2017
Air Quality Progress Report

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

Mid & East Antrim Borough Council

www.midandeastantrim.gov.uk

Mid and East Antrim Borough Council

Local Authority Officer	Sam Mills
Department	Environmental Health
Address	Ardeevin 80 Galgorm Road Ballymena BT42 1AB
Telephone	02825 633136
e-mail	sam.mills@midandeastantrim.gov.uk
Report Reference number	MEABC/PR2017v2

1 Executive Summary

Mid and East Antrim Borough Council has completed this 2017 Air Quality Progress Report in accordance with the provisions of the Environment (Northern Ireland) Order 2002 and the Northern Ireland Local Air Quality Management Policy Guidance document LAQM.PGNI (16)

In undertaking this report, we have completed a review of 2016 ambient air quality monitoring data across the borough in order to identify locations where new or existing exceedances of Air Quality Strategy (AQS) objectives and European Commission limit values are occurring.

It also considers any potential new pollutant emission sources that may have an impact on local air quality.

Mid and East Antrim Borough Council have two declared Air Quality Management Areas (AQMAs) currently enacted due to exceedences of the AQS objectives for Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}): -

- Ballymena Ballykeel (PM_{10})
- Ballymena Linenhall Street (NO_2)

Following the conclusions of this report it is recommended that the present AQMA declarations should remain.

Results from automatic analysers located at Ballymena Ballykeel showed that PM_{10} and SO_2 levels continue the trend of decreasing over time.

Results of NO_2 Diffusion tubes monitoring showed that there continues to be exceedences of the AQS objectives for NO_2 within the Ballymena Linenhall AQMA.

Mid and East Antrim Borough Council

Of note is the increase in NO_2 levels at monitoring sites in Carrickfergus area. These levels are still below the AQS objectives for NO_2, but will warrant further investigation at the next update and screen assessment.

The affected diffusion monitoring sites are located in the vicinity of a road scheme that was completed in 2015/2016. This road scheme was assessed for air quality impact using the DMRB screening methodology. It was concluded for the schemes that the effect on local air quality would be of minor significance.

As a results of previously received smoke nuisance complaint, this authority has served notice on a biomass installation. As a result the installation owner has been required to undertake an air quality emissions assessments from the boiler.

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

With regard to improving air quality within the Borough, this council continues to promote modal shift to less polluting forms of transport, as well as promotion of cycling through events such as cycle to work, travelwise bike week, as well as looking at strategies such as greening highways to provide high quality cycle transport network.

Mid and East Antrim Borough Council will be proceeding to annual progress report in 2018.

Table of Contents

List of Tables

List of Figures

Appendices

2 Introduction

2.1 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 PM10 concentrations predicted by domestic fuel modelling, and Linenhall AQMA has been declared due to modelled and monitored concentrations of NO2 being above the AQS annual mean objective.

2.2 Purpose of Progress Report

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

Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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

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

2.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in Northern Ireland** are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre µg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	3.25 µg/m^3	Running annual mean	31.12.2010
1,3-butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

2.4 Summary of Previous Review and Assessments

Mid and East Antrim is comprised of the former Ballymena, Larne and Carrickfergus Borough Councils respectively. Included below are the summaries for these individual councils. This is combined from 2015 onwards

Table 2-1 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 2013	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.

Mid and East Antrim Borough Council

LAQM Annual Progress Report 2014	August 2014	No exceedences of annual concentrations for NO_2, SO_2 or PM10. Exceedences occurring of hourly and daily mean concentrations for NO_2 and PM_{10}.

Table 2-2 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.

Table 2-3 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.

Table 2-4 Mid and East Antrim Borough Council

Previous Assessment	Date completed	Summarised Outcomes
LAQM Updating and Screening Assessment 2015	August 2015	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 2016		NO_2 objectives met, no AQMA declared.

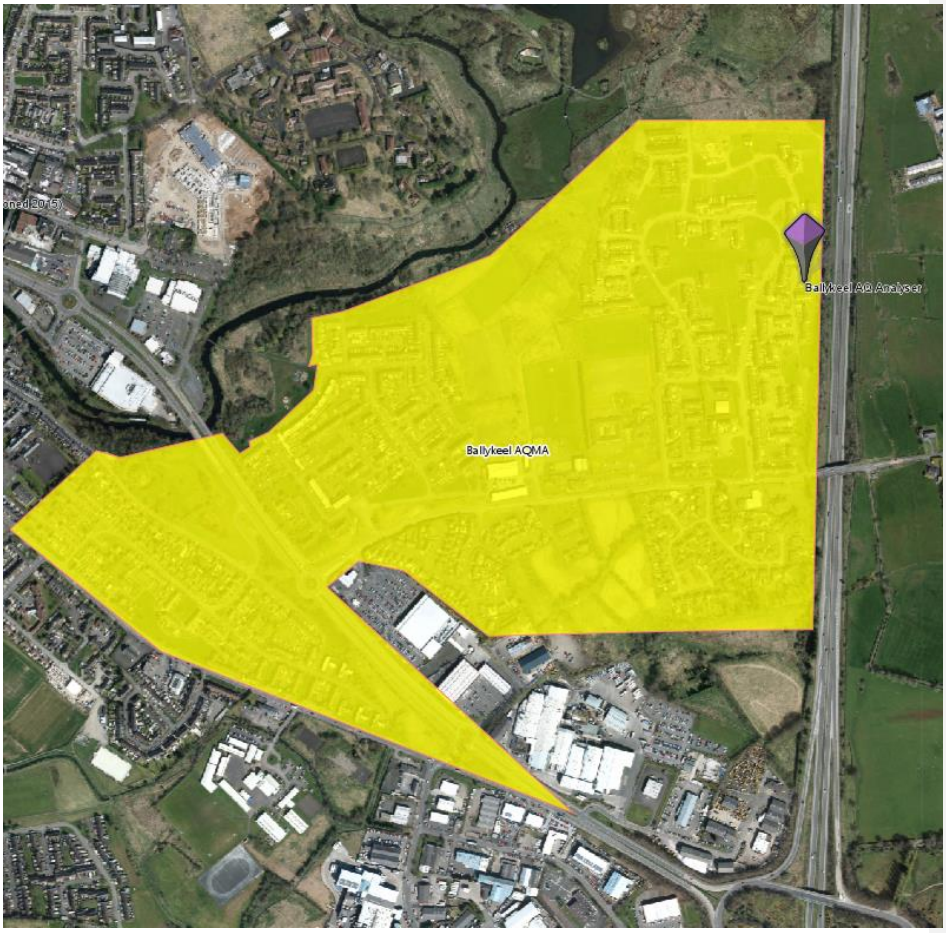


Figure 1.1 – Map of Ballykeel AQMA, showing location of Automatic Analyser

Figure 2-1 Linenhall Street AQMA showing location of Diffusion Tubes

3 New Monitoring Data

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Ballymena North Analyser experienced several breakdowns throughout year and was taken out of service in September 2015 following unserviceable breakdown of the analyser.

There is currently one automatic monitoring station operated within Mid and East Antrim Borough Council, and is sited at the following location:

- Ballymena Ballykeel

The Ballymena Ballykeel monitor continuously monitors:

- Sulphur Dioxide (SO_2) using a real time ultraviolet fluorescent SO_2 analyser.
- Particulate Matter (PM_{10}) using an Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS).

Figure 3-1 Map of Ballykeel Automatic Monitoring Site

Table 2.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
	Ballymena Ballykeel	Urban Background	311900	402600	3m	PM_{10} SO_2	Y	TEOM/FDMS Fluorescent	Y	N/A	Y

3.1.2 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 2016. 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.

Commented [SM1]: Made it to here

There has been no change to the NO_2 monitoring network from 2015.

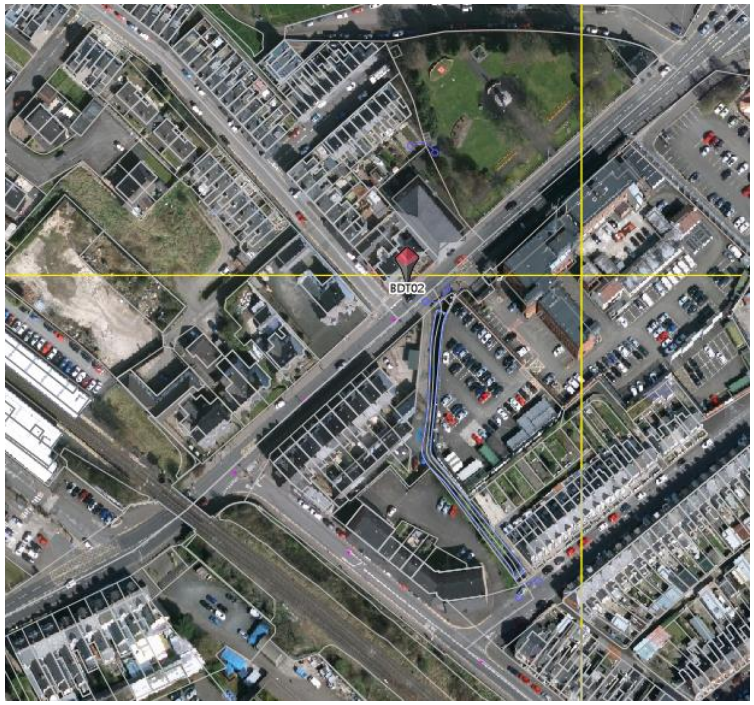
The locations of the NO_2 diffusion tubes are shown in Figures 3.2 below and details of the monitoring network are given in Table 2.2.

Figure 3-2 Maps of Non-Automatic Monitoring Sites

Commented [SM2]:

BDT1 – Leighmohr Avenue

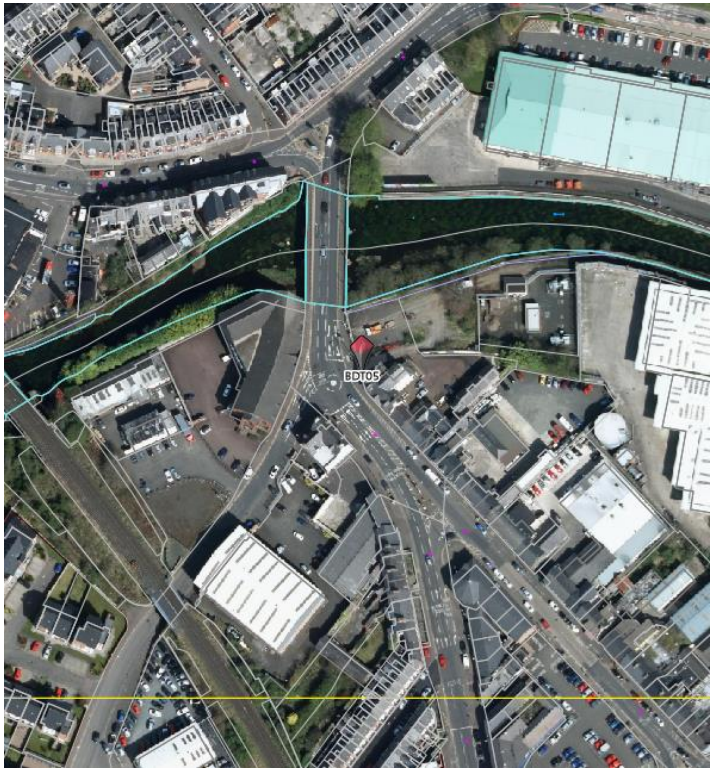
BDT2 – Galgorm Road



BDT3 – Main Street, Cullybackey

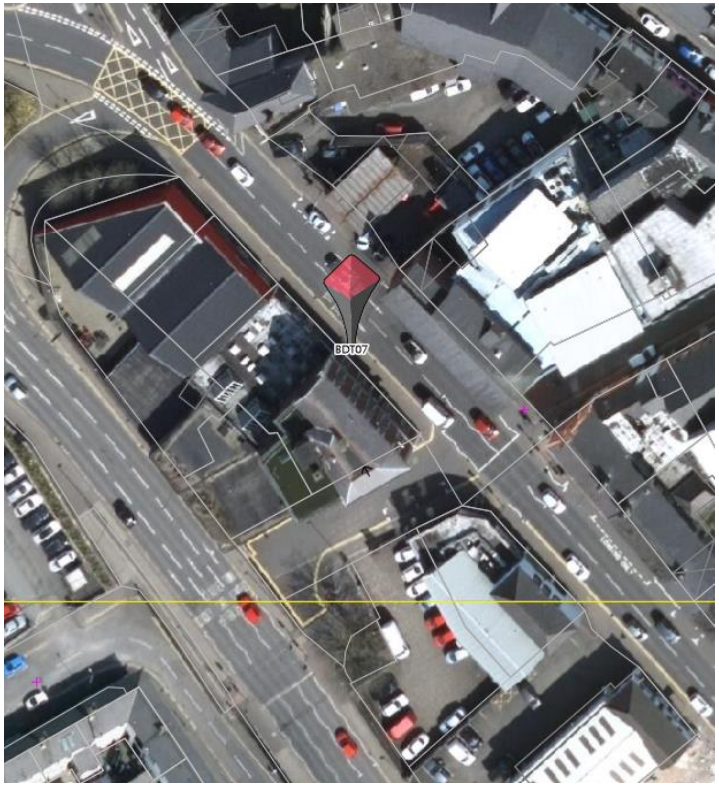
BDT4 – Cullybackey Road

BDT5 – Larne Street



BDT6 – Ballyloughan Avenue

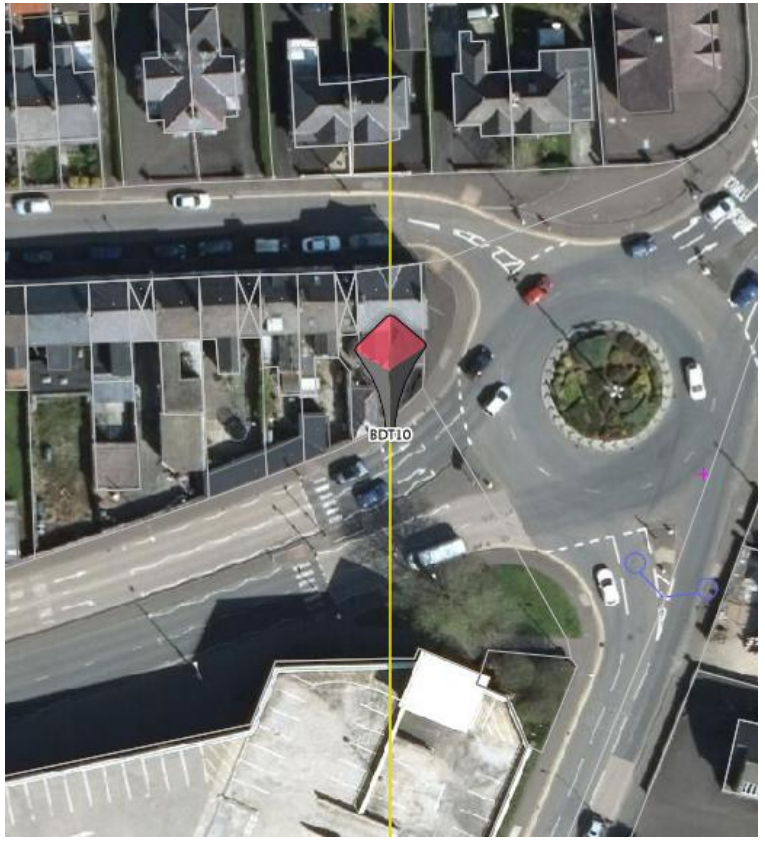
BDT7 – George Street



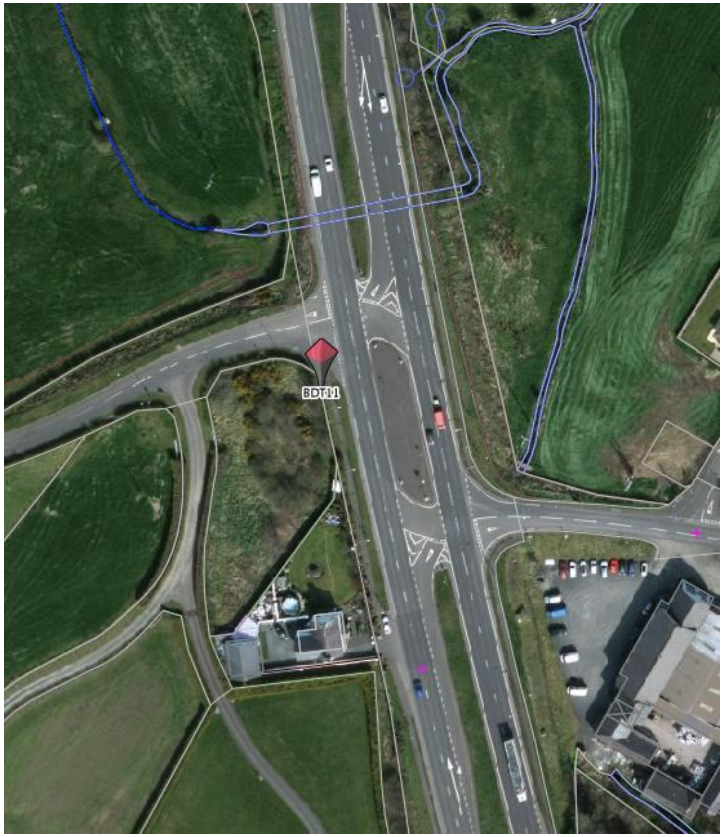
BDT8 – Wellington Street

BDT9 – Ballymoney Street

BDT10 – Parkway



BDT11 – Lisnevenagh Road



BDT12 – Queen Street

BDT13/14/14B – North Road

BDT15 – Linenhall Street

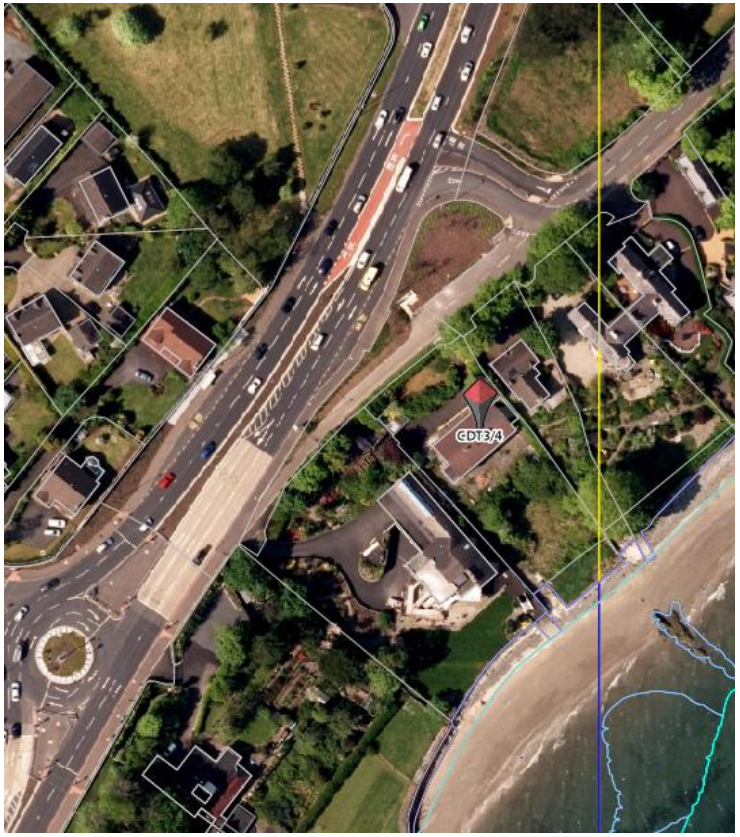
BDT16 – Bridge Street

BDT17 – Galgorm Road

CDT 01 – 27 Upper Road, Greenisland

CDT 02 – 32 Mullaghmore

CDT 3/4 – 50 Shore Road, Greenisland



CDT 5 – 189 Shore Road, Greenisland

CDT 6 – 93 Belfast Road

CDT 7/8 – Model PS Belfast Road

CDT 9 – Minorca Place

CDT 10 – 42 Albert Road

CDT 11 – Fergus Avenue

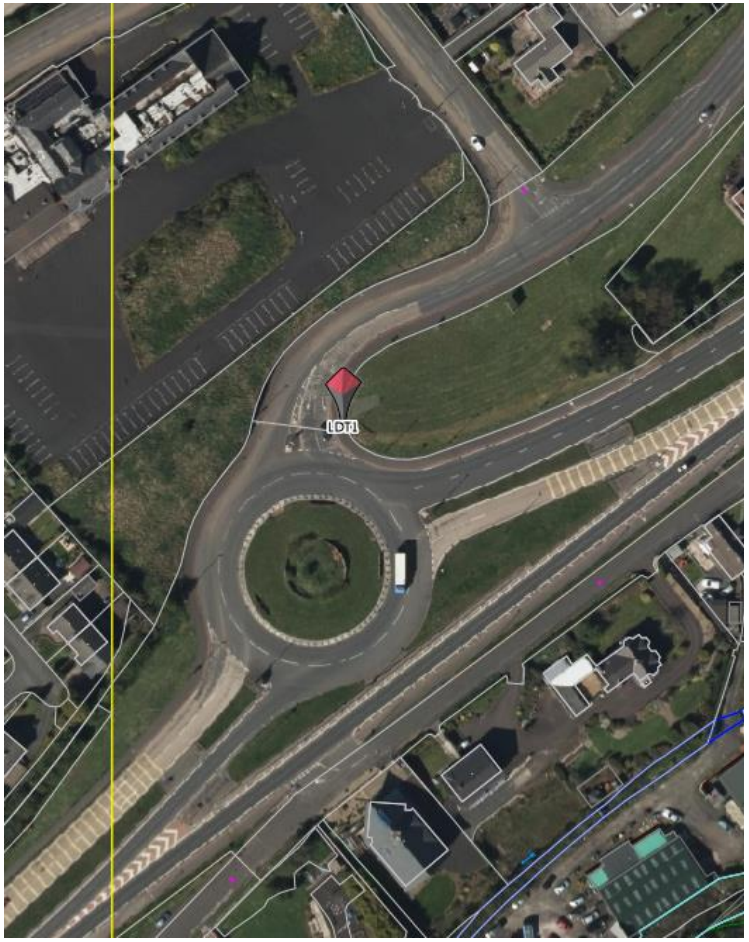
CDT 12 – College Road North

CDT 13 – Victoria Road

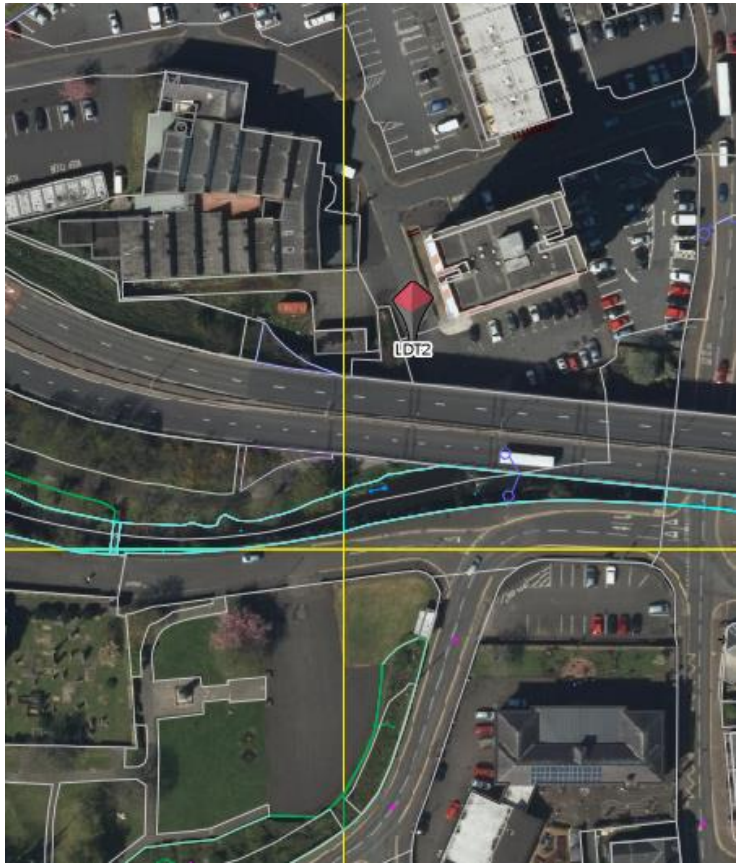
CDT 14 – Islandmagee Road, Whitehead

LDT 1 – Antiville Road

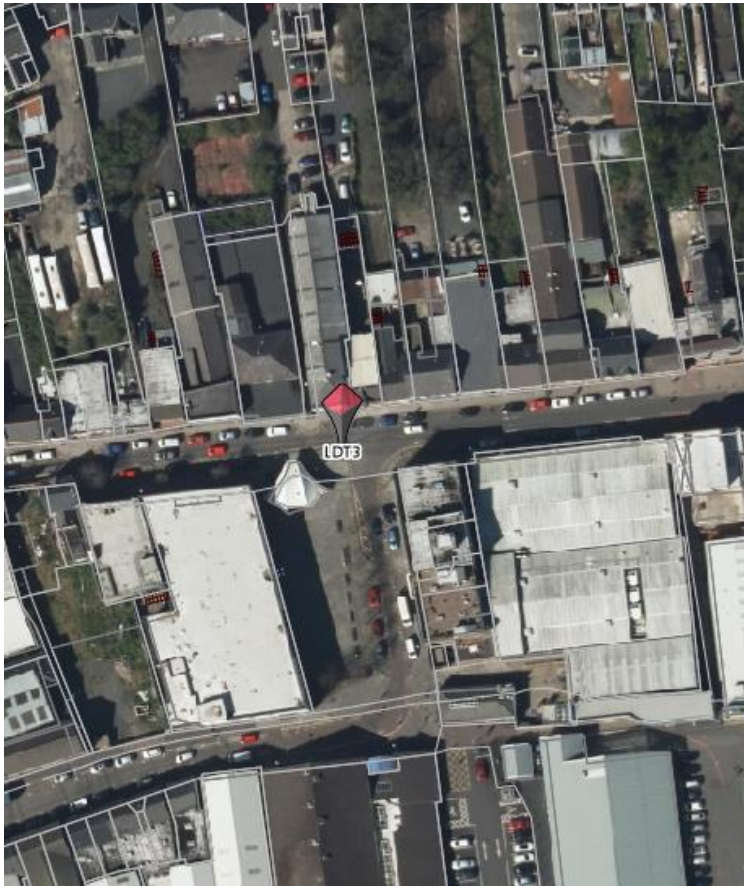
LDT 2 – Riverdale



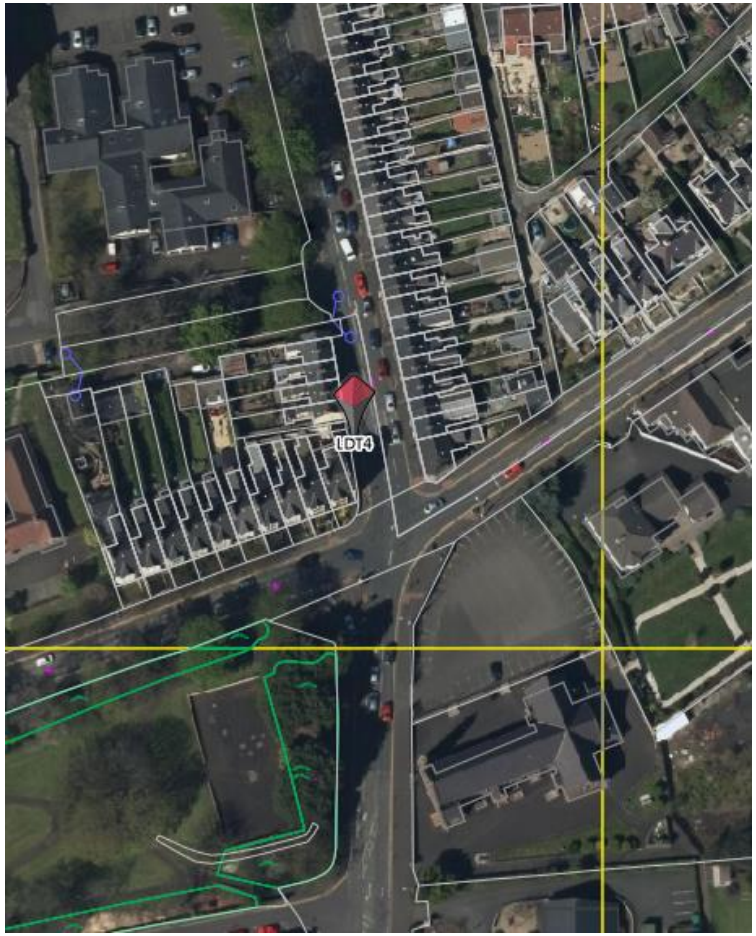
LDT 3 – Main Street, Larne



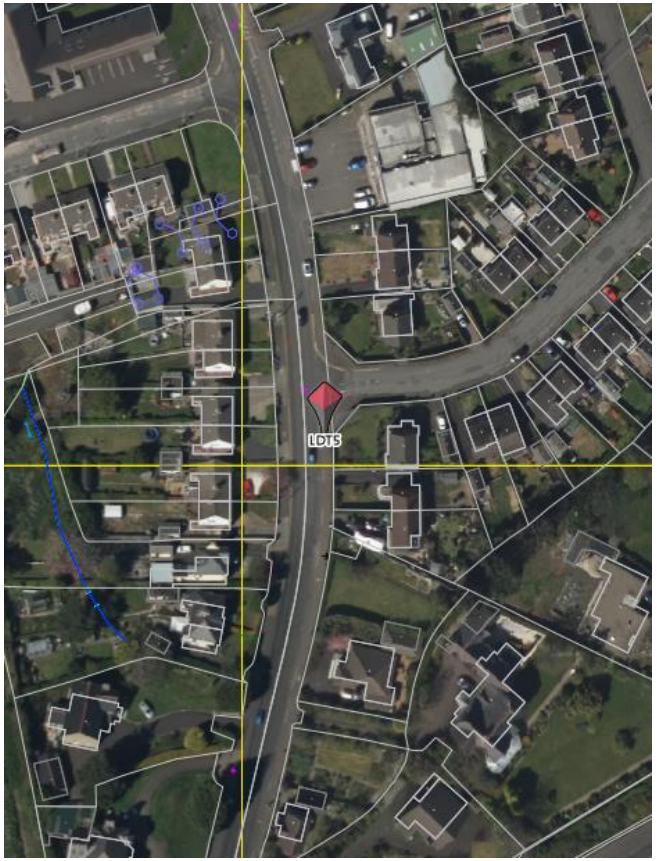
LDT 4 – Victoria Road



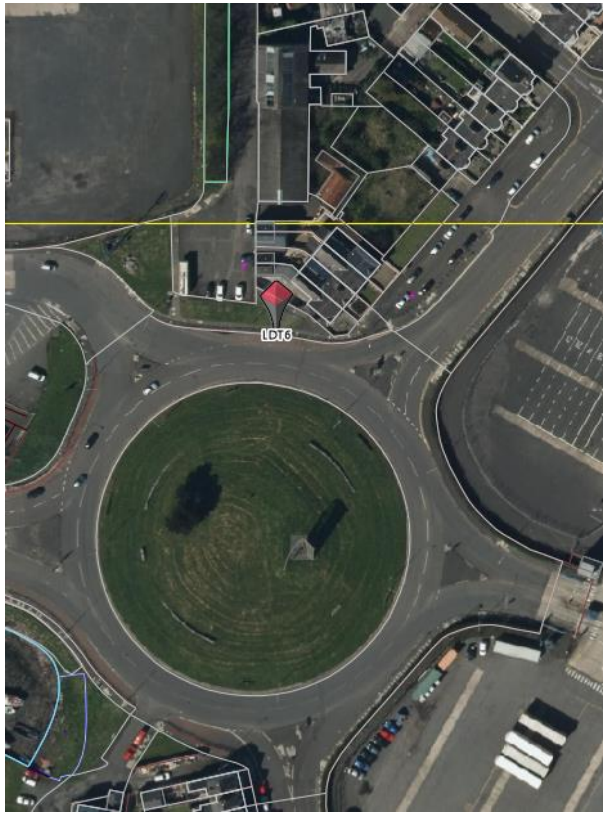
LDT 5 – Upper Cairncastle Road



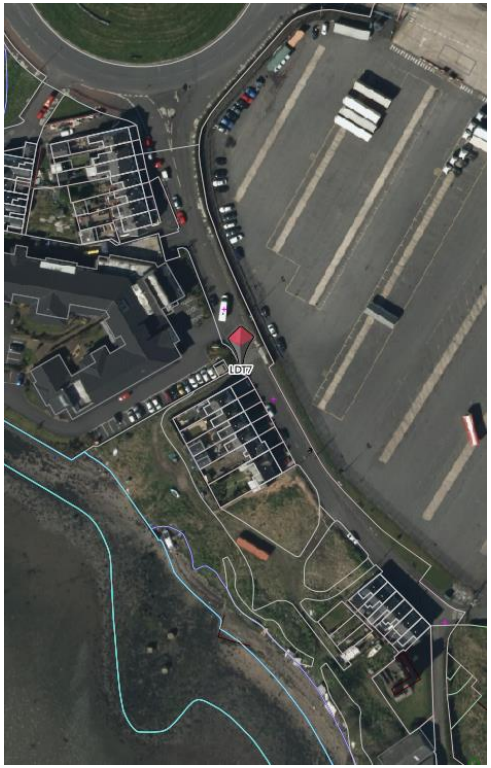
LDT 6 – Larne Harbour Roundabout



LDT 7 – Coastguard Road



LDT 8 – Ballylumford Road


LDT7


LDT8

Table 2.2 – Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
BDT1	Leighinmohr Av	Urban Background	310228	402546		NO_2	N	N	Y	N/A	Y
BDT2	Galgorm Road	Kerbside	310336	403196		NO_2	N	N	Y	3m	Y
BDT3	Main St, Cullybackey	Kerbside	305841	405690		NO_2	N	N	Y	2m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
BDT4	Cullybackey Road	Kerbside	310350	403443		NO_2	N	N	Y	3m	Y
BDT5	Larne St	Kerbside	310602	402920		NO_2	N	N	Y	3m	Y
BDT6	Ballyloughan Ave	Urban Background	309532	404425		NO_2	N	N	Y	N/A	Y
BDT7	George St	Kerbside	310584	403239		NO_2	N	N	Y	1m	Y
BDT8	Wellington St	Kerbside	310795	403386		NO_2	N	N	Y	2m	Y
BDT9	Ballymoney St	Kerbside	310796	403582		NO_2	N	N	Y	2m	Y
BDT10	Parkway	Kerbside	311000	403905		NO_2	N	N	Y	2m	Y
BDT11	Lisnevenagh Rd	Road Side	311884	397037		NO_2	N	N	Y	6m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
BDT12	Queen St	Kerbside	310743	402219		NO_2	N	N	Y	3m	Y
BDT13	North Road	Roadside	310638	403079		NO_2	N	N	Y	2m	Y
BDT14	North Road	Roadside	310638	403079		NO_2	N	N	Y	2m	Y
BDT14B	North Road	Roadside	310638	403079		NO_2	N	N	Y	2m	Y
BDT15	Linenhall St	Kerbside	310687	403122		NO_2	Y	N	Y	<1m	Y
BDT16	Bridge St	Kerbside	310710	403119		NO_2	N	N	Y	2m	Y
BDT17	Galgorm Rd	Kerbside	310491	403314		NO_2	N	N	Y	2m	Y
CDT1	27 Upper Road, Greenisland	Roadside	336386	385717		NO_2	N	N	Y (1m)	1m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CDT2	32 Mullaghmore Park, Greenisland	Urban Background	336901	385621	1.56	NO_2	N	N	Y (30m)	3m	N
CDT3/4	59 Shore Road, Greenisland	Roadside	337969	384916		NO_2	N	Duplicate	Y (1m)	1m	Y
CDT5	186 Shore Road, Greenisland	Roadside	338411	385380	2.74	NO_2	N	N	Y (1m)	1m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CDT6	93 Belfast Road, Carrickfergus	Roadside	339911	386741	2.58	NO_2	N	N	Y (1m)	1m	Y
CDT7	Model PS Belfast Road, Carrickfergus	Roadside	340781	387100	2.4	NO_2	N	N	Y (1m)	1m	Y
CDT8	Model PS Belfast Road, Carrickfergus	Roadside	340781	387100	2.4	NO_2	N	N	Y (1m)	1m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CDT9	Minorca Place/ Tesco junction, Carrickfergus	Roadside	340897	387381	2.99	NO_2	N	N	Y (1m)	1m	Y
CDT10	42 Albert Road, Carrickfergus	Roadside	341186	387558	2.77	NO_2	N	N	Y (1m)	1m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CDT11	Railway Station, Fergus Avenue, Carrickfergus	Roadside	341204	387692	2.96	NO_2	N	N	Y (15m)	15m	Y
CDT12	College North Road, Carrickfergus	Roadside	341147	388596	2.99	NO_2	N	N	Y (1m)	1m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CDT13	Victoria Road/Larne Road junction, Carrickfergus	Roadside	342354	388216	2.7	NO_2	N	N	Y (1m)	1m	Y
CDT14	Islandmagee Road, Whitehead	Roadside	347309	392433		NO_2	N	N	Y (1m)	2m	Y
LDT1	Antiville Road/ A8 Junction	Roadside	153472	557105	3.0	NO_2	N	N	N	N/A	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
LDT2	Riverdale/ Latharna House	Urban Background	154681	557306	3.2	NO_2	N	N	N	N/A	Y
LDT3	Main St, Larne	Urban Centre	155060	557432	3.2	NO_2	N	N	N	1m	Y
LDT4	Victoria Rd/ Agnew St Junction	Kerbside	155197	557647	4.3	NO_2	N	N	N	3m	Y
LDT5	Upper Caincastle Rd	Kerbside	154057	558376	3.9	NO_2	N	N	N	3m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
LDT6	Larne Harbour Roundabout	Roadside	156003	556709	3.3	NO_2	N	N	N	N/A	Y
LDT7	Coastguard Rd/ Castle Terrace	Urban Background	156065	556434	3.4	NO_2	N	N	N	N/A	Y
LDT8	Ballylumford Rd/ Islandmage	Industrial	156847	556756	3.2	NO_2	N	N	N	N/A	Y

3.2 Comparison of Monitoring Results with Air Quality Objectives

3.2.1 Nitrogen Dioxide (NO_2)

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

Within the monitoring period of 2016, no roadside automatic NO2 monitors where in operation within Mid and East Antrim Borough Council.

The NO_2 analyser at North Road, failed in September 2015, afterwhich it was taken out of service following equipment failure.

Mid and East Antrim Borough Council have since liased with DEFRA to install two NO_2 analysers at Ballymena Ballykeel site and also a road side NO_2 real time analyser at Ballymena Antrim Road.

Both of these analysers are part of DEFRA operated expanded AURN network and both became operable within 2017.

Mid and East Antrim Borough Council

Diffusion Tube Monitoring Data

Diffusion tube data obtained for the year 2016 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 Gradko, the tubes were prepared using the 20% triethanolamine (TEA) in water 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.

As there was no NO_2 real time analyser in operation during the monitoring period of 2016, national bias adjustment factor have been used for all diffusion tubes within the Borough.

National bias adjustment factor from the national database for Gradko 20% TEA diffusion tubes based on 32 studies (0.92), have been used to bias adjust the diffusion tubes.

The results of annual mean NO_2 concentrations measured using diffusion tubes in 2016 following bias adjustment are reported in Table 3-1, Table 3-2 and Table 3-3 Monthly results of NO_2 concentrations without bias adjustment are also provided in Appendix B

The results of NO_2 diffusion tube data (2012 – 2016) are presented in Table 3-4, Table 3-5 and Table 3-6.

The results of the diffusion tube data for 2016 show that there were exceedances of the AQS NO_2 annual mean objective at two diffusion tube locations

All of these diffusion tube locations are in close proximity to the declared Linenhall Street AQMA. One site is on the current boundary of the declare AQMA boundary and so future analysis will be carried out to determine if AQMA boundary requires adjustment.

BDT7 - George Street – (Within Linenhall Street AQMA)

BDT15 – Linenhall Street – (Within Linenhall Street AQMA)

Comparing the 2016 NO_2 monitoring with concentrations of previous years the locations that have resulted in exceedances in 2016 have had previous exceedances; BDT7 since 2009 has had an exceedance 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 2008-2016.

All other tubes within Ballymena have been, and continue to be below the AQS objective.

Mid and East Antrim Borough Council

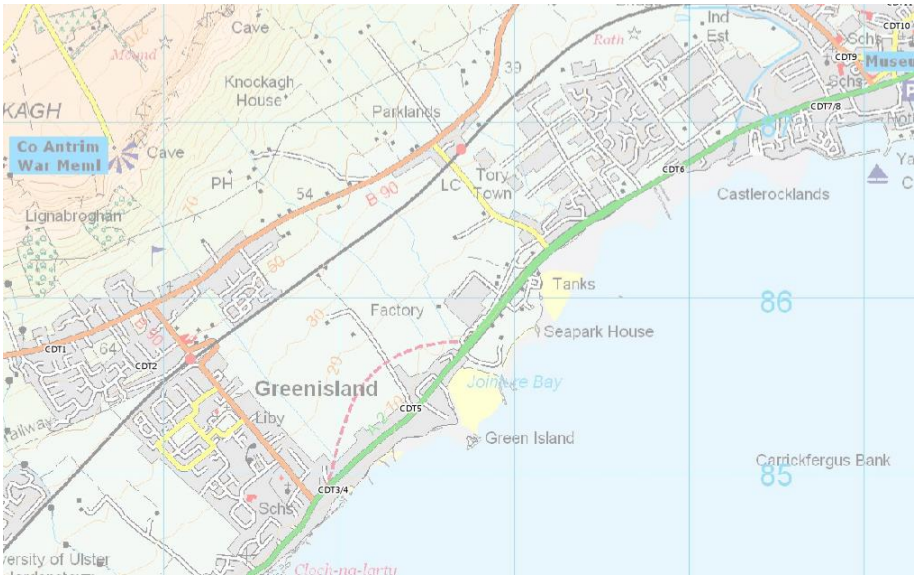
In line with previous years monitoring the diffusion tubes located within Carrickfergus area continue to be below the AQS annual mean objective.
However there is a step increase in NO2 concentrations at the following locations

CDT1	27 Upper Road, Greenisland
CDT2	32 Mullaghmore Park, Greenisland
CDT3	59 Shore Road, Greenisland
CDT4	59 Shore Road, Greenisland
CDT5	186 Shore Road, Greenisland
CDT6	93 Belfast Road, Carrickfergus
CDT7	Model PS Belfast Road, Carrickfergus
CDT8	Model PS Belfast Road, Carrickfergus
CDT9	Minorca Place/Tesco junction, Carrickfergus
CDT10	42 Albert Road, Carrickfergus
CDT13	Victoria Road/Larne Road junction, Carrickfergus

These tubes are located in the proximity of the recently upgraded A2 roadway, see , which was completed in 2015/16. Air quality was assessed for thisroad development project utilising Air quality screening methodology within DMRB. It was concluded for the scheme that the effect on local air quality would be of minor significance.

It is proposed to continue gathering emissions information at diffusion tube sites CDT1 – CDT10, CDT13 to assess the need for detailed assessment (all of the emission levels were below the AQS objective for NO_2).

Figure 3-3 NO_2 Diffusion tube proximity to A2 Road Upgrade Carrickfergus



All diffusion tube monitoring within Larne area continues to be within AQS objectives.

Table 3-1 Results of NO_2 Diffusion Tubes 2016 - Ballymena

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration (μg/m^3) - Bias Adjustment local factor = 0.92
BDT1	Leighinmohr Av	Urban Background	N	N	12	-	N	9.61
BDT2	Galgorm Road	Kerbside	N	N	11	-	N	35.11
BDT3	Main St, Cullybackey	Kerbside	N	N	11	-	N	24.45
BDT4	Cullybackey Road	Kerbside	N	N	12	-	N	28.37
BDT5	Larne St	Kerbside	N	N	12	-	N	24.52
BDT6	Ballyloughan Ave	Urban Background	N	N	12	-	N	10.63
BDT7	George St	Kerbside	Y	N	12	-	N	**41.70**

BDT8	Wellington St	Kerbside	N	N	11	-	N	23.65
BDT9	Ballymoney St	Kerbside	N	N	11	-	N	24.27
BDT10	Parkway	Kerbside	N	N	12	-	N	29.39
BDT11	Lisnevenagh Rd	Roadside	N	N	12	-	N	27.74
BDT12	Queen St	Kerbside	N	N	12	-	N	28.33
BDT13	North Road	Roadside	N	N	12	-	N	27.51
BDT14	North Road	Roadside	N	N	12	-	N	28.21
BDT14B	North Road	Roadside	N	N	12	-	N	26.25
BDT15	Linenhall St	Kerbside	Y	N	12	-	N	**45.60**
BDT16	Bridge St	Kerbside	N	N	12	-	N	32.09
BDT17	Galgorm Rd	Kerbside	N	N	12	-	N	37.89

Table 3-2 Results of NO_2 Diffusion Tubes 2016 - Carrickfergus

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment local factor = 0.92
CDT1	27 Upper Road, Greenisland	Roadside	N	N		-	N	22.08
CDT2	32 Mullaghmore Park, Greenisland	Urban Background	N	N		-	N	8.87
CDT3	59 Shore Road, Greenisland	Roadside	N	N		-	N	30.08
CDT4	59 Shore Road, Greenisland	Roadside	N	N		-	N	29.58

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration (μg/m^3) - Bias Adjustment local factor = 0.92
CDT5	186 Shore Road, Greenisland	Roadside	N	N		-	N	28.40
CDT6	93 Belfast Road, Carrickfergus	Roadside	N	N		-	N	33.49
CDT7	Model PS Belfast Road, Carrickfergus	Roadside	N	N		-	N	29.61
CDT8	Model PS Belfast Road, Carrickfergus	Roadside	N	N		-	N	30.39
CDT9	Minorca Place/ Tesco junction, Carrickfergus	Roadside	N	N		-	N	25.75

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration (μg/m^3) - Bias Adjustment local factor = 0.92
CDT10	42 Albert Road, Carrickfergus	Roadside	N	N		-	N	20.95
CDT11	Railway Station, Fergus Avenue, Carrickfergus	Roadside	N	N		-	N	13.43
CDT12	College North Road, Carrickfergus	Roadside	N	N		-	N	18.98
CDT13	Victoria Road/Larne Road junction, Carrickfergus	Roadside	N	N		-	N	26.04

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment local factor = 0.92
CDT14	Islandmagee Road, Whitehead	Roadside	N	N		-	N	11.97

Table 3-3 Results of NO_2 Diffusion Tubes 2016 - Larne

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment local factor = 0.92
LDT1	Antiville Road/ A8 Junction	Roadside	N	N	9	-	N	23.02
LDT2	Riverdale/ Latharna House	Urban Background	N	N	9	-	N	12.35
LDT3	Main St, Larne	Urban Centre	N	N	9	-	N	22.30
LDT4	Victoria Rd/ Agnew St Junction	Kerbside	N	N	10	-	N	25.13
LDT5	Upper Caincastle Rd	Kerbside	N	N	9	-	N	16.75
LDT6	Larne Harbour Roundabout	Roadside	N	N	10	-	N	12.96

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2015 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Data Distance Corrected (Y/N)	2016 Annual Mean Concentration ($\mu g/m^3$) - Bias Adjustment local factor = 0.92
LDT7	Coastguard Rd/ Castle Terrace	Urban Background	N	N	10	-	N	9.52
LDT8	Ballylumford Rd/ Islandmage	Industrial	N	N	10	-	N	9.52

Table 3-4– Results of NO_2 Diffusion Tubes (2012 to 2016) - Ballymena

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 1.02)	2014 (Bias Adjustment Factor = 1.13)	2015 (Bias Adjustment Factor = 1.09)	2016 (Bias Adjustment Factor = 0.92)
BDT1	Urban Background	N	9.53	12.32	12.70	11.90	9.61
BDT2	Kerbside	N	27.16	33.22	36.62	36.54	35.11
BDT3	Kerbside	N	20.90	26.84	27.52	26.24	24.45
BDT4	Kerbside	N	25.17	32.08	33.92	31.00	28.37
BDT5	Kerbside	N	24.11	27.17	29.78	27.89	24.52
BDT6	Urban Background	N	9.32	11.45	11.95	10.95	10.63
BDT7	Kerbside	N	33.67	**40.40**	**45.31**	**49.69**	**41.70**
BDT8	Kerbside	N	21.57	26.05	27.96	26.89	23.65
BDT9	Kerbside	N	24.58	29.19	32.85	27.94	24.27
BDT10	Kerbside	N	25.74	30.07	34.20	31.63	29.39
BDT11	Roadside	N	20.15	27.60	30.94	28.27	27.74

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 1.02)	2014 (Bias Adjustment Factor = 1.13)	2015 (Bias Adjustment Factor = 1.09)	2016 (Bias Adjustment Factor = 0.92)
BDT12	Kerbside	N	28.47	31.44	34.99	33.70	28.33
BDT13	Roadside	N	24.26	29.17	31.09	29.86	27.51
BDT14	Roadside	N	24.18	28.96	31.89	31.58	28.21
BDT14B	Roadside	N	21.74	28.35	31.88	45.64	26.25
BDT15	Kerbside	Y	**45.42**	**51.78**	**58.18**	37.77	**45.60**
BDT16	Kerbside	N	-	33.25	33.85	33.72	32.09
BDT17	Kerbside	N	-	40.43	42.39	43.40	37.89

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

Table 3-5 Results of NO_2 Diffusion Tubes (2012 to 2016) - Carrickfergus

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2012 (Bias Adjustment Factor = 0.97)	2013 (Bias Adjustment Factor = 0.95)	2014 (Bias Adjustment Factor = 0.92)	2015 (Bias Adjustment Factor = 0.87)	2016 (Bias Adjustment Factor = 0.92)
CDT1	Roadside	N	24.6	23.6	24.22	16.58	22.08
CDT2	Urban Background	N	10.8	9.4	9.12	8.45	8.87
CDT3	Roadside	N	28.4	21.5	20.21	19.11	30.08
CDT3	Roadside	N	28.4	21.5	20.21	19.11	29.58
CDT5	Roadside	N	30.7	26.6	23.88	19.78	28.40
CDT6	Roadside	N	28.8	26.8	24.63	21.24	33.49
CDT7	Roadside	N	34.9	31.0	30.08	24.78	29.61
CDT8	Roadside	N	34.9	31.0	30.08	24.78	30.39
CDT9	Roadside	N	28.6	25.4	24.98	20.32	25.75
CDT10	Roadside	N	24.4	21.3	22.07	17.90	20.95
CDT11	Roadside	N	15.0	13.6	14.72	12.54	13.43
CDT12	Roadside	N	21.7	19.8	19.70	17.30	18.98

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2012 (Bias Adjustment Factor = 0.97)	2013 (Bias Adjustment Factor = 0.95)	2014 (Bias Adjustment Factor = 0.92)	2015 (Bias Adjustment Factor = 0.87)	2016 (Bias Adjustment Factor = 0.92)
CDT13	Roadside	N	28.6	25.9	25.03	21.85	26.04
CDT14	Roadside	N	14.3	14.7	13.92	11.39	11.97

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

Table 3-6 Results of NO_2 Diffusion Tubes (2012 to 2016) - Larne

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.80)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.79)	2016 (Bias Adjustment Factor = 0.92)
LDT1	Roadside	N	23.15	22.7	24.29	21.97	23.02
LDT2	Urban Background	N	14.80	14.46	13.60	13.42	12.35
LDT3	Urban Centre	N	23.36	21.96	22.44	22.86	22.30
LDT4	Kerbside	N	35.00[a]	26.70[a]	25.00	24.05	25.13
LDT5	Kerbside	N	20.59	22.25	20.67	18.45	16.75
LDT6	Roadside	N	16.81	17.35	14.09	11.78	12.96
LDT7	Urban Background	N	9.92	10.48	10.10	11.27	9.52
LDT8	Industrial	N	10.97	10.54	10.79	10.81	9.52

Figure 3-4 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Ballymena Diffusion Tube Monitoring Sites

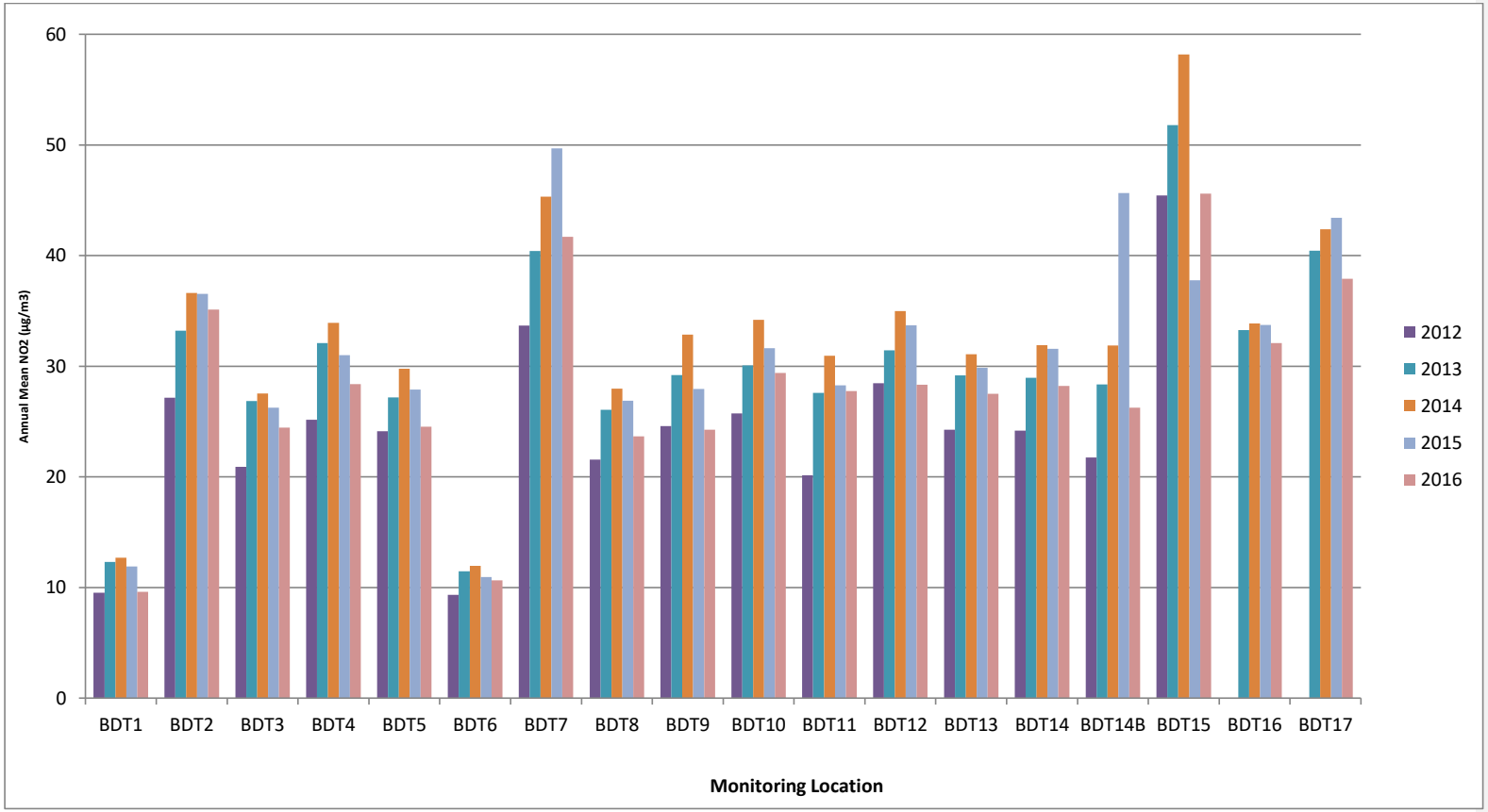


Figure 3-5 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Carrickfergus Diffusion Tube Monitoring Sites

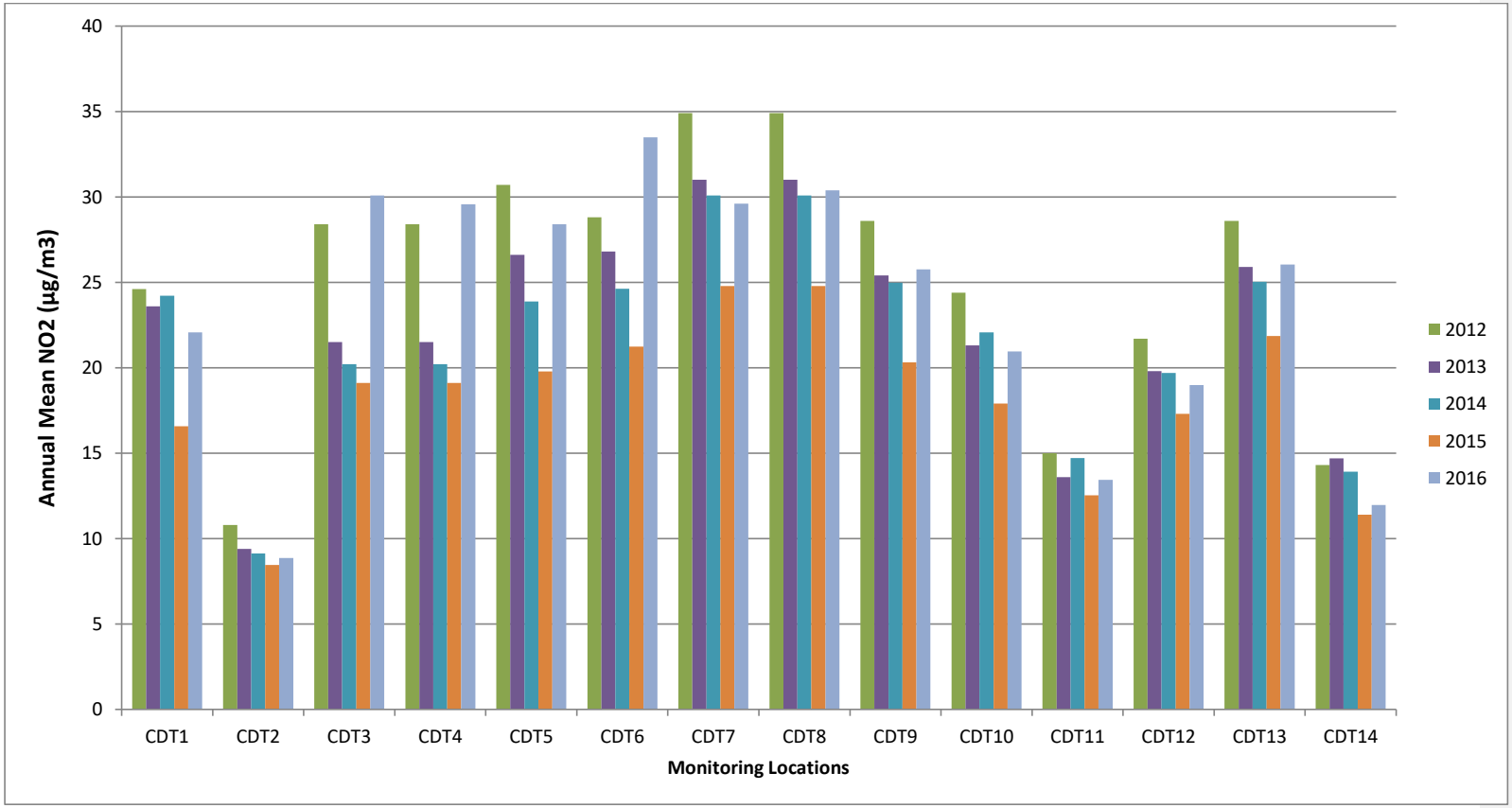
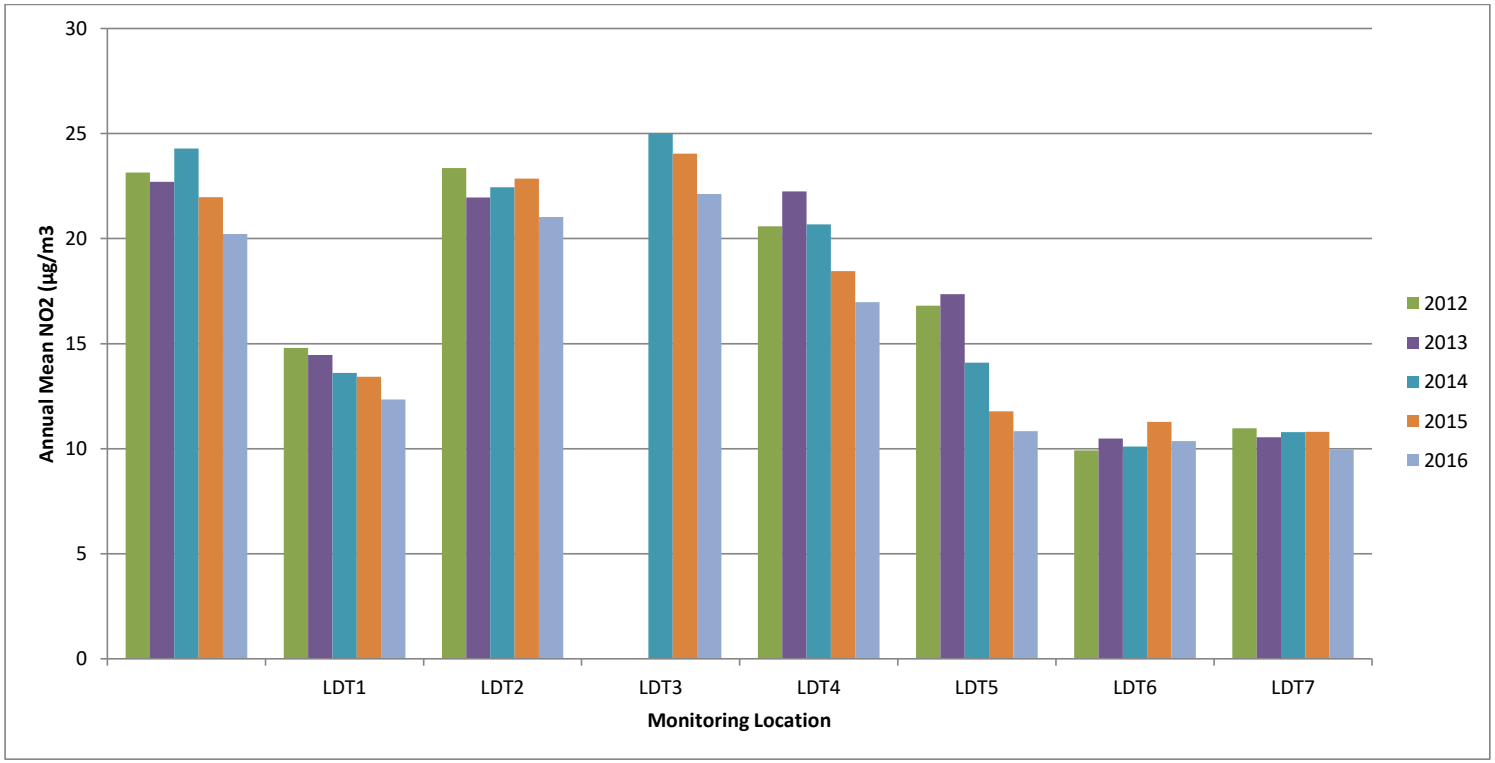


Figure 3-6 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Larne Diffusion Tube Monitoring Sites



3.2.2 Particulate Matter (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 2016; Ballymena Ballykeel, an urban background site. The PM_{10} monitoring data is presented in table 3-7 and table3-8**Error! Reference source not found.** below.

During the monitoring period, issues with instrument breakdowns, has resulted in data capture below the required 85%, therefore data has been analysed and presented as a 90.4th percentile.

From Table 7.6 – Equivalent Percentiles to the Air Quality Objectives [Local Air Quality Management Technical Guidance (TG16)]

Time Period	Permitted Exceedences	Equivalent Precentile
24-hour	35 per year	90.4th percentile

During the monitoring period during 2016, this 90.4th percentile of 35 exceedences of 24-hour mean has not been breached.

A trend graph of PM_{10} levels is presented as *Figure 3-7 Trends in Annual Mean PM10 Concentrations* which shows a gradual reduction in concentrations since 2008, however there is a slight increase in Annual Mean concentration in 2016.

The 2016 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 3-7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

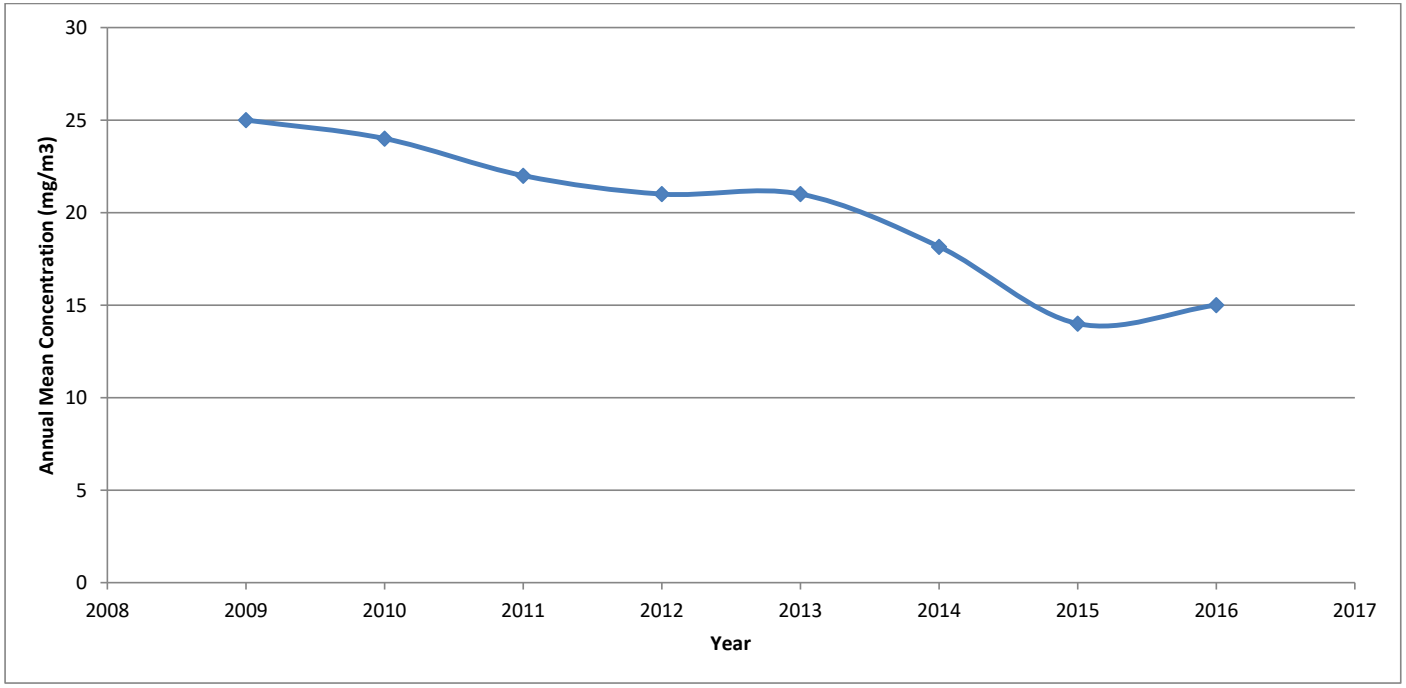
Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture Monitoring Period %	Valid Data Capture 2016 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)				
						2012* [c]	2013* [c]	2014* [c]	2015* [c]	2016 [c]
Ballymena Ballykeel	Urban Background	Y	82.4	82.4	Y	21	21	18.16	14	15

Table 3-8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture Monitoring Period %	Valid Data Capture 2016 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Number of Exceedences of 24-Hour Mean (50µg/m3)				
						2012* [c]	2013* [c]	2014* [c]	2015* [c]	2016 [c]
Ballymena Ballykeel	Urban Background	Y	82.4	82.4	Y	6	7	2	1	0

Figure 3-7 Trends in Annual Mean PM_{10} Concentrations



3.2.3 Sulphur Dioxide (SO_2)

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 2016 monitoring data for Ballymena Ballykeel presented in *Table 3-9 Results of Automatic Monitoring for SO2: Comparison with Objectives* shows that the SO_2 objectives were met for 2016

Table 3-9 Results of Automatic Monitoring for SO_2: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture Monitoring Period %	Valid Data Capture 20 [b]	Number of: [c]		
					15-minute Means > 266µ	1-hour Means > 350µ	24-hour Means > 125µ
Ballymena Ballykeel	Urban Background	Y	93.2	93.2	0	0	0

3.2.4 Other Pollutants Monitored

No other pollutants were monitored within Mid and East Antrim during 2016.

3.2.5 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 automatic monitors and a network of passive NO_2 diffusion tubes.

PM_{10} AQS objectives, both the annual mean and the 24-hour objectives were met at the monitoring location in 2016,

SO_2 AQS objectives for were also met at the monitoring sites with no exceedances of the 15-minute, 1-hour, or 24-hour mean objectives recorded.

There were two diffusion tube locations that exceeded the AQS annual mean objective for NO_2 within Mid and East Antrim Borough Council during 2015.

Both of the sites are within or immediately adjacent to the existing Linenhall AQMA therefore a Detailed Assessment is not required for this location.

Table 3-10 Summary of Compliance with AQS Objectives

Pollutant	General	New Exceedances identified?	Detailed Assessment Required	Objective	Description of Area and Details
Ballymena Monitoring Network					
NO_2	Monitoring outside AQMAs	No	No	Annual Mean / Hourly Objective	-
	Monitoring inside AQMAs	Yes	No	Annual Mean	Both BDT7 and 15 exceeded the AQS annual mean objective national bias adjustment factor -
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 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	-	-

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, therefore there is no need to proceed to a Detailed Assessment.

Delete box if not applicable. Otherwise add local authority name, amend the text as appropriate and leave box in the report. This box is only provided for guidance and can be adapted if necessary

4 New Local Developments

Mid and East Antrim 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.

Mid and East Antrim 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.

Delete box if not applicable. Otherwise add local authority name, amend the text as appropriate and leave box in the report. This box is only provided for guidance and can be adapted if necessary

5 Local / Regional Air Quality Strategy

Start writing here…

6 Planning Applications

There have been a number of applications received that, although not yet approved, have required an air quality assessment to be submitted in support of their application. Decisions on these applications will be made in due course by the relevant planning authority including

- New Link Road within the wider St Patricks Barracks Regeneration Scheme.
- Proposed extension to Anaerobic Digestor Plant
- Intensive Poultry units

7 Air Quality Planning Policies

Mid and East Antrim Local Development Plan (LDP) 2030

The LDP will Identify how and where settlements will grow and the anticipated amount of growth over the Plan period;

Bring forward growth strategies for various types of development including housing, economic, retail, leisure, minerals and renewable energy;

Provide for balanced development in the countryside, meeting the needs of rural communities, while safeguarding rural amenity and character;

Protect, and wherever possible enhance areas and assets that are enjoyed by the citizens and visitors of Mid and East Antrim Borough Council

The LDP will guide the future spatial land use within Mid and East Antrim, apply regional policies at the appropriate local level and inform the general public, statutory authorities, developers and other interested bodies of the policy framework and land use proposals that will guide development decisions within the Borough. The LDP will comprise of two development plan documents;

- The Plan Strategy (PS), and
- The Local Policies Plan (LPP)

These will be prepared in the context of the Council's overall Corporate Plan and wider government policy including the Regional Development Strategy and the Strategic Planning Policy Statement. The LDP will also take into account the Council's Community Plan providing a spatial expression of the Community Plan and thereby linking public and private sector investment through the land use planning system.

8 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.

9 Implementation of Action Plans

Mid and East Antrim Borough Council aim to promote the Health and Wellbeing of the citizens of the borough with specific emphasis on improving air quality in the following ways.

The actions listed below relate to the work undertaken by Council to address Air Quality matters and do not include other partnered working, such as promotion of more sustainable modes of transport, such as Park and Ride, Car share schemes, cycle networks etc.

Table 9-1 Mid and East Antrim Borough Council Air Quality Action Plan Progress

Air Quality Improvement Measure	Lead Authority	Timescale	Implementation	Progress in 2016
Comment on planning applications to ensure that all relevant air quality issues are highlighted and mitigation measures are considered wherever possible	Mid and East Antrim Borough Council	Ongoing	Consultation responses to planning provided, with specific consideration if application located in close proximity to AQMA	All planning applications assesses for air quality impact in line with planning guidance. No specific applications for development received within AQMA areas during 2016
Reduce impact of Council Fleet vehicles through purchasing lower/ zero emission vehicles	Mid and East Antrim Borough Council	Ongoing	Ongoing replacement in line with fleet operation requirements	Council Services continue to reassess vehicle specification with vehicle improvements
Reduction of emissions by Council Waste Collections	Mid and East Antrim Borough Council		Completed	Route optimisation of bin collection for Council vehicles operating across the borough taking into consideration emphasis on energy/emissions minimisation.

Mid and East Antrim Borough Council

Air Quality Improvement Measure	Lead Authority	Timescale	Implementation	Progress in 2016
Reduction of Smokey Solid Fuels being burned in Domestic Housing	Mid and East Antrim Borough Council	Ongoing	Council Energy Efficiency Officers identifying and promoting schemes such as Warm Homes to install Gas/OFCH heating to identified housing stock	Ongoing
Promotion of cycling as means of transport – cycle to work scheme, Promotion of safe cycling routes to schools Promotion of Bike week	Mid and East Antrim Borough Council in partnership with Travelwise	Ongoing	Running promotional events	MEABC undertook three events, timed to coincide with bike week to promote cycling within the borough and bring awareness to public of schemes such as cycle to work schemes, car sharing

10 Conclusions and Proposed Actions

10.1 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.

A review of the 2016 monitoring data found that there were no exceedences of any the AQS annual mean objectives PM_{10} or SO_2

AQS annual objectives were exceeded at two NO_2 diffusion tube monitoring sites. Both of these site were either in or in immediate vicinity to Linenhall Street AQMA (NO_2). 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.

AQS annual objectives, whilst met at diffusion tube located in proximity to the A2 road upgrade within the Carrickfergus area, have taken a step increase from previous gradual decrease. Consideration to be given at next updating and screening assessment if more detailed assessment is required at this location.

10.2 Proposed Actions

The proposed actions from the Mid and East Antrim 2017 Progress Report 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;

Mid and East Antrim Borough Council

- Continue to monitor at diffusion tube sites in vicinity of Linenhall Street AQMA to assess the need for a Detailed Assessment and any possible requirement to change the boundary of the AQMA;
- Continue to monitor diffusion tube data at monitoring sites CDT1 – CDT10 in proximity to upgraded A2 Road to assess the need for Detailed assessment.
- Continue to examine all planning applications within the borough to ensure compliance with Air Quality objectives
- Proceed to an Annual Status Report in 2018.

11 References

- Local Air Quality Management Technical Guidance LAQM.TG(16). April 2016. 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 v09_17
- Mid and East Antrim Borough Council 2016 Annual Progress Report
- Mid and East Antrim Borough Council 2015 Updating and Screening Assessment 2015
- 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

Appendices

Diffusion Tube Bias Adjustment Factors

Diffusion tube data obtained for the year 2016 were supplied and analysed by Gradko International Limited prepared using the 20% Triethanolamine (TEA) in water preparation method. The national bias adjustment factor for Gradko 20% TEA is 0.92 (based on 32 studies, version 09_17) as derived from the national bias adjustment calculator[1].

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[2] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

Within the monitoring year 2016, no co-located NO2 tubes were available. An NO_2 Roadside analyser was commissioned in March 2017 with triplicate tubes co-located. Hence for this 2017 report, the national bias adjustment factor for the laboratory for 2016 was 0.92 based on 32 studies, taken from the National Bias Adjustment Spreadsheet.

[1] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 09_16

[2] Laqm.defra.gov.uk

For previous years data presented (2012 – 2016), 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 2015, 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 Ballymena Ballykeel 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 are UKAS accredited laboratories and participate in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO2 concentrations reported are of a high calibre.

Mid and East Antrim Borough Council

Start writing here…

Appendix B: Diffusion Tube Monitoring Data

Monthly NO2 Concentrations – Mid and East Antrim Borough Council Diffusion Tube Sites (2016)

Site ID	Site Address	oncentrations (µg/m3)												Data Capture Periods	Average Concentration (µg/m3)	Bias Adjusted Tubes
Ballymena		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
BDT1	Leighinmohr Ave	11.82	15.09	13.17	9.99	7.98	7.31	6.23	8.22	8.44	3.66	18.65	14.78	12	10.45	9.61
BDT2	Galgorm Road	41.57	45.84	39.3	27.95	32.26	31.12	28.5		29.31	40.28	52.24	51.46	11	38.17	35.11
BDT3	Main St, Cullybackey	29.7	32.91	28.42	16.04		22.9	21.73	21.92	19.02	34.58	33.48	31.61	11	26.57	24.45
BDT4	Cullybackey Road	32.96	36.37	32.58	26.2	28.26	28.65	21.68	25.14	24.79	36.19	39.69	37.56	12	30.84	28.37
BDT5	Larne St	30.88	31.73	27.59	22.83	19.28	17.38	20.33	22.39	24.22	28.23	36.38	38.58	12	26.65	24.52
BDT6	Ballyloughan Ave	15.65	13.63	12.43	9.21	7.38	6.89	6.21	8.13	7.19	15.53	18.01	18.4	12	11.56	10.63
BDT7	George St	49.57	48.71	51.38	39.05	38.25	37.35	38.48	41.66	42.58	40.7	52.53	63.59	12	45.32	41.70
BDT8	Wellington St	26.35	30.47	25.97	20.41	20.18	19.59	19.41	20.95		23.1	36.24	40.09	11	25.71	23.65
BDT9	Ballymoney	31.72	32.19	27.11	21.68	20.18		19.72	23	22.79	23.26	34.23	34.28	11	26.38	24.27
BDT10	Parkway	32.27	36.21	33.11	24.76	27.64	26.87	25.2	26.61	31.02	34.6	44.66	40.41	12	31.95	29.39
BDT11	Lisnevenagh Rd	25.87	30.64	31	23.83	25.26	25.73	22.44	27.67	28.74	35.16	43.34	42.11	12	30.15	27.74
BDT12	Queen St	32.8	35.41	31.65	28.18	30.29	28.54	26.71	25.23	28.99	32.56	<0.16	38.35	12	30.79	28.33
BDT13	North Road	28.87	31.24	30.54	27.86	26.48	27.27	21.95	23.09	23.85	37.66	38.37	41.68	12	29.91	27.51
BDT14	North Road	31.61	32.36	31.42	28.55	28.56	26.09	22.84	25.35	24.24	36.09	39.4	41.48	12	30.67	28.21
BDT14B	North Road	29.67	34.54	30.12	16.05	25.81	24.84	20.06	21.22	25.11	34.39	39.3	41.28	12	28.53	26.25
BDT15	Linenhall St	57.98	59.75	58.45	40.26	38.63	40.47	44.29	40.36	48.68	53.32	72.06	40.58	12	49.57	45.60
BDT16	Bridge St	33.12	34.82	35.65	29.58	29.99	24.09	26.55	28.91	28.03	29.69	46.64	71.5	12	34.88	32.09
BDT17	Galgorm Rd	44.7	45.18	43.05	32.67	31.37	32.33	34.51	36.07	36.71	42.84	56.31	58.54	12	41.19	37.89
Carrickfergus		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
CDT1	27 Upper Road, Greenisland	28.52	28.85	22.98	18.92	21.94	20.71	16.48	20	20.22	26.72	28.87	33.73	12	24.00	22.08
CDT2	32 Mullaghmore	13.01	10.07	10.2	8.04	7.18	7.39	6.53	6.65	8.48	10.38	12.55	15.18	12	9.64	8.87
CDT3	50 Shore Road, Greenisland	48.12	31.18	35.13	27.85	24.5	23.76	23.88	29.29	32.88	28.07	42.42	45.21	12	32.69	30.08
CDT4	50 Shore Road, Greenisland	32.63	43.87	31.14	25.43	26.57	28.11	26.9	26.51	30.06	27.34	46.18	41.03	12	32.15	29.58
CDT5	186 Shore Road, Greenisland	29.67	34.12	31.33	25.07	26.12	24.44	26.28	26.79	32.03	30.48	38.53	45.61	12	30.87	28.40
CDT6	93 Belfast Road, Carrickfergus	38.09	34.24	39.59	34.09	35.68	37.27	27.31	30.91	33.44	41.99	41.67	42.51	12	36.40	33.49
CDT7	Model PS Belfast Road, Carrickfergus	35.67	37.78	35.38	31.18	28.34	32.06	25.59	27.09	20.81	36.49	37.7	38.13	12	32.19	29.61
CDT8	Model PS Belfast Road, Carrickfergus	33.89	38.04	32.59	30.81	29.05	33.11		25.98	24.07	37.33	37.94	40.56	11	33.03	30.39
CDT9	Minorca Place/ Tesco Junction, Carrickgfergus	29.68	28.19	29.65	27.14	24.25	31.62	22.23	22.5	22.44	27.4	33.85	36.92	12	27.99	25.75
CDT10	42 Albert Road Carrickfergus	24.07	25.58	26.62	20.87	20.35	21.2	15.67	16.65	20.87	21.67	26.93	32.74	12	22.77	20.95
CDT11	RailwayStation Fergus Avenue, Carrickfergus	18.3	18.7	14.64	10.45	10.44	11.33	10.35	10.67	13.09	13.46	19.23	24.57	12	14.60	13.43
CDT12	College North Road, Carrickfergus	21.97	16.38	20.81	22.55	20.22	18.9			15.41	20.66	24.47	24.9	10	20.63	18.98
CDT13	Victoria Road/Larne Road Junction, Carrickfergus	27.66	30.91	26.01	21.21	24.72	22.29	25.77	25.36	30.71	22.56	35.02	47.46	12	28.31	26.04
CDT14	Islandmagee Road, Whitehead	17.5	14.92	13.88	10.07	8.48	10.59	8.93	10.18	11.68	13.26	14.85	21.73	12	13.01	11.97
Larne		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
LDT1	Antville Roundabout					17.81	17.85	22.5	18.83	28.71	26.23	30.65	29.96	32.63	9	25.02	23.02
LDT2	Latharna House				14.65	12.51	8.46	13.1	9.66	16.29	11.87		16.84	17.41	9	13.42	12.35
LDT3	Main Street				25.83	25.38	23.43	23.61		21.36	17.28	24.75	27.74	28.74	9	24.24	22.30
LDT4	Old Glenarm Road				26.67	23.97	25.71	26.22	24.84	28.76	29.42	26.8	29.8	31.01	10	27.32	25.13
LDT5	Upper Cairncastle Road					16.61	14.41	17.28	14.1	22.11	16.22		20.84	24.11	9	18.21	16.75
LDT6	Harbour Roundabout				14.16	12.31	9.74	12.02	11.02	15.2	12.7	17.9	17.27	18.5	10	14.08	12.96
LDT7	Castle Terrace				10.02	9.53	10.46	12.12	6.77	9.43	8.16	11.05	13.14	12.77	10	10.35	9.52
LDT8	Ballylumford				10.23	8.38	7.03	8.58	8.53	9.49	9.98	10.27	14.32	16.63	10	10.34	9.52