



# 2014 Air Quality Progress Report for Newtownabbey Borough Council

In fulfillment of Environment (Northern Ireland) Order  
2002

Local Air Quality Management

September, 2014

**Newtownabbey Borough Council**

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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 3, Antrim Road, Elmfield**

Results of Automatic Monitoring for nitrogen dioxide showed an annual mean concentration of  $39\mu\text{g}/\text{m}^3$  which has continued to steadily decrease from the previous years and is now below the annual mean objective of  $40\mu\text{g}/\text{m}^3$ . There were no exceedances of the hourly mean nitrogen dioxide objective. Results of diffusion tube monitoring on the façade of the relevant location (Sites 60 and 61) were again well 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. Monitoring will cease at the end of 2014 at eight sites (Site 1,11,46,47,48,49,50,56) due to consistent results below the annual mean objective.

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 Updating and Screening Assessment Report in April 2015.

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

**Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in Northern Ireland**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> ) (gravimetric)	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005



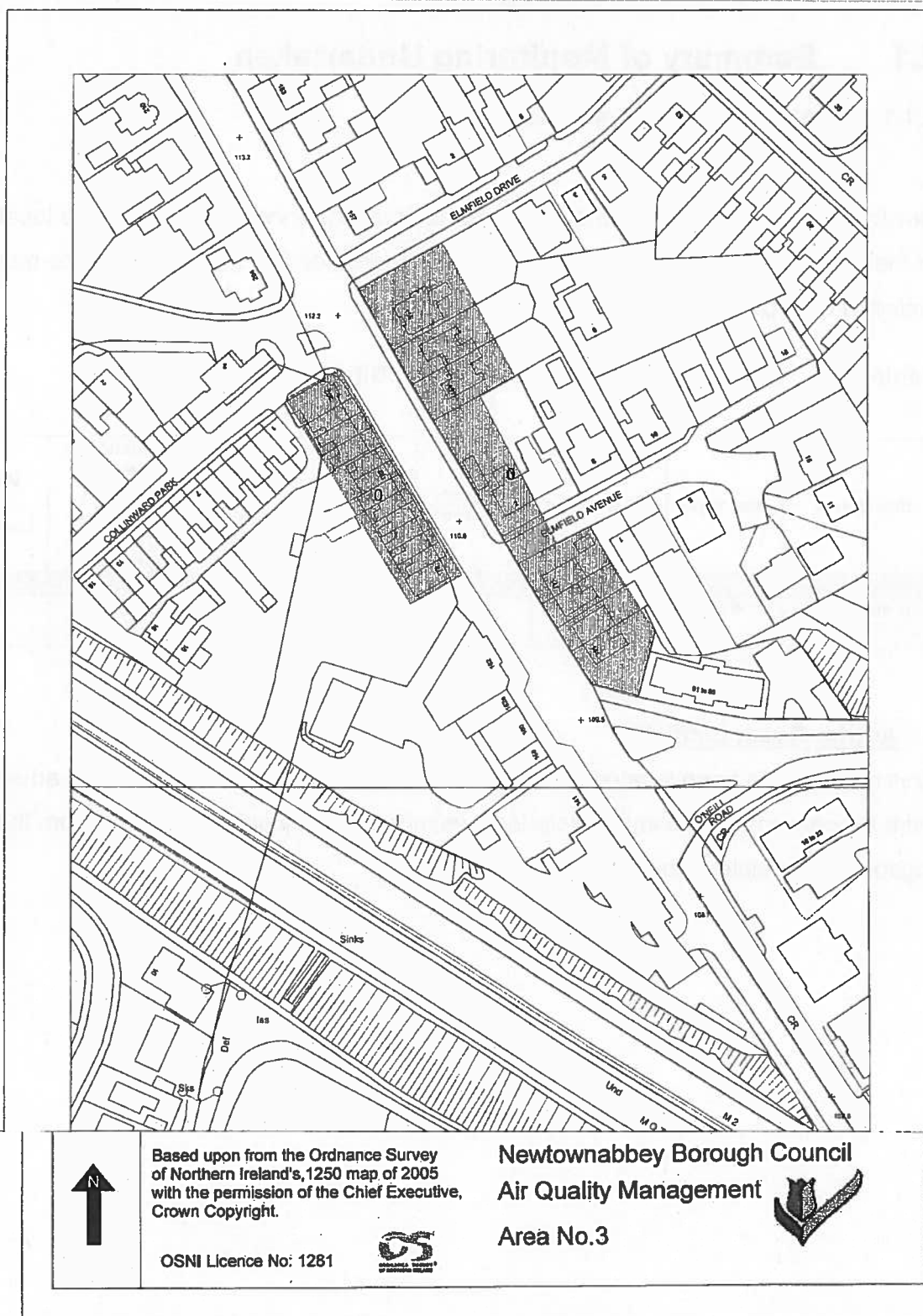
## 1.4 Summary of Previous Review and Assessments

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: <ul style="list-style-type: none"> <li>• Ballyclare</li> <li>• Antrim Road, Elmfield</li> <li>• Sandyknowes</li> </ul>
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;	

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		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	
Updating and Screening Assessment	April 2012	1. Exceedances of annual mean and 1 hour objective at Antrim Road, Elmfield; 2. No exceedances at Ballyclare or Sandyknowes. Revocation of both AQMAs.	
Action Plan Progress Report	October 2012		
Progress Report	Dec 2013	Exceedances of annual mean at Antrim Road, Elmfield	

Figure 1.1 Map of AQMA – Antrim Road, Elmfield



## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Newtownabbey Borough Council has one automatic monitoring station. 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 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?
Antrim Road	Roadside	332305 381697	NO <sub>2</sub>	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 14 nitrogen dioxide diffusion tubes across the Borough. Monitoring was ceased at sites 59,16,20,36,37,38 and 51 in December 2012.

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 in Appendix C.

The diffusion tube data is presented in Table 2.5 with exceedances of the 40  $\mu\text{g}/\text{m}^3$  annual mean  $\text{NO}_2$  highlighted in bold.

In 2013 the diffusion tubes were analysed by Gradko Services using 20% triethylamine in water.

QA/QC details which include the bias adjustment factor for 2013 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)
<b>Site 1</b> Main Street, Ballyclare	Roadside	328854 391134	NO <sub>2</sub>	N	N	Y (located on property)	2m
<b>Site 57</b> 7 Sandyholme Way	Roadside	330514 382939	NO <sub>2</sub>	N	N	Y (5m)	9m
<b>Site 12</b> 7 Sandyholme Way	Roadside	330514 382939	NO <sub>2</sub>	N	N	Y (5m)	9m
<b>Site 8</b> Braden Heights, Rathcoole	Urban Background	333898 381926	NO <sub>2</sub>	N	N	Y (5m)	n/a
<b>Site 11</b> 44 Sandyknowes Avenue	Roadside	330675 382586	NO <sub>2</sub>	N	N	Y (7m)	7m
<b>Site 46</b> 12 Collinbridge Road	Roadside	332193 381666	NO <sub>2</sub>	N	N	Y (located on property)	9m
<b>Site 47</b> 13 Sandyholme Park	Roadside	330554 382848	NO <sub>2</sub>	N	N	Y (7m)	7m
<b>Site 48</b> 24 Sandyknowes Avenue	Roadside	330631 382729	NO <sub>2</sub>	N	N	Y (located on property)	17m
<b>Site 49</b> 6 Sandyknowes Gardens	Urban Background	330641 382771	NO <sub>2</sub>	N	N	Y (located on property)	55m
<b>Site 50</b> 45 Burney's Lane	Roadside	331025 382224	NO <sub>2</sub>	N	N	Y (located on property)	17m
<b>Site 56</b> 5 Sandyholme Park	Roadside	330589 382908	NO <sub>2</sub>	N	N	Y (7m)	68m
<b>Site 58</b> Lamp-post, 198 Antrim Road Elmfield	Roadside	332305 381697	NO <sub>2</sub>	Y	N	Y (3m)	1.7m
<b>Site 60</b> 196 Antrim Road	Roadside	332305 381697	NO <sub>2</sub>	Y	N	Y (located on Property)	4m
<b>Site 61</b> 196 Antrim Road	Roadside	332305 381697	NO <sub>2</sub>	Y	N	Y (located on property)	4m

## 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 2009 and Table 2.4 compares the results with the 1 hour Mean Objective.

**Table 2.3 Results of Automatic Monitoring for NO<sub>2</sub> Comparison with Annual Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture 2013 %	Annual Mean Concentration $\mu\text{g}/\text{m}^3$				
				2009	2010	2011	2012	2013
Antrim Rd, Elmfield	Roadside	Y	90	68	46	43	42	39

**Table 2.4 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with 1-hour Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture 2013 %	Number of Exceedences of Hourly Mean ( $200 \mu\text{g}/\text{m}^3$ )				
				2009	2010	2011	2012	2013
Antrim Rd, Elmfield	Roadside	Y	90	11	3	7	3	0

Exceedances of the  $40 \mu\text{g}/\text{m}^3$  annual mean nitrogen dioxide objective and cases where there are more than the permitted 18 exceedances of the  $200 \mu\text{g}/\text{m}^3$  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 1<sup>st</sup> January 2012. All measurements were in the Low Band. The annual data capture (bottom line) just met the 90% target because there was an analyser fault 01 - 23 January 2013.

**Second table – Air Quality Exceedences.**

There were no exceedences of the NO<sub>2</sub> annual mean air quality standard (40 µg m<sup>-3</sup>) or the hourly mean standard (200 µg m<sup>-3</sup>) at Antrim Road, Elmfield.

**Figure 2.3 Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Antrim Road, Elmfield Automatic Monitoring Site**

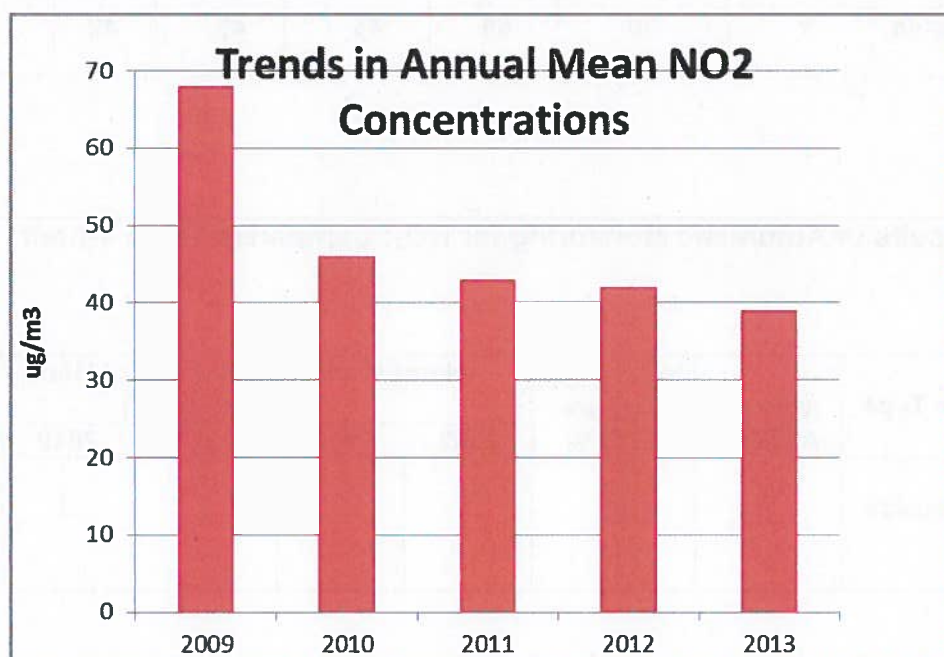


Figure 2.3 shows the Trends in Annual Mean Nitrogen Dioxide Concentrations measured at the Antrim Road, Elmfield monitoring site. In 2010 the sample inlet was moved from the roadside to within 1m of the façade of the relevant location and this resulted in a significant decrease in the concentrations.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



decrease in concentrations at the site. In 2013 the concentration is now below the annual mean objective of  $40 \mu\text{g m}^{-3}$

### Diffusion Tube Monitoring Data

Table 2.5 provides all nitrogen dioxide diffusion tube monitoring data for 2013 and Table 2.6 provides all data collected since 2009.

Exceedances of the  $40 \mu\text{g/m}^3$  annual mean nitrogen dioxide objective are highlighted in bold.

Table 2.5 Results of NO<sub>2</sub> Diffusion Tubes 2013 (full monthly data sheets 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 (national Bias Adjustment factor = 0.95)	
								2013 (µg/m <sup>3</sup> )	
Site 1	Main Street, Ballyclare	Roadside	N		12 months		N	28.74	
Site 57	7 Sandyholme Way	Roadside	N	Collocated with Site 12	10 months		Y	38.30*	
Site 12	7 Sandyholme Way	Roadside	N	Collocated with Site 57	11 months		Y	35.4*	
Site 8	Braden Heights, Rathcoole	Urban Background	N		12 months		N	15.70	
Site 11	44 Sandyknowes Avenue	Roadside	N		11 months		Y	32.10*	
Site 46	12 Collinbridge Road	Roadside	N		11 months		N	32.92	
Site 47	13 Sandyholme Park	Roadside	N		11 months		Y	33.30*	
Site 48	24 Sandyknowes Avenue	Roadside	N		11 months		N	33.86	
Site 49	6 Sandyknowes Gardens	Urban Background	N		11 months		N	26.10	
Site 50	45 Burney's Lane	Roadside	N		11 months		N	33.87	
Site 56	5 Sandyholme Park	Roadside	N		11 months		N	24.63	

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 (national Bias Adjustment factor = 0.95)	
								2013 ( $\mu\text{g}/\text{m}^3$ )	
Site 58	Lamp-post, 198 Antrim Road, Elmfield	Roadside	Y		11 months		Y	34.8*	
Site 60	196 Antrim Road	Roadside	Y	Collocated	11 months		N	33.02	
Site 61	196 Antrim Road	Roadside	Y	Collocated	11 months		N	33.80	

In bold, exceedence of the  $\text{NO}_2$  annual mean AQS objective of  $40\mu\text{g}/\text{m}^3$ .

\*Distance Correction Calculations in Appendix E

Table 2.6 Results of NO<sub>2</sub> Diffusion Tubes (2009 to 2013)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m <sup>3</sup>				
			2009 (Bias Adjustment Factor = 0.9)	2010 (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)	2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 0.95)
Site 1 Main Street, Ballyclare	Roadside	Y	29	32	27	30.4	28.74
Site 57 Sandyholme Way	Roadside	Y	37	40	40	40.74	38.30*
Site 12 Sandyholme Way	Roadside	Y	38	40	40	40.05	35.40*
Site 8 Braden Heights, Rathcoole	Urban Background	N	17	19	16	16.72	15.70
Site 11 Sandyknowes Avenue	Roadside	N	35	41	37	38.87	32.10*
Site 46 12 Collinbridge Road	Roadside	N	37	37	36	37.79	32.92
Site 47 13 Sandyholme Park	Roadside	Y	39	47	41	40.56	33.30*
Site 48 24 Sandyknowes Avenue	Roadside	N	29	35	35	35.39	33.86

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$				
			2009 (Bias Adjustment Factor = 0.9)	2010 (Bias Adjustment Factor = 0.96)	2011 (Bias Adjustment Factor = 0.92)	2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 0.95)
<b>Site 49</b> Sandyknowes Gardens	Urban Background	N	26	31	27	27.97	26.10
<b>Site 50</b> 45 Burney's Lane	Roadside	N	32	36	37	34.59	33.87
<b>Site 56</b> 5 Sandyholme Park	Roadside	N	27	32	30	28.43	24.63
<b>Site 58</b> Lamp-post, 198 Antrim Road, Elmfield	Roadside	Y	47	47	48	49.10	34.8*
<b>Site 60</b> 196 Antrim Road	Roadside	Y	32	42	39	37.7	33.02
<b>Site 61</b> 196 Antrim Road	Roadside	Y	31	41	38	37.75	33.80

In bold, exceedence of the  $\text{NO}_2$  annual mean AQS objective of  $40\mu\text{g}/\text{m}^3$

\*Distance Corrected for 2013 only

**2.2.2 Particulate Matter (PM<sub>10</sub>)**

Newtownabbey Borough Council does not carry out PM<sub>10</sub> monitoring.

**2.2.3 Sulphur Dioxide (SO<sub>2</sub>)**

Newtownabbey Borough Council does not carry out SO<sub>2</sub> 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 are now below the objective level at Antrim Road, Elmfield. This will be monitored and the AQMA should remain in place until reviewed again in the next USA.

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 their 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

Table 5.1 is the Action Plan Progress Report

Table 5.1 Action Plan Progress Report

Action Plan Measure	Lead Authority	Original Timescale	Implementation	On Target?	Progress in last 12 months (2013)
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 2012/13 NBC have purchased 2 new LGV vehicles, and these have been to Euro 5 standards. Also, 5 new medium van sized vehicles and 2 small van sized vehicles, all of which were reviewed with regard to their emission levels.  NBC also continue to procure options for alternative fuel vehicles and as the market industry advances with electric vehicles, would hope availability of potential new vehicle options will be more readily available in the future.
2.To continue to improve the bus fleet by providing Eco-Driving Training and installing Driver Monitoring Devices	Translink	Ongoing	No of drivers trained and devices fitted	Completed	All drivers have received Eco-Driving Training and Eco-Driving is a continual part of their CPC training.  The Eco-Driving Project has been

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To continue the current practice of cleaning up the bus fleet as part of the planned fleet renewal	Newtownabbey Borough Council	October 2011 & ongoing	No of Vehicle Emission Testing Events	Yes	<p>implemented across the company and went into full operation from April 2013.</p> <p>Buses are fitted with RIBAS System which monitors Over-Revving, Idling, Excessive Braking, Accelerating and Steering. Drivers then receive regular reports on driving performance.</p> <p>There are no longer any pre Euro or Euro 1's in the Newtownabbey Fleet.</p>
3. Carry out vehicle emission testing	Newtownabbey Borough Council	October 2011 & ongoing	No of Vehicle Emission Testing Events	Yes	<p>Vehicle Emission Testing was carried out in October 2013 and with approximately 100 cars tested. A further Vehicle Emission Event is planned for Oct 2014.</p>

## Newtownabbey Borough Council

4. Introduce a Park and Ride Scheme at Ballyhenry Road	DRD Road Service	1-2 years (depending on approval)	Park & Ride Scheme implemented	No	Approval granted but scheme not going ahead at the present time.
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	7 schools in Newtownabbey participated in the Walk to School Week in May 2013. All received promotional material on benefits to health and environment of walking to School. Staff from Newtownabbey Borough Council participated in Travelwise 10 Minute Cycle Challenge.
6. Develop a Green Travel Plan for borough	Newtownabbey Borough Council	October 2011	Production of Green Travel Plan for council employees initially	Yes	<p>Newtownabbey Borough Council's Workplace Travel Plan was launched October 2011 and the action plan is currently being implemented. Actions in 2013 included:</p> <ul style="list-style-type: none"> <li>• 5 staff trained as cycle leaders to provide level 1,2 &amp; 3 training to staff or public</li> <li>• Bike hire at Council sites</li> <li>• Car Share site promoted in intranet and Staff Magazine</li> <li>• Staff induction training includes information on Bike to Work Scheme, Car Share and Walk/Cycle Site.</li> <li>• Staff Cycle Training was delivered in June 2013.</li> <li>• The Newtownabbey Way supports all mode of transport with a Blind cycle</li> </ul>



## Newtownabbey Borough Council

					<p>ride in June 2014</p> <ul style="list-style-type: none"> <li>Walking groups in Newtownabbey walked 10 mile on an average walk</li> <li>Guided walks from Leisure Centres on a weekly basis.</li> <li>Staff working with Tricycle in 6 schools</li> <li>Information on sustainable transport given at the Shoreline Festival and 4 promotions carried out</li> <li>A Strategy developed with schools and businesses to develop Travel Plans</li> </ul> <p>In addition over 900 Primary 7 pupils from local primary schools received information on bike safety and walking and cycling routes in Newtownabbey at our annual Bee Safe event in May 2013.</p> <p>As part of National Bike Week 15-23 June a kids Cycle Challenge was delivered in the Valley Park, Newtownabbey on 22 June 2013</p>
7. Deliver the 'Air Quality Schools Initiative' to St Bernard's Primary School	Newtownabbey Borough Council	March 2012	Air Quality Initiative delivered	Completed	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	Information provided on Council Website. No specific Information Event to be organised at present.

## Newtownabbey Borough Council

9. Provide information on the Council Website to encourage people to change their travel behaviour	Newtownabbey Borough Council	October 2011 and ongoing	Information provided	Yes	A dedicated Energy page has been incorporated in council website which includes information on Green Transport. It is being further developed to include information on sustainable travel. Detailed information on sustainable travel is available on staff intranet.
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	108 Planning Applications commented on

## **6 Conclusions and Proposed Actions**

### **6.1 Conclusions from New Monitoring Data**

#### **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 2013 showed an annual mean concentration of  $39 \mu\text{g}/\text{m}^3$  which has continued to steadily decrease from the previous years. There were no 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  $41.25 \mu\text{g}/\text{m}^3$ . However when the Nitrogen Dioxide Fall off with Distance Calculator was used the predicted annual mean concentration is  $34.8 \mu\text{g}/\text{m}^3$ . (Appendix E)

Diffusion tubes 60 and 61 are located on the façade of the relevant location and they showed an annual mean concentrations of  $33.02$  and  $33.80 \mu\text{g}/\text{m}^3$  respectively.

#### **Other Monitoring Results**

No other diffusion tube sites exceeded the annual mean concentration of  $40 \mu\text{g}/\text{m}^3$  when distance corrected.

## **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 monitoring at Sites 1,11,46,47,48,49,50,56 at the end of 2014 due to results consistently being below the annual mean objective.
- Submit Updating and Screening Assessment Report in April 2015

## 7 References

Local Air Quality Management Technical Guidance TG(09)

Policy Guidance LAQM PG Northern Ireland (09)

Newtownabbey Borough Council Progress Report 2013

Newtownabbey Borough Council Action Plan Progress Report 2012

<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

## Appendices

Appendix A QA/QC Data

Appendix B Location of Air Quality Management Area

Appendix C Locations of Monitoring Sites

Appendix D Monthly Diffusion Tube Results

Appendix E Nitrogen Dioxide Fall off With Distance Calculator

## Appendix A: QA:QC Data

### Diffusion Tube Bias Adjustment Factors

#### Diffusion Tube Monitoring

In 2013 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 0.95 was calculated from 36 studies from Gradko Services for 2013 using the diffusion tube spreadsheet tool, for the diffusion tubes study.

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 09/14							
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of March 2015							
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods						This spreadsheet will be updated every few months, the factors may therefore be subject to change. This should not discourage their immediate use							
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet						LAQM Helpdesk Group							
This spreadsheet will be updated every few months, the factors may therefore be subject to change. This should not discourage their immediate use						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.							
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AEGQM 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 <sup>2</sup> 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.		If you have your own co-location study then see footnote <sup>1</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953							
Analysed By <sup>1</sup>		Method <sup>2</sup> (To make your selection, please click from the pop-up list)		Year <sup>3</sup> (To make your selection, please click from the pop-up list)		Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>4</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Gradko		20% TEA in water		2013		R	NOTTINGHAM CITY COUNCIL	12	43	44	-2.2%	G	1.02
Gradko		20% TEA in water		2013		R	NOTTINGHAM CITY COUNCIL	10	41	39	6.4%	G	0.94
Gradko		20% TEA in water		2013		R	NOTTINGHAM CITY COUNCIL	11	43	42	1.9%	G	0.98
Gradko		20% TEA in water		2013		R	Brighton & Hove City Council	11	62	60	1.9%	G	0.98
Gradko		20% TEA in water		2013		R	Brighton & Hove City Council	11	41	30	37.5%	G	0.73
Gradko		20% TEA in water		2013		KS	Marplebone Road Intercomparison	12	101	81	25.8%	G	0.80
Gradko		20% TEA in water		2013		R	Brighton & Hove City Council	9	54	45	19.6%	G	0.84
Gradko		20% TEA in water		2013		R	Wiltshire Council	12	40	36	10.1%	G	0.91
Gradko		20% TEA in water		2013		R	Wiltshire Council	11	41	37	11.6%	G	0.90
Gradko		20% TEA in water		2013		R	Wiltshire Council	12	39	49	-20.0%	G	1.25
Gradko		20% TEA in water		2013		R	Breckland Council	12	32	33	-3.3%	G	1.03
Gradko		20% TEA in water		2013		R	City of Lincoln Council	12	43	43	0.5%	G	0.99
Gradko		20% TEA in water		2013		R	Monmouthshire County Council	12	41	34	19.0%	G	0.84
Gradko		20% TEA in water		2013		R	Lancaster City Council	12	44	40	9.9%	G	0.91
Gradko		20% TEA in water		2013		R	Lancaster City Council	12	36	34	6.1%	G	0.94
Gradko		20% TEA in water		2013		UB	Luton Borough Council	12	36	33	7.1%	G	0.93
Gradko		20% TEA in water		2013		R	Pendle	12	35	38	-8.7%	P	1.10
Gradko		20% TEA in water		2013		R	North Ayrshire Council	12	32	32	-0.1%	G	1.00
Gradko		20% TEA in water		2013		KS	New Forest DC	11	46	40	13.4%	G	0.88
Gradko		20% TEA in water		2013		R	New Forest District Council	11	34	28	19.4%	G	0.84
Gradko		20% TEA in water		2013		UB	Southampton City Council	12	30	30	-0.5%	G	1.00
Gradko		20% TEA in water		2013		UC	Belfast City Council	11	33	31	6.3%	G	0.94
Gradko		20% TEA in water		2013			Overall Factor <sup>2</sup> (36 studies)					Use	0.95

## QA/QC of Automatic Monitoring

In 2013 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<sub>x</sub> analyser is undertaken by Newtownabbey Borough Council fortnightly, using on-site certified calibration gas cylinders traceable to National Calibration Standards.

The 2013 summary for the Antrim Road, Elmfield monitor are provided below:

## Full Statistical Reports for Monitor

Produced by Ricardo-AEA on behalf of Newtownabbey

### ANTRIM ROAD 01 January to 31 December 2013

These data have been fully ratified by Ricardo-AEA

POLLUTANT	NO	NO <sub>2</sub>	NO <sub>x</sub>
Number Very High	-	0	-
Number High	-	0	-
Number Moderate	-	0	-
Number Low	-	7879	-
Maximum 15-minute mean	464 µg m <sup>-3</sup>	218 µg m <sup>-3</sup>	926 µg m <sup>-3</sup>
Maximum hourly mean	328 µg m <sup>-3</sup>	193 µg m <sup>-3</sup>	663 µg m <sup>-3</sup>
Maximum running 8-hour mean	172 µg m <sup>-3</sup>	128 µg m <sup>-3</sup>	378 µg m <sup>-3</sup>
Maximum running 24-hour mean	109 µg m <sup>-3</sup>	91 µg m <sup>-3</sup>	257 µg m <sup>-3</sup>
Maximum daily mean	101 µg m <sup>-3</sup>	86 µg m <sup>-3</sup>	240 µg m <sup>-3</sup>
Average	25 µg m <sup>-3</sup>	39 µg m <sup>-3</sup>	78 µg m <sup>-3</sup>
Data capture	89.9 %	89.9 %	89.9 %

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg m<sup>-3</sup>

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m <sup>-3</sup>	No	-
Nitrogen Dioxide	Hourly mean > 200 µg m <sup>-3</sup>	0	0



### QA/QC of diffusion tube monitoring

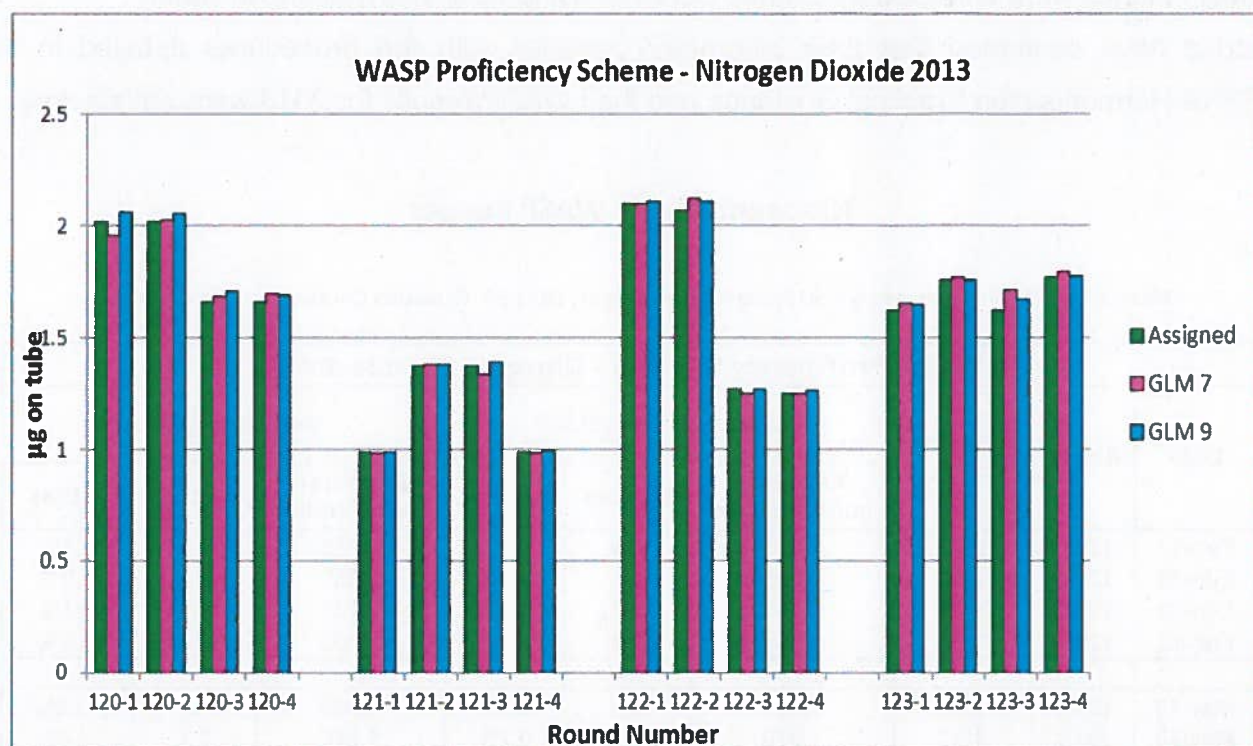
Diffusion tubes were analysed by Gradko Services using 20% triethylamine in water.

Gradko have confirmed that their laboratory complies with the procedures detailed in the DEFRA Harmonisation Practical Guidance and their WASP results for 2013 were satisfactory.

### Nitrogen Dioxide WASP Results

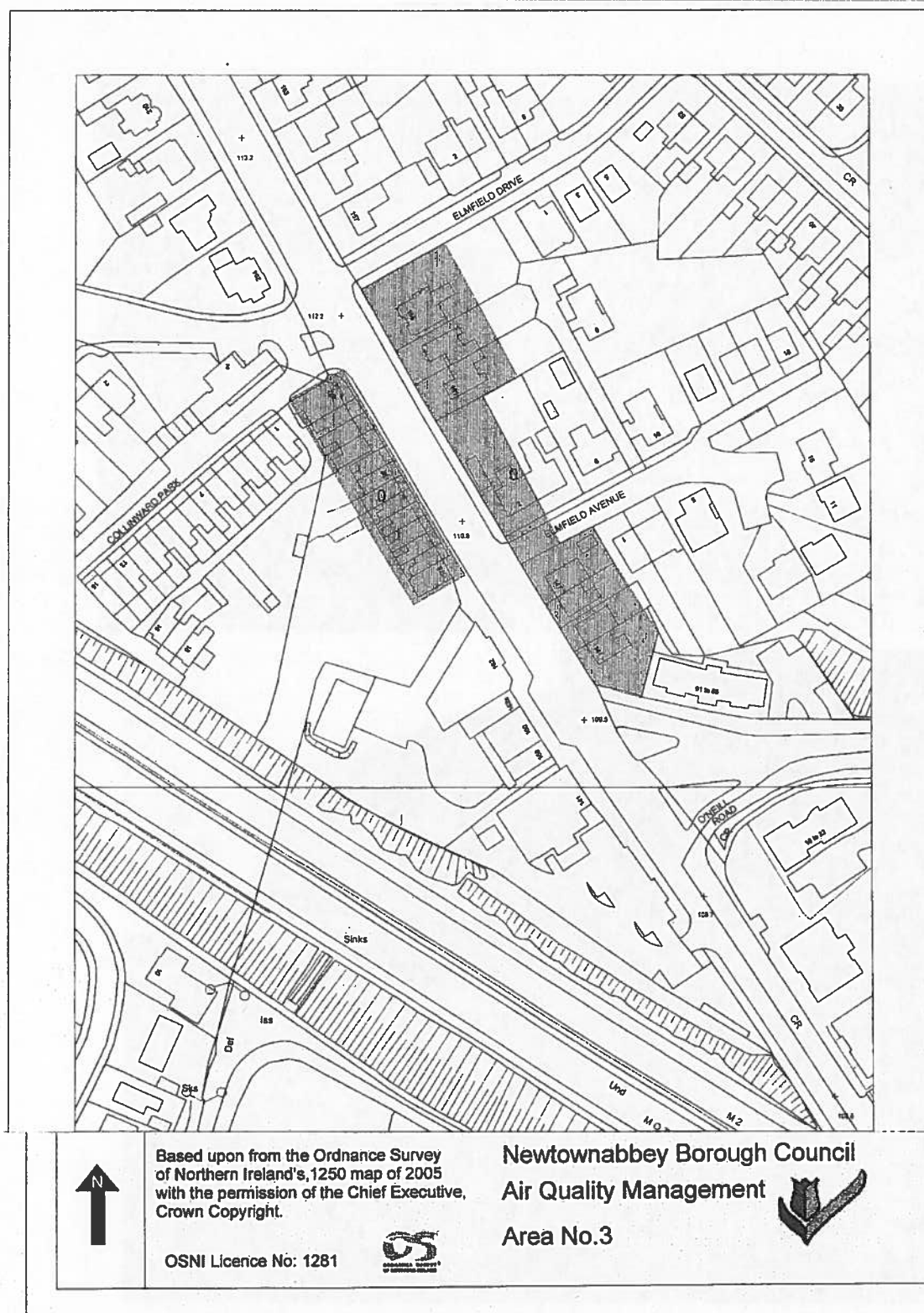
Methods: GLM 7 – Camspec M550 Spectrophotometer, GLM 9 – QuAAtro Continuous Flow analyser

WASP Proficiency Scheme - Nitrogen Dioxide 2013								
Date	Round	Assigned value	Camspec M550 - GLM 7			QuAAtro - GLM 9		
			Measured concentration	z-Score	% Bias	Measured concentration	z-Score	% Bias
Feb-13	120-1	2.02	1.956	-0.4	-3.2%	2.063	0.3	2.1%
Feb-13	120-2	2.02	2.026	0	0.3%	2.059	0.3	1.9%
Feb-13	120-3	1.66	1.681	0.2	1.3%	1.711	0.4	3.1%
Feb-13	120-4	1.66	1.698	0.3	2.3%	1.692	0.3	1.9%
May-13	121-1	0.99	0.984	-0.1	-0.6%	0.988	0	-0.2%
May-13	121-2	1.37	1.379	0.1	0.7%	1.380	0.1	0.7%
May-13	121-3	1.37	1.339	-0.3	-2.3%	1.392	0.2	1.6%
May-13	121-4	0.99	0.980	-0.1	-1.0%	0.995	0.1	0.5%
Aug-13	122-1	2.10	2.098	-0.01	-0.1%	2.113	0.19	0.6%
Aug-13	122-2	2.07	2.125	0.35	2.7%	2.108	0.24	1.8%
Aug-13	122-3	1.27	1.253	-0.19	-1.3%	1.269	-0.02	-0.1%
Aug-13	122-4	1.25	1.249	-0.05	-0.1%	1.263	0.10	1.0%
Nov-13	123-1	1.62	1.656	0.32	2.2%	1.649	0.26	1.8%
Nov-13	123-2	1.76	1.770	0.1	0.6%	1.760	0.02	0.0%
Nov-13	123-3	1.62	1.717	0.78	6.0%	1.672	0.41	3.2%
Nov-13	123-4	1.77	1.796	0.2	1.5%	1.777	0.06	0.4%



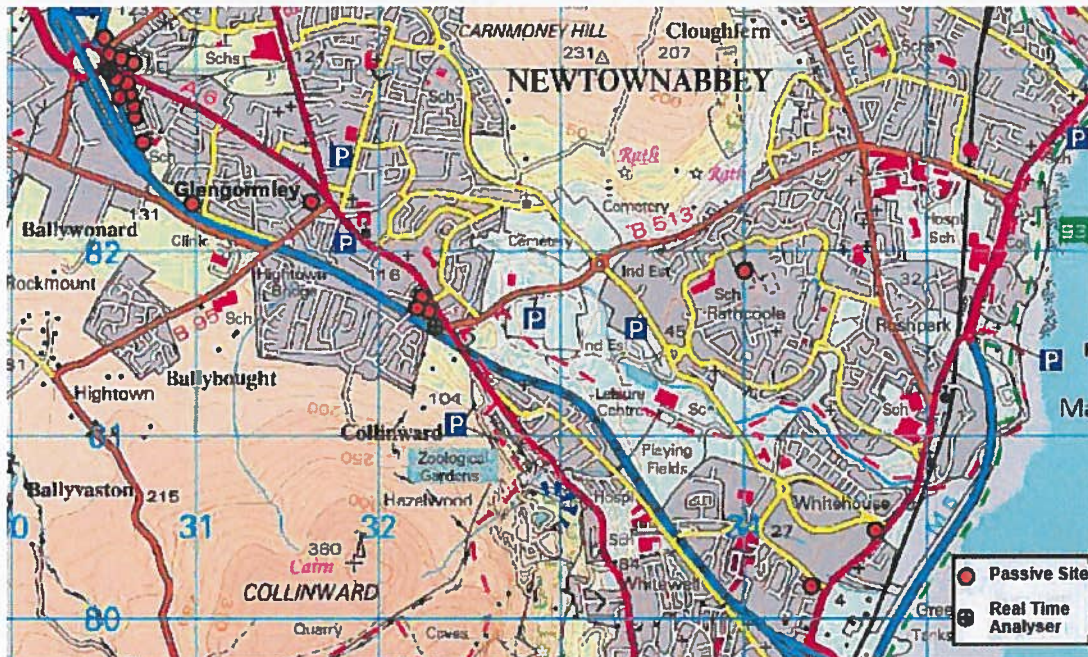
## Appendix B: Location of AQMA

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





## Appendix C: Location of Monitoring Sites



Antrim Road, Elmfield

## Appendix D: Monthly Diffusion Tube Results 2013

	Location	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
Site 1	Main Street, Ballyclare	35.34	39.20	34.58	27.76	23.47	27.78	19.93	20.94	31.40	36.96	37.74	27.92
Site 57	7 Sandyholme Way	48.24	38.47	33.35			41.32	41.69	45.75	40.52	49.92	56.73	55.51
Site 12	7 Sandyholme Way	31.93	41.43	32.26		38.18	41.47	41.34	56.99	39.12	34.44	56.48	43.56
Site 8	Braden Heights, Rathcoole	27.34	21.91	12.65	14.95	9.80	11.98	11.68	12.01	14.84	19.18	23.62	18.40
Site 11	44 Sandyknowes Avenue	41.43	42.78	29.93		34.48	36.40	32.15	37.90	41.28	34.27	72.12	32.50
	Lamport at Antrim, Elmfield												
Site 58	Analysar	54.96	45.53	40.17	35.82	35.14	34.76	38.3	44.18	44.53	47.79	63.19	36.70
Site 46	12 Collinbridge Road	40.07	42.21	41.12	31.87	37.60		35.9	36.31	39.59	42.05	57.24	40.95
Site 47	13 Sandyholme Park	44.20	41.97	35.69		40.41	33.82	32.43	43.57	35.10	41.03	61.80	42.82
Site 48	24 Sandyknowes Avenue	39.10	43.86	39.33		28.21	31.88	30.90	31.69	13.45	41.40	63.40	28.86
Site 49	6 Sandyknowes Gardens	27.18	32.09	26.39		25.33	23.08	23.75	24.23	26.65	28.77	38.68	25.67
Site 50	45 Burney's Lane	40.97	37.79	28.83		27.18	30.44	32.09	33.29	35.50	39.82	54.55	31.69
Site 56	5 Sandyholme Park	36.69	33.41	32.90		28.15	26.36	21.83	25.73	28.65	31.48	40.73	27.45
Site 60	On downpipe 196 Antrim Rd	38.55	38.50	30.57	28.93	32.96	33.15		30.42	35.42	34.09	43.09	36.71
Site 61	On downpipe 196 Antrim Rd	37.37	41.78	34.23	29.68	33.92	36.73	30.40		33.75	31.51	46.44	35.60



## Appendix E: NO<sub>2</sub> Fall off with Distance Calculator Results

### Diffusion Tube 57 ( 7 Sandyholme Way)

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b> (Note 1)	<b>9</b> metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b> (Note 1)	<b>14</b> metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b> (Note 2)	<b>13.84762</b> µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b> (Note 2)	<b>42.9</b> µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b> (Note 3)	<b>38.3</b> µg/m <sup>3</sup>

**Note 1:** In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


**Note 2:** The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

**Note 3:** The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11 Created by Dr Ben Marner, Approved by Prof Duncan Lawen. Contact: [benmarner@aqconsultants.co.uk](mailto:benmarner@aqconsultants.co.uk)

## Diffusion Tube 58 – Lamp post Antrim Road

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.7	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	(Note 1)	4.7	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	13.34	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	41.25	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	34.8	µg/m <sup>3</sup>

**Note 1:** In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


**Note 2:** The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

**Note 3:** The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner. Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

## Diffusion Tube 11 (44 Sandyknowes Avenue)

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	(Note 1)	7	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	(Note 1)	14	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	13.84762	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	37.59	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	32.1	µg/m <sup>3</sup>

**Note 1:** In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

**Note 2:** The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.


**Note 3:** The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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# Diffusion Tube 47 (13 Sandyholme Park)

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	7	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	14	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	13.84762	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	39.11	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	33.3	µg/m <sup>3</sup>

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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# Diffusion Tube 12 ( 7 Sandyholme Way)

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	9	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	14	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	13.84762	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	39.49	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	35.4	µg/m <sup>3</sup>

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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