



LARNE
Borough Council

2014 Air Quality Progress Report for Larne Borough Council

In fulfillment of Environment (Northern Ireland) Order
2002

Local Air Quality Management

April 2014

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Executive Summary

This Progress Report allowed Larne Borough Council to review and assess air quality of monitored pollutants within the borough 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 consider a detailed assessment for that pollutant.

The Progress Report of air quality in Larne Borough has concluded that for Nitrogen Dioxide, the air quality objectives are likely to be met and that a more detailed assessment is not required.

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1 Introduction

1.1 Description of Local Authority Area

Larne Borough is situated on the east coast of Northern Ireland and is often described as 'The Gateway to Ulster' due to the operations of cross channel ferries to and from the port of Larne.

The Borough covers an area of approximately 131km², stretching over 36 miles along the Antrim coastline from Islandmagee and Ballycarry in the south to Glenarm and Carnlough in the north. Two of the Glens of Antrim and part of the Antrim Plateau make Larne Borough very scenic with two thirds designated as areas of outstanding natural beauty.

The population of the council area is just over 30,000 Of which Larne town alone makes up approximately $\frac{2}{3}$ of the total population. Larne is a busy seaport and market town situated 20 miles north of Belfast. It is within easy reach of Northern Ireland's two main airports being 21 miles from Belfast International Airport and 24 miles from Belfast City Airport. The area is supported both by major roads and a continuous rail link to Belfast – Dublin route.

The manufacturing, tourism and agriculture industries provide the main economic base of the Borough

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment (Northern Ireland) Order 2002, 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

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, 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 LAQM in Northern Ireland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	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
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	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
Particulate Matter (PM ₁₀) (gravimetric)	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
Sulphur dioxide	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

LAQM Activity	Completion Date	Brief Outcomes
1st Stage Review And Assessment	July 2001	A second stage assessment is required for nitrogen dioxide due to significant road traffic and industrial sources. Second stage assessment is necessary for sulphur dioxide due to significant industrial, domestic and shipping sources. Second stage assessment for PM₁₀ is necessary due to significant road traffic, domestic, industrial and shipping sources.
2 nd and 3 rd Stage Review and Assessment	2004	Air Quality Objectives for NO ₂ , SO ₂ and PM ₁₀ unlikely to be exceeded. No AQMA's declared.
Progress Report	April 2005	SO ₂ , NO ₂ and PM ₁₀ objectives met. No AQMA to declare.
Update and Screening Assessment	April 2006	No detailed assessment required for any of the 7 pollutants. Monitoring of SO ₂ , NO ₂ and PM ₁₀ to continue.
Detailed Assessment	April 2007	Not applicable- no AQMA's
Progress Report	April 2007	SO ₂ , NO ₂ and PM ₁₀ objectives met. No AQMA to declare.
Progress Report	April 2008	SO ₂ , NO ₂ and PM ₁₀ objectives met. No AQMA to declare.
Update and Screening Assessment	August 2009	No detailed assessment required for any of the 7 pollutants. Monitoring of SO ₂ , NO ₂ and PM ₁₀ to continue. SO ₂ , NO ₂ and PM ₁₀ objectives met.
Progress Report	April 2010	SO ₂ , NO ₂ and PM ₁₀ objectives met. No AQMA to declare.
Addendum to Update and Screening Assessment Report 2009		Air quality objectives for SO ₂ and PM ₁₀ met over the past 4 years and therefore continued monitoring no longer required. Air quality monitoring station decommissioned.
Progress Report	April 2011	NO ₂ met. No AQMA declared.
Update and Screening Assessment	August 2012	No detailed assessment required for any of the 7 pollutants. Air quality objectives met. Monitoring of NO ₂ to continue.

Progress Report	April 2013	NO ₂ objectives met. No AQMA declared
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2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

No Automatic monitoring was carried out

2.1.2 Non-Automatic Monitoring Sites

Monthly average concentrations of NO₂ are monitored using passive diffusion tubes located at 8 sites identified as having potentially the highest concentration of NO₂ at the first round of review and assessment.

Environmental Scientifics Group (ESG) have had the contract for supplying and analysing the Nitrogen Dioxide Diffusion Tubes since April 2008 and prior to that Lambeth Scientific Services were used.

ESG are UKAS accredited and demonstrate satisfactory performance in the Workplace Analysis Scheme for Proficiency (WASP) over the past five quarterly rounds as verified on the Defra Local Air Quality Management Web pages.

The tubes are analysed by an aqueous extraction followed by automated flow injection analysis/UV spectroscopy.

A Bias Adjustment factor of 0.8 has been applied which was taken from the latest spreadsheet of factors i.e. version 03/14, year 2013- Environmental Scientifics Group - Didcot (50% TEA in Acetone) from the Review and Assessment Website.

Data from site reference L4 was annualised.

Please refer to Appendix A for diffusion tube locations

Appendix B for full data set (monthly mean values) from January 2005-December 2013

Appendix C for annualised data

Appendix D for quality assurance information

Table 2.1 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
L1	Antiville Road/A8 Junction	Roadside	3864	0212	3m	NO ₂	N	N	N	n/a	Y
L2	Riverdale/Lathama House	Urban Background	3968	249	3m	NO ₂	N	N	N	n/a	Y
L3	Main Street Larne	Urban Centre	4016	0260	3m	NO ₂	N	N	N	Approx 1m	Y
L4	Victoria Rd/Agnew St Junction	Kerbside	4033	0285	3m	NO ₂	N	N	N	Approx 3m	Y

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Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
L5	Upper Cairncastle Rd	Kerbside	3920	0323	3m	NO ₂	N	N	N	Approx 3m	Y
L6	Larne Harbour Roundabout	Roadside	4123	0196	3m	NO ₂	N	N	N	n/a	Y
L7	Coastguard Rd/Castle Terrace	Other	4131	0171	3m	NO ₂	N	N	N	n/a	Y
L8	Ballylumford Rd, Islandmage	Other	4206	0203	3m	NO ₂	N	N	N	n/a	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO₂)

Diffusion Tube Monitoring Data

Monitoring for 2013 is detailed in the table below

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Table 2.2 Results of NO₂ Diffusion Tubes 2013

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) ^a	2013 Annual Mean Concentration (µg/m ³) - Bias Adjustment factor = 0.8 ^b
L1	Antiville Road Junction	Roadside	N	N	12	22.37
L2	Riverdale/Lathama House	Urban Background	N	N	12	14.46
L3	Main Street, Larne	Urban Centre	N	N	12	21.96
L4	Victoria Rd/O Glenarm Rd	Kerbside	N	N	7 ^a	26.7 ^a
L5	Upper Cairncastle Rd	Kerbside	N	N	10	22.25
L6	Larne Harbour Roundabout	Roadside	N	N	10	17.35
L7	Coastguard Rd/Castle Terrace	Other	N	N	12	10.48

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Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) ^a	2013 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.8 ^b
L8	Ballylumford Rd, Islandmage	Other	N	N	11	10.54

^a Data was "annualised" as in Box 3.2 of TG(09)(<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>),

^b It should be noted that the monitoring sites are not representative of public exposure. However as there were no exceedences it was not necessary to use the procedure specified in Box 2.3 of TG(09) to estimate the concentration at the nearest receptor.

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Table 2.3 Results of NO₂ Diffusion Tubes (2009 to 2013)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ^a				
			2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 0.83)	2011 (Bias Adjustment Factor = 0.83)	2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.8)
L1	Antiville Road/A8 Junction	N	32.9	28.32	32.3	23.15	22.37
L2	Riverdale/Latharna House	N	24.39	23.23	19.36	14.8	14.46
L3	Main Street, Larne	N	32.8	28	24.14	23.36	21.96
L4	Victoria Rd/Old Glenarm Rd	N	36.96	32.94	33.12	35 ^a	26.7 ^a
L5	Upper Cairncastle Rd	N	33.09	21.66	21.78	20.59	22.25
L6	Larne Harbour Roundabout	N	29.7	21.92	20.21	16.81	17.35
L7	Coastguard Rd/Ca Terrace	N	16.9	15.26	12.05	9.92	10.48
L8	Ballylumford Rd, Islandmage	N	21.29	15.99	12.46	10.97	10.54

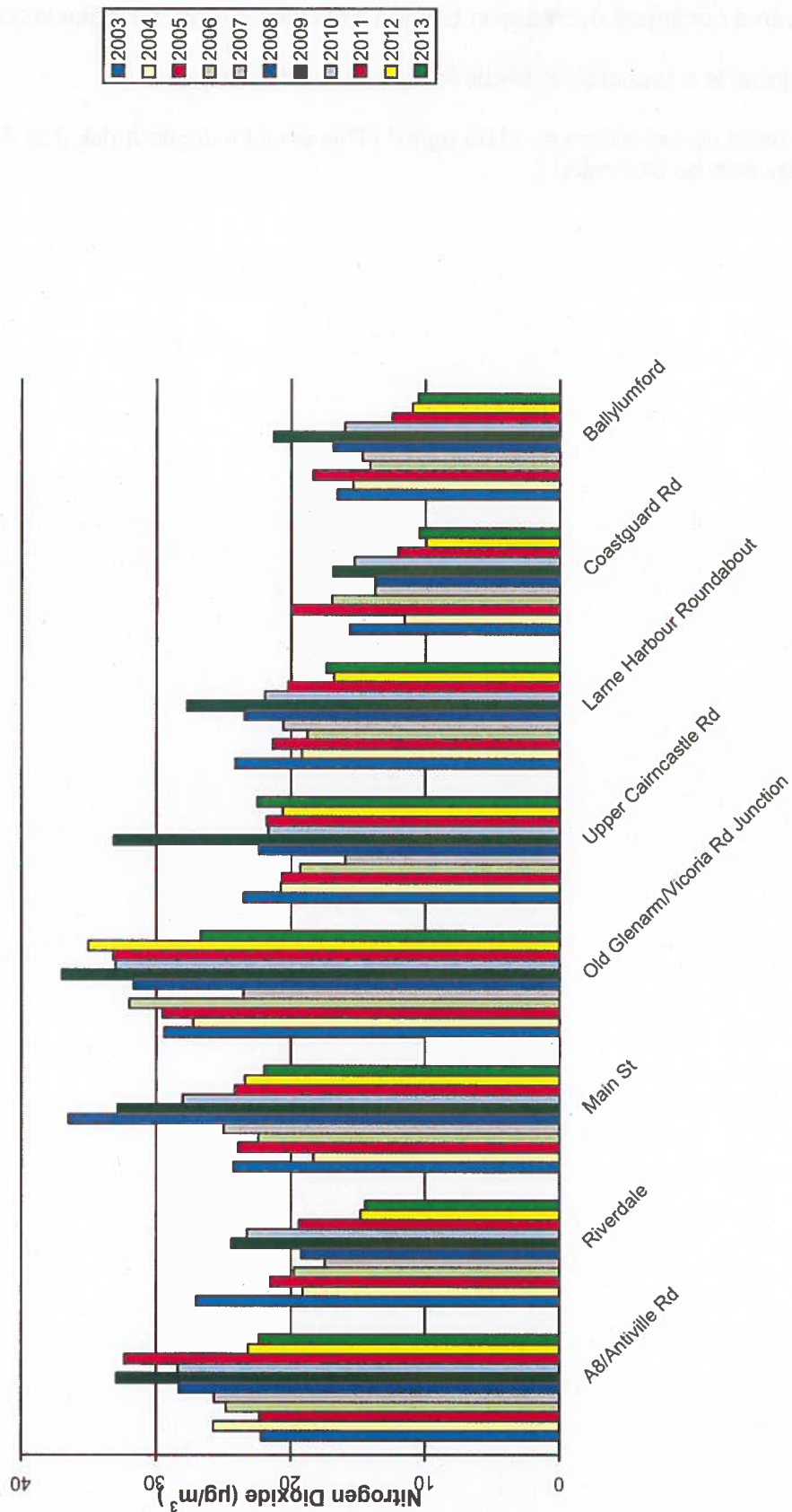
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In bold, exceedence of the NO₂ annual mean AQS objective of 40µg/m³

Underlined, annual mean > 60µg/m³, indicating a potential exceedence of the NO₂ hourly mean AQS objective

^a Means should be “annualised” as in Box 3.2 of TG(09) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>), if full calendar year data capture is less than 75%

Figure 1 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



Although over the last 10 years there have been no exceedences of the annual mean NO₂ objective of 40 µg/m³, in the years 2007-2009 there was a year on year increase on NO₂ levels. However, in 2010 levels began to fall at all sites and in 2011 this trend continued at 5 out of the 8 sites. In 2012 the same 5 sites have continued to see a decrease in levels with another 2 also seeing a decrease since 2011.

2013 has seen a continued decrease in 5 of the sites with a slight increase in 3 sites.

The overall trend is a reduction in levels in the last number of years

There have been no exceedences of 60 µg/m³. (This would indicate a risk that the 1-hour objective may also be exceeded.)

2.2 Summary of Compliance with AQS Objectives

Larne Borough Council has examined the results from monitoring in the. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

Larne Borough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Larne Borough Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Conclusions and Proposed Actions

4.1 Conclusions from New Monitoring Data

The assessment has indicated that there are no exceedences for Nitrogen Dioxide identified within the borough and the Air Quality objectives are being met.

4.2 Conclusions relating to New Local Developments

No new local developments were identified

4.3 Proposed Actions

The progress report has identified that no Detailed Assessment is required for Nitrogen Dioxide however monitoring will continue into 2014.

A further progress report will be submitted in April 2015.



5 References

The Environment (Northern Ireland) Order 2002

Air Quality Regulations (Northern Ireland) 2003

Larne Borough Council First Stage Review and Assessment of Air Quality 2001

Air Quality Review and Assessment Stage 2 AEA/ENV/R/1010

Local Air Quality Management Technical Guidance LAQM.TG (09)

Appendices

Appendix A – Diffusion Tube Locations



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Appendix B: NO₂ Diffusion Tube Monitoring Results

	Average Monthly NO ₂ Concentration (µg/m ³)							
	Location							
Month and Year	Antiville Rd/A8 (Grid Ref 3864 0212)	Riverdale (Grid Ref 3968 0249)	Main Street (Grid Ref 4016 0260)	Victoria Rd/Agnew Street (Grid Ref 4033 0285)	Upper Cairncastle Road (Grid Ref 3920 0323)	Larne Harbour Roundabout (Grid Ref 4123 0196)	Coastguard Road (Grid Ref 4131 0171)	Ballylumford Road (Grid Ref 4206 0203)
January 2005	18	15	17	22	17	20	15	-
February 2005	22	20	20	29	18	14	13	14
March 2005	20	15	24	16	12	6	8	10
April 2005	14	19	19	19	19	19	12	16
May 2005	18	26	28	24	18	24	21	20
June 2005	35	39	29	33	25	27	21	20
July 2005	18	14	17	23	14	11	13	20
August 2005	13	11	-	22	8	-	13	16
September 2005	21	14	14	31	12	19	8	13
October 2005	16	14	16	24	23	14	46	13
November 2005	4	12	17	20	18	16	11	9
December 2005	24	17	36	29	24	24	16	17
January 2006	29	27	28	62	22	16	12	18
February 2006	22	15	15	20	21	25	12	14
March 2006	11	12	8	15	9	12	6	5
April 2006	16	16	10	19	11	12	9	6
May 2006	22	14	21	25	15	16	16	13
June 2006	21	-	28	19	13	14	8	-
July 2006	19	-	20	25	19	16	13	9
August 2006	16	14	19	20	14	19	12	14

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Month and Year	Average Monthly NO ₂ Concentration (µg/m ³)							
	Location							
	Antiville Rd/A8 (Grid Ref 3864 0212)	Riverdale (Grid Ref 3968 0249)	Main Street (Grid Ref 4016 0260)	Victoria Rd/Agnew Street (Grid Ref 4033 0285)	Upper Cairncastle Road (Grid Ref 3920 0323)	Larne Harbour Roundabout (Grid Ref 4123 0196)	Coastguard Road (Grid Ref 4131 0171)	Ballylumford Road (Grid Ref 4206 0203)
September 2006	22	14	23	28	24	19	9	13
October 2006	19	15	16	19	6	7	11	13
November 2006	17	15	26	28	6	15	35	17
December 2006	29	22	19	25	25	16	9	10
January 2007	21	13	23	24	15	20	8	20
February 2007	37	23	29	24	18	21	11	15
March 2007								
April 2007	21	16	16	9	15	13	20	11
May 2007	-	11	19	13	14	13	10	9
June 2007	61	15	7	-	6	17	13	8
July 2007	14	14	-	25	9	18	11	11
August 2007	17	14	29	26	8	19	12	8
September 2007	24	14	-	26	14	20	13	13
October 2007	28	19	33	-	11	25	15	10
November 2007	26	19	-	30	21	22	14	23
December 2007	38	26	34	-	34	27	16	25

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		Average Monthly NO ₂ Concentration ((µg/m ³))							
Month and Year		Location							
		Antiville Rd/A8 (Grid Ref 3864 0212)	Riverdale (Grid Ref 3968 0249)	Main Street (Grid Ref 4016 0260)	Victoria Rd/Agnew Street (Grid Ref 4033 0285)	Upper Cairncastle Road (Grid Ref 3920 0323)	Larne Harbour Roundabout (Grid Ref 4123 0196)	Coastguard Road (Grid Ref 4131 0171)	Ballylumford Road (Grid Ref 4206 0203)
January 2008		34	44	31	40	25	42	21	20
February 2008		31	21	31	37	32	23	18	19
March 2008		30	16	29	33	20	21	10	22
April 2008		26	20	32	32	23	28	14	14
May 2008		32	24	37	37	35	31	27	13
June 2008		25	17	27	32	17	17	14	19
July 2008		24	15	25	11	19	23	13	14
August 2008		27	19	30	33	21	20	9	12
September 2008		33	26	28	43	23	26	15	19
October 2008		33	14	24	38	19	22	10	17
November 2008		25	17	-	31	21	24	14	26
December 2008		42	29	38	41	33	30	14	25
January 2009		53	29	36	43	43	36	22	29
February 2009		45	27	43	55	32	31	18	26
March 2009		36	14	31	37	27	24	12	25
April 2009		36	26	40	40	37	-	18	18
May 2009		34	20	-	38	23	31	13	14
June 2009		-	29	30	-	-	30	28	17
July 2009		2	-	26	-	22	28	12	15
August 2009		-	19	26	-	24	28	11	15
September 2009		46	29	40	6	64	-	20	29
October 2009		24	32	28	79	27	35	14	21
November 2009		37	24	30	40	30	24	13	22
December 2009		44	35	44	46	35	38	24	27

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		Average Monthly NO ₂ Concentration ((µg/m ³))							
Month and Year		Location							
		Antiville Rd/A8 (Grid Ref 3864 0212)	Riverdale (Grid Ref 3968 0249)	Main Street (Grid Ref 4016 0260)	Victoria Rd/Agnew Street (Grid Ref 4033 0285)	Upper Cairncastle Road (Grid Ref 3920 0323)	Larne Harbour Roundabout (Grid Ref 4123 0196)	Coastguard Road (Grid Ref 4131 0171)	Ballylumford Road (Grid Ref 4206 0203)
January 2010		42	55	42	46	33	31	21	27
February 2010		37.71	41.32	46.75	47.06	39.82	44.64	30.77	22.32
March 2010		46.99	29.76	46.68	50.13	33.52	30.08	19.11	29.76
April 2010		34.08	30.87	32.33	43.98	23.59	27.67	23.88	19.19
May 2010		30.40	21.15	28.75	26.70	24.85	22.59	16.64	15.81
June 2010		21.88	13.44	23.80	29.94	16.89	13.82	13.44	9.60
July 2010		32.34	18.58	28.72	37.64	22.68	-	11.58	16.17
August 2010		25.34	11.89	22.84	30.66	14.70	10.64	11.57	16.89
September 2010		30.5	21.7	26.4	40.5	25.4	27.1	13.1	20.1
October 2010		35.4	26.3	29.1	41.8	26.1	25.6	15.1	17.3
November 2010		33	28.6	30.5	36.8	22.4	28.4	19.6	14.5
December 2010		39.8	37.2	46.9	45.1	30.2	29	24.8	22.5
January 2011		42.9	31.8	-	41.1	33.5	29.8	18	19.5
February 2011		51.5	43.9	-	50.2	29.1	46.6	20	22.9
March 2011		42.7	27.5	39.2	43.2	32.6	27.8	17.2	14.1
April 2011		39.3	26.4	37.2	40.1	30.8	30.9	15.7	14.6
May 2011		23	15.4	20.7	31.2	19.8	16.6	7.5	-
June 2011		28.7	17.6	28.8	34.8	22.4	20.6	11.9	14.2
July 2011		19	14.4	23.1	-	19.6	16.4	11.2	9.3
August 2011		-	16	28.2	35	21.5	17.1	11.5	-

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Average Monthly NO ₂ Concentration ((µg/m ³))								
Month and Year	Location							
	Antville Rd/A8 (Grid Ref 3864 0212)	Riverdale (Grid Ref 3968 0249)	Main Street (Grid Ref 4016 0260)	Victoria Rd/Agnew Street (Grid Ref 4033 0285)	Upper Cairncastle Road (Grid Ref 3920 0323)	Larne Harbour Roundabout (Grid Ref 4123 0196)	Coastguard Road (Grid Ref 4131 0171)	Ballylumford Road (Grid Ref 4206 0203)
September 2011	-	15.7	20.9	38.4	22.9	22.4	7.9	10.4
October 2011	-	23.6	27.7	44.8	25.5	-	10.9	13.4
November 2011	-	24.9	32.9	48.8	38.7	15.3	27.9	21.6
December 2011	28.4	-	32.1	31.4	18.5	-	-	19.1
January 2012	29.7	24	39.3	46.9	18.1	29.8	3	22.5
February 2012	38.5	22.3	31	41.8	26.8	24.5	13.4	19.2
March 2012	34.7	23.6	35.2	-	34.6	24.7	15.4	15.2
April 2012	22.8	14.2	24.7	-	19.8	19.3	13.7	13.4
May 2012	27.4	16	25.6	-	17.9	18.7	17.9	9.7
June 2012	25.2	18.3	28.8	-	22.8	18.1	12.8	8.5
July 2012	-	12.2	24	-	19	13.8	11.2	9.6
August 2012	26.7	18.3	23.2	-	30.2	20.4	12.4	-
September 2012	23.6	13.1	16	-	23.4	16.1	10.1	11.6
October 2012	27.9	19.7	36.6	-	26.9	22	12.5	12.7
November 2012	23.8	17.1	27	-	32.4	19.8	8.7	11.3
December 2012	42.1	26.1	43.5	-	40.8	28.2	20.5	19
January 2013	29.7	20	30.7	-	30.3	24.7	10.4	15.7
February 2013	34.8	26	31.1	-	40.2	30	17.4	19.1
March 2013	33.8	22.4	28.2	-	30.8	13.5	24	11.9
April 2013	26.4	18.2	26.9	-	27.2	-	11.5	-
May 2013	19	11.2	22.8	-	-	-	8.7	8.8
June 2013	24.3	16.2	25.5	29.6	23	19.5	13.4	10.7

Larne Borough Council

Average Monthly NO ₂ Concentration (µg/m ³)	
Month and Year	Location
	Antiville Rd/A8 (Grid Ref 3864 0212) Riverdale (Grid Ref 3968 0249) Main Street (Grid Ref 4016 0260) Victoria Rd/Agnew Street (Grid Ref 4033 0285) Upper Cairncastle Road (Grid Ref 3920 0323) Larne Harbour Roundabout (Grid Ref 4123 0196) Coastguard Road (Grid Ref 4131 0171) Ballylumford Road (Grid Ref 4206 0203)
July 2013	24.8 16.3 23.5 27.4 21.3 19.8 13.5 8.8
August 2013	22.8 14.5 23.5 33.3 24.4 17.9 10.4 10.4
September 2013	26.8 14.1 28.6 34.7 23 19.4 11.1 14.4
October 2013	33.4 20.7 26.8 34.8 33.4 27.2 14.6 12.8
November 2013	26.6 19.6 38.2 38.9 - 21.2 11.4 16.2
December 2013	33.3 17.8 23.8 38.1 24.6 23.7 10.9 16.2

NB Lambeth Scientific Services collected and analysed the data from January 2008 to March 2008. A new contract started with Bureau Veritas (Now ESG) in April 2008

Appendix C: Short-term to Long-term Data adjustment

Adjustment Factor for Victoria Road/Old Glenarm Road Data (L4)

Site	Annual Mean	Period Mean	Ratio
Belfast	31.3	33	0.948
Londonderry	14	14.4	0.972
		Average	0.96

Appendix D - QA/QC of Diffusion tube Monitoring

Table 1: Laboratory summary performance for WASP NO₂ PT rounds 115 - 122

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent HSL WASP NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be satisfactory based upon a z-score of $\leq \pm 2$ as defined above.

WASP Round	WASP R115	WASP R116	WASP R117	WASP R118	WASP R119	WASP R120	WASP R121	WASP R122
Round conducted in the period	October - December 2011	January - March 2012	April - June 2012	July - September 2012	October - December 2012	January - March 2013	April - June 2013	July - September 2013
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Bristol City Council [4]	100 %	-	-	-	-	-	-	-
Cardiff Scientific Services	75 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Edinburgh Scientific Services	0 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Environmental Services Group, Didcot (formerly Bureau Veritas Laboratories, Glasgow and Harwell Scientifics) [1] [2]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Exova (formerly Clyde Analytical)	75 %	0 %	0 %	100 %	25 %	75 %	NR [5]	NR [5]
Glasgow Scientific Services	100 %	100 %	50 %	100 %	100 %	50 %	25 %	100 %
Gradko International [2]	37.5 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	75 %	75 %	100 %	75 %	100 %	50 %	75 %	100 %
Kirklees MBC	50 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
Lambeth Scientific Services	25 %	75 %	100 %	0 %	100 %	100 %	0 %	50 %
Milton Keynes Council	100 %	100 %	100 %	75 %	100 %	50 %	100 %	75 %
Northampton Borough Council	100 %	100 %	100 %	100 %	100 %	0 %	100 %	100 %
Somerset Scientific Services [3]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	75 %	100 %	50 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %
West Yorkshire Analytical Services	100 %	75 %	75 %	50 %	100 %	100 %	100 %	50 %

[1] Bureau Veritas laboratory and Harwell Scientific now part of ESG Group.

[2] Participant subscribes to two sets of test samples (2 x 4 test samples) in each WASP PT round.

[3] New participant from R115.

[4] No longer involved in NO₂ diffusion tube measurements from R116.

[5] Not reported before round deadline

Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies, by Laboratory

ESG Didcot, 50% TEA in Acetone

[illegible]

Larne Borough Council

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/14

ESG Didcot	50% TEA in acetone	2013	Overall Factor ³ (28 studies)	Use 0.80
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