
Sulphur Dioxide	15-minute mean > 266 μgm^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 μgm^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 μgm^{-3}	0	0

* PM_{10} as measured by a FDMS using a factor of 1
# PM_{25} instruments: FDMS from 7 February 2008 to 26 February 2009

Lisburn Dunmurry High School

Hourly Mean Data for 1st January to 31st December 2008



LISBURN ISLAND CIVIC CENTRE

Automatic Monitoring Data
1st January to 31st December 2008

These data have been fully ratified by AEA

POLLUTANT	PM_{10}+	PM_{10} VCM*	PM_{10} GR10
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	8613
Maximum 15-minute mean	143 μgm^{-3}	-	186 μgm^{-3}
Maximum hourly mean	120 μgm^{-3}	-	156 μgm^{-3}
Maximum running 8-hour mean	89 μgm^{-3}	-	116 μgm^{-3}
Maximum running 24-hour mean	48 μgm^{-3}	-	63 μgm^{-3}
Maximum daily mean	47 μgm^{-3}	58 μgm^{-3}	61 μgm^{-3}
90th percentile of daily means	22 μgm^{-3}	26 μgm^{-3}	29 μgm^{-3}
Average	15 μgm^{-3}	17 μgm^{-3}	19 μgm^{-3}
Data capture	97.3%	72.1%	97.3 %

+ PM_{10} as measured by a TEOM
*PM_{10} VCM – TEOM data corrected using Volatile Correction Model
PM_{10} GR10 - indicative gravimetric corrected, i.e. 'raw' TEOM PM_{10} data with a 1.3 factor applied
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (VCM Corrected)	Daily mean > 50 μgm^{-3}	2	2
PM_{10} Particulate Matter (VCM Corrected)	Annual mean > 40 μgm^{-3}	0	-

The PM_{10} TEOM data has been corrected using the Volatile Correction Model (www.volatile-correction-model.info) as detailed on Page 3-10 of LAQM.TG (09).

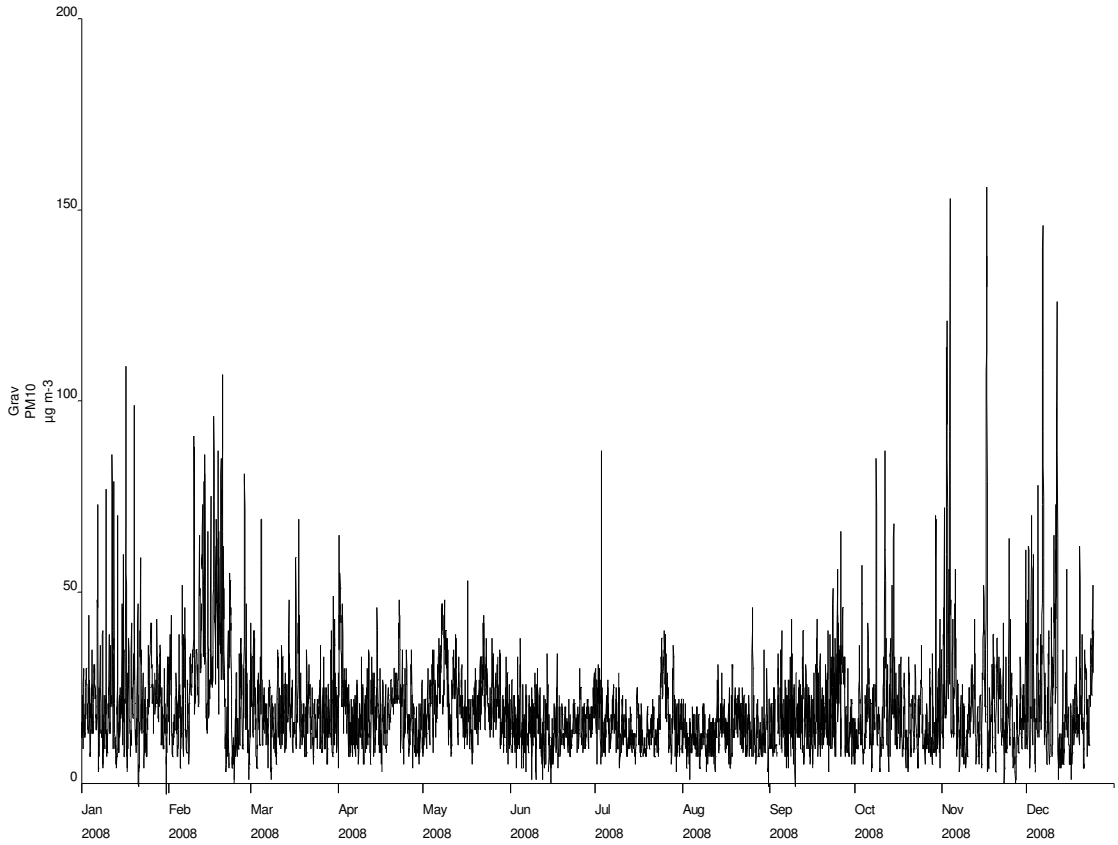
Please be advised the VCM has been calculated using local source ratified FDMS data (Lisburn Dunmurry High School) plus temperature and pressure as selected by the VCM Model

For information – PM_{10} TEOM data as indicative corrected, i.e. 'raw' TEOM PM_{10} data with a 1.3 factor applied

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 μgm^{-3}	6	6
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 μgm^{-3}	0	-

Lisburn Island Civic Centre

Hourly Mean Data for 1st January to 31st December 2008



LISBURN LAGAN VALLEY HOSPITAL

Automatic Monitoring Data
1st January to 31st December 2008

These data have been fully ratified by AEA

POLLUTANT	PM_{10}+	PM_{10} VCM*	PM_{10} GR10
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	48
Number Low	-	-	8509
Maximum 15-minute mean	777 μgm^{-3}	-	1010 μgm^{-3}
Maximum hourly mean	235 μgm^{-3}	-	306 μgm^{-3}
Maximum running 8-hour mean	140 μgm^{-3}	-	182 μgm^{-3}
Maximum running 24-hour mean	74 μgm^{-3}	-	96 μgm^{-3}
Maximum daily mean	73 μgm^{-3}	85 μgm^{-3}	95 μgm^{-3}
90th percentile of daily means	24 μgm^{-3}	29 μgm^{-3}	32 μgm^{-3}
Average	17 μgm^{-3}	20 μgm^{-3}	22 μgm^{-3}
Data capture	97.5%	72.4%	97.5%

+ PM_{10} as measured by a TEOM
*PM_{10} VCM – TEOM data corrected using Volatile Correction Model
PM_{10} GR10 - indicative gravimetric corrected, i.e. 'raw' TEOM PM_{10} data with a 1.3 factor applied
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (VCM Corrected)	Daily mean > 50 μgm^{-3}	2	2
PM_{10} Particulate Matter (VCM Corrected)	Annual mean > 40 μgm^{-3}	0	-

The PM_{10} TEOM data has been corrected using the Volatile Correction Model (www.volatile-correction-model.info) as detailed on Page 3-10 of LAQM.TG (09).

Please be advised the VCM has been calculated using local source ratified FDMS data (Lisburn Dunmurry High School) plus temperature and pressure as selected by the VCM Model

For information – PM_{10} TEOM data as indicative corrected, i.e. 'raw' TEOM PM_{10} data with a 1.3 factor applied

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 $\mu g\ m^{-3}$	10	10
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 $\mu g\ m^{-3}$	0	-

Lisburn Lagan Valley Hospital

Hourly Mean Data for 1st January to 31st December 2008