2012 Air Quality Updating and Screening Assessment for *Newtownabbey Borough Council*

In fulfillment of Environment (Northern Ireland) Order 2002
Local Air Quality Management

April, 2012

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Executive Summary

This report follows Guidance LAQM.TG(09) issued by DEFRA and intends to identify any significant changes that have occurred since the previous stage of Review and Assessment which may have the potential to affect the localised air quality.

The findings of this assessment would indicate the following:

AQMA 2, Ballyclare

Results of Automatic Monitoring for nitrogen dioxide showed an annual mean concentration of 33µg/m^3 and diffusion tube monitoring results were 27 and 28µg/m^3 all of which were below the annual mean objective of 40µg/m^3. Newtownabbey Borough Council ceased automatic monitoring at this site at the end of March 2012 and proposes to revoke the AQMA.

AQMA 3, Antrim Road, Elmfield

Results of Automatic Monitoring for nitrogen dioxide showed an annual mean concentration of 43 µg/m^3 which has continued to steadily decrease from the previous years. Results of diffusion tube monitoring on the façade of the relevant locations were below the annual mean objective. Newtownabbey Borough Council will continue to monitor and implement Action Plan measures in this AQMA.

AQMA 4 Sandyknowes, Mallusk

Results of Automatic Monitoring for nitrogen dioxide showed an annual mean concentration of 31µg/m^3. There was an exceedance (41µg/m^3) of the annual mean objective at one diffusion tube location however this is located 7m from the relevant location. All other monitoring results were below the annual mean objective of 40µg/m^3. Newtownabbey Borough Council ceased automatic monitoring at this site at the end of March 2012 and proposes to revoke the AQMA.

A Detailed Assessment to justify revocation of AQMA's 2 and 4 is contained in Appendix E

This report has not identified any new sources with relevant exposure therefore it is not considered necessary to proceed to a Detailed Assessment based on potential sources.

Newtownabbey Borough Council will be submitting its next Progress Report in April 2013.

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1 Introduction

1.1 Description of Local Authority Area

Newtownabbey is situated on the shore of Belfast Lough reaching north from the City of Belfast and stretching up towards the Glens of Antrim. The Council area is 54 square miles and is bound to the west by Antrim Borough Council, to the north by Larne Borough Council, to the east by Carrickfergus Borough Council and to the south by Belfast City Council.

Newtownabbey Borough Council has a population of approximately 80,000 and is the fifth highest Borough population within Northern Ireland.

The majority of the population of the Borough is in the developed urban area stretching out from Glengormley to include Whiteabbey, Mossley, Monkstown and Mallusk and Ballyclare. There are a number of rural villages including Ballynure, Ballyrobert, Ballyeaston, Doagh and Straid, all of which lie within the commuter belt of Belfast.

The Borough is a prime business location with large industrial centres at Mallusk, Hydepark and Monkstown. Newtownabbey's proximity to Northern Ireland's ports and airports makes these industrial parks an ideal place to locate. The port of Larne, Belfast International Airport and Belfast City Airport are within 30 minutes drive and the area is also well served by major roads linking it to the rest of the province. The Borough is well provided for in terms of major retail outlets and shopping centres at Abbeycentre and Northcott.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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 LAQM 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

Report Type	Date	Exceedances	AQMA's Declared/Revoked
Stage 1 Review and Assessment of Air Quality	Mar 2001	None	No
Stage 2/3 Review and Assessment of Air Quality	Aug 2004	Yes PM10	PM10 for Ballyclare Declared
Stage 3 Domestic Fuel Combustion (PM10) Stage 4 Air Quality Review and Assessment PM10	Aug 2004	Yes	
Declaration of AQMA for PM10 Ballyclare	Oct 2004		
Progress Report	Apr 2005	None	
Updating and Screening Assessment	May 2006	None	PM10 Ballyclare Revoked
Revocation of AQMA for PM10	Nov 2006		
Air Quality Progress Report	Aug 2007	Yes Nitrogen Dioxide	3 Declared for Ballyclare Antrim Road, Elmfield Sandyknowes
Declaration of 3 Air Quality Management Areas for Nitrogen Dioxide	Jan 2008		
Air Quality Progress Report	Aug 2008	Yes Nitrogen Dioxide	
Air Quality Detailed Assessment Nitrogen Dioxide	Apr 2009		
Amendment of AQMA, Antrim Road, Elmfield	Jun 2009		
Updating & Screening Assessment	Aug 2009	1. Exceedances of annual mean and 1 hour objective at Antrim Road, Elmfield;	

		2. No exceedances at Ballyclare or Sandyknowes	
Progress Report	Sep 2010	1. Exceedances of annual mean and 1 hour objective at Antrim Road, Elmfield; 2. No exceedances at Ballyclare or Sandyknowes	
Action Plan for Antrim Road, Elmfield	Mar 2011		
Progress Report	Jun 2011	1. Exceedances of annual mean and 1 hour objective at Antrim Road, Elmfield; 2. No exceedances at Ballyclare or Sandyknowes	

Map of AQMA Boundaries (Appendix B Figure 1-1, Figure 1-2, Figure 1-3, Figure 1-4)

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Newtownabbey Borough Council has 3 automatic monitoring stations. The locations of the automatic continuous monitoring stations are included in Table 2.1 and the maps are included in Appendix C

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?
Sandyknowes	Roadside	330542 383012	NO_2	N	N	4m	N
Ballyclare, Main St	Roadside	328851 391134	NO_2	Y	Y (5m)	0.5m	Y
Antrim Road	Roadside	332305 381697	NO_2	Y	Y (1m)	3m	Y

- **Sandyknowes**

This monitor has been located here since 2003. It is located as close to the AQMA as possible as previous attempts to relocate it closer to the relevant locations in the AQMA have failed due to legal reasons. It has ceased operation on 31 March 2012 based on continuous results being below the air quality objective level.

- **Main Street Ballyclare**

This monitor has been located here since January 2008. It has ceased operation on 31 March 2012 based on continuous results being below the air quality objective level.

- **Antrim Road, Elmfield**

This monitor has been located here since January 2008. In January 2010 on advice from Review and Assessment Helpdesk we moved the sample inlet to 1m from the façade of the relevant location.

2.1.2 Non-Automatic Monitoring Sites

Newtownabbey Borough Council operates a network of 21 nitrogen dioxide diffusion tubes across the Borough.

The diffusion tubes are exposed for a 4-5 week period and further site specific details on these tube locations are provided in Table 2.2 and Appendix C.

In January 2011 Sites 57 & 12, located at 7 Sandyholme Way were relocated from the façade of the relevant location to the motorway side of the fence which is approximately 5m from the relevant location.

The tube data is presented in Table 2.5 with exceedances of the 40 $\mu g/m^3$ annual mean NO_2 highlighted in bold.

In 2011 the diffusion tubes were analysed by Gradko Services using 20% triethylamine in water.

QA/QC details which include the bias adjustment factor for 2011 is reported in Appendix A

Table 2.2 Details of Non-Automatic Monitoring Sites

Site Name	Site Type	X & Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Site 1 Main Street, Ballyclare	Roadside	328854 391134	NO_2	Y	N	Y (located on property)	2m	Y
Site 59 Main Street, Ballyclare	Roadside	328854 391134	NO_2	Y	N	Y (located on property)	2m	Y
Site 57 7 Sandyholme Way	Roadside	330514 382939	NO_2	Y	N	Y (5m)	9m	N
Site 12 7 Sandyholme Way	Roadside	330514 382939	NO_2	Y	N	Y (5m)	9m	N
Site 8 Braden Heights, Rathcoole	Urban Background	333898 381926	NO_2	N	N	Y (5m)	n/a	N
Site 11 44 Sandyknowes Avenue	Roadside	330675 382586	NO_2	N	N	Y (7m)	7m	N
Site 16 Doagh Village	Roadside	326136 383539	NO_2	N	N	Y (8m)	1m	N
Site 20 A8/Motorway at Sandyknowes	Roadside	330499 383141	NO_2	N	N	Y (located on property)	20m	Y
Site 36 NOx Analyser Antrim Road, Sandyknowes	Roadside	330545 383011	NO_2	N	Y	N	n/a	N

Site Name	Site Type	X & Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Site 37 NOx Analyser Antrim Road, Sandyknowes	Roadside	330545 383011	NO_2	N	Y	N	n/a	N
Site 38 NOx Analyser Antrim Road, Sandyknowes	Roadside	330545 383011	NO_2	N	Y	N	n/a	N
Site 46 12 Collinbridge Road	Roadside	332193 381666	NO_2	N	N	Y (located on property)	9m	Y
Site 47 13 Sandyholme Park	Roadside	330554 382848	NO_2	Y	N	Y (7m)	7m	N
Site 48 24 Sandyknowes Avenue	Roadside	330631 382729	NO_2	N	N	Y (located on property)	17m	Y
Site 49 6 Sandyknowes Gardens	Urban Background	330641 382771	NO_2	N	N	Y (located on property)	55m	Y
Site 50 45 Burney's Lane	Roadside	331025 382224	NO_2	N	N	Y (located on property)	17m	Y
Site 51 196 Shore Road	Roadside	334758 380501	NO_2	N	N	Y (located on property)	6m	Y
Site 56 5 Sandyholme Park	Roadside	330589 382908	NO_2	N	N	Y (7m)	68m	N
Site 58 Lamp-post,	Roadside	332305 381697	NO_2	Y	N	Y (3m)	1m	N

Site Name	Site Type	X & Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
198 Antrim Road ,Elmfield								
Site 60 196 Antrim Road	Roadside	332305 381697	NO_2	Y	N	Y (located on Property	3m	Y
Site 61 196 Antrim Road	Roadside	332305 381697	NO_2	Y	N	Y (located on property)	3m	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Table 2.3 provides all nitrogen dioxide continuous monitoring data collected since 2007 and Table 2.4 compares the results with the 1 hour Mean Objective.

Exceedances of the 40 µg/m^3 annual mean nitrogen dioxide objective and cases where there are more than the permitted 18 exceedances of the 200 µg/m^3 1-hour mean nitrogen dioxide objective are highlighted in bold.

Figure 2.3 shows the Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Automatic Monitoring Sites. This shows that there has been a decrease in concentrations at all sites since 2007 with the exception of 2010, which was an exceptional year of extremely cold weather which had an impact on monitoring throughout Northern Ireland.

Statistical Summary Reports for the Automatic Monitoring Sites (Appendix A)

First table – Air Quality Statistics

The top four lines show the duration within the bands of the new Daily Air Quality Index (DAQI). This was introduced by Defra on 1st January 2012. There were 7 occasions in the Moderate band for Antrim Road and 6 for Sandyknowes. There were no measurements in the High and Very High bands. The annual data captures (bottom line) were very satisfactory with 94.7% at Antrim Road, 96.9% at Ballyclare Main St and 96.0% at Sandyknowes. This compares well with the 90% target.

Second table – Air Quality Exceedences.

The NO2 annual mean air quality standard (40 µg m^{-3}) was only exceeded at Antrim Road (43 µg m^{-3}). The annual means at the other sites were considerably lower. There were 7 exceedences on 5 days of the hourly mean standard (200 µg m^{-3}) at

Antrim Road. Sandyknowes had 6 exceedences on 4 days. The annual allowance is 18 hours so the hourly mean standard was not breached at these sites.

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

Site ID	Site Type	Within AQMA?	Valid Data Capture 2011 % [b]	Annual Mean Concentration µg/m^3				
				2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
Sandyknowes, Mallusk	Roadside	N	96	34	35	33	38	31
Ballyclare, Main St	Roadside	Y	96.9	N/A	37	34	40	33
Antrim Rd, Elmfield		Y	94.7	N/A	**56**	**68**	**46**	**43**

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

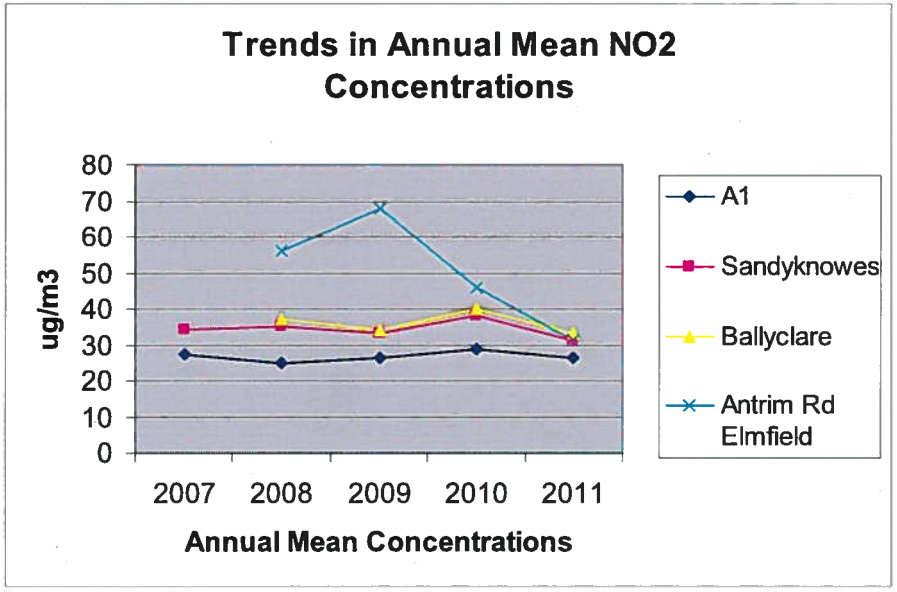


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Within AQMA?	Valid Data Capture 2011 % [b]	Number of Exceedences of Hourly Mean (200 µg/m^3)				
			2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
Sandyknowes, Mallusk	N	96		15	7	**29**	6
Ballyclare, Main St	Y	96.9		0	1	2	0
Antrim Rd, Elmfield	Y	94.7		**55**	11	3	7

Diffusion Tube Monitoring Data

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2011 (full monthly data sets are in Appendix D)

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (local Bias Adjustment factor = 0.92) 2011 ($\mu g/m^3$)
Site 1	Main Street, Ballyclare	Roadside	Y	Collocated	12 months		N	27
Site 59	Main Street, Ballyclare	Roadside	Y	Collocated	12 months		N	28
Site 57	7 Sandyholme Way	Roadside	Y	Collocated	12 months		N	40
Site 12	7 Sandyholme Way	Roadside	Y	Collocated	12 months		N	40
Site 8	Braden Heights, Rathcoole	Urban Background	N		12 months		N	16
Site 11	44 Sandyknowes Avenue	Roadside	N		12 months		N	37
Site 16	Doagh Village	Roadside	N		12 months		N	26
Site 20	A8/Motorway at Sandyknowes	Roadside	N		12 months		N	29
Site 36	NOx Analyser Antrim Road, Sandyknowes	Roadside	N	Triplicate and Collocated	12 months		N	31
Site 37	NOx Analyser Antrim Road, Sandyknowes	Roadside	N	Triplicate and Collocated	12 months		N	33

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (local Bias Adjustment factor = 0.92) 2011 (µg/m^3)
Site 38	NOx Analyser Antrim Road, Sandyknowes	Roadside	N	Triplicate and Collocated	12 months		N	32
Site 46	12 Collinbridge Road	Roadside	N		11 months		N	36
Site 47	13 Sandyholme Park	Roadside	Y		12 months		N	**41**
Site 48	24 Sandyknowes Avenue	Roadside	N		12 months		N	35
Site 49	6 Sandyknowes Gardens	Urban Background	N		12 months		N	27
Site 50	45 Burney's Lane	Roadside	N		12 months		N	37
Site 51	196 Shore Road	Roadside	N		12 months		N	32
Site 56	5 Sandyholme Park	Roadside	N		12 months		N	30
Site 58	**Lamp-post, 198 Antrim Road ,Elmfield**	**Roadside**	**Y**		**12 months**		**N**	**48**
Site 60	196 Antrim Road	Roadside	Y	Collocated	12 months		N	39
Site 61	196 Antrim Road	Roadside	Y	Collocated	12 months		N	38

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2007* (Bias Adjustment Factor = 0.89)	2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)
Site 1 Main Street, Ballyclare	Roadside	Y	32	30	29	32	27
Site 59 Main Street, Ballyclare	Roadside	Y	29	28	29	31	28
Site 57 7 Sandyholme Way	Roadside	Y	39	37	37	40	40
Site 12 7 Sandyholme Way	Roadside	Y	37	36	38	40	40
Site 8 Braden Heights, Rathcoole	Urban Background	N	21	16	17	19	16
Site 11 44 Sandyknowes Avenue	Roadside	N	37	32	35	**41**	37
Site 16 Doagh Village	Roadside	N	26	27	28	31	26

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2007* (Bias Adjustment Factor = 0.89)	2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)
Site 20 A8/Motorway at Sandyknowes	Roadside	N	31	25	25	32	29
Site 36 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	37	34	28	37	31
Site 37 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	39	34	33	37	33
Site 38 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	36	34	32	36	32
Site 46 12 Collinbridge Road	Roadside	N	35	34	37	37	36
Site 47 13 Sandyholme Park	Roadside	Y	**45**	37	39	**47**	**41**
Site 48 24 Sandyknowes Avenue	Roadside	N	31	28	29	35	35
Site 49 6 Sandyknowes Gardens	Urban Background	N	27	24	26	31	27

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2007* (Bias Adjustment Factor = 0.89)	2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)
Site 50 45 Burney's Lane	Roadside	N	31	29	32	36	37
Site 51 196 Shore Road	Roadside	N	32	30	31	34	32
Site 56 5 Sandyholme Park	Roadside	N	32	27	27	32	30
Site 58 Lamp-post, 198 Antrim Road ,Elmfield	Roadside	Y	**45**	**45**	**47**	**47**	**48**
Site 60 196 Antrim Road	Roadside	Y	31	29	32	**42**	39
Site 61 196 Antrim Road	Roadside	Y	32	30	31	**41**	38

2.2.2 PM_{10}

Newtownabbey Borough Council does not carry out PM10 Monitoring.

2.2.3 Sulphur Dioxide

Newtownabbey Borough Council does not carry out Sulphur Dioxide Monitoring.

2.2.4 Benzene

Newtownabbey Borough Council does not carry out Benzene Monitoring.

2.2.5 Summary of Compliance with AQS Objectives

Newtownabbey Borough Council has examined the results from monitoring in the Newtownabbey Borough Council area. Concentrations are below the objectives in AQMA 2, Ballyclare, AQMA 4 Sandyknowes, therefore there is no need to proceed to a Detailed Assessment and these two areas will be revoked.

Newtownabbey Borough Council has examined the results from monitoring in the Newtownabbey Borough Council area. Concentrations outside of the AQMAs are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

Newtownabbey Borough Council has measured concentrations of Nitrogen Dioxide above the annual mean in AQMA 3, Antrim Road, Elmfield. An Action Plan has already been produced for this and monitoring will continue at this site.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Newtownabbey 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

Newtownabbey 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.

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

3.4 Junctions

Newtownabbey 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

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

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

Newtownabbey Borough Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Newtownabbey Borough Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Newtownabbey 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

Newtownabbey 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)

Newtownabbey 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

Newtownabbey 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

Newtownabbey 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

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

5.3 Petrol Stations

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

5.4 Poultry Farms

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Newtownabbey Borough Council confirms that there are no biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

Newtownabbey Borough Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Newtownabbey Borough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Newtownabbey Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

AQMA 2, Main Street, Ballyclare

The Nitrogen Dioxide Analyser is sited 5m from the relevant location in the AQMA 2, Ballyclare.

Results of Automatic Monitoring Data for Nitrogen Dioxide in 2011 showed an annual mean concentration of 33µg/m$^{3.}$ This result is consistent with the previous 3 years results, with the exception of 2010, which was increased due to the extreme cold weather conditions experienced in January and December 2010, which produced very still air.

Nitrogen dioxide diffusion tubes 1 and 59 are located on the façade of the relevant location in Ballyclare AQMA. Results from these diffusion tubes for 2011 showed annual means of 27 and 28 µg/m^3 respectively and again are consistent with the previous four year's results.

As a result of diffusion tube monitoring results and automatic monitoring results from 2007 showing levels of nitrogen dioxide well below the annual mean objective of 40 µg/m^3 we ceased automatic monitoring at this site at the end of March 2012 and we propose revoking the AQMA.

AQMA 3, Antrim Road, Elmfield

The Nitrogen Dioxide Analyser inlet was relocated in January 2010 and is now located 1m from the relevant location in AQMA 3 Antrim Road, Elmfield and 3m from the roadside.

Results of Automatic Monitoring for nitrogen dioxide in 2011 showed an annual mean concentration of 43 $\mu g/m^3$ which has continued to steadily decrease from the previous years. There were only 7 exceedances of the 1 hour objective.

Diffusion tube 58 is located on a lamp post adjacent to the road, within 3m from the relevant location, and showed an exceedance of the annual mean concentration with a result of 48 $\mu g/m^3$.

Diffusion tubes 60 and 61 are located on the façade of the relevant location and they showed an annual mean concentration of 39 and 38 $\mu g/m^3$ respectively, both of which were below the annual mean objective.

It is interesting to note the levels from the roadside (Tube 58) to the façade (Tubes 60 & 61) drop by 9 $\mu g/m^3$ over a distance of 3m.

Even though the measurements on the façade of the relevant location are below the annual mean objective Newtownabbey Borough Council will continue to progress the Action Plan measures during 2012.

AQMA 4 Sandyknowes, Mallusk

The Nitrogen Dioxide Analyser is located outside the AQMA in Sandyknowes. Attempts were made in 2010 to locate the analyser to the garden of the relevant location but due to legal complications this was not able to proceed.

Results of Automatic Monitoring Data for nitrogen dioxide showed an annual mean concentration of 31 $\mu g/m^3$ in 2011. There were only 6 exceedances of the 1 hour objective.

In January 2011, diffusion tubes 57 and 12 were relocated from the façade of the relevant location in the AQMA to the motorway side of the fence which is 5m from the relevant location on the request of the householder. Moving the tubes closer to the motorway resulted in an increase in the annual mean concentration at both sites to

40 µg/m^3 . Prior to this movement the air quality objective was met on previous years.

Diffusion tube 11 is located within 7m of the relevant location and the annual mean concentration in 2011 was 37 µg/m^3 which is consistent with previous year's results.

Diffusion tube 47 had an annual mean concentration of 41µg/m^3 however this tube is located 7m from the relevant location.

Diffusion tube 48 is a background tube located on the façade of a relevant location, 17m from the motorway and it had an annual mean concentration of 35 µg/m^3

As a result of the continued automatic monitoring results being below the annual mean objective and the fact that the monitor is located outside the AQMA we ceased automatic monitoring at this site at the end of March 2012.

As a result of the diffusion tube results above which are consistent with previous year's monitoring results we propose to revoke this AQMA.

Other monitoring results

Monitoring results at the following sites: 1, 59, 16, 20, 36, 37, 38, 51, 56 have been below the annual mean objective since 2007.

8.2 Conclusions from Assessment of Sources

No new sources with relevant exposure have been identified through this Update and Screening Assessment. It is therefore not considered necessary to proceed to a 'Detailed Assessment' based on potential sources.

8.3 Proposed Actions

- AQMA 2, Main Street, Ballyclare

  Revoke AQMA

- AQMA 3, Antrim Road, Elmfield

  Continue monitoring and implement Action Plan Measures

- AQMA 4 Sandyknowes

  Revoke AQMA

- Review Diffusion Tube results outside AQMA's and cease monitoring at the following sites: 1, 59, 16, 20, 36, 37, 38, 51, 56

- Submit Progress Report 2013

9 References

Local Air Quality Management Technical Guidance TG(09)

Newtownabbey Borough Council Progress Report 2011

Newtownabbey Borough Council USA 2009

Appendices

Appendix A QA/QC Data

Appendix B Locations of Air Quality Management Areas

Appendix C Locations of Monitoring Sites

Appendix D Monthly Diffusion Tube Results

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion Tube Monitoring

In 2011 the diffusion tubes were analysed by Gradko Services using 20% TEA in water.

The laboratory bias correction factor was calculated using the diffusion tube spreadsheet tool. This diffusion tube spreadsheet tool is published by Air Quality Consultants Ltd on behalf of DEFRA, the Welsh Assembly Government, the Scottish Executive and the Department of the Environment Northern Ireland and it is available on the UWE website.

The bias adjustment factor of 0.89 was calculated from 26 studies from Gradko Services for 2011 using the diffusion tube spreadsheet tool, for the diffusion tubes study.

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/12

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2012

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If the laboratory is not shown, we have no data for this laboratory

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.

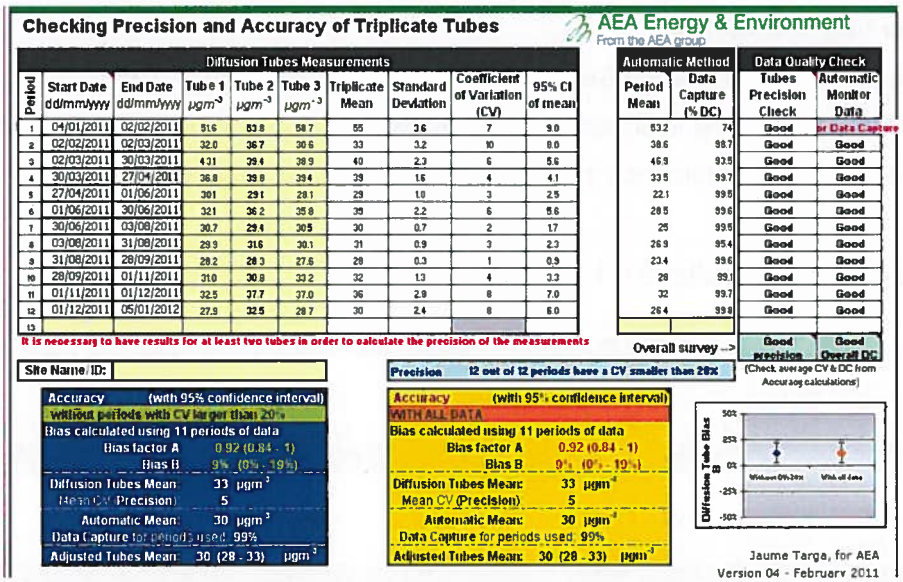
If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2011	R	Boston Borough Council	11	57	36	59.6%	P	**0.63**
Gradko	20% TEA in water	2011	UB	Luton Borough Council	11	39	35	11.1%	G	**0.90**
Gradko	20% TEA in water	2011	R	Exeter City Council	11	37	33	15.1%	S	**0.87**
Gradko	20% TEA in water	2011	UB	Belfast City Council	12	36	29	23.5%	G	**0.81**
Gradko	20% TEA in water	2011	R	Bromsgrove District Council (Wo	10	56	53	6.0%	G	**0.94**
Gradko	20% TEA in water	2011	R	Monmouthshire County Council	11	47	40	17.9%	S	**0.85**
Gradko	20% TEA in water	2011	K	New Forest District Council	10	49	42	16.7%	G	**0.86**
Gradko	20% TEA in water	2011	R	New Forest District Council	12	34	26	29.9%	G	**0.77**
Gradko	20% TEA in water	2011	R	Fareham Borough Council	12	39	33	17.4%	G	**0.85**
Gradko	20% TEA in water	2011	R	Rushcliffe BC	11	35	39	-9.5%	G	**1.10**
Gradko	20% TEA in Water	2011	R	Carlisle City Council	12	35	28	24.8%	G	**0.80**
Gradko	20% TEA in Water	2011	O	North Warwickshire Borough Co	12	48	39	23.0%	G	**0.81**
Gradko	20% TEA in water	2011	R	Wokingham Borough Council	11	41	38	8.6%	G	**0.92**
Gradko	20% TEA in water	2011	Overall Factor (26 studies)					Use		**0.89**

Factor from Local Co-location Studies

A local co-location study was carried out at Sandyknowes, Mallusk. A bias adjustment factor of 0.92 was calculated from the diffusion tubes co-located within the Sandyknowes site using the

AEA Energy and Environments "Spreadsheet for calculating Precision, Accuracy and Bias Adjustment factors of Diffusion Tubes".



Checking Precision and Accuracy of Triplicate Tubes — AEA Energy & Environment (From the AEA group)

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	04/01/2011	02/02/2011	51.6	53.8	58.7	55	3.6	7	9.0
2	02/02/2011	02/03/2011	32.0	36.7	30.6	33	3.2	10	8.0
3	02/03/2011	30/03/2011	43.1	39.4	38.9	40	2.3	6	5.6
4	30/03/2011	27/04/2011	36.8	39.8	39.4	39	1.6	4	4.1
5	27/04/2011	01/06/2011	30.1	29.1	28.1	29	1.0	3	2.5
6	01/06/2011	30/06/2011	32.1	36.2	35.8	35	2.2	6	5.6
7	30/06/2011	03/08/2011	30.7	29.4	30.5	30	0.7	2	1.7
8	03/08/2011	31/08/2011	29.9	31.6	30.1	31	0.9	3	2.3
9	31/08/2011	28/09/2011	28.2	28.3	27.6	28	0.3	1	0.9
10	28/09/2011	01/11/2011	31.0	30.8	33.2	32	1.3	4	3.3
11	01/11/2011	01/12/2011	32.5	37.7	37.0	36	2.9	8	7.0
12	01/12/2011	05/01/2012	27.9	32.5	28.7	30	2.4	8	6.0
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
53.2	74	Good	Good
38.6	98.7	Good	Good
46.9	92.5	Good	Good
33.5	99.7	Good	Good
22.1	99.6	Good	Good
28.5	99.6	Good	Good
25	99.5	Good	Good
26.9	95.4	Good	Good
23.4	99.6	Good	Good
28	99.1	Good	Good
32	99.7	Good	Good
26.4	99.8	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.92 (0.84 - 1)
Bias B: 9% (0% - 19%)
Diffusion Tubes Mean: 33 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 30 (28 - 33) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A: 0.92 (0.84 - 1)
Bias B: 9% (0% - 19%)
Diffusion Tubes Mean: 33 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 30 (28 - 33) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Discussion of Choice of Factor to Use

The Bias Adjustment Factor from the local co-location study has been applied to the diffusion tube data because the precision calculated from the results is 5 which is below the accepted value of 10.

QA/QC of automatic monitoring

In 2011 Air Quality Data Management for the three Automatic Analysers was carried out by Envitech Europe. The measured data was ratified using the techniques developed for the AURN and AEA Calibration Club as specified in LAQM TG(09). Bi-annual Quality Control audits were carried out by AEA Technology.

Routine calibration of the NO_x analysers is undertaken by Newtownabbey Borough Council fortnightly, using on-site certified calibration gas cylinders traceable to National Calibration Standards.

The 2011 summaries and hourly data sets for the three Newtownabbey monitoring locations are provided at the end of Appendix A.

QA/QC of diffusion tube monitoring

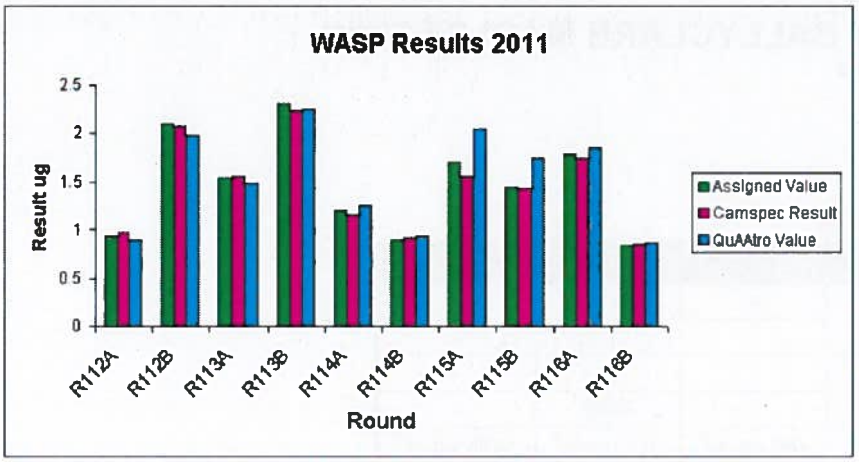
Diffusion tubes were analysed by Gradko Services using 20% triethylamine in water.

Gradko have confirmed that their laboratory complies with the procedures detailed in the DEFRA Harmonistaion Practical Guidance and their WASP results for 2011 were satisfactory.

Nitrogen Dioxide WASP Results 2011 - 2012

Camspec M550 & QuAAtro										
WASP Round No:-	R112A Feb-11	R112B Feb-11	R113A May-11	R113B May-11	R114A Aug-11	R114B Aug-11	R115A Nov-11	R115B Nov-11	R116A Feb-12	R116B Feb-12
Assigned Value	0.94	2.10	1.532	2.304	1.20	0.89	1.70	1.44	1.79	0.84
Camspec Value	0.977	2.100	1.525	2.196	1.113	0.917	1.667	1.415	1.779	0.858
Camspec Value	0.969	2.049	1.586	2.288	1.202	0.918	1.424	1.448	1.708	0.841
Average	0.973	2.075	1.556	2.242	1.158	0.918	1.546	1.432	1.744	0.850
Z Score	0.5	-0.2	0.2	-0.3	0.4	-0.5	-0.3,-2.2	-0.2, 0.1	-0.1, -0.6	0.3, 0
QuAAtro Value	0.901	1.926	1.503	2.229	1.247	0.939	1.957	1.812	1.854	0.872
QuAAtro Value	0.890	2.018	1.471	2.277	1.244	0.937	2.141	1.675	1.846	0.868
Average	0.896	1.972	1.487	2.253	1.246	0.938	2.049	1.744	1.850	0.870
Z Score	-0.6	-0.8	-0.4	-0.3	0.7	0.5	2.0 , 3.4	3.4, 2.1	0.5, 0.4	0.5, 0.5

Note: Round 115 QuAAtro results were poor due to contamination of samples during analysis. This was an isolated incident. No other samples were affected.



Full Statistical Reports for Monitors

NEWTOWNABBEY BALLYCLARE MAIN ST 2011

These data have been fully ratified

Site Description

Ballyclare Main Street

Air Quality Statistics

Pollutant	NO	NO_2	NO_X
Number Very High #	-	0	-
Number High #	-	0	-
Number Moderate #	-	0	-
Number Low #	-	8488	-
Maximum 15-minute mean	786 µg m^{-3}	376 µg m^{-3}	1496 µg m^{-3}
Maximum hourly mean	429 µg m^{-3}	164 µg m^{-3}	796 µg m^{-3}
Maximum running 8-hour mean	197 µg m^{-3}	124 µg m^{-3}	419 µg m^{-3}
Maximum running 24-hour mean	128 µg m^{-3}	88 µg m^{-3}	284 µg m^{-3}
Maximum daily mean	124 µg m^{-3}	84 µg m^{-3}	273 µg m^{-3}
Average	31 µg m^{-3}	33 µg m^{-3}	81 µg m^{-3}
Data capture	96.9 %	96.9 %	96.9 %

Daily Air Quality Index (DAQI) as defined by COMEAP 1st January 2012
Mass units for the gases are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m-3

Air Quality Exceedences

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days	Allowed	Exceeded
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-	-	No
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0	18 hours	No

NEWTOWNABBEY SANDYKNOWES 2011

These data have been fully ratified

Site Description

Antrim Road, Sandyknowes

Air Quality Statistics

Pollutant	NO	NO_2	NO_x
Number Very High #	-	0	-
Number High #	-	0	-
Number Moderate #	-	6	-
Number Low #	-	8402	-
Maximum 15-minute mean	1035 µg m^{-3}	342 µg m^{-3}	1923 µg m^{-3}
Maximum hourly mean	845 µg m^{-3}	296 µg m^{-3}	1585 µg m^{-3}
Maximum running 8-hour mean	385 µg m^{-3}	156 µg m^{-3}	738 µg m^{-3}
Maximum running 24-hour mean	237 µg m^{-3}	116 µg m^{-3}	479 µg m^{-3}
Maximum daily mean	234 µg m^{-3}	115 µg m^{-3}	472 µg m^{-3}
Average	22 µg m^{-3}	31 µg m^{-3}	65 µg m^{-3}
Data capture	96.0 %	96.0 %	96.0 %

Daily Air Quality Index (DAQI) as defined by COMEAP 1st January 2012
Mass units for the gases are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m-3

Air Quality Exceedences

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days	Allowed	Exceeded
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-	-	No
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	6	4	18 hours	No

NEWTOWNABBEY ANTRIM ROAD 2011

These data have been fully ratified

Site Description

Antrim Road, Glengormley

Air Quality Statistics

Pollutant	NO	NO_2	NO_x
Number Very High #	-	0	-
Number High #	-	0	-
Number Moderate #	-	7	-
Number Low #	-	8285	-
Maximum 15-minute mean	633 µg m^{-3}	277 µg m^{-3}	1205 µg m^{-3}
Maximum hourly mean	566 µg m^{-3}	218 µg m^{-3}	1083 µg m^{-3}
Maximum running 8-hour mean	240 µg m^{-3}	146 µg m^{-3}	497 µg m^{-3}
Maximum running 24-hour mean	161 µg m^{-3}	115 µg m^{-3}	361 µg m^{-3}
Maximum daily mean	147 µg m^{-3}	104 µg m^{-3}	329 µg m^{-3}
Average	33 µg m^{-3}	43 µg m^{-3}	93 µg m^{-3}
Data capture	94.7 %	94.7 %	94.7 %

Daily Air Quality Index (DAQI) as defined by COMEAP 1st January 2012
Mass units for the gases are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m-3

Air Quality Exceedences

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days	Allowed	Exceeded
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	1	-	-	Yes
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	7	5	18 hours	No

Appendix B: Locations of AQMAs

Figure 1-1 AQMA 2, Main Street Ballyclare

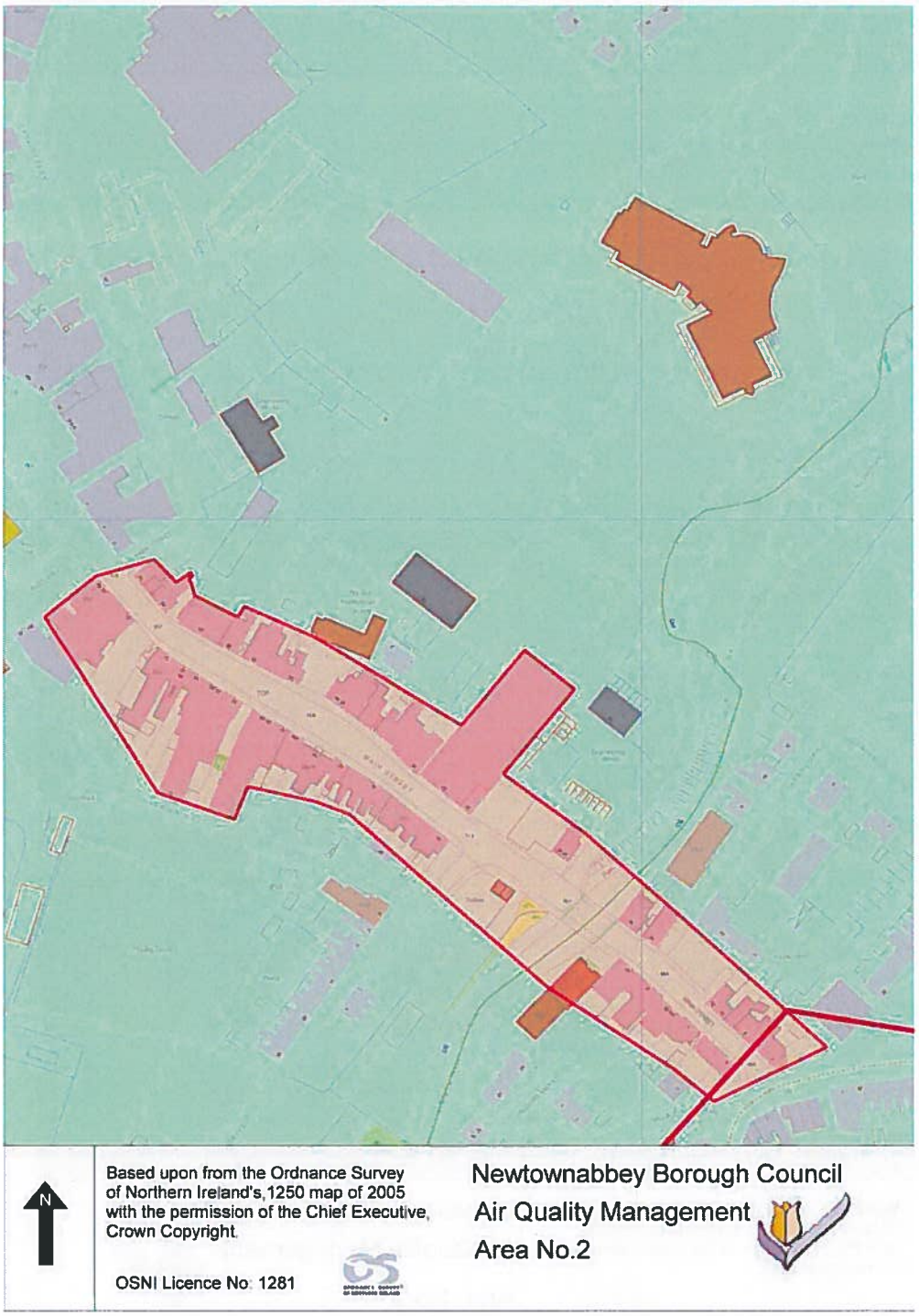


Figure 1-2 AQMA 3 Antrim Road, Elmfield

Based upon from the Ordnance Survey of Northern Ireland's 1250 map of 2005 with the permission of the Chief Executive, Crown Copyright.

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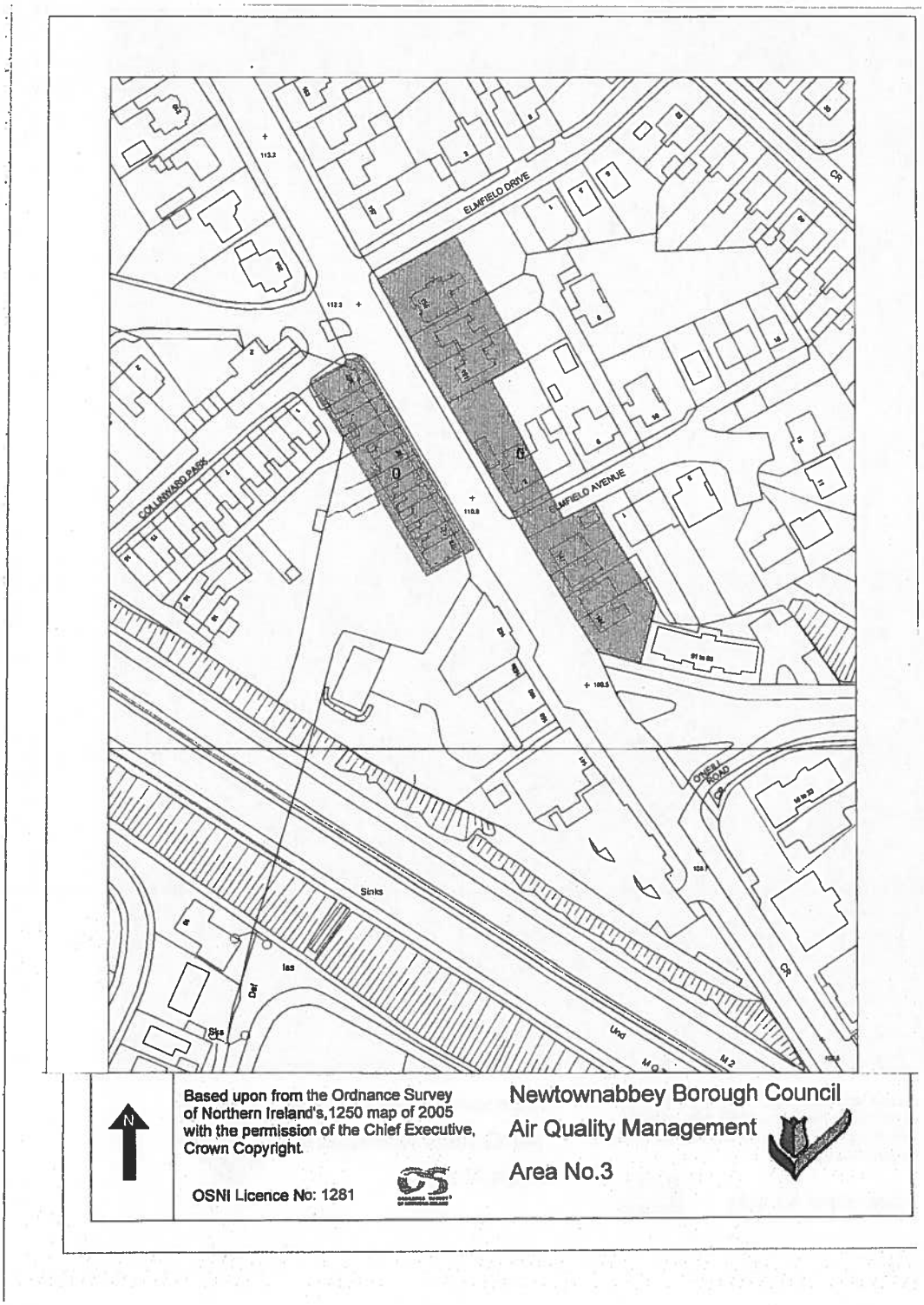
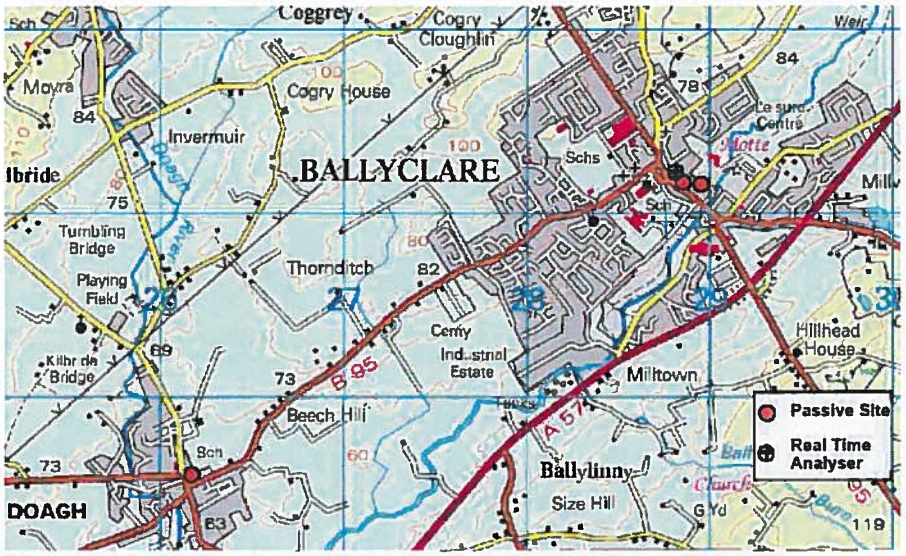
Newtownabbey Borough Council
Air Quality Management
Area No.3

Figure 1-3 AQMA 4 Sandyknowes

Figure 1-4 AQMA 3 (amended) Antrim Road, Elmfield

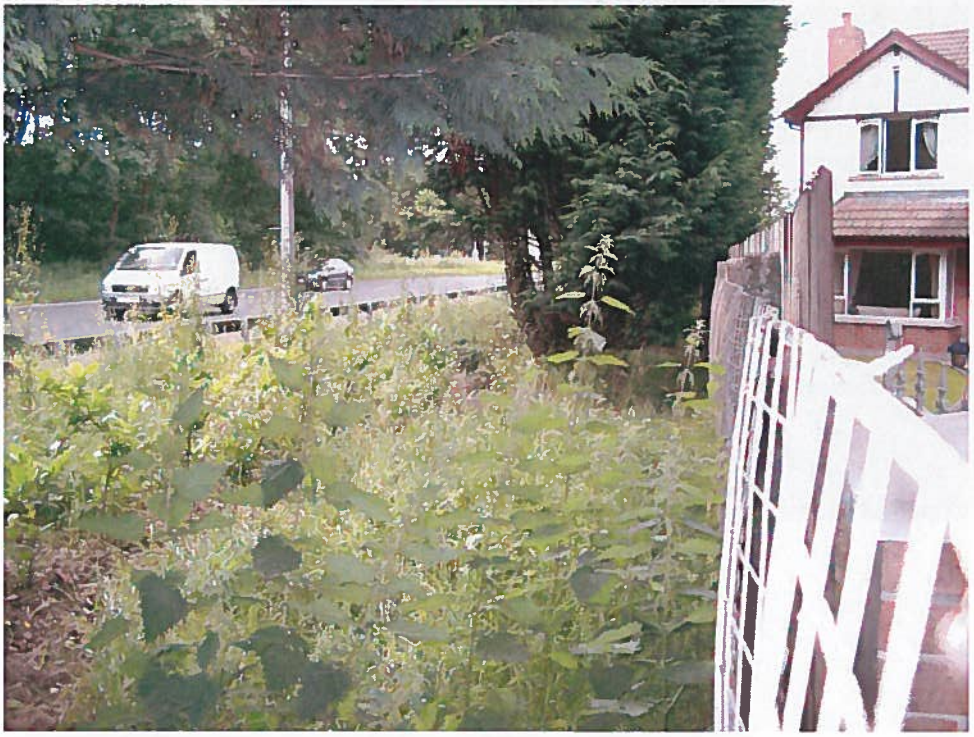


Appendix C: Location of Monitoring Sites



Main Street, Ballyclare

Antrim Road, Elmfield



Sandyholme Way, Sandyknowes

Appendix D: Monthly Diffusion Tube Results 2011

	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Average
Site 1	45.69	25.59	36.62	32.08	22.17	31.96	26.47	26.92	25.23	27.59	33.64	24.14	**29.84**
Site 59	46.05	32.27	35.71	32.43	21.63	30.78	26.02	28.85	23.92	26.67	34.27	22.28	**30.07**
Site 57	52.18	35.71	48.35	38.14	37.75	44.95	38.45	36.23	46.55	47.47	51.90	43.55	**43.44**
Site 12	49.40	38.57	43.57	33.27	34.56	45.23	37.99	36.68	52.49	49.61	50.39	48.20	**43.33**
Site 8	31.42	29.28	26.14	5.56	12.53	13.10	11.28	11.75	13.88	16.39	26.56	14.25	**17.68**
Site 11	51.78	38.49	44.84	37.77	34.80	44.16	36.19	39.39	33.63	41.88	38.20	37.71	**39.90**
Site 16	36.62	31.81	35.86	33.72	19.88	32.28	29.29	27.54	23.43	27.05	31.01	17.15	**28.80**
Site 20	48.36	35.10	36.57	31.80	22.97	30.11	22.42	26.86	29.27	31.05	33.55	29.94	**31.50**
Site 36	51.59	31.98	43.06	36.81	30.14	32.12	30.72	29.90	28.17	31.02	32.49	27.94	**33.83**
Site 37	53.77	36.73	39.41	39.81	29.06	36.23	29.4	31.64	28.30	30.77	37.68	32.46	**35.44**
Site 38	58.68	30.63	38.89	39.43	28.12	35.76	30.45	30.14	27.64	33.16	36.98	28.70	**34.88**
Site 58	73.86	47.09	51.85	50.59	39.55	52.67	48.07	59.77	51.02	61.37	55.07	39.77	**52.56**
Site 46	50.91	51.15	45.57	48.13	35.30	44.09	39.68	37.91		41.26	46.37	32.30	**39.39**
Site 47	76.64	50.08	46.24	44.58	38.03	53.02	37.10	24.69	31.46	49.68	39.63	42.86	**44.50**
Site 48	51.30	45.33	41.56	40.56	27.37	36.85	30.85	35.37	33.46	36.28	40.09	35.89	**37.91**
Site 49	43.16	35.91	36.01	30.02	22.56	28.43	22.92	25.45	25.84	27.27	33.16	24.73	**29.62**
Site 50	50.07	48.24	40.80	42.77	30.41	41.31	34.28	36.07	36.62	44.61	40.76	34.88	**40.07**
Site 51	47.31	36.06	40.04	41.53	27.75	34.63	29.56	28.44	28.87	32.00	41.11	33.64	**35.08**
Site 56	48.02	40.91	38.34	31.90	23.19	30.90	24.52	24.83	28.46	32.01	37.65	25.98	**32.23**
Site 60	55.31	40.05	59.76	48.42	34.98	43.39	36.57	37.69	38.39	41.24	36.92	33.90	**42.22**
Site 61	51.58	52.78	53.31	47.41	33.27	42.17	36.61	39.19	34.57	41.41	32.31	36.78	**41.78**

Appendix E: Detailed Assessment of AQMA 2 and AQMA 4

Newtownabbey Borough Council's Progress Report 2007 showed exceedances of the annual mean nitrogen dioxide objective in Ballyclare and Sandyknowes.

The 2006 annual average concentrations for the passive nitrogen dioxide monitoring sites at Sandyholme Way (Site 12) and Ballyclare (Site 1) were equal or above the annual mean air quality objective of 40 μgm^{-3} .

Air Quality Management Areas were declared in Ballyclare (AQMA 2) and Sandyknowes (AQMA 4) in January 2008.

A Detailed Assessment of these two areas was carried out by AEA in 2008/9 through extensive monitoring and modelling to ascertain the concentrations at relevant exposure locations and the geographical extent of the exceedance.

The conclusions from this Detailed Assessment confirmed the following:

Main Street, Ballyclare (AQMA 2)

- The modelled nitrogen dioxide concentrations in Main Street, Ballyclare marginally exceeded the objective of 40µg m-3 in 2007;
- The measured nitrogen dioxide concentrations in Main Street, Ballyclare were above the objective of 40µg m-3

On the basis of the modelled and measured results in Main Street, Ballyclare, AQMA 2, it was recommended that AQMA 2 be retained for present. However it was noted that the predicted modelled concentrations for 2010 showed that nitrogen dioxide concentrations in the AQMA 2 will be below the objective.

Sandyknowes (AQMA 4)

- The modelled nitrogen dioxide concentrations in the Sandyknowes area were below the objective of 40µg m-3 in 2007;
- The measured nitrogen dioxide concentrations in Sandyknowes AQMA were above the objective

On the basis of the average modelled and measured results in Sandyknowes, AQMA 4, it was recommended that AQMA 4 be retained for present. However again it was noted that the predicted modelled concentrations for 2010 showed that nitrogen dioxide concentrations in the AQMA 4 will be below the objective.

Air quality monitoring has continued in both these AQMA's since 2007, with an automatic monitor being placed in AQMA 2 in January 2008 and automatic and diffusion tube monitoring results have shown levels of nitrogen dioxide to be well below the annual mean objective of 40µg m-3

This report is a Detailed Assessment for Newtownabbey Borough Council to justify the proposed revocations of AQMA's 2 and 4

The report will present the recorded annual mean Nitrogen Dioxide Concentrations in these areas and outline the expected reasons for the decline in the concentrations.

1. Comparison of Monitoring Results with AQ Objectives

1.1 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2011 %	Annual Mean Concentration µg/m³				
				2007	2008	2009	2010	2011
Sandyknowes, Mallusk (AQMA 4)	Roadside	N	96	34	35	33	38	31
Ballyclare, Main St (AQMA 2)	Roadside	Y	96.9	N/A	37	34	40	33

1.2 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Within AQMA?	Valid Data Capture 2011 %	Number of Exceedences of Hourly Mean (200 µg/m³)				
			2007	2008	2009	2010	2011
Sandyknowes, Mallusk	N	96		15	7	29	6
Ballyclare, Main St	Y	96.9		0	1	2	0

1.3 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m³				
			2007* (Bias Adjustment Factor = 0.89)	2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)
AQMA 2							
Site 1 Main Street, Ballyclare	Roadside	Y	32	30	29	32	27
Site 59 Main Street, Ballyclare	Roadside	Y	29	28	29	31	28
AQMA 4							
Site 57 7 Sandyholme Way	Roadside	Y	39	37	37	40	40
Site 12 7 Sandyholme Way	Roadside	Y	37	36	38	40	40
Site 11 44 Sandyknowes Avenue	Roadside	N	37	32	35	41	37
Site 47 13 Sandyholme Park	Roadside	Y	45	37	39	47	41

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m³				
			2007* (Bias Adjustment Factor = 0.89)	2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)
Site 48 24 Sandyknowes Avenue	Roadside	N	31	28	29	35	35
Site 36 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	37	34	28	37	31
Site 37 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	39	34	33	37	33
Site 38 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	36	34	32	36	32

2. Conclusions

2.1 AQMA 2 Ballyclare

The Nitrogen Dioxide Analyser is sited 5m from the relevant location.

Results of Automatic Monitoring Data for Nitrogen Dioxide in 2011 showed an annual mean concentration of 33µg/m$^{3.}$ This result is consistent with the previous 3 years results, with the exception of 2010, which was increased due to the extreme cold weather conditions experienced in January and December 2010, which produced very still air.

Nitrogen dioxide diffusion tubes 1 and 59 are located on the façade of the relevant location in Ballyclare AQMA. Results from these diffusion tubes for 2011 showed annual means of 27 and 28 µg/m^3 respectively and again are consistent with the previous four year's results.

Reasons for decline in concentrations

Declaration of this AQMA was based on exceedances of the annual mean nitrogen dioxide objective obtained from diffusion tubes which were analysed by Lambeth Scientific and which were Bias Adjusted using a factor of 1.34.

When the automatic monitor, which is a more reliable monitoring method, was placed in the AQMA in 2008 the results have been consistently well below the annual mean objective of 40µg m-3 which is consistent with the predicted modelling carried out by AEA in the Detailed Assessment in 2009.

In addition Newtownabbey Borough Council, based on advice from DOE, changed the laboratory used to analyse our diffusion tubes to Gradko in 2007. Since 2007 the bias adjustment factor has decreased dramatically (see table below taken from 2007 Progress Report) with the local bias adjustment factor since 2007 being around 0.9 which has resulted in no exceedances of the annual mean objective.

Site Ref.	Location	Annual Average	Bias Adjustment Factor (Sandyknowes) 1.2	Bias Adjustment Factor (Shore Road) 1.45	Bias Adjustment Factor (Lambeth) 1.34
1	Main St, Ballyclare	33	40	48	44
11	44 Sandyknowes Avenue	28	34	41	38
12	7 Sandyholme Way	40	48	58	54

2.2 AQMA 4 Sandyknowes

The Nitrogen Dioxide Analyser is located outside the AQMA in Sandyknowes. Attempts were made in 2010 to locate the analyser to the garden of the relevant location but due to legal complications this was not able to proceed.

Results of Automatic Monitoring Data for nitrogen dioxide showed an annual mean concentration of 31 $\mu g/m^3$ in 2011. There were only 6 exceedances of the 1 hour objective.

In January 2011, diffusion tubes 57 and 12 were relocated from the façade of the relevant location in the AQMA to the motorway side of the fence which is 5m from the relevant location on the request of the householder. Moving the tubes closer to the motorway resulted in an increase in the annual mean concentration at both sites to 40 $\mu g/m^3$. Prior to this movement the air quality objective was met on previous years.

Diffusion tube 11 is located within 7m of the relevant location and the annual mean concentration in 2011 was 37 $\mu g/m^3$ which is consistent with previous year's results.

Diffusion tube 47 had an annual mean concentration of 41$\mu g/m^3$ however this tube is located 7m from the relevant location.

Diffusion tube 48 is a background tube located on the façade of a relevant location, 17m from the motorway and it had an annual mean concentration of 35 $\mu g/m^3$

Reasons for decline in concentrations

Again, declaration of the AQMA was based on exceedances of annual mean nitrogen dioxide objective obtained from diffusion tubes which were analysed by Lambeth Scientific and which were Bias Adjusted using a local factor of 1.2

Since 2007 when we changed our laboratory analysing the diffusion tubes to Gradko our local bias adjustment factor has been consistently lower, around 0.9, which has resulted in no exceedances of the annual mean objective.