2013 Air Quality Progress Report for Newtownabbey Borough Council

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

December, 2013

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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 and AQMA 4 Sandyknowes, Mallusk were revoked in December 2012 due to continuous annual mean concentrations below the air quality objective for nitrogen dioxide.

AQMA 3, Antrim Road, Elmfield

Results of Automatic Monitoring for nitrogen dioxide showed an annual mean concentration of 42 µg/m^3 which has continued to steadily decrease from the previous years. There were only 3 exceedances of the hourly mean nitrogen dioxide objective. Results of diffusion tube monitoring on the façade of the relevant location were again below the annual mean objective.

Newtownabbey Borough Council will continue to monitor and implement Action Plan measures in this AQMA.

This report has not identified any other exceedance of the annual mean concentration for nitrogen dioxide at any other monitoring site in the Borough and monitoring. Monitoring will cease in 2013 at 6 sites (Site 59, 16, 20, 36, 37, 38, 51) because of results below the annual mean objective since 2007.

This report has not identified any new local developments which may have an impact on air quality within the Local Authority area.

Newtownabbey Borough Council will be submitting its next Progress Report in April 2014.

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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 Progress 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.

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 Local Air Quality Management 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 micrograms per cubic metre µg/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 µg/m^3	Running annual mean	31.12.2003
	3.25 µg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/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. Exceedance of annual mean at Antrim Road, Elmfield; 2. No exceedances at Ballyclare or Sandyknowes	
Action Plan for Antrim Road, Elmfield	Mar 2011		
Progress Report	Jun 2011	1. Exceedance of annual mean at Antrim Road, Elmfield; 2. No exceedances at Ballyclare or Sandyknowes	
Updating and Screening Assessment	April 2012	1. Exceedance of annual mean at Antrim Road, Elmfield; 2. No exceedances at Ballyclare or Sandyknowes. Revocation of both AQMAs.	
Action Plan Progress Report	October 2012		

Figure 1.1 Map of AQMA Boundaries (Appendix B Figure 1-1)

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Newtownabbey Borough Council has one automatic monitoring station. Monitoring ceased at the Ballyclare and Sandyknowes monitoring stations in March 2012 following the approval of the revocation of these AQMAs in our last Updating and Screening Report.

The location of the automatic continuous monitoring station is included in Table 2.1 and the map is included in Appendix C.

Table 2.1 Details of Automatic Monitoring Site

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?
Antrim Road	Roadside	332305 381697	NO_2	Y	Y (1m)	3m	Y

- **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 in Appendix C.

The tube data is presented in Table 2.5 with exceedances of the 40 µg/m3 annual mean NO2 highlighted in bold.

In 2012 the diffusion tubes were analysed by Gradko Services using 20% triethylamine in water.

QA/QC details which include the bias adjustment factor for 2012 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 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 58 Lamp-post, 198 Antrim Road ,Elmfield	Roadside	332305 381697	NO_2	Y	N	Y (3m)	1.7m	N
Site 60 196 Antrim Road	Roadside	332305 381697	NO_2	Y	N	Y (located on Property	4m	Y
Site 61 196 Antrim Road	Roadside	332305 381697	NO_2	Y	N	Y (located on property)	4m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Table 2.3 provides all nitrogen dioxide continuous monitoring data collected since 2008 and Table 2.4 compares the results with the 1 hour Mean Objective.

Table 2.3 Results of Automatic Monitoring for NO_2 Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2012 %	Annual Mean Concentration μg/m^3				
				2008	2009	2010	2010	2012
Antrim Rd, Elmfield	Roadside	Y	97	**56**	**68**	**46**	**43**	**42**

Table 2.4 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2012 %	Number of Exceedences of Hourly Mean (200 μg/m^3)				
				2008	2009	2010	2011	2012
Antrim Rd, Elmfield	Roadside	Y	94.7	**55**	11	3	7	3

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.

Statistical Summary Reports for the Automatic Monitoring Sites are included in 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. All measurements

were in the Low Band. The annual data capture (bottom line) was very satisfactory with 97%. This compares well with the 90% target.

Second table – Air Quality Exceedences.

The NO2 annual mean air quality standard (40 µg m^{-3}) was exceeded at Antrim Road (42 µg m^{-3}). There were 3 exceedences on 3 days of the hourly mean standard (200 µg m^{-3}) at Antrim Road. The annual allowance is 18 hours so the hourly mean standard was not breached at this site.

Figure 2.3 Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites

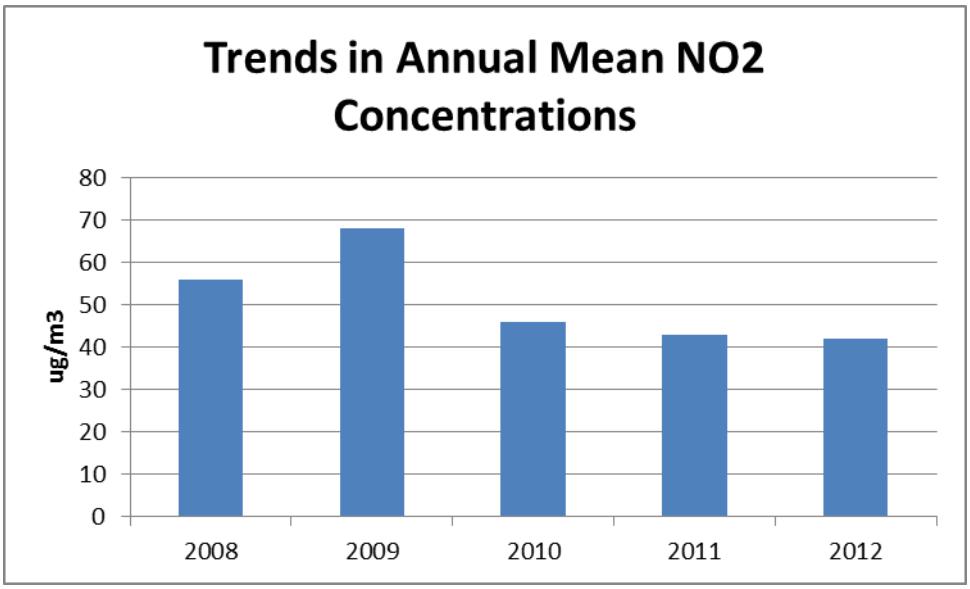


Figure 2.3 shows the Trends in Annual Mean Nitrogen Dioxide Concentrations measured at the Antrim Road, Elmfield monitoring site. In 2010 the sample inlet was moved from the roadside to within 1m of the façade of the relevant location and this resulted in a significant decrease in the concentrations. Since then there has been a decrease in concentrations at the site.

Diffusion Tube Monitoring Data

Table 2.5 provides nitrogen dioxide diffusion tube monitoring data for 2012 and Table 2.6 provides all data collected since 2008.

Exceedances of the 40 µg/m^3 annual mean nitrogen dioxide objective are highlighted in bold.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2012 (full monthly data sets are in Appendix D)

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2012 (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 = 0.96) 2012 ($\mu g/m^3$)
Site 1	Main Street, Ballyclare	Roadside	Y		10 months		N	30.04
Site 59	Main Street, Ballyclare	Roadside	Y		10 months		N	29.25
Site 57	7 Sandyholme Way	Roadside	Y	Collocated with tube 12	12 months		N	**40.74**
Site 12	7 Sandyholme Way	Roadside	Y	Collocated with tube 57	12 months		N	**40.05**
Site 8	Braden Heights, Rathcoole	Urban Background	N		12 months		N	16.72
Site 11	44 Sandyknowes Avenue	Roadside	N		12 months		N	38.87
Site 16	Doagh Village	Roadside	N		11months		N	29.04
Site 20	A8/Motorway at Sandyknowes	Roadside	N		12 months		N	30.01
Site 36	NOx Analyser Antrim Road, Sandyknowes	Roadside	N	Triplicate and Collocated	12 months		N	33.01
Site 37	NOx Analyser Antrim Road, Sandyknowes	Roadside	N	Triplicate and Collocated	12 months		N	33.77
Site 38	NOx Analyser Antrim Road, Sandyknowes	Roadside	N	Triplicate and Collocated	12 months		N	33.85
Site 46	12 Collinbridge Road	Roadside	N		11 months		N	37.79

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2012 (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 = 0.96) 2012 (µg/m^3)
Site 47	13 Sandyholme Park	Roadside	Y		10 months		N	**40.56**
Site 48	24 Sandyknowes Avenue	Roadside	N		12 months		N	35.39
Site 49	6 Sandyknowes Gardens	Urban Background	N		12 months		N	26.97
Site 50	45 Burney's Lane	Roadside	N		12 months		N	34.59
Site 51	196 Shore Road	Roadside	N		12 months		N	31.09
Site 56	5 Sandyholme Park	Roadside	N		12 months		N	28.43
Site 58	**Lamp-post, 198 Antrim Road ,Elmfield**	**Roadside**	**Y**		**12 months**		**N**	**49.10**
Site 60	196 Antrim Road	Roadside	Y	Collocated with tube 60	12 months		N	37.70
Site 61	196 Antrim Road	Roadside	Y	Collocated with tube 61	12 months		N	37.75

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3.

Table 2.6 Results of NO_2 Diffusion Tubes (2008 to 2012)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) μg/m^3				
			2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011* (Bias Adjustment Factor = 0.92)	2012 (Bias Adjustment Factor = 0.96)
Site 1 Main Street, Ballyclare	Roadside	Y	30	29	32	27	30.04
Site 59 Main Street, Ballyclare	Roadside	Y	28	29	31	28	29.25
Site 57 7 Sandyholme Way	Roadside	Y	37	37	40	40	**40.74**
Site 12 7 Sandyholme Way	Roadside	Y	36	38	40	40	**40.05**
Site 8 Braden Heights, Rathcoole	Urban Background	N	16	17	19	16	16.72
Site 11 44 Sandyknowes Avenue	Roadside	N	32	35	**41**	**37**	38.87
Site 16 Doagh Village	Roadside	N	27	28	31	26	29.04

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) μg/m^3				
			2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011* (Bias Adjustment Factor = 0.92)	2012 (Bias Adjustment Factor = 0.96)
Site 20 A8/Motorway at Sandyknowes	Roadside	N	25	25	32	29	30.01
Site 36 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	34	28	37	31	33.01
Site 37 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	34	33	37	33	33.77
Site 38 NOx Analyser Antrim Road, Sandyknowes	Roadside	N	34	32	36	32	33.85
Site 46 12 Collinbridge Road	Roadside	N	34	37	37	36	37.79
Site 47 13 Sandyholme Park	Roadside	Y	37	39	**47**	**41**	**40.56**
Site 48 24 Sandyknowes Avenue	Roadside	N	28	29	35	35	35.39
Site 49 6 Sandyknowes Gardens	Urban Background	N	24	26	31	27	26.97

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2008* (Bias Adjustment Factor = 0.89)	2009* (Bias Adjustment Factor = 0.9)	2010* (Bias Adjustment Factor = 0.96)	2011* (Bias Adjustment Factor = 0.92)	2012 (Bias Adjustment Factor = 0.96)
Site 50 45 Burney's Lane	Roadside	N	29	32	36	37	34.59
Site 51 196 Shore Road	Roadside	N	30	31	34	32	31.09
Site 56 5 Sandyholme Park	Roadside	N	27	27	32	30	28.43
Site 58 Lamp-post, 198 Antrim Road ,Elmfield	Roadside	Y	**45**	**47**	**47**	**48**	**49.10**
Site 60 196 Antrim Road	Roadside	Y	29	32	**42**	39	37.70
Site 61 196 Antrim Road	Roadside	Y	30	31	**41**	38	37.75

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

2.2.2 Particulate Matter (PM_{10})

Newtownabbey Borough Council does not carry out PM_{10} monitoring.

2.2.3 Sulphur Dioxide (SO_2)

Newtownabbey Borough Council does not carry out SO_2 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 within the AQMA still exceed the objective for NO_2 at Antrim Road, Elmfield and the AQMA should remain.

Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

Newtownabbey 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.

Newtownabbey 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 Local Transport Plans and Strategies

Regional Development Strategy

The Regional Development Strategy (RDS) is a strategy to guide the future development of Northern Ireland to 2025. The RDS will influence the future distribution of activities throughout the region and recognises that development policies will have a significant impact on the environment and the health of individuals.

Spatial Development Strategy for Northern Ireland

The Spatial Development Strategy (SDS) guides the physical development of the Region to 2025. The SDS will contribute to meeting a number of key regional challenges emerging from the significant local, national and international forces, which will drive change over the next 25 years, including:

Transport:

- Promote a change in travel culture and particularly manage the effects of a possible 100% growth in the number of vehicles by 2025;
- Contribute to the creation of a modern, sustainable, safe transportation system for the Region, meeting the travel needs of all groups in society;
- Accommodate the growing volume of freight moving to and from the regional gateways; and
- Strengthen the regional gateways to handle the increasing flow of people and goods in and out of the Region.

Environment:

- Accommodate future development growth while protecting and caring for the environment;
- Reduce the consumption of resources;
- Continue to maintain or, where needed, improve the quality of air, water and land resources within the Region;

- Seek to maintain local landscape character and to conserve cultural assets; and
- Take particular care to sustain and, where required, to enhance the biodiversity of the Region, its natural habitats, high quality landscapes and built heritage.

Developing a Regional Transportation System

Creating an upgraded and integrated transport system, built around the Regional Strategic Transport Network of the key transport corridors with **t**heir main public transport services providing the framework for future development is recognised as one of the key assets to accommodate growth. Strategic planning guidelines relating to the development of a Regional Transport System (RTS) are as follows:

- **SPG-TRAN 1:** To develop a Regional Strategic Transport Network (RSTN), based on Key Transport Corridors (KTCs), to enhance accessibility to regional facilities and services.

- **SPG-TRAN 2:** To extend travel choice for all sections of the community by enhancing public transport, including the strengthening of the regional bus network (including the promotion of public transport routes and Park and Ride schemes) and the regional rail system;

- **SPG-TRAN 3:** To integrate land use and transportation to provide a much better range of travel choices for all, and reduce the demand for travel; and

- **SPG-TRAN 4:** To change the regional travel culture and contribute to healthier lifestyles, such as giving greater priority to encouraging more walking and cycling.

Regional Transportation Strategy

The Regional Transportation Strategy (RTS) for Northern Ireland 2002- 2012 identifies strategic transportation investment priorities and considers potential funding sources and affordability of planned initiatives. The RTS focuses on 3 geographic areas and one overlying Network. These are as follows:

- Belfast Metropolitan Area (BMA), containing the continuous area comprising Belfast City Council and the built-up areas within the Council areas of Carrickfergus, Castlereagh, Lisburn, Newtownabbey and North Down;

- Other Urban Areas (OUAs): collectively those towns described as main or local hubs in the RDS;

- Rural Area – the remainder of Northern Ireland; and

- Regional Strategic Transport Network (RSTN) comprising the complete rail network and all motorway and trunk road links (including the Key Transport Corridors and Link Corridors).

The RTS is a "daughter document" of the Regional Development Strategy (RDS), which sets out the spatial development framework for Northern Ireland up to 2025. Implementation of the Strategy will be through three Transport Plans covering the Regional Strategic Transport Network (RSTN), the Belfast Metropolitan Area (BMA), and the Sub-Regional Transport Plan (SRTP).

Regional Strategic Transport Network Transport Plan

The Regional Strategic Transport Network (RSTN) Transport Plan prepared by the Department for Regional Development (DRD) covers the complete rail network, 5 Key Transport Corridors (KTCs), 4 Link Corridors, the Belfast Metropolitan Transport Corridors and the remaining trunk network across Northern Ireland. The Plan is based on the guidance set out in the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS), as described in Sections 3.1 and 3.2, above.

The RSTN Transport Plan consists of proposals for transport schemes and measures for the maintenance, management and development of the RSTN until 2015. The RSTN Transport Plan also includes a number of measures for rail, bus, roads, walking and cycling.

Sub-Regional Transport Plan 2015

The Sub-Regional Transport Plan (SRTP) was prepared by the Department for Regional Development (DRD) and completed in 2007. The SRTP is based upon the guidance provided by the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS).

5 Implementation of Action Plans

Newtownabbey Borough Council submitted its last Action Plan Progress Report in October 2012. This is included in Table 5.1 and includes actions taken in 2012. Further actions taken in 2013 will be included in the next Progress Report to be submitted in April 2014.

Table 5.1 Action Plan Progress Report

Action Plan Measure	Lead Authority	Original Timescale	Implementation	On Target?	Comments
1. To investigate options for moving to cleaner fuels and purchase vehicles that comply with the prevailing EURO standard	Newtownabbey Borough Council	March 2012 & Ongoing	No of vehicles purchased in compliance and cleaner fuels being used	Yes	In 2011/2012 NBC have purchased 3 new vehicles, and these have been to Euro 5 standards. NBC also continue to procure options for alternative fuel vehicles and have recently purchased two electric vans.
2.To continue to improve the bus fleet by providing Eco-Driving Training and installing Driver Monitoring Devices To continue the current practice of cleaning up the bus fleet as part of the planned fleet renewal	Translink	Ongoing	No of drivers trained and devices fitted	Yes	All drivers have received Eco-Driving Training and Eco-Driving is a continual part of their CPC training. No eco driving systems have been fitted within Newtownabbey depot however Translink are currently in the middle of procurement for a fleet wide install over the coming 12 months. They undertook a pilot study at Bangor and Pennyburn before developing a fleet wide tender process.
3. Carry out vehicle emission testing	Newtownabbey Borough Council	October 2011 & ongoing	No of Vehicle Emission Testing Events	Yes	Vehicle Emission Testing was carried out in October 2011 and October 2012 with approximately 200 cars tested

4. Introduce a Park and Ride Scheme at Ballyhenry Road	DRD Road Service	1-2 years (depending on approval)	Park & Ride Scheme implemented	Pending approval	Still awaiting approval
5. Promote sustainable modes of transport to Newtownabbey Borough Council employees, residents/commuters within the AQMA and St Bernard's Primary School	Travelwise	March 2012 & ongoing	No of initiatives implemented	Yes	6 schools in Newtownabbey participated in the Walk to School Weeks in June 2011 and June 2012 and 3 participated in the Walk to School Month. All received promotional material on benefits to health and environment of walking to School. St Marys on the Hill PS featured in the launch of Walk to School Week 2011 with a visit from DRD Minister Danny Kennedy which attracted media coverage. Carnmoney PS also featured in the 2011 Bike Week campaign with a visit from Wendy Houvenhagl and media coverage to encourage cycling to school.
6. Develop a Green Travel Plan for the Borough	Newtownabbey Borough Council	October 2011	Production of Green Travel Plan	Yes	Newtownabbey Borough Council's Workplace Travel Plan was launched October 2011 and the action plan is currently being implemented. Some actions already implemented include: • Bike to Work Week • Walk to Work Week • Corporate Commuter Initiatives (discount vouchers for Translink)

					• Bike to Work Scheme • Sustrans Cycle training • Designation of Active Travel Champions In addition NBC organised a Green Miles School Competition as part of Bike Week in June 2011 where 3 Local primary schools recorded miles walked or cycled over the week and 913 Primary 7 pupils received information on bike safety and walking and cycling routes in Newtownabbey at Bee Safe event in May 2012
7. Deliver the 'Air Quality Schools Initiative' to St Bernard's Primary School	Newtownabbey Borough Council	March 2012	Air Quality Initiative delivered	Yes	Delivered as part of Health Fair
8. Organise an Information Event for residents in the AQMA	Newtownabbey Borough Council	March 2012	Information Event organised	No	To be completed in 2013 as a lot of information has been given through schools
9. Provide information on the Council Website to encourage people to change their travel behaviour	Newtownabbey Borough Council	October 2011	Information provided	Yes	A dedicated Energy page has been incorporated in website and is being further developed
10. Comment on planning applications to ensure that all relevant air quality issues are highlighted and mitigation measures are considered wherever possible	Newtownabbey Borough Council	Ongoing	No of plans commented on	Yes	154 Planning Applications commented on

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

AQMA 2, Main Street, Ballyclare and AQMA 4, Sandyknowes, Mallusk were revoked in December 2012 (Appendix B).

AQMA 3, Antrim Road, Elmfield

The Nitrogen Dioxide Analyser sample 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 2012 showed an annual mean concentration of 42 µg/m^3 which has continued to steadily decrease from the previous years. There were only 3 exceedances of the 1 hour objective.

Diffusion tube 58 is located on a lamp post adjacent to the road, 3m from the relevant location, and showed an exceedance of the annual mean concentration with a result of 49 µg/m^3.

Diffusion tubes 60 and 61 are located on the façade of the relevant location and they both showed an annual mean concentration of 37 µg/m^3

It should be noted the concentration levels from the roadside (Tube 58 (49 µg/m^3)) to the façade (Tubes 60 & 61 (37 µg/m^3)) drop by 12 µg/m^3 over a distance of 3m.

Even though the diffusion tube measurements on the façade of the relevant location are below the annual mean objective, the AQMA will remain because the annual mean objective is still exceeded at the continuous analyser. We will review this again at the next Progress Report.

Other Monitoring Results

There were 3 sites, namely 57, 12 and 47 where annual mean concentrations were recorded as just above 40 µg/m^3 and these are discussed below:

Diffusion tube sites 57 and 12

In January 2011, diffusion tube sites 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. There would be no exceedances of the annual mean concentration at the receptors.

Diffusion tube site 47

This site had an annual mean concentration of 40.56 µg/m^3 however this tube is located 7m from the relevant location and again there would be no exceedances of the annual mean concentration at the receptor.

There were no other exceedances of the annual mean objective at any other monitoring site in the Borough.

Monitoring results at the following sites: 59, 16, 20, 36, 37, 38, 51 have been below the annual mean objective since 2007 and will cease to be monitored in 2013.

6.2 Conclusions relating to New Local Developments

This report has not identified any new local developments which may have an impact on air quality within the Local Authority area.

6.3 Proposed Actions

- AQMA 3, Antrim Road, Elmfield

  Continue monitoring and implement Action Plan Measures

- Cease Diffusion Tube monitoring at the following sites: 59, 16, 20, 36, 37, 38, 51
- Submit Progress Report April 2014

7 References

Local Air Quality Management Technical Guidance TG(09)

Policy Guidance LAQM PG Northern Ireland (09)

Newtownabbey Borough Council Progress Report 2011

Newtownabbey Borough Council USA 2012

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 2012 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 0.96 was calculated from 35 studies from Gradko Services for 2012 using the diffusion tube spreadsheet tool, for the diffusion tubes study.

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 09/13

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 spreadhseet 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 March 2014

LAQM Helpdesk Website

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:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	**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[3] shown in blue at the foot of the final column.**
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	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[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2012	R	Brighton & Hove City Council	11	41	37	10.5%	G	**0.91**
Gradko	20% TEA in water	2012	R	City of Lincoln Council	11	53	44	18.4%	G	**0.84**
Gradko	20% TEA in water	2012	R	Fareham Borough Council	9	38	39	-4.1%	G	**1.04**
Gradko	20% TEA in water	2012	R	NOTTINGHAM CITY COUNCIL	10	44	44	-0.2%	G	**1.00**
Gradko	20% TEA in water	2012	R	NOTTINGHAM CITY COUNCIL	11	43	41	4.9%	G	**0.95**
Gradko	20% TEA in water	2012	R	NOTTINGHAM CITY COUNCIL	10	46	47	-0.3%	G	**1.00**
Gradko	20% TEA in water	2012	R	The Highland Council	9	24	32	-24.1%	G	**1.32**
Gradko	20% TEA in water	2012	R	Wiltshire Council	10	36	35	3.9%	G	**0.96**
Gradko	20% TEA in Water	2012	UB	LB Waltham Forest	11	33	38	-11.8%	S	**1.13**
Gradko	20% TEA in water	2012	R	Pendle	10	39	32	20.6%	G	**0.83**
Gradko	20% TEA in water	2012	R	Lancaster City Council	10	46	42	11.3%	G	**0.90**
Gradko	20% TEA in water	2012	R	Lancaster City Council	11	37	36	2.1%	G	**0.98**
Gradko	20% TEA in water	2012	R	Wokingham Borough Council	9	32	34	-7.4%	G	**1.08**
Gradko	20% TEA in water	2012	R	London Borough of Ealing	10	55	54	1.8%	P	**0.98**
Gradko	20% TEA in water	2012	R	London Borough of Ealing	10	83	84	-0.3%	P	**1.00**
Gradko	20% TEA in water	2012	UB	London Borough of Ealing	9	32	36	-10.8%	G	**1.12**
Gradko	20% TEA in water	2012	B	Chelmsford City Council	11	19	14	30.9%	G	**0.76**
Gradko	20% TEA in water	2012		**Overall Factor[3] (35 studies)**				**Use**		**0.96**

QA/QC of Automatic Monitoring

In 2012 Air Quality Data Management for the Automatic Analyser was carried out by Ricardo-AEA. 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 Ricardo-AEA.

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 2012 summaries and hourly data sets for the three Newtownabbey monitoring locations are provided at the end of Appendix A.

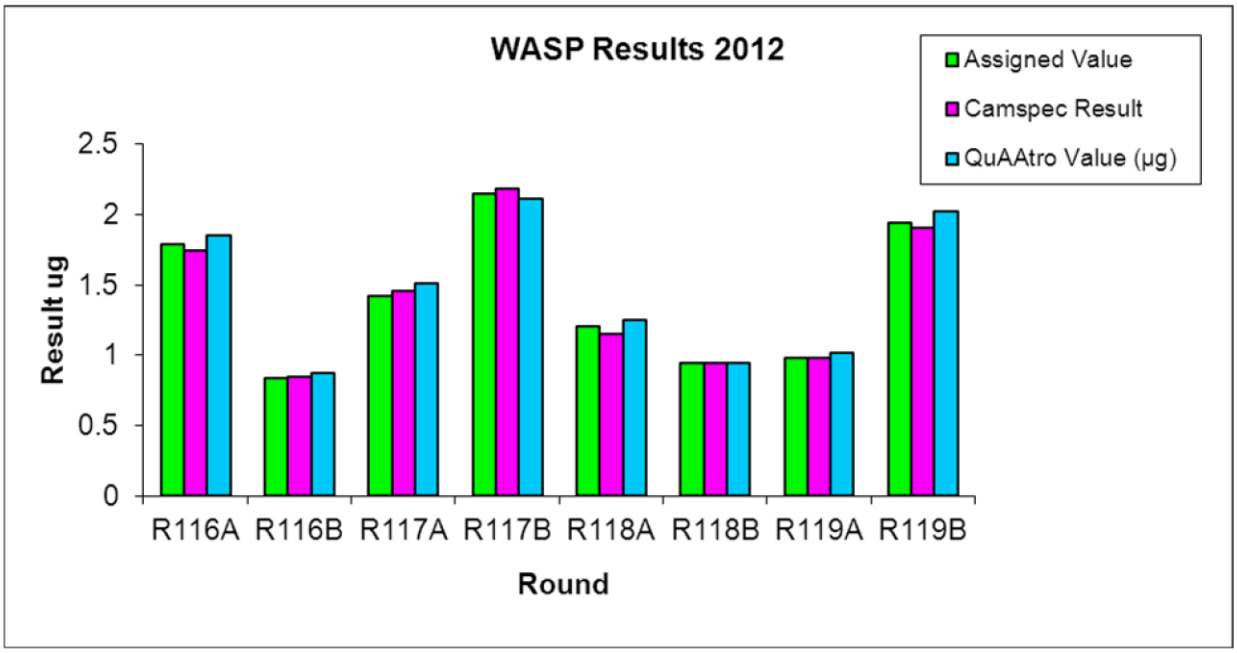
QA/QC of diffusion tube monitoring

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 Harmonisation Practical Guidance and their WASP results for 2012 were satisfactory.

Nitrogen Dioxide WASP Results 2012

Analysis carried out using UKAS accredited methods GLM 7 (Camspec) and GLM 9 (QuAAtro)

WASP Round No:-	R116A Feb-12	R116B Feb-12	R117A May-12	R117B May-12	R118A Aug-12	R118B Aug-12	R119A Nov-12	R119B Nov-12
Assigned Value (µg)	**1.79**	**0.84**	**1.42**	**2.15**	**1.203**	**0.940**	**0.98**	**1.94**
Camspec Value (µg)	1.779	0.858	1.477	2.180	1.142	0.940	1.012	1.921
Camspec Value (µg)	1.708	0.841	1.443	2.191	1.156	0.946	0.944	1.884
Average (µg)	**1.744**	**0.850**	**1.460**	**2.186**	**1.149**	**0.943**	**0.978**	**1.903**
Z Scores	**-0.1, -0.6**	**0.3, 0.0**	**0.5, 0.2**	**0.2, 0.3**	**-0.8, -0.6**	**0.0, 0.1**	**0.4, -0.5**	**-0.1, -0.4**
% Bias	-0.6, -4.6	2.1, 0.1	4.0, 1.6	1.4, 1.9	-5.1, -3.9	0.0, 0.6	3.3, -3.7	-1.1, -2.9
QuAAtro Value (µg)	1.854	0.872	1.516	2.209	1.250	0.934	1.023	2.030
QuAAtro Value (µg)	1.846	0.868	1.499	2.01	1.257	0.954	1.001	2.012
Average (µg)	**1.850**	**0.870**	**1.508**	**2.110**	**1.254**	**0.944**	**1.012**	**2.021**
Z Scores	**0.5, 0.4**	**0.5, 0.5**	**0.9, 0.7**	**0.4, -0.9**	**0.4, 0.5**	**-0.1, 0.2**	**0.6, 0.3**	**0.6, 0.5**
% Bias	3.6, 3.2	3.8, 3.3	6.8, 5.4	2.7, -6.4	3.9, 4.5	-0.6, 1.5	4.4, 2.1	4.6, 3.7



Zscore classification: Zscore ± 2 – satisfactory result
Zscorę ± 2 tǫ ± 3 – questionable (warning) result
Zscorę ± 3 – unsatisfactory result

Full Statistical Reports for Monitors

NEWTOWNABBEY ANTRIM ROAD
01 January to 31 December 2012

Data have been fully ratified by Ricardo-AEA between 01/04/2012-31/12/2012.
Customer supplied data between 01/01/2012-31/03/2012)

POLLUTANT	NO_X	NO	NO_2
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	8519
Maximum 15-minute mean	1280 µg m^{-3}	695 µg m^{-3}	241 µg m^{-3}
Maximum hourly mean	1112 µg m^{-3}	596 µg m^{-3}	223 µg m^{-3}
Maximum running 8-hour mean	880 µg m^{-3}	462 µg m^{-3}	175 µg m^{-3}
Maximum running 24-hour mean	428 µg m^{-3}	214 µg m^{-3}	112 µg m^{-3}
Maximum daily mean	422 µg m^{-3}	211 µg m^{-3}	112 µg m^{-3}
Average	90 µg m^{-3}	32 µg m^{-3}	42 µg m^{-3}
Data capture	97.0 %	97.0 %	97.0 %

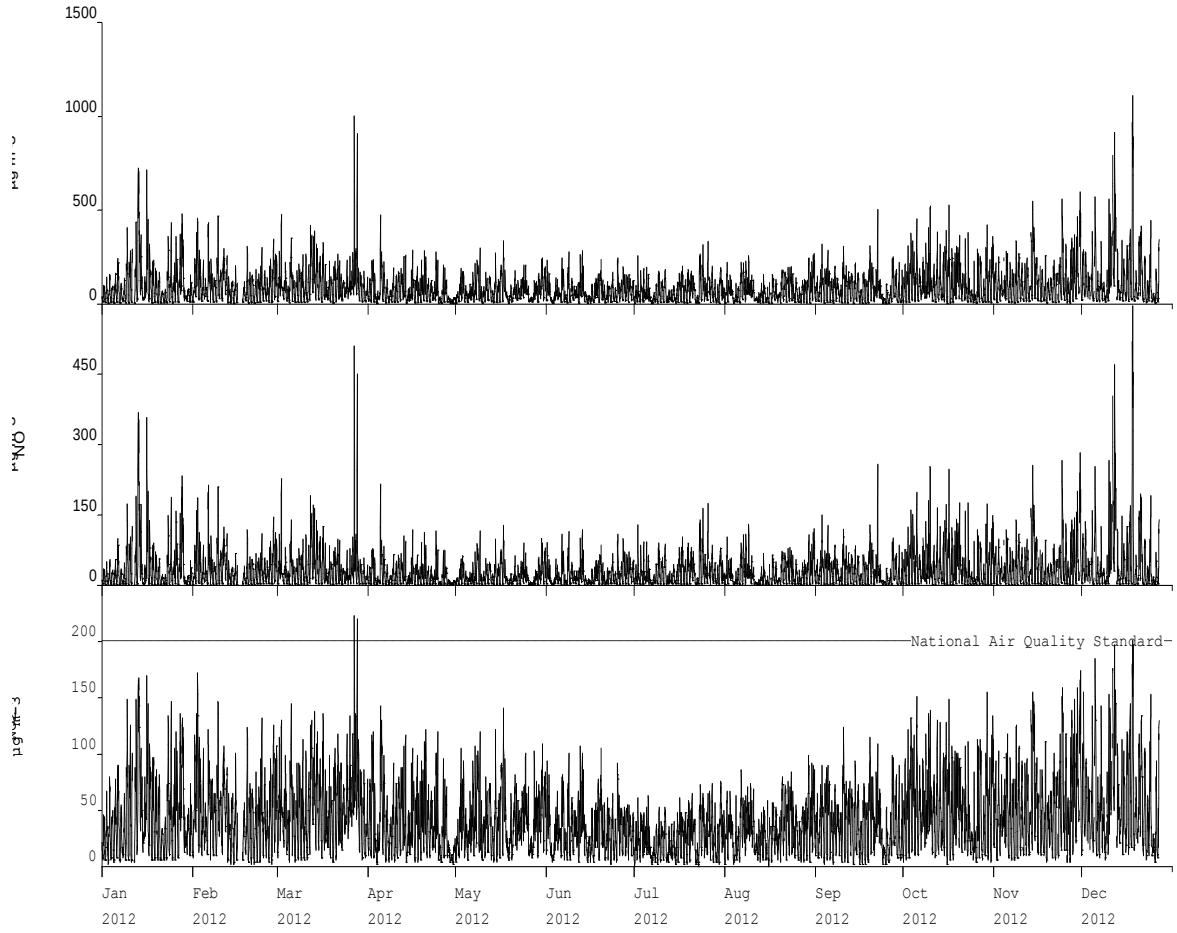
All gaseous pollutant mass units are at 20'C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.
NO_X mass units are NO_X as NO_2 µg m-3

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	YES	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	3	3

Note: For a strict comparison against the objectives there must be a data capture of >90% throughout the calendar year

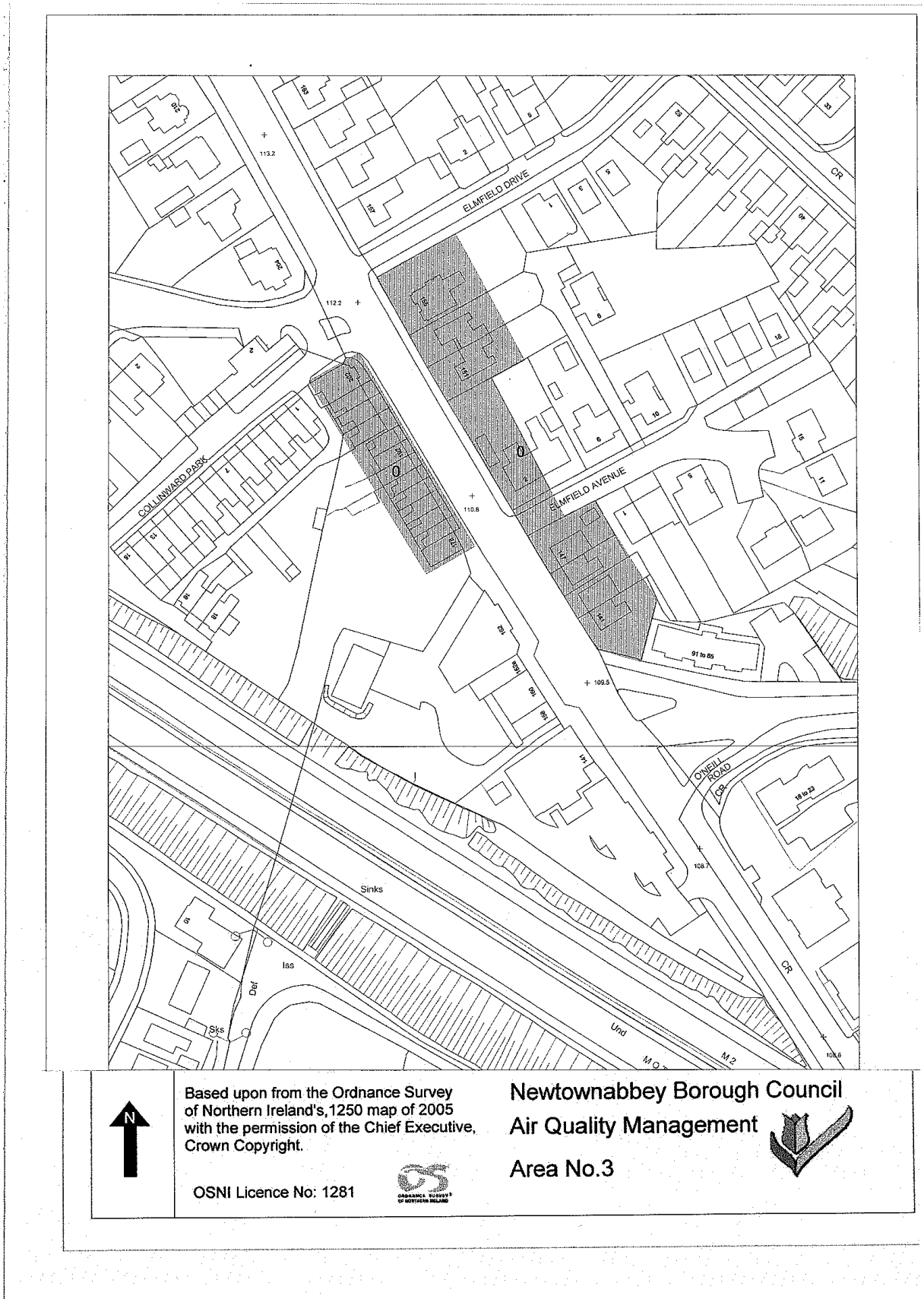
Produced by Ricardo-AEA on behalf of Newtownabbey

Newtownabbey Antrim Road
Hourly Mean Data for 01 January to 31 December 2012



Appendix B: Locations of AQMAs

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



Newtownabbey Borough Council

Air Quality Management Area Revocation Order 2012

Environment (Northern Ireland) Order 2002 Part III, Article 12 (4)(b)

Newtownabbey Borough Council hereby makes the following order under Part III, Article 12 (4) (b) of the Environment (Northern Ireland) Order 2002.

By an Order dated 28th January 2008, the Council made the Newtownabbey Borough Council Air Quality Management Area No. 2 Main Street, Ballyclare Order.

Whereas the Council is satisfied that as a result of its Updating and Screening Assessment of Air Quality dated April 2012 it appears that the Air Quality Objectives for Nitrogen Dioxide (annual and daily mean) are unlikely to be exceeded in Main Street, Ballyclare.

Therefore the Council, in exercise of the powers conferred on it by Part III, Article 12(4)(b) of the Environment (Northern Ireland) Order 2002, hereby makes the following order, revoking the 2008 Order which came into operation on 28th January 2008.

It is hereby ordered that:-

1. The designated area shown in red on the attached map which forms part of the Order known as Newtownabbey Borough Council Air Quality Management Area No.2 Main Street, Ballyclare Order 2008 shall be revoked in its entirety as an Air Quality Management Area.

2. The Order shall be cited as the Newtownabbey Borough Council Air Quality Management Area No.2 Main Street, Ballyclare Revocation Order 2012.

3. The Order shall come into force on 18th December 2012.

Given under the Corporate Seal of Newtownabbey Borough Council on 17th day of December 2012

Present when the Corporate Seal of the Newtownabbey Borough Council was affixed hereto:-

_____

Mayor

_____

Chief Executive

Newtownabbey Borough Council

Air Quality Management Area Revocation Order 2012

Environment (Northern Ireland) Order 2002 Part III, Article 12 (4)(b)

Newtownabbey Borough Council hereby makes the following order under Part III, Article 12 (4) (b) of the Environment (Northern Ireland) Order 2002.

By an Order dated 28th January 2008, the Council made the Newtownabbey Borough Council Air Quality Management Area No.4 Sandyknowes Order.

Whereas the Council is satisfied that as a result of its Updating and Screening Assessment of Air Quality dated April 2012 it appears that the Air Quality Objectives for Nitrogen Dioxide (annual and daily mean) are unlikely to be exceeded at Sandyknowes.

Therefore the Council, in exercise of the powers conferred on it by Part III, Article 12(4)(b) of the Environment (Northern Ireland) Order 2002, hereby makes the following order, revoking the 2008 Order which came into operation on 28th January 2008.

It is hereby ordered that:-

4. The designated area shown in red on the attached map which forms part of the Order known as Newtownabbey Borough Council Air Quality Management Area No.4 Sandyknowes Order 2008 shall be revoked in its entirety as an Air Quality Management Area.

5. The Order shall be cited as the Newtownabbey Borough Council Air Quality Management Area No.4 Sandyknowes Revocation Order 2012.

6. The Order shall come into force on 18th December 2012.

Given under the Corporate Seal of Newtownabbey Borough Council on 17th day of December 2012.

Present when the Corporate Seal of the Newtownabbey Borough Council was affixed hereto:-

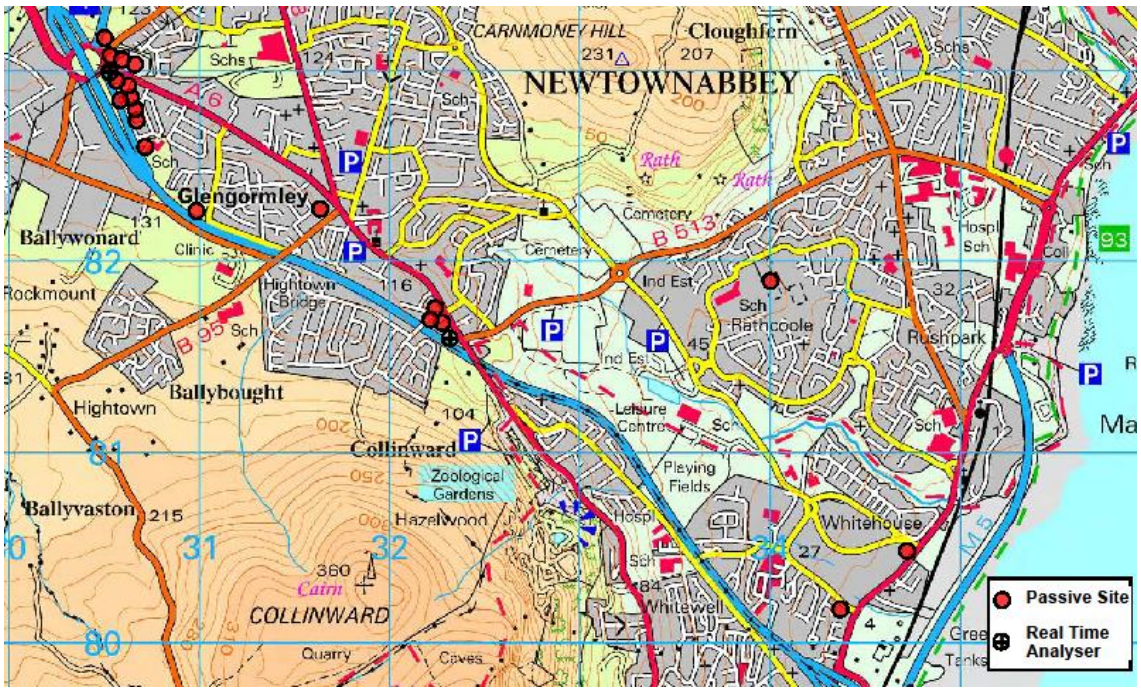
_____

Mayor

_____

Chief Executive

Appendix C: Location of Monitoring Sites



Antrim Road, Elmfield

Appendix D: Monthly Diffusion Tube Results 2012

	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Site 1	33.80	34.12	41.69	28.05	25.98	28.87	19.69			33.40	38.24	29.05
Site 59		35.03	36.90	30.93	23.06	28.89	18.29	26.51		34.46	38.51	32.09
Site 57	45.84	47.99	*0.65	81.32	33.43	33.68	31.85	48.50	42.75	42.94	56.34	44.59
Site 12	43.33	45.73	46.04	35.83	31.79	35.28	37.05	41.56	44.58	43.82	54.67	40.94
Site 8	25.41	24.70	22.97	11.58	9.98	10.46	10.01	14.58	12.56	17.68	21.35	27.79
Site 11	45.31	46.85	48.98	46.49	28.61	31.02	34.08	36.77	37.28	41.33	47.59	41.55
Site 16	32.21	29.87	35.87	29.69	27.80	31.80	24.52	30.39	24.04	34.96	31.59	
Site 20	41.58	40.85	40.01	29.20	24.52	24.01	23.21	24.11	25.68	28.31	41.33	32.28
Site 36	37.84	40.07	41.50	34.42	29.38	25.33	26.38	28.50	32.35	38.50	44.82	33.49
Site 37	41.77	34.21	40.04	35.33	29.60	27.50	27.12	28.13	35.97	36.72	41.91	43.85
Site 38	38.02	40.40	37.80	31.15	29.07	27.11	28.13	28.09	36.63	38.37	42.44	45.90
Site 58	55.92	59.43	69.82	41.87	36.77	40.25	38.42	45.92	40.23	53.53	56.64	74.92
Site 46	42.53	46.91	55.32	35.61	15.89	37.22	34.14	39.47	36.59	42.29	46.72	39.64
Site 47	50.88	57.06	51.81	49.24	34.18	30.45	32.71	36.83	41.60			37.72
Site 48	46.99	46.99	42.28	35.36	28.17	28.56	28.59	31.65	33.37	39.27	43.78	37.33
Site 49	36.63	34.32	35.26	27.39	22.10	20.60	23.18	22.88	26.07	28.79	35.42	24.47
Site 50	44.74	49.38	45.21	27.89	19.29	25.06	29.47	35.13	34.78	35.68	43.77	42
Site 51	36.48	38.34	43.2	26.08	28.42	27.62	28.27	28.93	28.70	35.41	38.64	28.58
Site 56	39.53	38.55	33.15	29.90	20.27	23.44	19.96	24.59	24.75	31.07	38.56	31.56
Site 60	43.08	46.27	50.04	36.21	32.17	34.44	32.84	34.69	38.74	41.81	43.70	37.25
Site 61	47.67	46.06	49.34	35.93	34.66	33.19	33.63	35.13	35.43	42.49	42.80	35.52

* The result for April is double the expected result because it was exposed for 2 months and the tube due to be exposed for April was returned to the lab instead of being located which explains the result for tube 57 in March of 0.6ugm^{-3} which is at blank levels.

Tubes 57 and 12 are co-located and the sum of the results for tube 12 in March and April was 82ugm^{-3}, this is similar to the result obtained in April for tube 57 of 81ugm^{-3} further confirming that tube 57 was exposed for 2 months.