Mid and East Antrim Borough Council

Updating And Screening Assessment 2015

Bureau Veritas Air Quality

May 2016

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Document Control Sheet

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Project number	6271498	

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2015 Updating and Screening Assessment for Mid and East Antrim Borough Council

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

May, 2016

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Report Reference number	Mid and East Antrim Borough Council 2015 Updating and Screening Assessment
Date	May 2016

Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Updating and Screening Assessment (USA) is a requirement of the Sixth Round of Review and Assessment for all local authorities. The Report has been undertaken in accordance with the Technical Guidance LAQM.TG(09) and associated tools.

This report considers monitoring data from 2014, assessing this against the Air Quality Strategy (AQS) objectives. It also considers any potential new pollutant emission sources that may have an impact on local air quality.

Two Air Quality Management Areas (AQMAs) are currently in force, one at Ballymena Ballykeel and one at Ballymena Linenhall Street due to exceedences of the AQS objectives for Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}). Following the conclusions of this report it is recommended that the present AQMA declarations should remain.

Results from automatic NO_2, PM_{10} and SO_2 monitoring showed that all AQS objectives continued to be met at the Ballymena Ballykeel and Ballymena North Road monitoring sites.

Results from passive NO_2 diffusion tube monitoring showed exceedences of the annual mean AQS objective at three locations; one within the existing Linenhall AQMA (BDT15), and two outside of any existing AQMAs (BDT7 and BDT17).

The Ballymena diffusion tubes BDT7 and BDT17 have been bias adjusted using the locally derived bias adjustment factor of 1.13, the national bias adjustment factor is 0.92. Using the national bias adjustment factor the annual mean concentrations at these locations are both below the NO_2 annual mean AQS objective. It is recommended that monitoring is continued in this area and a decision whether a Detailed Assessment should be completed within the 2016 Annual Progress Report (APR).

Mid and East Antrim Borough Council

Two new road links have been completed during 2015 within Mid and East Antrim Borough Council. Both schemes completed assessed air quality using the DMRB screening methodology. It was concluded for the schemes that the effect on local air quality would be of minor significance for one scheme and of a net benefit from the second scheme.

Mid and East Antrim Borough Council has identified a biomass installation which may have the potential to impact the air quality within the Borough. Two nuisance complaints have been made against the installation and are currently being investigated. Currently the required emissions data is not available to complete a screening assessment of the installation, although the Council would hope to be able to complete this in its 2016 APR.

The proposed actions from the Mid and East Antrim 2015 Updating and Screening Assessment are as follows:

- Continue to undertake both automatic and passive monitoring of NO_2, PM_{10} and SO_2 to identify future trends in concentration and any exceedences of the AQS objectives;
- The Ballymena Ballykeel and Ballymena Linenhall Street AQMAs will be retained, and monitoring will continue within the AQMAs to assess the need for retention of the AQMAs in the future;
- Continue to monitor at diffusion tube sites BDT7 and BDT17 to assess the need for a Detailed Assessment;
- Continue to gather emissions information for the identified biomass installation to determine the impact upon local air quality; and
- Proceed to an APR in 2016.

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1 Introduction

1.1 Description of Local Authority Area

The Borough of Mid and East Antrim was created on the 1st of April 2015 through the merging of three separate Boroughs; Ballymena Borough Council, Carrickfergus Borough Council and Larne Borough Council. Mid and East Antrim is located within County Antrim along the Eastern coast from Greenisland in the south to north of Carnlough, and stretching West to bound with Lough Beg. The main settlements within the Borough are Ballymena to the West, Larne to the East, and Carrickfergus to the South East.

The main source of air pollution within the Borough is from road traffic, with good road links to Belfast and its two associated airports and also to the seaports of Larne and Belfast. A number of homes within the Borough continue to burn solid fuel although this number has declined over the years due to the arrival of Phoenix piped natural gas and the Northern Island Housing Executive home improvement schemes.

There are currently two AQMA's in force within the Borough, both are located within Ballymena; Ballykeel AQMA and Linenhall Street AQMA. Ballykeel AQMA has been declared in respect of PM_{10} concentrations predicted by domestic fuel modelling, and Linenhall AQMA has been declared due to modelled and monitored concentrations of NO_2 being above the AQS annual mean objective. The boundaries of both of the AQMAs can be seen in Figure 1.1.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in the Environment (Northern Ireland) Order 2002, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an AQMA and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in Northern Ireland** are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in

Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	3.25 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 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
Particles (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

1.4.1 Ballymena Borough Council

Previous Assessment	Date completed	Summarised Outcomes
1st Stage Air Quality Review and Assessment	2000/01	SO_2 and PM_{10} from domestic fuel burning, PM_{10} and NO_2 from road traffic, and SO_2 from two industrial point sources to progress to 2nd Stage of the Air Quality Review.
2nd Stage Air Quality Review and Assessment	2003/04	Modelling completed in regards to domestic fuel burning confirmed that an AQMA be declared in respect of PM_{10} for two areas of concern, Ballykeel and Dunclug. Automatic and diffusion tube monitoring of SO_2 commenced. DMRB modelling confirmed there was no need to declare an AQMA due to road traffic sources of NO_2 or PM_{10}. GSS modelling for two industrial plants confirmed that SO_2 and PM_{10} objectives would not be exceeded.
3rd Stage Review and Assessment	2004	Two AQMA's, Ballykeel and Dunclug were declared in respect of PM_{10} concentrations on 25th October 2004. A real-time PM_{10} analyser was co-located with the existing SO_2 automatic monitor within the Ballykeel AQMA in December 2004.
4th Stage Review and Assessment	2004/05	Using updated fuel use data further modelling was completed regarding current and future PM_{10} and SO_2 concentrations as a result of domestic fuel combustion emissions. PM_{10} emissions arising from domestic fuel combustion were predicted to cause an exceedence of the annual and daily AQS objective at relevant receptors within the assessed areas. SO_2 emissions arising from domestic fuel combustion were not predicted to cause an exceedence of the AQS objectives at relevant receptors within the assessed areas.
LAQM Updating and Screening Assessment 2006	April 2006	Detailed assessment for PM_{10} arising from domestic solid fuel burning, in the two declared AQMAs continued. Co-location study undertaken with the NO_x real time analyser and NO_2 diffusion tubes.
LAQM Annual Progress Report 2007	2007	Ballykeel air quality monitoring station relocated to a best-fit location within the Ballykeel AQMA. Monitoring undertaken for consideration of revocation of the Dunclug AQMA and possible revocation/amendment of the Ballykeel AQMA. All NO_2 diffusion tubes were below the annual mean AQS objective using the national bias adjustment factor.

LAQM Annual Progress Report 2008	2008	Using the Gradko bias adjustment factor there were two locations that produced an exceedences of the NO_2 annual mean AQS objective; Linenhall Street and George Street and four further sites were close to the AQS objective. Of the six sites only four were considered to have relevant exposure close to them, a Detailed Assessment was commissioned to determine whether an AQMA needed to be declared. Both SO_2 and PM_{10} annual mean concentrations were below the AQS objective. FDMS upgrade to the Ballykeel analyser completed, to allow consideration to the revoking/amending of the Ballykeel AQMA.
LAQM Updating and Screening Assessment 2009	2009	A Detailed Assessment was completed for the Linenhall Street/George Street due to exceedences of the NO_2 annual mean AQS objective. The detailed assessment concluded that the area should be declared an AQMA. Due to fuel conversion undertaken by the NIHE the AQOs are now being achieved within the Dunclug and Ballymena AQMAs. It was proposed to revoke both AQMAs (subject to approval). The assessment of sources did not highlight any new areas of concern.
LAQM Annual Progress Report 2010	2010	A Further Assessment for NO_2 commissioned to review the newly declared AQMA. A Detailed Assessment commissioned with a view to revoke the AQMAs in Dunclug and Ballykeel.
LAQM Annual Progress Report 2011	2011	Following the Detailed Assessment decision reached to revoke the Dunclug AQMA, Ballymena AQMA to remain due to continuing increased levels of PM_{10}.
LAQM Updating and Screening Assessment 2012	2012	The updating and screening assessment showed that no significant actions are required in relation to air quality management for identified pollutants. NO_2 diffusion tube monitoring showed exceedences within the Linenhall Street AQMA. The North Road AQMS showed an annual mean NO_2 concentration below the annual mean AQS objective and there were no exceedences of the hourly AQS objective.
LAQM Annual Progress Report 2013	August 2014	The report identified that there were no exceedences of the annual mean AQS objective for either NO_2, SO_2 or PM_{10}. It was determined prudent to maintain both the Ballykeel and Linenhall Street AQMAs.

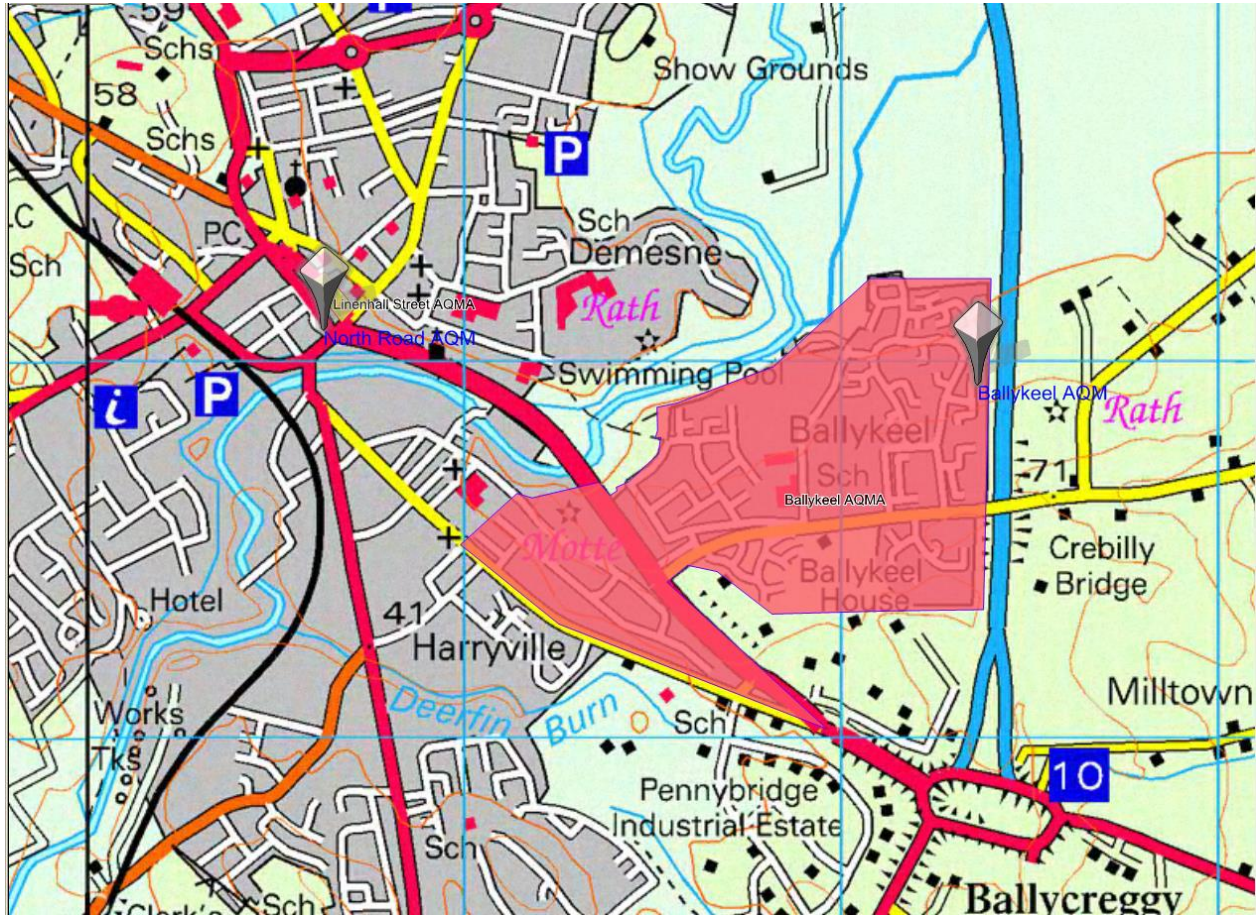
1.4.2 Carrickfergus Borough Council

Previous Assessment	Date completed	Summarised Outcomes
1st Stage Air Quality Review and Assessment	Feb 2001	NO_2 for roads and industrial sources, SO_2 for industrial and domestic sources and PM_{10} for domestic and industrial sources to progress to 2nd Stage of the Air Quality Review.
2nd Stage Air Quality Review and Assessment	Feb 2002	SO_2 and PM_{10} from sources and NO_2 from industrial and road sources excluded from 3rd Stage Review.
3rd Stage Review and Assessment	June 2004	Concentrated on PM_{10} from domestic and road sources. Modelling predicted exceedences from PM_{10} from domestic sources in Carrickfergus and Greenisland. Two AQMAs were declared.
4th Stage Review and Assessment	July 2005	PM_{10} and SO_2 were not predicted to exceed the objectives. Both the AQMAs were revoked.
LAQM Updating and Screening Assessment 2006	Oct 2006	No requirement to proceed to a Detailed Assessment for any of the 7 key pollutants.
LAQM Annual Progress Report 2007	Sept 2007	No requirement to proceed to a Detailed Assessment for any of the 7 key pollutants.
LAQM Updating and Screening Assessment 2009	April 2009	Detailed Assessment required for NO_2 at Minorca Place, Carrickfergus. PM_{10} to be considered at the same location.
LAQM Detailed Assessment for NO_2 and PM_{10}	February 2011	All AQS objectives for NO_2 and PM_{10} were considered likely to be met at relevant receptor locations. Additional NO_2 monitoring recommended at relevant receptor locations (building facades).
LAQM Annual Progress Report 2010	February 2011	No further detailed assessments required for any pollutants
LAQM Annual Progress Report 2011	April 2011	No further detailed assessments required for any pollutants
Updating and Screening Assessment 2012	March 2013	No further detailed assessments required for any pollutants.
LAQM Annual Progress Report 2013	October 2013	The report confirmed there were no exceedences of air quality objectives in the Borough for any of the prescribed pollutants. It was recommended to assess the air quality impact of new road schemes proposed as part of the Belfast Metropolitan Area Plan (2015) in the next USA.
LAQM Annual Progress Report 2014	November 2014	The report confirmed there continued to be no exceedences of air quality objectives in the Borough for any of the prescribed pollutants. It was recommended to assess the air quality impact of new road schemes proposed as part of the Belfast Metropolitan Area Plan (2015) in the next USA.

1.4.3 Larne Borough Council

Previous Assessment	Date completed	Summarised Outcomes
1st Stage Air Quality Review and Assessment	July 2001	A second stage assessment was found to be required for NO_2 due to significant road traffic and industrial sources. Second stage assessment was found to be required for SO_2 due to significant industrial, domestic and shipping sources. Second stage assessment for PM_{10} was found to be required due to significant road traffic, domestic, industrial and shipping sources.
2nd and 3rd Stage Air Quality Review and Assessment	2004	The air quality objectives for NO_2, SO_2 and PM_{10} were not exceeded. No AQMA to declare.
LAQM Annual Progress Report 2005	April 2005	SO_2, NO_2, and PM_{10} objectives were met, no AQMA to declare.
LAQM Updating and Screening Assessment 2006	April 2006	No detailed assessment required for any of the seven pollutants. Monitoring of SO_2, NO_2 and PM_{10} to continue.
LAQM Annual Progress Report 2007	April 2007	SO_2, NO_2, and PM_{10} objectives met, no AQMA to declare.
LAQM Annual Progress Report 2008	April 2008	SO_2, NO_2, and PM_{10} objectives met, no AQMA to declare.
LAQM Updating and Screening Assessment 2009	August 2009	No detailed assessment required for any of the seven pollutants. Monitoring of SO_2, NO_2 and PM_{10} to continue. SO_2, NO_2 and PM_{10} objectives met.
LAQM Annual Progress Report 2010 Addendum to Updating and Screening Assessment Report 2009	April 2010	SO_2, NO_2, and PM_{10} objectives met, no AQMA to declare. Air quality objectives for SO_2 and PM_{10} met over the previous four years, therefore continued monitoring was no longer required. Air quality monitoring station decommissioned.
LAQM Annual Progress Report 2011	April 2011	NO_2 objectives met, no AQMA declared.
Updating and Screening Assessment 2012	August 2012	No detailed assessment required for any of the seven pollutants. Air quality objectives met. Monitoring of SO_2, NO_2 and PM_{10} to continue.
LAQM Annual Progress Report 2013	April 2013	NO_2 objectives met, no AQMA declared.
LAQM Annual Progress Report 2014	April 2014	NO_2 objectives met, no AQMA declared.

Figure 1.1: Map of BallyKeel and Linenhall Street AQMA Boundaries and Automatic Analysers



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Location	**Mid and East Antrim Borough Council**
Title	**Ballymena AQMAs and Automatic Monitoring Stations**
By PB	**Approved** JC
Scale Not To Scale	**Job Ref** 6271498
Date March 2016	**Figure No.** **1.1**

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are two automatic monitoring stations operated within Mid and East Antrim Borough Council, these are sited at the following locations:

- Ballymena Ballykeel; and
- Ballymena North Road.

The Ballymena Ballykeel monitor continuously monitors concentrations of Sulphur Dioxide (SO_2) using a real time ultraviolet fluorescent SO_2 analyser, and Particulate Matter (PM_{10}) using an Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS).

The Ballymena North Road monitor continuously monitors concentrations of Nitrogen Oxide (NO), Nitrogen Oxides (NO_x) and Nitrogen Dioxide (NO_2) using a real time NO_x analyser.

Further details of the two monitoring stations are provided in

, their locations are shown in Figure 1.1 and images of the sites are shown in Figure 2.1 and Figure 2.2.

Figure 2.1: Ballymena Ballykeel Automatic Monitoring Station

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Location	**Mid and East Antrim Borough Council**
Title	**Ballymena Ballykeel Automatic Monitoring Station**
By PB	**Approved** JC
Scale Not To Scale	**Job Ref** 6271498
Date March 2016	**Figure No.** **2.1**

Figure 2.2: Ballymena North Road Automatic Monitoring Station

	Air Quality Bureau Veritas 5th Floor 66 Prescott Street London, E1 8HG
Location	**Mid and East Antrim Borough Council**
Title	**Ballymena North Road Automatic Monitoring Station**
By PB	**Approved** JC
Scale Not To Scale	**Job Ref** 6271498
Date March 2016	**Figure No.** **2.2**

Table 2.1: Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	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?
Ballymena Ballykeel	Urban Background	311900	402600	PM_{10} SO_2	Y	TEOM/FDMS Fluorescent	Y	N/A	Y
Ballymena North Road	Roadside	310636	403072	NO NO_x NO_2	N	Chemiluminescence	Y	2m	N*

* As the preferred worst-case location was not an option due to a narrow footpath, the second worst-case location was chosen.

2.1.2 Non-Automatic Monitoring Sites

A network of passive NO_2 diffusion tubes is in place within Mid and East Antrim, a total of thirty six monitoring sites were in operation during 2014. These are split between the previous administration boundaries in the sections below; sixteen sites within Ballymena, twelve sites within Carrickfergus and eight sites within Larne.

There is one location within Mid and East Antrim where a triplicate set of NO_2 diffusion tubes are co-located with an automatic NO_x analyser; Ballymena North Road. In addition there are two sets of duplicate diffusion tubes located at 59 Shore Road, Geenisland and Model PS Belfast Road, Carrickfergus.

There has been no change to the NO_2 monitoring network from 2014.

The locations of the NO_2 diffusion tubes are shown in Figures 2.3 – 2.13, and details of the monitoring network are given in Table 2.2.

Figure 2.3: Ballymena Diffusion Tube Locations 1

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Location

Mid and East Antrim Borough Council

BDT1 – Leighmohr Avenue
BDT2 – Galgorm Road

Title

Ballymena Diffusion Tube Locations 1

By	Approved
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Figure 2.4: Ballymena Diffusion Tube Locations 2

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Location

Mid and East Antrim Borough Council

BDT3 – Main Street
BDT4 – Cullybackey Road

Title

Ballymena Diffusion Tube Locations 2

By	Approved
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Scale	**Job Ref**
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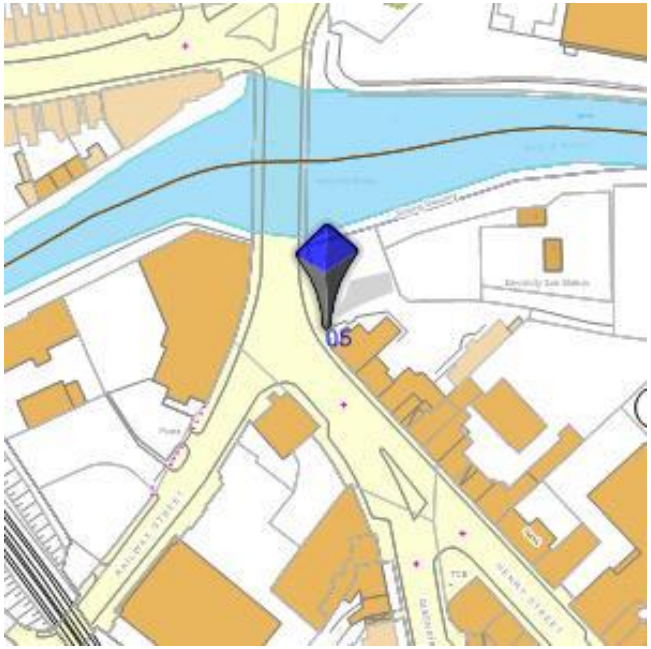
Date	**Figure No.**
March 2016	**2.4**

Figure 2.5: Ballmena Diffusion Tube Locations 3



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Location

Mid and East Antrim Borough Council

BDT5 – Larne Street
BDT6 – Ballyloughan Avenue

Title

Ballymena Diffusion Tube Locations 3

By	Approved
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Figure 2.6: Ballymena Diffusion Tube Locations 4

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Location

Mid and East Antrim Borough Council

BDT7 – George Street
BDT8 – Wellington Street

Title

Ballymena Diffusion Tube Locations 4

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Scale	**Job Ref**
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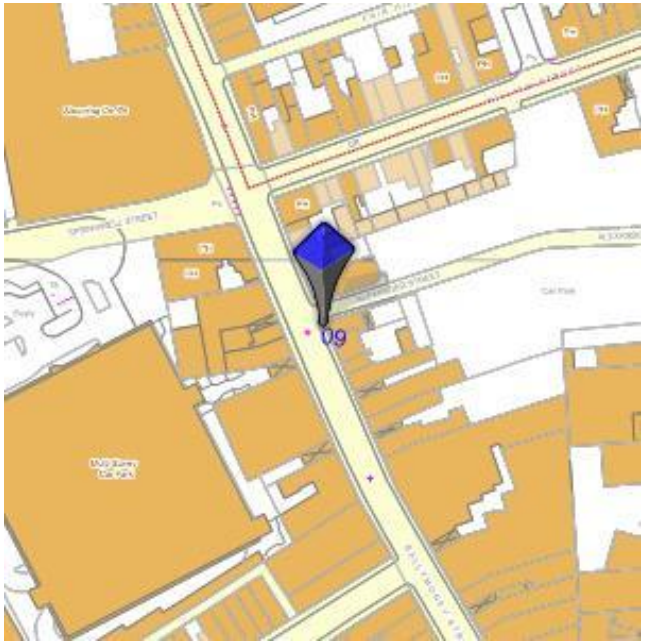
March 2016	**2.6**

Figure 2.7: Ballymena Diffusion Tube Locations 5



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Location

Mid and East Antrim Borough Council

BDT9 – Ballymoney Street
BDT10 – Parkway

Title

Ballymena Diffusion Tube Locations 5

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Figure 2.8: Ballymena Diffusion Tube Locations 6

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Location

Mid and East Antrim Borough Council

BDT11 – Lisnevenagh Road
BDT12 – Queen Street

Title

Ballymena Diffusion Tube Locations 6

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Scale	**Job Ref**
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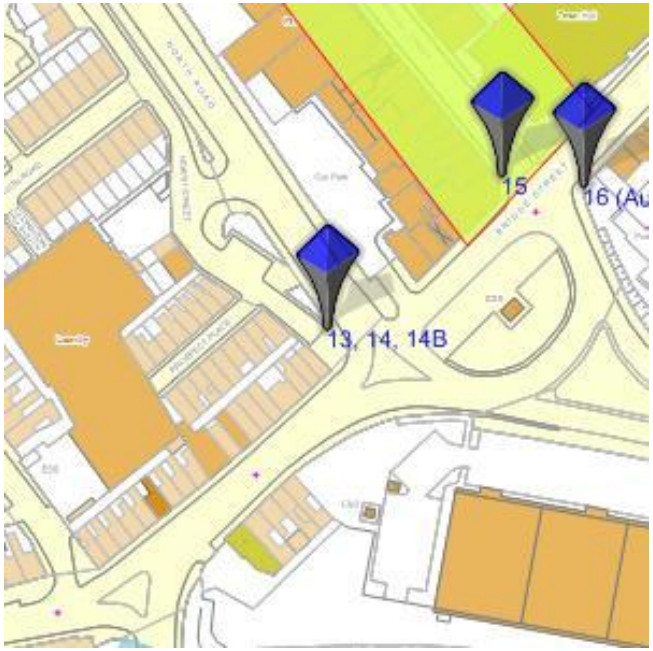
Date	**Figure No.**
March 2016	**2.8**

Figure 2.9: Ballymena Diffusion Tube Locations 7



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Location
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BDT13/14/14B – North Road and Bridge Street
BDT15/16 – Linenhall Street and Bridge Street

Title

Ballymena Diffusion Tube Locations 7

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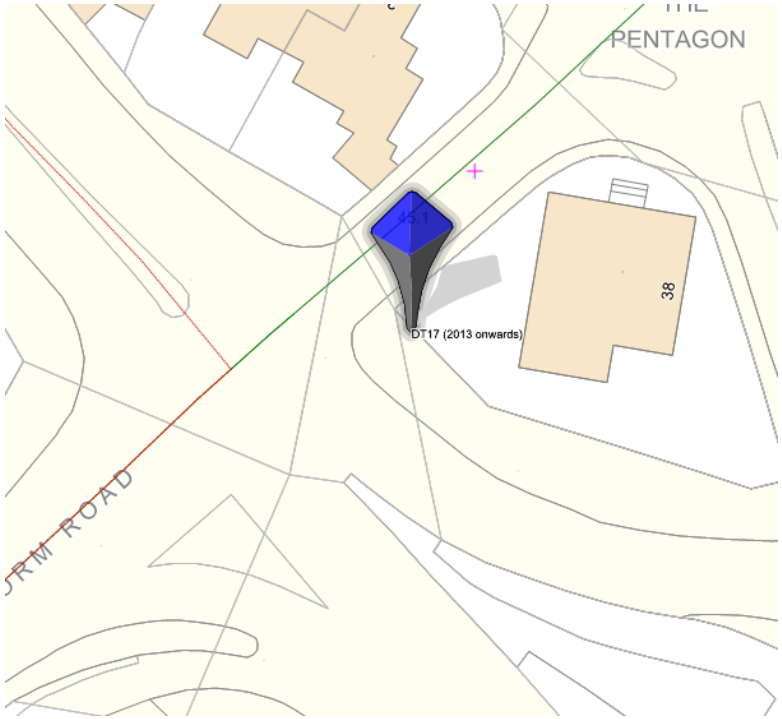
Figure 2.10: Ballymena Diffusion Tube Locations 8



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Location

Mid and East Antrim Borough Council

BDT17 – Galgorm Road

Title

Ballymena Diffusion Tube Locations 8

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Figure 2.11: Carrickfergus Diffusion Tube Locations 1

Legend
Diffusion Tube Monitoring Site

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Location

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CDT 1, 2, 3, 4, 5 and 14

Title

Carrickfergus Diffusion Tube Locations 1

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Figure 2.12: Carrickfergus Diffusion Tube Locations 2

Legend
Diffusion Tube Monitoring Site

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Location

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CDT 6 - 13

Title

Carrickfergus Diffusion Tube Locations 2

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Figure 2.13: Larne Diffusion Tube Locations

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Location

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LDT 1 - 8

Title

Larne Diffusion Tube Locations

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Date	**Figure No.**
March 2016	**2.13**

Table 2.2: Details of Non-Automatic Monitoring Sites

Site ID		Site Type	X OS Grid Ref	Y OS Grid Ref	In AQMA?	Triplicate/ Duplicate or co-located with a continuous analyser (Y/N)	Relevant Exposure?	Distance to kerb of nearest road (m)	Does this location represent worst-case exposure?
Ballymeana									
BDT1	Leighinmohr Av	Urban Background	310228	402546	N	N	Y	N/A	Y
BDT2	Galgorm Road	Kerbside	310336	403196	N	N	Y	3m	Y
BDT3	Main St, Cullybackey	Kerbside	305841	405690	N	N	Y	2m	Y
BDT4	Cullybackey Road	Kerbside	310350	403443	N	N	Y	3m	Y
BDT5	Larne St	Kerbside	310602	402920	N	N	Y	3m	Y
BDT6	Ballyloughan Ave	Urban Background	309532	404425	N	N	Y	N/A	Y
BDT7	George St	Kerbside	310584	403239	N	N	Y	1m	Y
BDT8	Wellington St	Kerbside	310795	403386	N	N	Y	2m	Y
BDT9	Ballymoney St	Kerbside	310796	403582	N	N	Y	2m	Y
BDT10	Parkway	Kerbside	311000	403905	N	N	Y	2m	Y
BDT11	Lisnevenagh Rd	Road Side	311884	397037	N	N	Y	6m	Y
BDT12	Queen St	Kerbside	310743	402219	N	N	Y	3m	Y
BDT13/ 14/14B	North Road	Roadside	310638	403079	N	Y - Triplicate	Y	2m	Y
BDT15	Linenhall St	Kerbside	310687	403122	Y	N	Y	<1m	Y
BDT16	Bridge St	Kerbside	310710	403119	N	N	Y	2m	Y
BDT17	Galgorm Rd	Kerbside	310491	403314	N	N	Y	2m	Y
Carrickfergus									
CDT1	27 Upper Road, Greenisland	Roadside	336386	385717	N	N	Y (1m)	1m	Y
CDT2	32 Mullaghmore	Urban Background	336901	385621	N	N	Y (30m)	3m	N

Site ID		Site Type	X OS Grid Ref	Y OS Grid Ref	In AQMA?	Triplicate/ Duplicate or co-located with a continuous analyser (Y/N)	Relevant Exposure?	Distance to kerb of nearest road (m)	Does this location represent worst-case exposure?
	Park, Greenisland								
CDT3/4	59 Shore Road, Greenisland	Roadside	337969	384916	N	Duplicate	Y (1m)	1m	Y
CDT5	186 Shore Road, Greenisland	Roadside	338411	385380	N	N	Y (1m)	1m	Y
CDT6	93 Belfast Road, Carrickfergus	Roadside	339911	386741	N	N	Y (1m)	1m	Y
CDT7/8	Model PS Belfast Road, Carrickfergus	Roadside	340781	387100	N	Duplicate	Y (1m)	1m	Y
CDT9	Minorca Place/ Tesco junction, Carrickfergus	Roadside	340897	387381	N	N	Y (1m)	1m	Y
CDT10	42 Albert Road, Carrickfergus	Roadside	341186	387558	N	N	Y (1m)	1m	Y
CDT11	Railway Station, Fergus Avenue, Carrickfergus	Roadside	341204	387692	N	N	Y (15m)	15m	Y
CDT12	College North Road, Carrickfergus	Roadside	341147	388596	N	N	Y (1m)	1m	Y
CDT13	Victoria Road/Larne Road junction, Carrickfergus	Roadside	342354	388216	N	N	Y (1m)	1m	Y
CDT14	Islandmagee Road, Whitehead	Roadside	347309	392433	N	N	Y (1m)	2m	Y
Larne									
LDT1	Antiville Road/ A8 Junction	Roadside	153472	557105	N	N	N	N/A	Y

Site ID		Site Type	X OS Grid Ref	Y OS Grid Ref	In AQMA?	Triplicate/ Duplicate or co-located with a continuous analyser (Y/N)	Relevant Exposure?	Distance to kerb of nearest road (m)	Does this location represent worst-case exposure?
LDT2	Riverdale/ Latharna House	Urban Background	154681	557306	N	N	N	N/A	Y
LDT3	Main St, Larne	Urban Centre	155060	557432	N	N	N	1m	Y
LDT4	Victoria Rd/ Agnew St Junction	Kerbside	155197	557647	N	N	N	3m	Y
LDT5	Upper Caincastle Rd	Kerbside	154057	558376	N	N	N	3m	Y
LDT6	Larne Harbour Roundabout	Roadside	156003	556709	N	N	N	N/A	Y
LDT7	Coastguard Rd/ Castle Terrace	Urban Background	156065	556434	N	N	N	N/A	Y
LDT8	Ballylumford Rd/ Islandmage	Industrial	156847	556756	N	N	N	N/A	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

There are two AQS objectives for NO_2, namely:

- The annual mean of 40 µg/m^3; and
- The 1-hour mean of 200 µg/m^3 not to be exceeded more than 18 times per year.

Automatic Monitoring Data

There is one roadside automatic NO_2 monitor in operation within Mid and East Antrim Borough Council; Ballymena North Road.

The monitoring data is presented in Table 2.3 and Table 2.4 below. Full details of the QA/QC procedure for the automatic monitors is provided in **Error! Reference source not found.**.

Data capture was above 75% at the automatic monitoring site during 2014, therefore annualisation was not required at any site.

The results for 2014 indicate that both the AQS annual mean and hourly mean objectives were met at the Ballymena North Road site, this is in line with previous year's results at the location.

Figure 2.14 shows the trend in annual mean NO_2 concentrations from 2008 to 2014 at the Ballymena North Road monitoring location. There have been no exceedences of the AQS annual mean objective recorded at this location from 2008. The range of annual mean concentration is between 27 and 32.07 and there have been two marginal peaks in concentration experienced in 2010 and 2014.

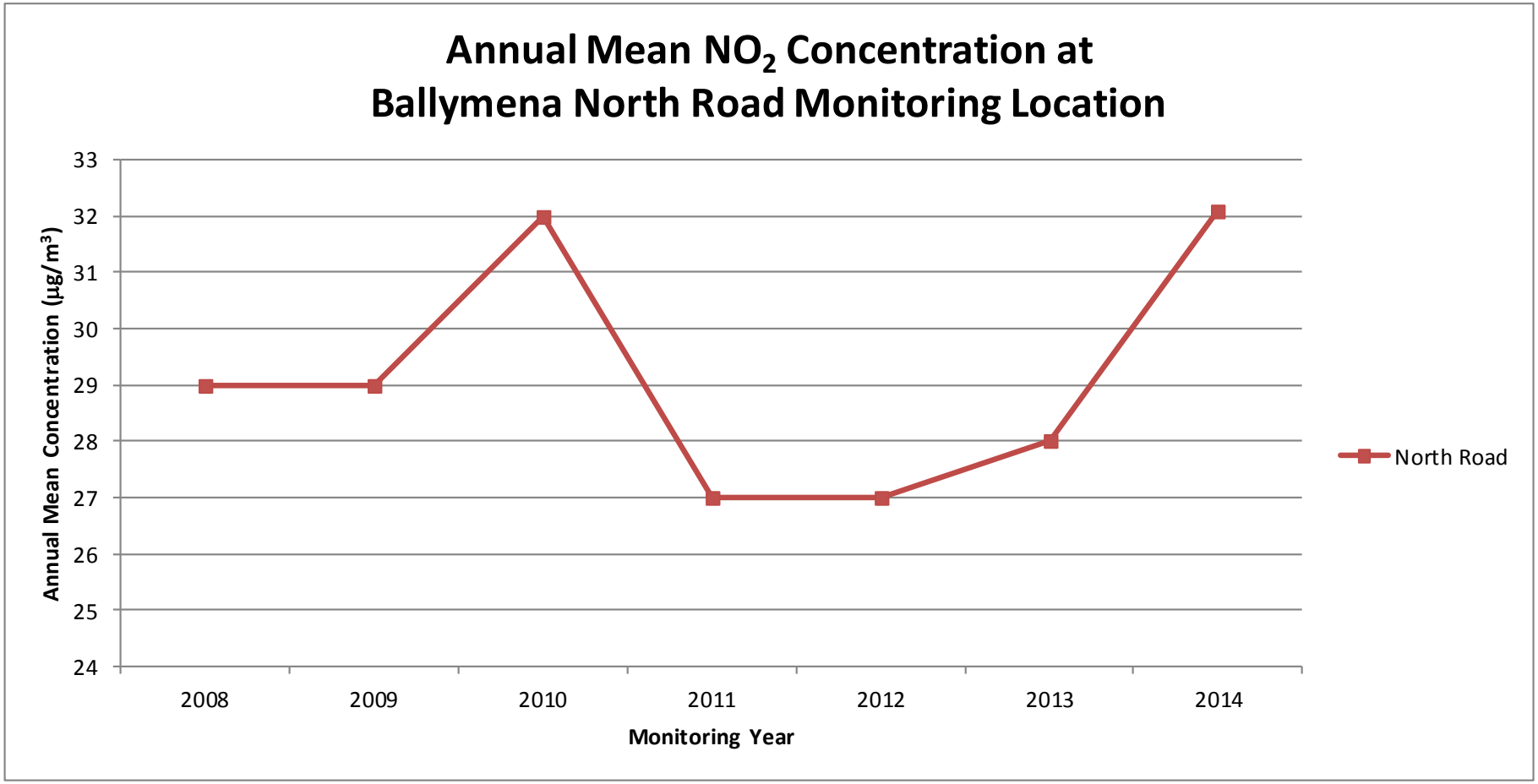
Table 2.3: Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site Name	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2014 %	Annual Mean Concentration (μg/m^3)						
					2008	2009	2010	2011	2012	2013	2014
Ballymena North Road	Roadside	Y	96.9	96.9	29	29	32	27	27	28	32.07

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

Site Name	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2014 %	Number of Exceedences of Hourly Mean (200 μg/m^3)						
					2008	2009	2010	2011	2012	2013	2014
Ballymena North Road	Roadside	Y	96.9	96.9	0	1	2	0	9	2	5

Figure 2.14: Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Ballymena North Road



Diffusion Tube Monitoring Data

Diffusion tube data obtained for the year 2014 was supplied and analysed by the following companies using the listed methodologies:

- **Ballymena** – Diffusion tubes supplied and analysed by Gradko, the tubes were prepared using the 20% triethanolamine (TEA) in water preparation method.

- **Carrickfergus** – Diffusion tubes supplied and analysed by Gradko, the tubes were prepared using the 20% triethanolamine (TEA) in water preparation method.

- **Larne** – Diffusion tubes supplied and analysed by Environmental Scientifics Group (ESG), the tubes were prepared using the 50% triethanolamine (TEA) in acetone preparation method.

All results have been bias adjusted and there were no monitoring locations where data capture was below 75% therefore no sites have been annualised.

It is necessary to apply a bias adjustment factor to NO_2 diffusion tube results. This is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter being a more accurate method of monitoring. The Defra Technical Guidance LAQM.TG(09) provides guidance with regard to the application of a bias adjustment factor to adjust diffusion tube results.

Co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from continuous NO_x analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method where there are no local co-location studies.

There is a set of triplicate diffusion tubes co-located with the Ballymena North Road automatic NO_x monitor, the bias factor derived from the co-location for 2014 was 1.13. This local bias adjustment factor has been used for the diffusion tubes within Ballymena. For reference the national adjustment bias factor was 0.92.

In addition the national bias adjustment factor from the national database for Gradko 20% TEA diffusion tubes based on 22 studies (0.92), and for ESG 50% TEA diffusion tubes based on 31 studies (0.81) have been used to bias adjust the diffusion tubes in Carrickfergus and Larne. Full details of the local bias adjustment procedure are provided in Appendix A.

The results of annual mean NO_2 concentrations measured using diffusion tubes in 2014 following bias adjustment are reported in Table 2.5, Table 2.6 and Table 2.7. Monthly results of NO_2 concentrations without bias adjustment are also provided in Appendix B.

The results of NO_2 diffusion tube data (2008/09 – 2014) are presented in Table 2.8, Table 2.9 and Table 2.10 and a number of charts displaying the changing trends on annual mean NO_2 concentration over the same time period are presented in Figure 2.15, Figure 2.16 and Figure 2.17.

The results of the diffusion tube data for 2014 show that there were exceedences of the AQS NO_2 annual mean objective at three diffusion tube locations, one within an existing AQMA and two outside of the existing AQMAs.

Exceedences of the AQS annual mean objective were observed at BDT7, 15 and 17. BDT15 is located within the existing boundary of the Linenhall AQMA and BDT7 (George Street) and 17 (Galgorm Road) are both located on streets that are of close proximity to the AQMA and the North Road/Galgorm Road interchange.

Comparing the 2014 NO_2 monitoring with concentrations of previous years the three locations that have resulted in exceedences in 2014 have had previous exceedences; BDT7 since 2009 has had an exceedence of the AQS annual mean objective in 2008/13/14 and also was very close to the 40$\mu g/m^3$ limit in 2009/10, BDT15 has exceeded every year from 2008-2014, and DBT17 has exceeded for 2013 following annualisation of the results (50% monitoring in 2013) and for 2014 with a full years monitoring.

Within Ballymena since 2008, BDT7, 15 and 17 are the only diffusion tubes that have exceeded the AQS annual mean NO_2 objective. All other tubes within Ballymena have been, and continue to be below the AQS objective.

In line with previous years monitoring the diffusion tubes located within Carrickfergus and Larne continue to be below the AQS annual mean objective, to date there has not been an exceedence at any monitoring site within these two locations. Compared to 2013 concentration levels, in Carrickfergus, three locations showed an increase in concentration and nine locations showed a decrease in concentration. Within Larne two locations showed an increase in concentration and six locations showed a decrease in concentration.

Table 2.5: Results of Nitrogen Dioxide Diffusion Tubes in 2014 - Ballymena

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2014 Annual Mean Concentration (μg/m^3) - Bias Adjustment factor = 1.13
BDT1	Leighinmohr Av	Urban Background	N	N	12	-	N	12.70*
BDT2	Galgorm Road	Kerbside	N	N	11	-	N	36.62
BDT3	Main St, Cullybackey	Kerbside	N	N	11	-	N	27.52
BDT4	Cullybackey Road	Kerbside	N	N	12	-	N	33.92
BDT5	Larne St	Kerbside	N	N	12	-	N	29.78
BDT6	Ballyloughan Ave	Urban Background	N	N	12	-	N	11.95
BDT7	George St	Kerbside	N	N	11	-	N	**45.31**
BDT8	Wellington St	Kerbside	N	N	12	-	N	27.96
BDT9	Ballymoney St	Kerbside	N	N	12	-	N	32.85
BDT10	Parkway	Kerbside	N	N	12	-	N	34.20
BDT11	Lisnevenagh Rd	Roadside	N	N	12	-	N	30.94
BDT12	Queen St	Kerbside	N	N	12	-	N	34.99
BDT13	North Road	Roadside	N	Triplicate & co-located	12	-	N	31.09
BDT14	North Road	Roadside	N	Triplicate & co-located	11	-	N	31.89
BDT14B	North Road	Roadside	N	Triplicate & co-located	11	-	N	31.88
BDT15	Linenhall St	Kerbside	Y	N	10	-	N	**58.18**
BDT16	Bridge St	Kerbside	N	N	11	-	N	33.85
BDT17	Galgorm Rd	Kerbside	N	N	11	-	N	**42.39**

Exceedences of the AQS annual mean objective shown in **Bold.**

Table 2.6: Results of Nitrogen Dioxide Diffusion Tubes in 2014 – Carrickfergus

Site ID	Location	Site Type	Within AQMA?	Triplicate, Duplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2014 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment factor = 0.92
CDT1	27 Upper Road, Greenisland	Roadside	N	N	11	-	N	24.22
CDT2	32 Mullaghmore Park, Greenisland	Urban Background	N	N	12	-	N	9.12**
CDT3/4	59 Shore Road, Greenisland	Roadside	N	N	12/12	-	N	20.21**
CDT5	186 Shore Road, Greenisland	Roadside	N	N	12	-	N	23.88
CDT6	93 Belfast Road, Carrickfergus	Roadside	N	N	10	-	N	24.63
CDT7/8	Model PS Belfast Road, Carrickfergus	Roadside	N	N	12/10	-	N	30.08
CDT9	Minorca Place/ Tesco junction, Carrickfergus	Roadside	N	N	12	-	N	24.98
CDT10	42 Albert Road, Carrickfergus	Roadside	N	N	12	-	N	22.07
CDT11	Railway Station, Fergus Avenue, Carrickfergus	Roadside	N	N	12	-	N	14.72
CDT12	College North Road, Carrickfergus	Roadside	N	N	12	-	N	19.70
CDT13	Victoria Road/Larne Road junction, Carrickfergus	Roadside	N	N	12	-	N	25.03
CDT14	Islandmagee Road, Whitehead	Roadside	N	N	12	-	N	13.92

Table 2.7: Results of Nitrogen Dioxide Diffusion Tubes in 2014 – Larne

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2014 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment factor = 0.81
LDT1	Antiville Road/ A8 Junction	Roadside	N	N	11	-	N	24.29
LDT2	Riverdale/ Latharna House	Urban Background	N	N	12	-	N	13.60
LDT3	Main St, Larne	Urban Centre	N	N	12	-	N	22.44
LDT4	Victoria Rd/ Agnew St Junction	Kerbside	N	N	12	-	N	25.00
LDT5	Upper Caincastle Rd	Kerbside	N	N	9	-	N	20.67
LDT6	Larne Harbour Roundabout	Roadside	N	N	10	-	N	14.09
LDT7	Coastguard Rd/ Castle Terrace	Urban Background	N	N	12	-	N	10.10
LDT8	Ballylumford Rd/ Islandmage	Industrial	N	N	12	-	N	10.79

* - Diffusion tube data to be treated as cautious as certain tubes within the year were found to be dirty.

** - Diffusion tube data to be treated as cautious as certain tubes within the year were found to have spiders inside them.

Table 2.8: Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2014) - Ballymena

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (μg/m^3) - Adjusted for Bias						
			2008 (Bias Adjustment Factor = 0.9)	2009 (Bias Adjustment Factor = 0.9)	2010 (Bias Adjustment Factor = 0.92)	2011 (Bias Adjustment Factor = 0.91)	2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 1.02)	2014 (Bias Adjustment Factor = 1.13)
BDT1	Urban Background	N	10.4	11.4	13	12.63	9.53	12.32	12.70
BDT2	Kerbside	N	32.5	33.53	34.04	30.56	27.16	33.22	36.62
BDT3	Kerbside	N	22.5	21.67	24.56	24.04	20.90	26.84	27.52
BDT4	Kerbside	N	27.8	30.22	31.74	30.58	25.17	32.08	33.92
BDT5	Kerbside	N	25.8	25.8	28.89	26.28	24.11	27.17	29.78
BDT6	Urban Background	N	9.9	11.1	14.44	15.26	9.32	11.45	11.95
BDT7	Kerbside	N	**44.1**	39.0	39.84	35.24	33.67	**40.40**	**45.31**
BDT8	Kerbside	N	26.7	24.9	27.5	28.33	21.57	26.05	27.96
BDT9	Kerbside	N	27.6	28.73	31	29.92	24.58	29.19	32.85
BDT10	Kerbside	N	27.0	23.25	30.18	30.8	25.74	30.07	34.20
BDT11	Roadside	N	23.2	24.68	27.6	27.28	20.15	27.60	30.94
BDT12	Kerbside	N	34.7	32.78	36.98	35.54	28.47	31.44	34.99
BDT13	Roadside	N	25.5	21.81	27.69	28.78	24.26	29.17	31.09
BDT14	Roadside	N	25.5	21.81	27.69	28.78	24.18	28.96	31.89
BDT14B	Roadside	N	25.5	21.81	27.69	28.78	21.74	28.35	31.88
BDT15	Kerbside	Y	**43.0**	**49.12**	**58.14**	**57**	**45.42**	**51.78**	**58.18**
BDT16	Kerbside	N	-	-	-	-	-	33.25	33.85
BDT17	Kerbside	N	-	-	-	-	-	**40.43**	**42.39**

Exceedences of the AQS annual mean objective shown in **Bold.**

Table 2.9: Results of Nitrogen Dioxide Diffusion Tubes (2009 to 2014) – Carrickfergus

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (μg/m^3) - Adjusted for Bias					
			2009 (Bias Adjustment Factor = 0.83)	2010 (Bias Adjustment Factor = 0.83)	2011 (Bias Adjustment Factor = 0.90)	2012 (Bias Adjustment Factor = 0.97)	2013 (Bias Adjustment Factor = 0.95)	2014 (Bias Adjustment Factor = 0.92)
CDT1	Roadside	N	24.1	23.1	21.3	24.6	23.6	24.22
CDT2	Urban Background	N	8.5	17.9	8.1	10.8	9.4	9.12
CDT3/4	Roadside	N	23.2	31.4	23.2	28.4	21.5	20.21
CDT5	Roadside	N	28.8	28.6	28.3	30.7	26.6	23.88
CDT6	Roadside	N	24.9	20.1	26.9	28.8	26.8	24.63
CDT7/8	Roadside	N	24.9	26.8	25.8	34.9	31.0	30.08
CDT9	Roadside	N	-	28.5	28.1	28.6	25.4	24.98
CDT10	Roadside	N	22.1	20.5	20.8	24.4	21.3	22.07
CDT11	Roadside	N	17.9	16.5	13.0	15.0	13.6	14.72
CDT12	Roadside	N	11.9	21.6	19.3	21.7	19.8	19.70
CDT13	Roadside	N	25.2	23.2	28.5	28.6	25.9	25.03
CDT14	Roadside	N	17.0	17.5	14.7	14.3	14.7	13.92

Table 2.10: Results of Nitrogen Dioxide Diffusion Tubes (2009 to 2014) – Larne

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (μg/m^3) - Adjusted for Bias					
			2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 0.83)	2011 (Bias Adjustment Factor = 0.83)	2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.80)	2014 (Bias Adjustment Factor = 0.81)
LDT1	Roadside	N	32.90	28.32	32.30	23.15	22.7	24.29
LDT2	Urban Background	N	24.39	23.23	19.36	14.80	14.46	13.60
LDT3	Urban Centre	N	32.8	28.00	24.14	23.36	21.96	22.44
LDT4	Kerbside	N	36.96	32.94	33.12	35.00[a]	26.70[a]	25.00
LDT5	Kerbside	N	33.09	21.66	21.78	20.59	22.25	20.67
LDT6	Roadside	N	29.70	21.92	20.21	16.81	17.35	14.09
LDT7	Urban Background	N	16.9	15.26	12.05	9.92	10.48	10.10
LDT8	Industrial	N	21.29	15.99	12.46	10.97	10.54	10.79

[a] Data has been annualised due to data capture being less than 75%.

Figure 2.15: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Ballymena Diffusion Tube Monitoring Sites

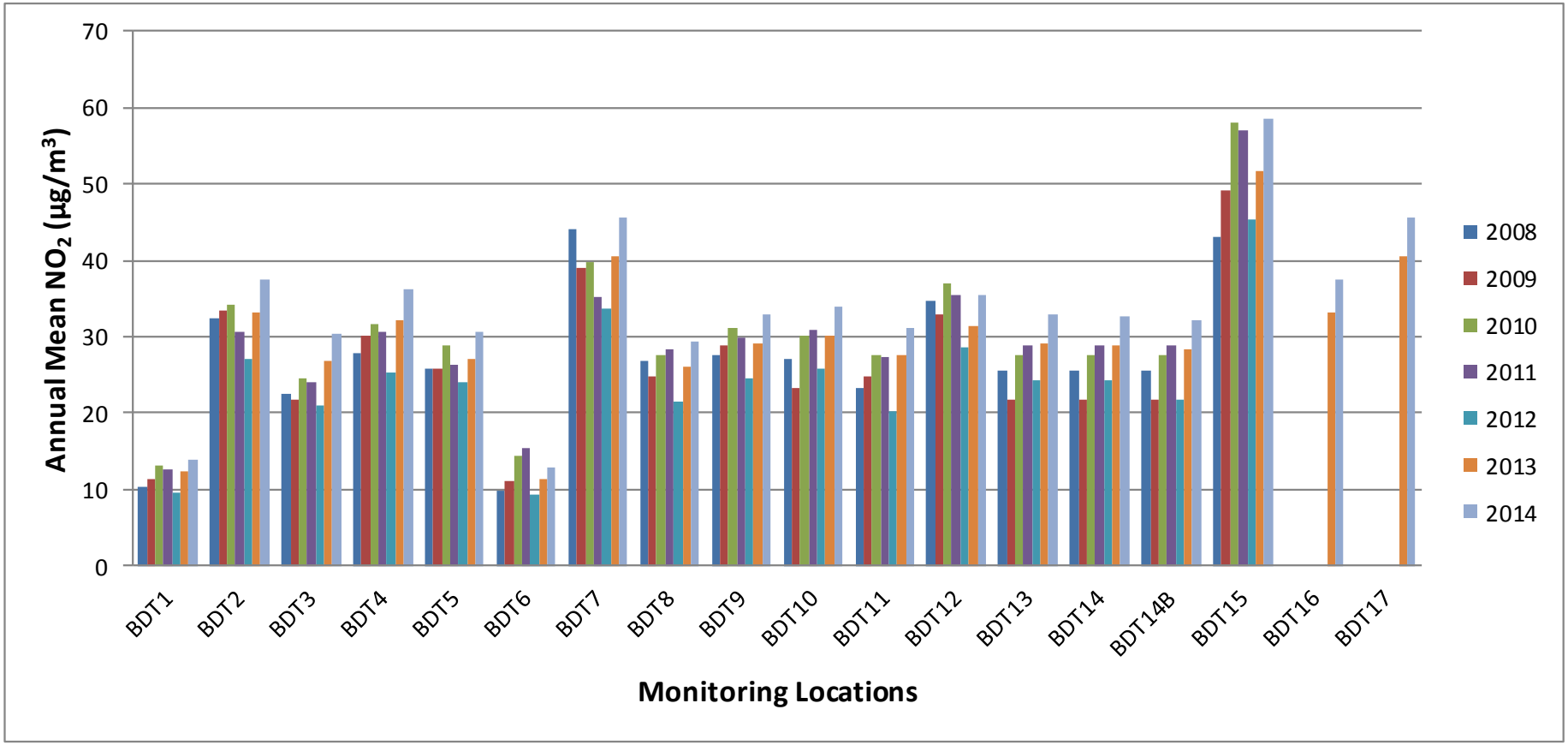


Figure 2.16: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Carrickfergus Diffusion Tube Monitoring Sites

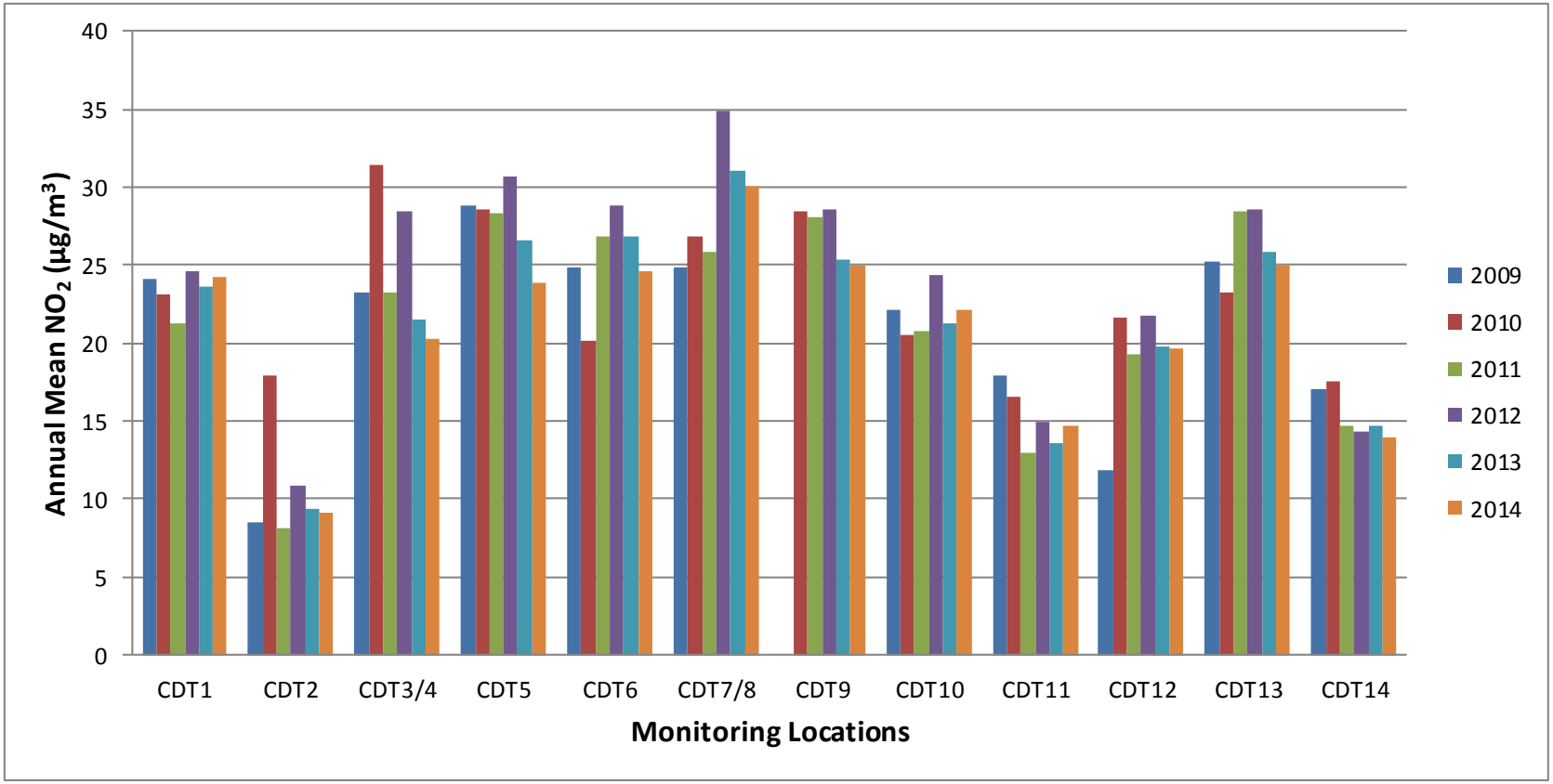
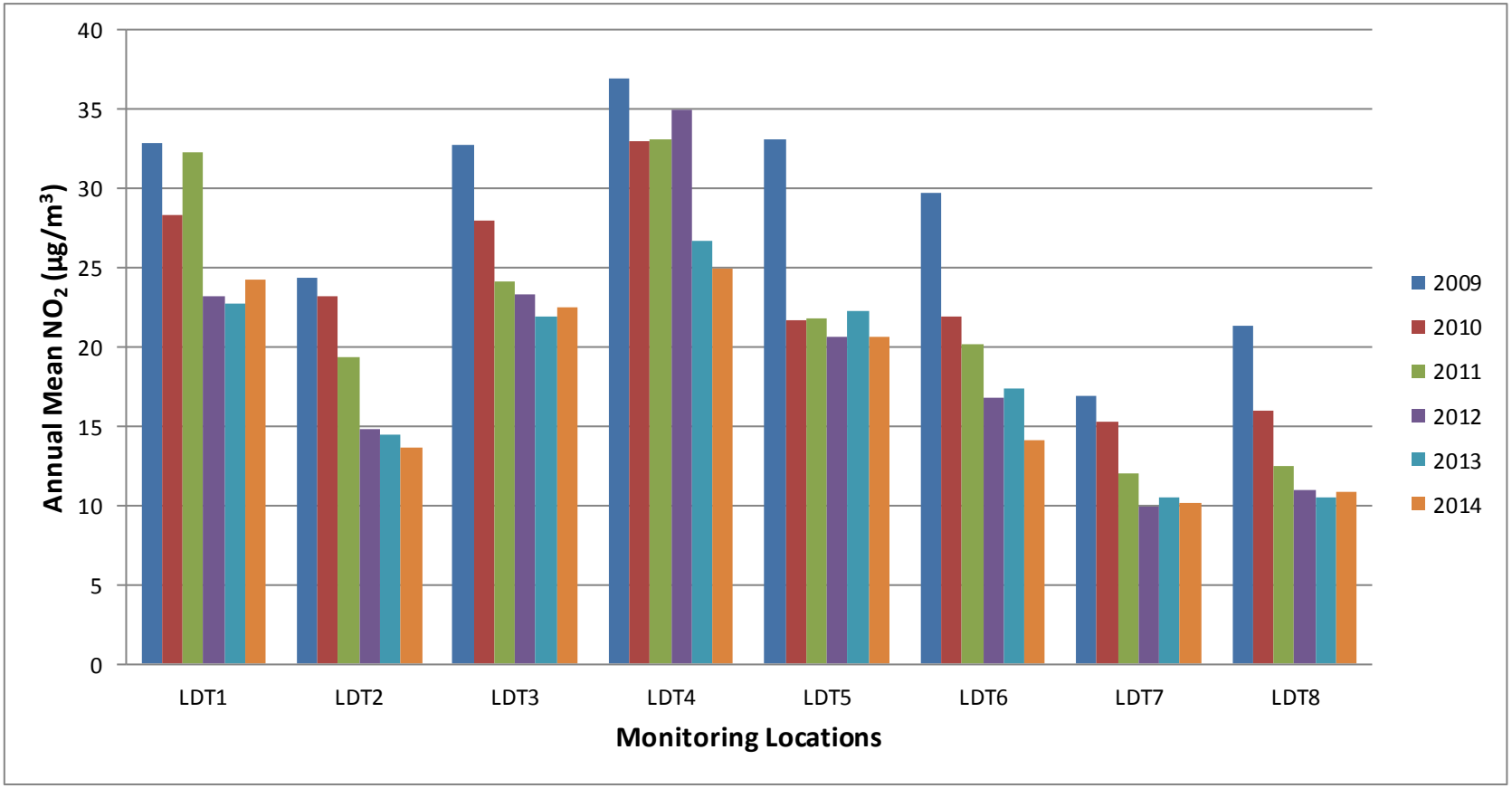


Figure 2.17: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Larne Diffusion Tube Monitoring Sites



2.2.2 PM_{10}

There are two AQS objectives for PM_{10}, namely:

- The annual mean of 40 µg/m^3; and
- The 24-hour mean of 50 µg/m^3 not to be exceeded more than 35 times a year.

Mid and East Antrim Borough Council undertook monitoring of PM_{10} using a TEOM with FDMS analyser at one location during 2014; Ballymena Ballykeel, an urban background site. The PM_{10} monitoring data is presented in Table 2.11 and Table 2.12 below. Full details of the QA/QC procedures are provided in Appendix A.

The trend graph presented as Figure 2.18 shows that in 2014 both the annual mean and the number of exceedences of the 24-hour mean objective are the lowest values recorded since 2008. The annual mean PM_{10} has seen a gradual reduction in concentration since 2008, with the number of 24-hour exceedences showing a peak in 2010 and a reduction every year following this.

The 2014 PM_{10} results show that the annual mean and the 24-hour mean continue to meet the AQS objectives at the Ballymena Ballykeel monitoring site.

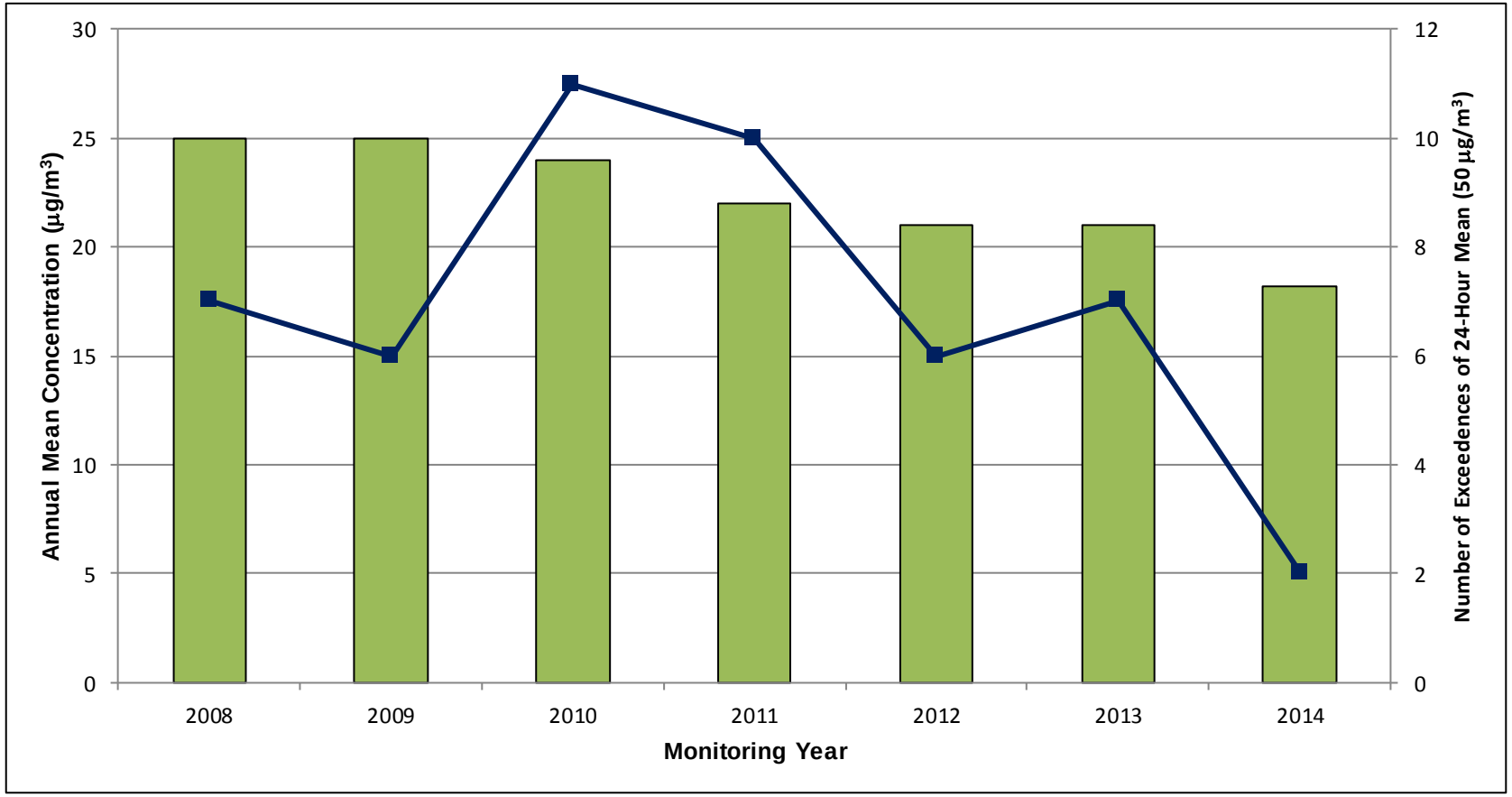
Table 2.11: Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site Name	Site Type	Within AQMA?	Valid Data Capture 2014 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration (μg/m^3)						
					2008	2009	2010	2011	2012	2013	2014
Ballymena Ballykeel	Urban Background	Y	87.61	Y	25	25	24	22	21	21	18.16

Table 2.12: Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site Name	Site Type	Within AQMA?	Valid Data Capture 2014 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Number of Exceedences of 24-Hour Mean (50μg/m^3)						
					2008	2009	2010	2011	2012	2013	2014
Ballymena Ballykeel	Urban Background	Y	87.61	Y	7	6	11	10	6	7	2

Figure 2.18: Trends in Annual Mean PM_{10} Concentrations and 24-Hour Mean Exceedences at Ballymena Ballykeel



2.2.3 Sulphur Dioxide

There are three Air Quality Objectives for sulphur dioxide, namely:

- the 1-hour mean of 350µg/m^3, not to be exceeded more than 24 times a year;
- the 24-hour mean of 125µg/m^3 not to be exceeded more than 3 times a year, and
- the 15-minute mean of 266µg/m^3 not to be exceeded more than 35 times a year.

The 2014 monitoring data for Ballymena Ballykeel presented in Table 2.13 shows that the SO_2 objectives were met for 2014.

Table 2.13: Results of Automatic Monitoring of SO_2: Comparison with AQS Objectives

Site Name	Site Type	Within AQMA?	Data Capture for full calendar year 2014 % (15-minute Means)	Number of Exceedences of AQS Objectives:		
				15-minute Means > 266µg/m^3	1-hour Means > 350µg/m^3	24-hour Means > 125µg/m^3
Ballymena Ballykeel	Urban Background	Y	97.43	0	0	0

2.2.4 Other pollutants monitored

No other pollutants were monitored within Mid and East Antrim during 2014.

2.2.5 Summary of Compliance with AQS Objectives

Monitoring of NO_2, PM_{10} and SO_2 is completed across Mid and East Antrim Borough Council using two automatic monitors and a network of passive NO_2 diffusion tubes. In 2014 there have been no changes made to the monitoring network.

The Ballymena Ballykeel automatic monitor records both PM_{10} and SO_2 continuously. In regards to the PM_{10} AQS objectives, both the annual mean and the 24-hour objectives were met at the monitoring location in 2014, with both the annual mean concentration and the number of 24-hour means above 50 $\mu g/m^3$ recording their lowest values since 2008. The AQS objectives for SO_2 were also met at the monitoring sites with no exceedences of the 15-minute, 1-hour, or 24-hour mean objectives recorded.

The North Road automatic monitor records NO_2 continuously. In regards to the NO_2 AQS objectives both the annual mean and the 1-hour objectives were met at the monitoring location in 2014. The annual mean concentration was the highest recorded since 2008 and there were 5 exceedences of the 1-hour objective during the year.

There were three diffusion tube locations that exceeded the AQS annual mean objective for NO_2 within Mid and East Antrim Borough Council during 2014. One of these sites (BDT15) is within the existing Linenhall AQMA therefore a Detailed Assessment is not required for this location.

The further two sites (BDT7 and BDT17) that that exceeded the NO_2 AQS annual mean objective are located close to the Linenhall AQMA but are outside of the existing boundary. BDT7 has exceeded the AQS annual mean objective for three out of the past seven years, and BDT17 since monitoring began in 2013 the site has exceeded the AQS annual mean in 2013 and 2014 (the 2013 results were annualised due to 50% data capture).

The diffusion tubes in Ballymena have been bias adjusted using the locally derived bias adjustment factor of 1.13, the national bias adjustment factor is 0.92. Using the

national bias adjustment factor the annual mean concentrations at these locations are 36.49µg/m^3 (BDT7) and 34.14µg/m^3 (BDT17), both below the NO_2 annual mean AQS objective. It is recommended that monitoring is continued in this area and a decision whether a Detailed Assessment should be completed be made within the 2016 Annual Status Report.

Table 2.14: Summary of Compliance with AQS Objectives

Pollutant	General	New Exceedences identified?	Detailed Assessment Required	Objective	Description of Area and Details
Ballymena Monitoring Network					
NO_2	Monitoring outside AQMAs	No	No	Annual Mean / Hourly Objective	Both BDT7 and 17 exceeded the AQS annual mean objective using the local bias adjustment factor but not when adjusted using the national factor
	Monitoring inside AQMAs	No	No	Annual Mean	BDT15 as per previous years exceeded the AQS annual mean objective
PM_{10}	Monitoring outside AQMAs	No	No	-	-
	Monitoring inside AQMAs	No	No	Annual Mean / 24-hour Objective	Both the annual mean and daily mean AQS objectives continue to be met by the Ballymena Ballykeel automatic monitor
All other pollutants	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
Carrickfergus Monitoring Network					
NO_2	Monitoring outside AQMAs	No	No	Annual Mean	All diffusion tube locations continue to meet the AQS annual mean objective
	Monitoring inside AQMAs	N/A	N/A	-	-
PM_{10}	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
All other pollutants	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
Larne Monitoring Network					
NO_2	Monitoring outside	No	No	Annual Mean	All diffusion tube locations continue to meet the AQS

	AQMAs				annual mean objective
	Monitoring inside AQMAs	N/A	N/A	-	-
PM_{10}	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-
All other pollutants	Monitoring outside AQMAs	N/A	N/A	-	-
	Monitoring inside AQMAs	N/A	N/A	-	-

Mid and East Antrim Borough Council has examined the results from monitoring in the Borough. Concentrations outside of the AQMA are all below the objectives at relevant locations when the national bias adjustment factor is applied, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Defra Technical Guidance TG(09) defines narrow congested streets to have the following:

- Daily traffic flow (AADT) of around 5,000 vehicles per day;
- A congested street is one that has slow moving traffic that is frequently stopping and starting through the day; and
- A narrow street is one where residential properties are within 2m of the kerb and there are buildings on both sides of the road.

No new roads have been identified within Mid and East Antrim as meeting the above criteria.

Mid and East Antrim confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

There will be some street locations where individuals may regularly spend 1-hour or more, for example streets with many shops and streets with outdoor cafes and bars. People occupationally exposed in such locations should not be included, as they are not covered by the regulations.

No busy streets have been identified within Fareham and Gosport as meeting these criteria.

Mid and East Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

A road with a high flow of buses of HGV's would be one where the proportion of these vehicles within the daily traffic flow is greater than 20%.

Mid and East Antrim Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Defra Technical Guidance TG(09) states that for a junction to require assessment the flowing criteria must be met:

- A 'busy' junction can be taken to be one with more than 10,000 vehicles per day; and
- There is relevant exposure within 10m of the kerb.

Mid and East Antrim Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

A new road where an air quality assessment has not been completed as part of the planning application should be assessed using the following criteria as per Defra Technical Guidance TG(09):

- Only proceed if there is relevant exposure within 10m, 20m in major conurbations (population is greater than 2 million);
- Establish whether the traffic flow on the new road is greater than 10,000 vehicles per day or whether the new road has increased traffic flow on existing roads previously identified as having:
  - NO_2 annual mean concentrations greater than 36 µg/m^3; or
  - More than 30, 24-hour exceedences of the PM_{10} objective of 50 µg/m^3.

The works to expand the A8 Belfast to Larne to a dual carriageway were completed in 2015 and the road was opened. An Environmental Statement (ES) was completed for the expansion in 2011 with Chapter 14 assessing the air quality impacts of the

scheme. A DMRB assessment was completed to predict the operational effects of the scheme and it was concluded that the overall impact of the scheme upon air quality in local area would be of minor significance.

Major road works have been completed in 2015 on the A2 Shore Road. An ES was completed for this scheme in 2007 with Chapter 14 providing an assessment of the air quality impacts of the scheme. A DMRB assessment was completed to predict the operational effects of the scheme and it was concluded that there would be no significant effect on either local, or regional air quality as a result of the scheme. Furthermore from the modelling completed it was concluded that there would be a net benefit for the majority of properties in regards to improved air quality.

Mid and East Antrim has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

Mid and East Antrim Borough Council confirm that there have been no roads with a traffic flow of greater than 10,000 vehicles per day that have experienced an increase in traffic flow of more than 25%.

Mid and East Antrim confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The assessment considers both NO_2 and PM_{10} emissions at bus stations that are not enclosed with greater than 2,500 movements per day.

Mid and East Antrim confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

The criteria for Airports that require assessment as a source as stated within Defra Technical Guidance TG(09) is as follows:

- Establish whether there is relevant exposure within 1,000m of the airport boundary;
- Passenger numbers of more than 10 million passengers per annum; and
- The existing NO_x background concentration is greater than 25 µg/m^3.

Mid and East Antrim Borough Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

The assessment for stationary trains considers SO_2 emissions, while the assessment for moving trains also considers NO_2 emissions. The specific criteria for Railways (stationary and moving) that require assessment as stated within Defra Technical Guidance TG(09) is as follows:

- Any locations where diesel/steam trains are regularly stationary for periods of 15 minutes or more;
- There is the potential for regular outdoor exposure of individuals within 15m of the stationary locomotives; and
- Where the existing NO_2 background concentration is above 25 µg/m^3.

4.2.1 Stationary Trains

Stationary locomotives, both diesel and coal fired, can give rise to high levels of SO_2 close to the point of emission. Railway locomotives have not been identified in previous rounds of review and assessment as being a significant source of SO_2 within Mid and East Antrim Borough Council.

Mid and East Antrim Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Rail lines with a heavy traffic of diesel passenger trains are listed in the Defra Technical Guidance TG(09) and on the Defra website for Guidance on Assessing Emissions from Railway Locomotives[1]. Of the lines that are listed, none pass through Mid and East Antrim Borough Council.

Mid and East Antrim Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

The specific criteria for ports (shipping) that require assessment as stated within Defra Technical Guidance TG(09) should include the following:

- Relevant exposure within either 250m or 1km of the berths and main areas of ship manoeuvring;
- Ship movements of between 5,000 and 15,000 per year for relevant exposure within 250m; and
- Ship movements of more than 15,000 per year for relevant exposure within 1km.

The Port of Larne offers facilities for both passenger and freight customers, daily arrivals and departures to Cairnryan are operated by P&O. SO_2 emissions from Larne Harbour were monitored between the 1st of April 2003 and the end of December 2005. This was completed in the vicinity of the port at a site selected on the basis that it was representative of levels at the nearest sensitive receptors which were residential properties located on Coastguard Road.

The equipment was located at a distance of approximately 25m from the identified residential properties and 235m from the closest mooring quay. An automatic UV fluorescent SO_2 analyser was installed which provided real time data relating to the

[1] Guidance on Assessing Emissions from Railway Locomotives, available online at laqm.defra.gov.uk/laqm-faqs/faq37.html

short-time AQS objectives. During the monitoring period all AQS objectives were met and have been reported in previous rounds of Review and Assessment.

Mid and East Antrim Borough Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

This report has assessed any changes to the following since the last Updating and Screening Assessment:

- New or proposed installations for which an air quality assessment has been carried out;
- Existing installations where emissions have increased substantially or new relevant exposure has been introduced;
- New or significantly changed installations with no previous air quality assessment;
- Major fuel storage depots storing petrol;
- Petrol stations; and
- Poultry farms.

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

Mid and East Antrim Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

As per Defra Technical Guidance TG(09) existing industrial installations to be taken into account should include the following criteria:

- Installation has experienced an increase in emissions by greater than 30%; and
- New relevant exposure has been identified in the vicinity of the installation.

Mid and East Antrim Borough council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Mid and East Antrim Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

The specific criteria for petrol stations that require assessment as stated within Defra Technical Guidance TG(09) is a petrol station with the following:

- An annual throughput of more than 2,000m^3 of petrol;
- A busy road nearby, one with more than 30,000 vehicles per day; and
- Relevant receptors within 10m of the refuelling pumps.

Mid and East Antrim Borough Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Studies have been conducted by the Environmental Agency, Department for Environment Northern Island and a local authority. From the studies completed the following guidance has been produced as to the assessment of poultry farms:

- Identify any farms housing in excess of:
  - 400,000 birds if mechanically ventilated;
  - 200,000 birds if naturally ventilated; and
  - 100,000 birds for any turkey farm.
- Establish whether there is any relevant exposure within 100m of the poultry farms.

Mid and East Antrim Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Mid and East Antrim Borough Council have identified one biomass installation that is over 50kW in power output within the Borough:

- SPR McGowen Tree Services, 83A Ballystrudder Road, Islandmagee, BT40 3SJ.

Currently the installation is the subject of two ongoing statutory nuisance complaints under Section 63 of the Clean Neighbourhoods and Environment Act (NI, 2011). At the present time full emission data for the installation is not available, therefore a screening assessment using the Biomass Calculator Tool cannot be completed. Once full details of the installation are known, possibly through the nuisance compliant then an assessment of the installation can be completed in the next round of review and assessment.

Mid and East Antrim Borough Council has identified a biomass combustion plant within the Borough, currently full specifications of the installation are unavailable. When these are available it be concluded if it is necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

Mid and East Antrim Borough Council has identified a biomass combustion plant, currently full specifications of the installation are unavailable. When these are available it be concluded if it is necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning

The current enforced Ballykeel AQMA and the revoked Dunclug AQMA were both declared in respect to PM_{10} concentrations from domestic fuel burning, principally coal. During the time of these declarations the Northern Island Housing Executive (NIHE) began a fuel conversion scheme introducing natural gas as the fuel used within residential properties.

Due to the fuel conversion that took place the AQS objectives for PM_{10} are continually met and the Dunclug AQMA was revoked in 2011. PM_{10} modelling completed within the 2011 Detailed Assessment concluded that the Ballykeel AQMA remain.

Mid and East Antrim Borough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

The assessment of fugitive or uncontrolled sources considers only PM_{10} AQS objectives. The assessment considers but is not limited to the following sources of dust; quarries, landfill sites, opencast coal mining, waste transfer sites, materials handling (i.e. ports, major construction sites). Only sources with planning approval granted need to be considered. An assessment should only be completed if there are locations that haven't been covered by previous rounds of Review and Assessment or where there is new relevant exposure.

Relevant exposure is defined within the Defra Technical Guidance TG(09) using the following criteria as to whether there is exposure 'near' to the source:

- Within 1000m for a local PM_{10} background concentration > 28 µg/m^3;
- Within 400m for a local PM_{10} background concentration between 26 and 28 µg/m^3; and
- Within 200m for a local PM_{10} background concentration < 26 µg/m^3.

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Monitoring of NO_2, PM_{10} and SO_2 is completed within East and Mid Antrim utilising continuous automatic monitors and passive NO_2 diffusion tubes. There are two continuous monitors and a total of thirty six diffusion tubes locations in place during 2014; eighteen sites within Ballymena, twelve sites within Carrickfergus and eight within Larne.

A review of the 2014 NO_2 monitoring data found that there were no exceedences of any the AQS annual mean objectives for NO_2, PM_{10} or SO_2 at automatic monitoring locations of North Street and Ballymena Ballykeel. There were three NO_2 diffusion tube monitoring sites where an exceedences of the AQS annual mean objective were recorded; BDT7, BDT15 and BDT17. None of the diffusion tubes had an annual mean greater than 60 µg/m^3, therefore there are no diffusion tube sites likely to be at risk of exceeding the 1-hour mean AQS objective.

Of the three sites where exceedences occurred, one of the locations is within a designated AQMA (BDT15) and the other two locations are outside of the two designated AQMAs (BDT7 and BDT17).

The diffusion tubes BDT7 and BDT17 have been bias adjusted using the locally derived bias adjustment factor of 1.13, the national bias adjustment factor is 0.92. Using the national bias adjustment factor the annual mean concentrations at these locations are both below the NO_2 annual mean AQS objective. It is recommended that monitoring is continued in this area and a decision whether a Detailed Assessment should be completed within the 2016 Annual Status Report.

8.2 Conclusions from Assessment of Sources

Two new road links have been completed during 2015 within Mid and East Antrim Borough Council. Both schemes completed air quality assessments using DMRB as part of their Environmental Statements (ES), it was concluded for the schemes that the effect on local air quality would be of minor significance for one scheme and a net benefit from the second scheme.

Mid and East Antrim Borough Council has identified a biomass installation which may have the potential to impact the air quality within the Borough, two nuisance complaints have been made against the installation and are currently being investigated. Currently the required emissions data is not available to complete a screening assessment of the installation, this will be completed within Review and Assessment when the emissions data becomes available.

8.3 Proposed Actions

The proposed actions from the Mid and East Antrim 2015 Updating and Screening Assessment are as follows:

- Continue to undertake both automatic and passive monitoring of NO_2 and PM_{10} to identify future trends in concentration and any exceedences of the AQS objectives;
- The Linenhall and Ballykeel AQMAs will be retained and monitoring will continue within the Ballykeel AQMA to assess the need for retention of the AQMAs in the future;
- Continue to monitor at diffusion tube sites BDT7 and BDT17 to assess the need for a Detailed Assessment;
- Continue to gather emissions information for the identified biomass installation to determine the impact upon local air quality; and
- Proceed to an Annual Status Report in 2016.

9 References

- Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- National Diffusion Tube Bias Adjustment Spreadsheet, version 03/15 published in March 2015.
- http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf
- Ballymena Borough Council 2014 Annual Progress Report
- Ballymena Borough Council 2013 Annual Progress Report
- Ballymena Borough Council 2012 Updating and Screening Assessment
- Dunclug and Ballykeel Detailed Assessment of Air Quality, PM_{10} Modelling Study, March 2011, produced by AEA.
- Carrickfergus Borough Council 2014 Annual Progress Report
- Carrickfergus Borough Council 2013 Annual Progress Report
- Carrickfergus Borough Council 2012 Updating and Screening Assessment
- Larne Borough Council 2014 Annual Progress Report
- Larne Borough Council 2013 Annual Progress Report
- Larne Borough Council 2012 Updating and Screening Assessment
- A8 Belfast to Larne Dual Carriageway (Coleman's Corner to Ballyrickard Road), Environmental Statement Volume 1, January 2011, produced by Arup.
- A2 Shore Road Greenisland, Environmental Statement Volume 1, February 2007, produced by Feruson McIlveen.

Appendices

Appendix A: QA/QC Data

Appendix B: Diffusion Tube Monitoring Data

Appendix A: QA/QC Data

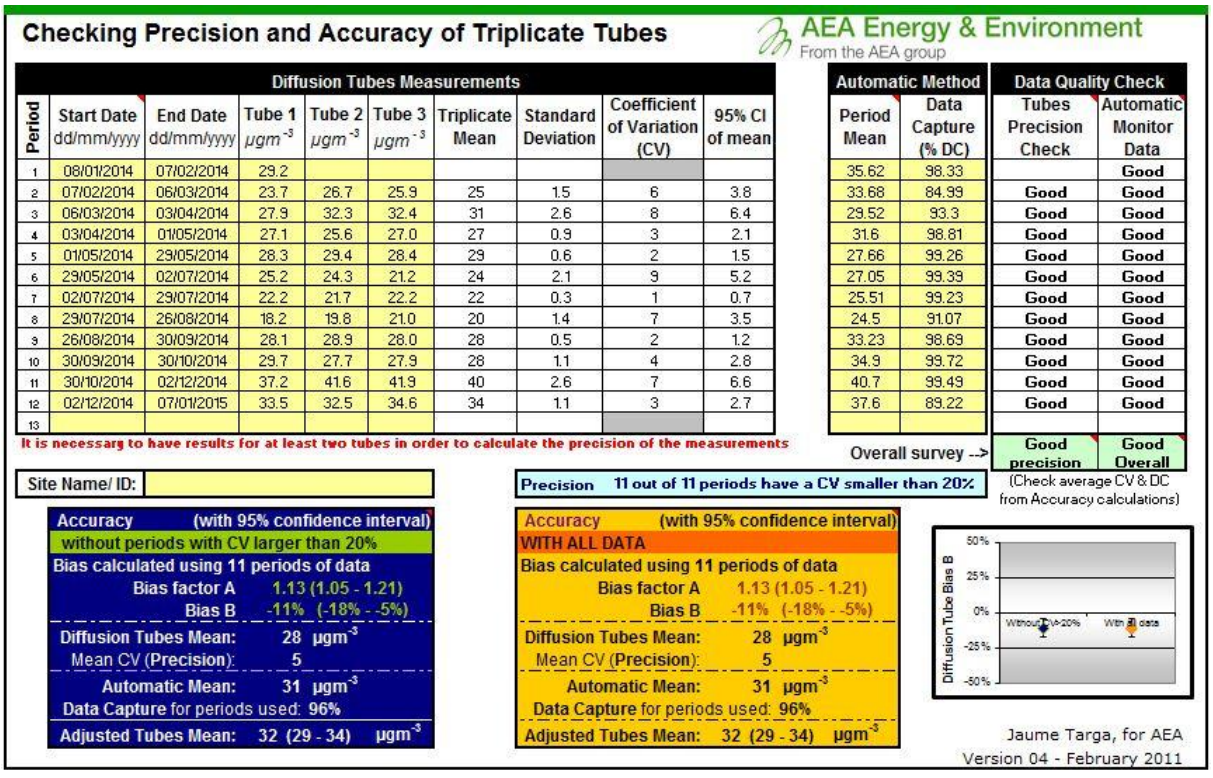
Factor from Local Co-location Studies (if available)

There is one triplicated diffusion tube monitoring site located within Mid and East Antrim Borough Council, these are located at the North Road automatic monitoring station. A local bias adjustment factor has been calculated from the Precision and Bias Adjustment spreadsheet (v04)[2] and is shown in Table A1 and the outputs from the spreadsheet are shown in Figure A1.

Table A1: Local Bias Correction Factor

Location	Diffusion Tube Data Capture	Continuous Monitor Data Capture	Diffusion Tube Annual Mean (µg/m^3)	Continuous Monitor Annual Mean (µg/m^3)	Ratio
North Road, Ballymena	94.4	95.96	27.98	31.45	1.13

Figure A1: Local Bias Correction Factor Output – North Road, Ballymena



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2014	07/02/2014	29.2						
2	07/02/2014	06/03/2014	23.7	26.7	25.9	25	1.5	6	3.8
3	06/03/2014	03/04/2014	27.9	32.3	32.4	31	2.6	8	6.4
4	03/04/2014	01/05/2014	27.1	25.6	27.0	27	0.9	3	2.1
5	01/05/2014	29/05/2014	28.3	29.4	28.4	29	0.6	2	1.5
6	29/05/2014	02/07/2014	25.2	24.3	21.2	24	2.1	9	5.2
7	02/07/2014	29/07/2014	22.2	21.7	22.2	22	0.3	1	0.7
8	29/07/2014	26/08/2014	18.2	19.8	21.0	20	1.4	7	3.5
9	26/08/2014	30/09/2014	28.1	28.9	28.0	28	0.5	2	1.2
10	30/09/2014	30/10/2014	29.7	27.7	27.9	28	1.1	4	2.8
11	30/10/2014	02/12/2014	37.2	41.6	41.9	40	2.6	7	6.6
12	02/12/2014	07/01/2015	33.5	32.5	34.6	34	1.1	3	2.7
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
35.62	98.33		Good
33.68	84.99	Good	Good
29.52	93.3	Good	Good
31.6	98.81	Good	Good
27.66	99.26	Good	Good
27.05	99.39	Good	Good
25.51	99.23	Good	Good
24.5	91.07	Good	Good
33.23	98.69	Good	Good
34.9	99.72	Good	Good
40.7	99.49	Good	Good
37.6	89.22	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

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

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 1.13 (1.05 - 1.21)
Bias B -11% (-18% - -5%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 31 µgm^{-3}
Data Capture for periods used: 96%
Adjusted Tubes Mean: 32 (29 - 34) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A 1.13 (1.05 - 1.21)
Bias B -11% (-18% - -5%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 31 µgm^{-3}
Data Capture for periods used: 96%
Adjusted Tubes Mean: 32 (29 - 34) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

[2] AEA_DifTPAB_v04.xls, version 04 published in February 2015

Diffusion Tube Bias Adjustment Factors

Diffusion tube data obtained for the year 2014 were supplied and analysed by Gradko International Limited and Environmental Scientifics Group (ESG) The Gradko tubes were prepared using the 20% Triethanolamine (TEA) in water preparation method, and the ESG tubes were prepared using the 50% TEA in acetone preparation method. The national bias adjustment factor for Gradko 20% TEA is 0.92 (based on 22 studies, version 09_15) and for ESG Didcot 50% TEA it is 0.81 (based on 31 studies, version 09_15) as derived from the national bias adjustment calculator[3].

Discussion of Choice of Factor to Use

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The Defra Technical Guidance LAQM.TG(09) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, the Defra Technical Guidance LAQM.TG(09) and the LAQM Helpdesk[4] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

The local bias adjustment factor for the Ballymena diffusion tubes is 1.13. The co-located triplicate monitoring site at Ballymena North Road had a good data capture in 2014 (94.4% diffusion tubes, 95.96% automatic monitor) with a good precision recorded for all but one period. It was decided, in line with the 2014 Annual Progress Report that the local bias adjustment factor be applied to the 2014 diffusion tube concentrations. For comparison, the national bias adjustment factor for the laboratory

[3] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 06/15 published in June 2015
[4] Laqm.defra.gov.uk

for 2014 was 0.92 based on 22 studies, taken from the National Bias Adjustment Spreadsheet.

The national bias adjustment factors of 0.92 and 0.81 derived from the National Bias Adjustment Spreadsheet have been used to adjust the diffusion tube concentrations recorded in Carrickfergus and Larne. A national bias factor has been used due there not being a co-located study in operation in either of these locations, this is in line with previous LAQM reports from both Boroughs. The calculated bias factors were based on 22 (Gradko) and 31 (ESG Didcot) studies respectively.

For previous years data presented (2008 – 2013), the bias adjustment factors have been taken from the three previous Councils LAQM reports.

PM Monitoring Adjustment

A Tapered Element Oscillating Microbalance (TEOM) fitted with an Filter Dynamics Measurement System (FDMS) is in operation at the Ballymena Ballykeel monitoring location to record PM_{10} concentration. The FDMS monitor meets the equivalence criteria for PM_{10} monitoring therefore the data does not need to be adjusted.

Short-term to Long-term Data Adjustment

Data capture at all of the diffusion tube monitoring locations within Mid and East Antrim Borough Council was greater than 75% in 2014, therefore annualisation of any of the results was not required.

QA/QC of Automatic Monitoring

Formal Quality Assurance/Quality Control (QA/QC) data management duties are currently provided by Ricardo Energy & Environment at both Ballymena Ballykeel and Ballymena North Road to ensure reliability and accuracy of the concentrations recorded. Audits of all the automatic analysers at the monitoring sites are completed on a six monthly basis.

The maintenance and any urgent call outs of both monitoring sites are completed by Environmental Monitoring Systems Ltd (EMS) who have a 24-hour response time to any urgent call outs.

Calibrations and minor maintenance of the automatic monitors is completed by an air quality management officer from Mid and East Antrim Borough Council acting as the Local Site Operator (LSO), these duties are completed on a fortnightly basis.

QA/QC of Diffusion Tube Monitoring

Gradko International Ltd and ESG Didcot are UKAS accredited laboratories and both participate in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre.

Both Gradko and ESG Didcot previously participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis and the Annual Field Inter-Comparison Exercise. In April 2014, a new scheme, AIR PT[5], was introduced. This is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme. Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

Gradko International Ltd's performance for 2014 is covered by the last round of the WASP scheme, WASP R124 and the first four rounds of AIR PT, AR001-004. In each of these rounds, 100% of samples submitted by Gradko were deemed satisfactory.

ESG Didcot's performance for 2014 is covered by the last round of the WASP scheme, WASP R124 and the first four rounds of AIR PT, AR001-004. In each of these rounds, 100% of samples submitted by ESG Didcot were deemed satisfactory.

[5] http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf

Appendix B: Diffusion Tube Monitoring Data

Table B1: Monthly NO_2 Concentrations – Gosport Borough Council Diffusion Tube Sites (2014)

Site ID	NO_2 Concentrations ($\mu g/m^3$)												Data Capture (no of months)	Average Concentration ($\mu g/m^3$)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Ballymena														
BDT1	12.88	9.03	12.79	10.22	8.62	6.96	7.28	6.83	15.52[a]	11.90	19.31	13.51	12	11.24
BDT2	30.58	30.53	35.10	30.61	28.97	26.42	23.50	22.78	-	37.70	44.44	45.82	11	32.40
BDT3	26.89	19.64	28.07	23.12	21.11	-	19.48	18.65	25.93	23.86	33.10	28.04	11	24.35
BDT4	31.13	26.92	33.05	29.64	29.17	25.03	25.38	23.28	28.13	33.17	40.53	34.80	12	30.02
BDT5	34.38	26.04	26.36	24.61	21.89	16.58	20.26	20.57	25.46	30.85	39.16	30.09	12	26.35
BDT6	16.65	10.30	12.15	9.52	7.96	6.33	5.82	5.84	9.97	11.26	16.27	14.84	12	10.58
BDT7	33.18	37.32	40.44	38.26	38.00	30.40	35.43	38.31	38.07	-	56.35[c]	55.29[c]	11	**40.09**
BDT8	28.08	23.37	27.55	21.29	23.04	19.72	20.00	18.63	24.83	26.19	32.40	31.78	12	24.74
BDT9	27.99	26.46	32.51	30.34	26.60	25.33	24.38	23.80	30.82	30.47	35.10	35.00	12	29.07
BDT10	29.45	27.06	33.32	29.08	29.92	27.82	23.64	25.71	28.48	32.73	41.65	34.29	12	30.26
BDT11	30.86	23.29	25.82	27.88	26.88	22.00	23.03	20.85	30.71	29.37	39.83	28.07	12	27.38
BDT12	25.84	27.26	32.50	29.52	30.69	29.11	25.67	27.59	30.30	41.16	38.87	33.03	12	30.96
BDT13	29.22	23.69	27.90	27.08	28.29	25.16	22.19	18.15	28.12	29.74	37.17	33.48	12	27.52
BDT14	-	26.68	32.29	25.55	29.43	24.29	21.74	19.82	28.87	27.65	41.61	32.46	11	28.22
BDT14B	-	25.85	32.29	26.96	28.43	21.18	22.23	20.98	28.01	27.93	41.87	34.60	11	28.21
BDT15	-	48.24	55.36	51.37	-	43.11	46.20	56.47	53.18[c]	55.23	39.58	66.15[c]	10	**51.49**
BDT16	-	26.98	33.59	27.14	28.99	27.40	26.56	33.21	31.84	32.71	32.01	29.06	11	29.95
BDT17	-	31.33	38.09	34.57	37.35	29.54	32.16	36.69	37.69	44.43	36.38	54.43[0.0c]	11	37.51
Carrickfergus														
CDT1	-	23.12	25.43	28.92	25.63	23.25	21.63	20.49	26.86	27.95	41.70	24.59	11	26.33

CDT2	12.99	9.69	12.72	9.78	9.12	7.19	7.10[d]	4.84	9.61	10.31	13.59	12.04	12	9.91
CDT3	29.39	24.70	23.16	18.93	24.89[d]	19.14[d]	17.20	19.74	20.93	8.13	22.50	25.60	12	21.19
CDT4	29.42	23.09	23.61	21.44	23.16	20.39	18.02	18.18	21.68	27.92	22.88	23.08	12	22.74
CDT5	32.02	25.57	26.14	24.98	27.38	22.71	23.01	21.41	22.77	25.29	31.11	29.09	12	25.96
CDT6	30.49	25.48	27.64	25.55	-	25.32	23.48	18.84	26.35	-	36.91	27.65	10	26.77
CDT7	31.94	25.42	35.43	31.60	31.61	33.88	31.52	26.03	33.39	29.30	42.23	28.87	12	31.77
CDT8	34.51	21.63	0.20[b]	60.80	-	37.01	28.22	27.62	31.31	31.94	-	29.52	10	33.62
CDT9	31.47	24.86	31.63	29.08	25.29	24.63	23.95	22.55	24.16	26.33	36.14	25.73	12	27.15
CDT10	30.60	24.97	28.68	27.40	25.03	18.99	18.34	13.85	20.94	21.44	27.83	29.78	12	23.99
CDT11	22.22	18.47	20.85	15.86	14.59	9.96	10.70	7.35	11.34	16.55	22.41	21.73	12	16.00
CDT12	25.63	17.28	23.82	23.09	22.83	21.65	17.41	16.35	23.49	19.12	30.82	15.53	12	21.42
CDT13	32.77	33.86	31.32	25.48	29.76	21.91	21.58	20.63	22.37	26.87	31.52	28.42	12	27.21
CDT14	20.76	15.74	19.26	14.95	15.33	10.28	9.99	7.70	12.63	13.96	26.88	14.04	12	15.13
Larne														
LDT1	30.60	28.30	34.70	28.40	25.30	18.10	-	22.10	30.60	32.50	39.30	39.90	11	29.98
LDT2	22.00	17.80	12.90	20.10	14.70	12.90	15.00	12.60	18.30	17.40	19.60	18.20	12	16.79
LDT3	30.60	25.60	25.30	23.50	24.60	22.30	25.50	25.40	19.00	30.00	34.80	45.80	12	27.70
LDT4	39.50	32.80	32.10	26.80	30.30	22.50	23.40	29.90	31.30	30.10	35.00	36.60	12	30.86
LDT5	20.70	-	27.40	29.90	25.00	-	20.70	17.60	-	29.00	34.80	24.60	9	25.52
LDT6	-	15.80	17.00	19.20	13.10	10.50	16.30	11.50	31.70	13.70	25.10	25..4	10	17.39
LDT7	9.40	10.40	12.60	15.70	13.00	9.10	13.00	9.90	14.10	9.40	20.60	12.50	12	12.48
LDT8	13.60	12.40	13.00	12.30	11.10	7.30	12.00	11.30	13.40	12.70	19.10	21.70	12	13.33

Exceedences of the AQS annual mean objective shown in **Bold**.

[a] Tube was found to be dirty, results to be treated with caution.

[b] Results reported are below Gradko's reporting limit.

[c] Tubes were diluted to read within Gradko's accredited calibration range.

[d] Tube contained a spider, results to be treated with caution.