Derry City Council
LAQM Progress Report 2014

Bureau Veritas

February 2015

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Document Control Sheet

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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 Annual Progress Report is a requirement of the Fifth Round of Review and Assessment and is a requirement for all local authorities. The Report has been undertaken in accordance with the Technical Guidance LAQM.TG (09) and associated tools.

This Annual Progress Report considers all new monitoring data and assesses the data against the Air Quality Strategy objectives. It also considers any changes that may have an impact on air quality.

Air quality within four of the five existing AQMAs continued to exceed the annual mean AQS objective for NO_2 in 2013. However, all diffusion tube monitoring sites within Strand Road AQMA met the objective in 2013 and two previous years; as such the Council can consider potential revocation of this AQMA.

The review of 2013 monitoring data has identified no exceedences of the AQS Objectives outside of the AQMAs at any of the Derry City Council's diffusion tube or continuous monitoring locations.

Continuous monitoring results for 2013 indicate that both the annual mean objective and the 1-hour objective for nitrogen dioxide were met at the two monitoring locations outside the AQMAs – Brooke Park (AURN) and Dale's Corner. The annual mean NO_2 objective was exceeded at Marlborough Street in the Creggan Road AQMA. Despite the high annual mean concentration monitored, the hourly mean objective was met at this site.

The 2013 results for PM_{10} show that the annual mean and the 24-hour mean continue to be met at the Brook Park (AURN) monitoring site.

Proposed actions based up findings in this assessment are:

- Continue to monitor within and around the AQMAs;
- Finalise the Air Quality Action Plan; and
- Proceed to the Updating and Detailed Assessment 2015.

Table of Contents

List of Tables

List of Figures

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B – Diffusion Tube Monitoring Results

1 Introduction

1.1 Description of Local Authority Area

Derry City is located on the coast, in the west of Northern Ireland, spreading across the banks of the River Foyle, with two bridges connecting the parts of the City. The City is very near the border with County Donegal in the Republic of Ireland, and is the second largest city in Northern Ireland.

Within the local authority boundaries lie Foyle Port and the City of Derry Airport. Road transport emissions have previously been found to be the dominant source of air pollution within the Derry City Council area. Five AQMAs have been declared in Derry: Creggan Road (2005), Dale's Corner (2010), Buncrana Road (2010), Spencer Road (2012) and Strand Road (2013).

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995) and the Environment (NI) Order 2002, the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment (USA) reports. Their purpose is to maintain continuity in the LAQM process.

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

1.3 Air Quality Objectives

The AQS objectives applicable to LAQM in Northern Ireland set out in the Air Quality Standards Regulations (Northern Ireland) 2010 are shown in Table 1-1. This table shows the objectives in units of microgrammes 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 England

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 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Table 1-2 provides a summary of the previous reports completed by Derry City Council (the Council) as part of the LAQM Review and Assessment process.

An AQMA was declared in February 2005 at the Creggan Road / Infirmary Road junction in Derry. Two other AQMAs were declared in 2011 at Dale's Corner and at the Buncrana Road / Racecourse Road junction. In 2012/2013, two further AQMAs were declared at Spencer Road and Strand Road. All AQMAs are due to the exceedence of the NO_2 annual mean AQS objective. Figures below show the locations of the existing AQMAs.

Table 1-2 Summary of Previous Review and Assessment

Report	Summary
2004 Detailed Air Quality Modelling of Domestic Fuel Use and Road Traffic Emissions in Derry (Stage 3)	Exceedences of the annual mean NO_2 concentrations were modelled at the Creggan Road / Infirmary Road junction, and the Council subsequently declared an AQMA in February 2005, and a draft Air Quality Action Plan was released in November 2006. The 2004 Detailed Assessment concluded that PM_{10} exceedences were not expected; however it was not possible to rule out potential exceedences of the SO_2 or PM_{10} objectives due to the resolution of the modelling undertaken.
2005 Progress Report	The 2005 Progress Report provided a review of the most recent monitoring data within the local authority. Automatic monitoring of SO_2 and PM_{10} at Brandywell indicated a large drop in the number of 15-minute and daily mean exceedences, reflecting the decreased use of solid fuel in the area.
2006 Updating & Screening Assessment	The Updating & Screening Assessment identified 2 locations to consider for the Detailed Assessment of NO_2: Dale's Corner and the Buncrana Road / Racecourse Road Junction. It was concluded that no further assessment was required for carbon monoxide, benzene, 1,3-butadiene, lead or sulphur dioxide, however assessment was required for PM_{10} at a rural area near Claudy, and in the Culmore Point area.
2007 Detailed Assessment and Further Assessment	A Detailed Assessment was undertaken for Dale's Corner and Buncrana Road / Racecourse Road Junction following measured exceedence of the NO_2 annual mean objective. It was determined that a declaration of an AQMA at either location was not required at the time, as the modelling did not confirm exceedences of the air quality objectives at locations of relevant exposure. A Further Assessment was undertaken for the existing AQMA at Creggan Road / Infirmary Road, and it was concluded that there was a continuing need for the AQMA, though no extension was considered necessary.
2008 Progress Report	Review of updated NO_2 monitoring data for the Creggan Road / Infirmary Road junction confirmed the continuing need for the AQMA. Decreases were seen in concentrations of SO_2. The Progress Report proposed that a new detailed dispersion modelling be undertaken at the Dale's Corner junction due to exceedences of the NO_2 annual mean objective recorded at a new monitoring diffusion tube site at no.5 Glendermott Road
2008 Final Air Quality Action Plan	The final Air Quality Action Plan, released in September 2008, included detailed dispersion modelling to quantify the potential impact of a number of traffic measures, which may be implemented to reduce air pollution in the area of the Creggan Road / Infirmary Road junction. Proposals included the removal of HGVs on specific road links within the AQMA.
2008 Dale's Corner Detailed Assessment	The assessment confirmed that exceedences of the NO_2 annual mean AQS objective were likely at the façade of properties along Glendermott Road and Limavady Road close to the junction and it was recommended that an AQMA encompassing these properties be declared. The Council declared the Dale's Corner AQMA in 2010.

Report	Summary
2009 Updating & Screening Assessment	The Updating & Screening Assessment reviewed and assessed new monitoring data and potential new sources of pollutants within the area. There were no new or significantly changed sources identified which may cause potential exceedences of the AQS objectives. However, the assessment highlighted that a new Detailed Assessment was required with regard to NO_2 at Buncrana Road / Racecourse Road junction based on updated monitoring data.
2010 Air Quality Progress Report and Buncrana Road Detailed Assessment	Based on updated 2009 monitoring data, the air quality Progress Report 2010 confirmed exceedences of the NO_2 annual mean objective at several monitoring sites within the Creggan Road / Infirmary Road and Dale's Corner AQMAs and at the junction of Buncrana Road and Racecourse Road. The Detailed Assessment of Buncrana Road confirmed that a third AQMA was required at the junction for NO_2. The Council declared an AQMA at the junction in 2010.
2010 Dale's Corner Further Assessment	The report confirmed the need for an AQMA at Dale's Corner and provided detailed information related to source apportionment, population exposure and required reduction of NOx emissions to comply with the AQS objectives. The Further Assessment also considered the impact of several mitigation measures. Conclusions were that the combined effect of these measures would result in significant reductions in NO_2 levels, and compliance with the annual mean objective.
2011 Buncrana Road Further Assessment	The report confirmed the need for an AQMA at Buncrana Road and provided detailed information related to source apportionment, showing that road traffic is the main contributor to overall NO_2 levels, population exposure and required reduction of emissions to comply with the AQS objectives. The Further Assessment estimated that the annual mean objective would be met at all locations by 2014, however it was noted that this was an optimistic estimate, as predicted concentrations were likely to be underestimated as shown by recent NO_2 monitoring trends across the UK.
2011 Progress Report	Review of updated monitoring data showed that areas within the existing AQMAs were still exceeding the NO_2 objective. In addition, four new areas of where exceedences were identified in Spencer Road, John Street, Strand Road and Abercorn Road. a Detailed Assessment was therefore recommended.
2012 Air Quality Action Plan Update	The Air Quality Action Plan update reviewed the first AQAP to incorporate the new AQMAs. The AQAP included details of the traffic measures which may be implemented to reduce air pollution in the identified AQMAs together with an update as to how measures identified in 2008 have been implemented.
2012 Updating & Screening Assessment	Review of updated monitoring data showed that areas within the existing AQMAs were still exceeding the NO_2 objective. It was noted that concentrations in John Street, Strand Road and Abercorn Road had fallen below objective levels and it was recommended to continue monitoring in these locations. Concentrations at Spencer Road were still exceeding the objectives and a Detailed Assessment was recommended.
2012 Detailed Assessments	Based on monitoring results, Derry CC decided to undertake Detailed Assessments at Spencer Road, John Street, Strand Road and Abercorn Road. It was concluded, based on a combination of pollutant monitoring and predictive modelling, that AQMA's be declared at Spencer Road and Strand Road. The report found that there was no requirement to declare for John Street and Abercorn Road.
2012/2013 AQMA declaration	Based upon the outcome of the Detailed Assessments at Spencer Road and Strand Road, two new small AQMA areas were declared.
2013 Progress Report	Review of updated monitoring data showed that sites within the existing AQMAs were still exceeding the annual mean NO_2 objective. It was therefore recommended to continue to monitor within the AQMAs and surrounding areas including Abercorn Road. The Council proceeded to the review of the Air Quality Action Plan to include the new AQMAs in Strand Road and Spencer Road.
2014 Detailed Assessment (Draft)	The modelling confirmed exceedences of the annual mean NO_2 objective within all AQMAs, with the exception of the Strand Road AQMA. The area of exceedence in the Creggan Road and Buncrana Road AQMAs is smaller than when they were declared, therefore amended AQMA boundaries were recommended. Most of the properties in the

Report	Summary
	Spencer Road AQMA were determined not to be relevant receptors for the annual mean objective, therefore an amended AQMA boundary was recommended. As no exceedences were monitored in the Strand AQMA for three years, the report recommended that this AQMA be revoked. The assessment confirmed that an AQMA for the short-term NO_2 objective was not needed as this objective has not been breached.

Figure 1-1 Map of AQMA Boundary - Creggan Road

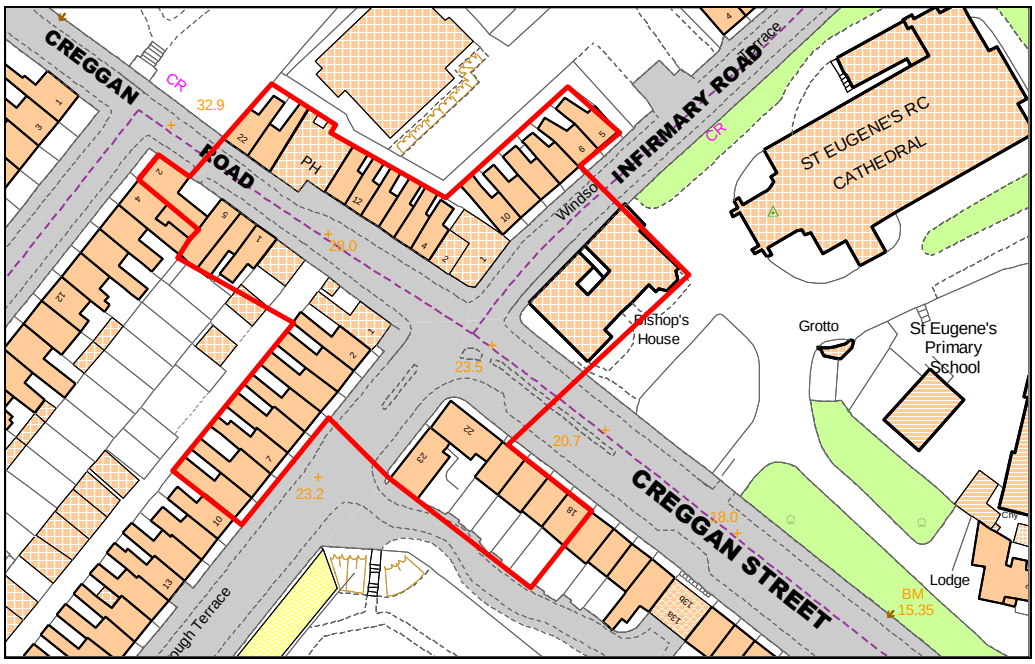


Figure 1-2 Map of AQMA Boundary - Dale's Corner

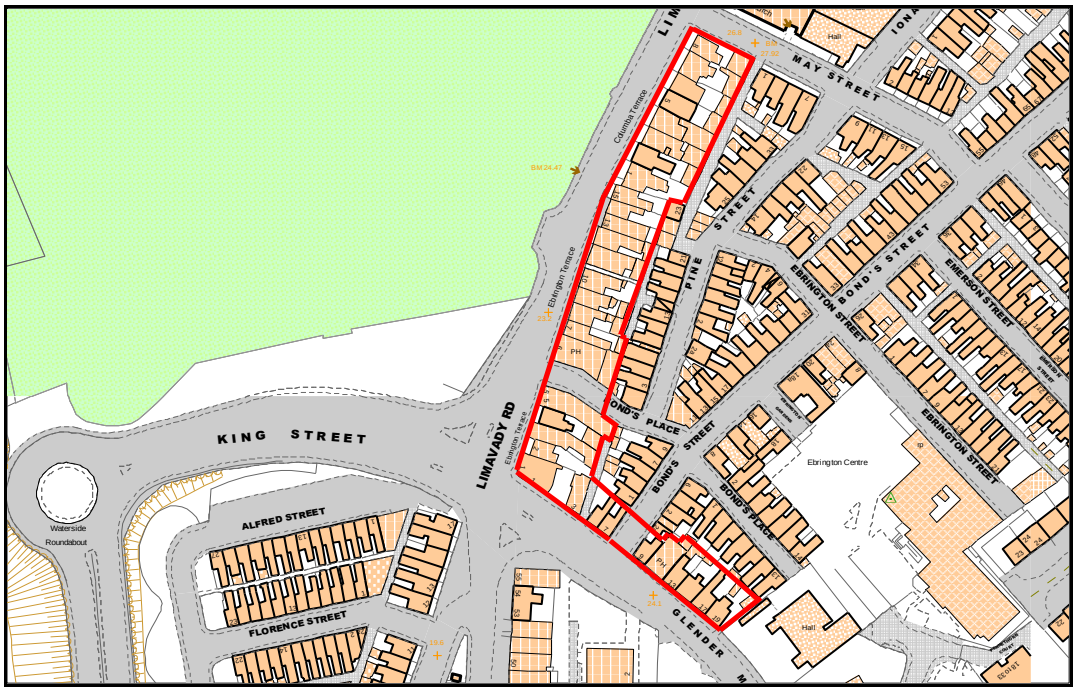


Figure 1-3 Map of AQMA Boundary - Buncrana Road

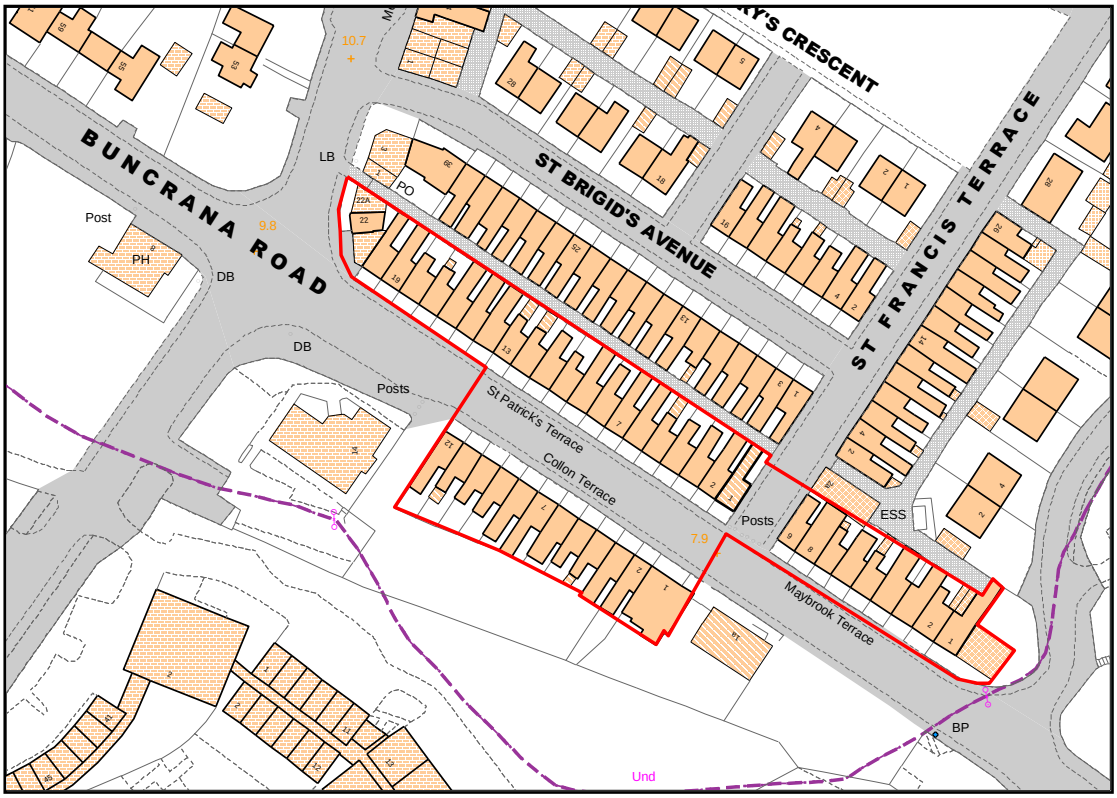


Figure 1-4 Map of AQMA Boundary – Spencer Road

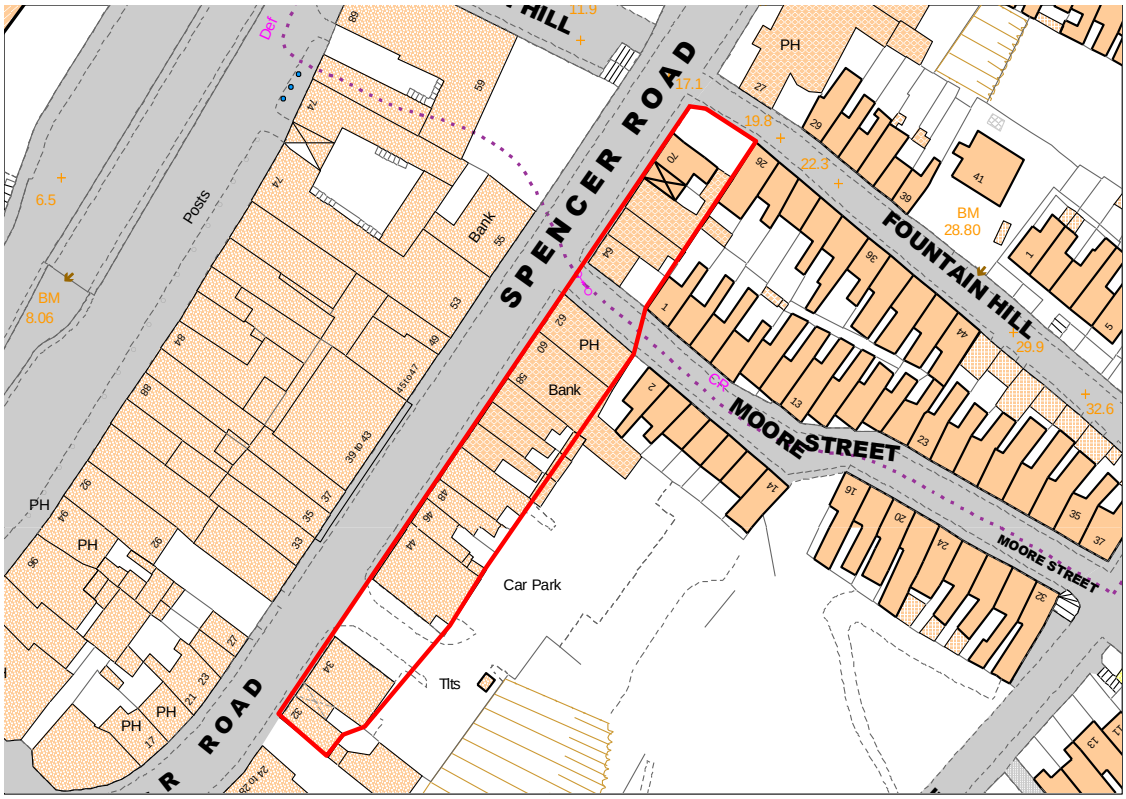
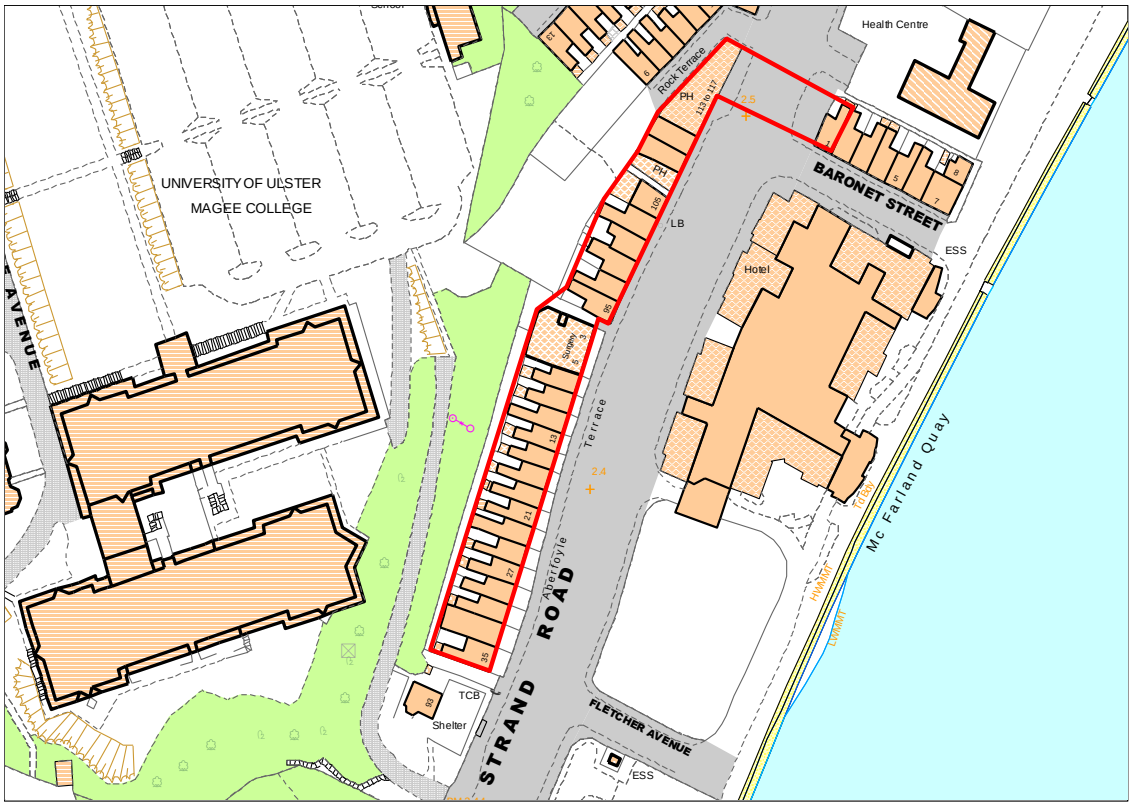


Figure 1-5 Map of AQMA Boundary – Strand Road



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

The Council operated three automatic monitoring sites in 2013, in Brooke Park (urban background), Dale's Corner and Marlborough Street (both roadside sites). The location of these monitoring sites is shown in Figure 2-1 and further details are provided in Table 2-1. Dale's Corner and Marlborough Street sites monitor NO_x / NO_2 only, whilst Brooke Park also monitors PM_{10}, $PM_{2.5}$, O_3, and SO_2.

The Marlborough Street monitoring station was installed in November 2011, within the Creggan Road AQMA.

The quality assurance and quality control procedures are set out in Appendix A.

Figure 2-1 Map of Automatic Monitoring Sites

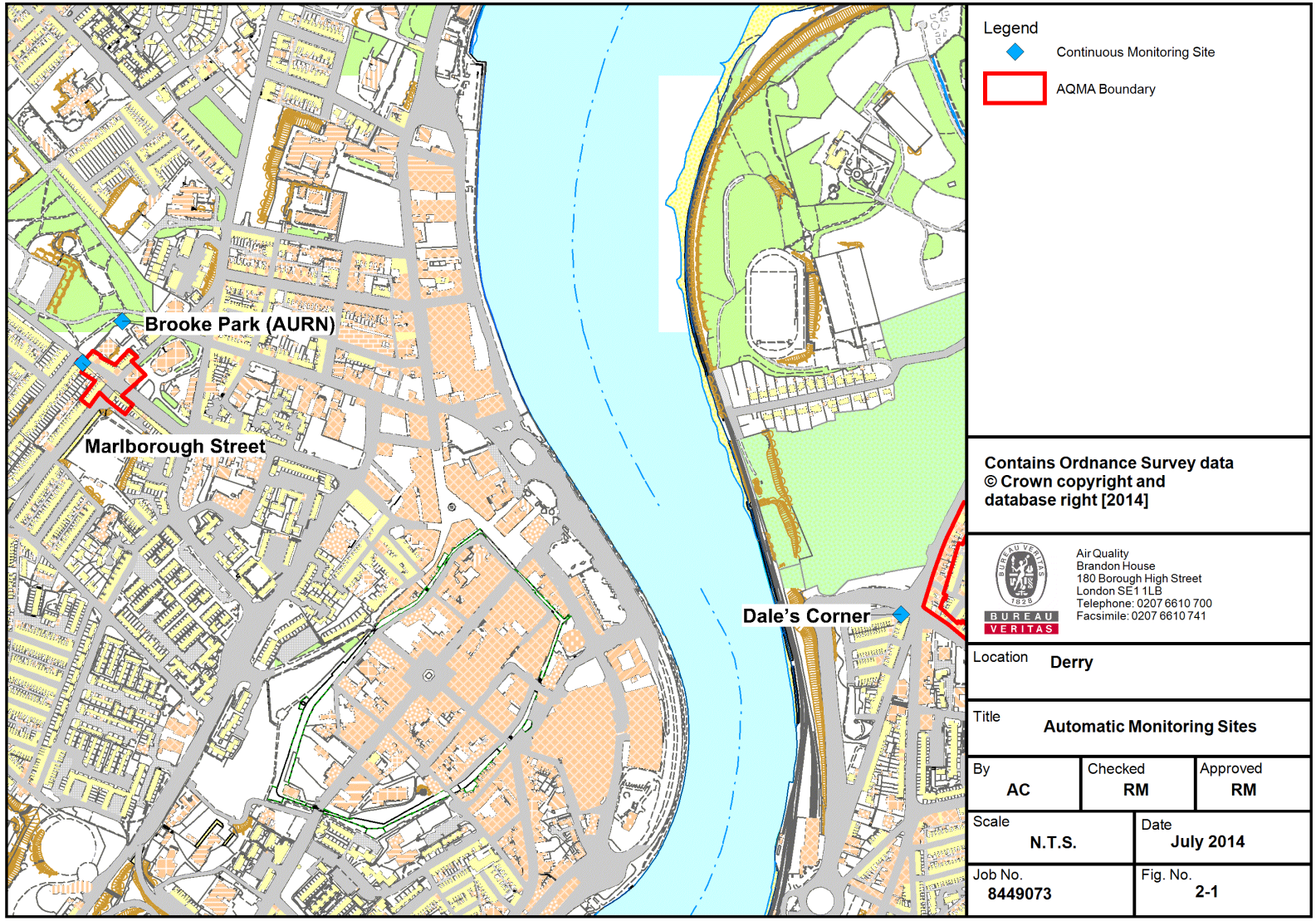


Table 2-1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	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?
Brooke Park (AURN)	Urban Background	242962	417217	O_3, NO_2, NO_X, SO_2, PM_{10}, $PM_{2.5}$	N	FDMS and chemiluminescence monitor	N (approx. 50m, background site)	N/A	N/A
Dale's Corner	Roadside	244178	416760	NO_2, NO_x	N	chemiluminescence monitor	Y - 1.5m	2m	Y
Marlborough Street	Roadside	242900	417152	NO_2, NO_x	Y	chemiluminescence monitor	Y - 1m	2m	Y

2.1.2 Non-Automatic Monitoring Sites

The Council monitored NO_2 at 33 sites across Derry using passive diffusion tubes. The location of all sites is shown in Figures 2-2 to 2-6 and details of the diffusion tube sites are provided in Table 2-2.

Most sites have been installed with either duplicate tubes or triplicate tubes to improve accuracy. All three continuous monitoring sites have triplicate tubes co-located with them:

- A1-3 – co-located with Brooke Park (AURN) continuous monitoring site;
- C11-C13 - co-located with Marlborough Street continuous monitoring site;
- D1-3 - co-located with Dale's Corner continuous monitoring site.

In 2013 five sites were installed and ten locations were discontinued. Details of these sites are as follows:

The new monitoring sites installed in 2013 were:

- Strand Road:
- S5-6 (1 Baronet Street);
- S7-8 (35 Aberfoyle Terrace);
- S9-10 (1 Rock Terrace).
- Spencer Road:
- SP1-2 (32 Spencer Road);
- SP3-4 (48 Spencer Road).

The following sites were discontinued in 2013:

- Abercorn Road:
  - AB5-6 (67 Abercorn Road);
  - AB7-8 (115 Bishop Street).
- Glengalliagh:
  - GL1-2 (38 Glengalliagh Park);
  - GL3 (7 Capal Court).
- John Street:
  - JS1-2 (10 John Street);
  - JS3-4 (12 John Street).
- Racecourse:
  - RC1 (76 Racecourse Road);
  - RC2 (1 Castleview Park);
  - RC3 (31 Balmoral Avenue).

- The Branch:

  B1-2 (17 The Branch).

Figure 2-2 Map of Diffusion Tube Locations – Buncrana Road

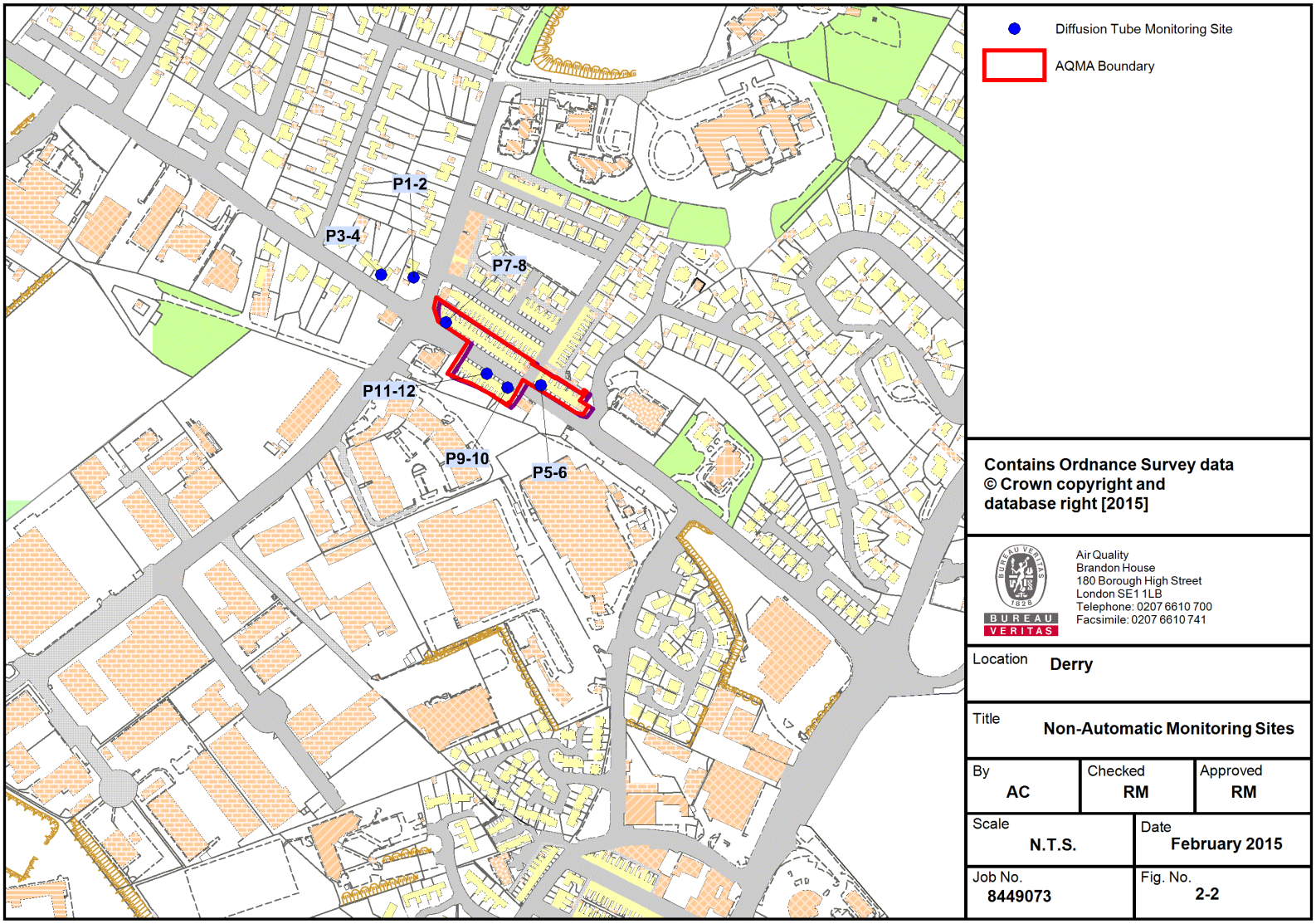


Figure 2-3 Map of Diffusion Tube Locations – Strand Road

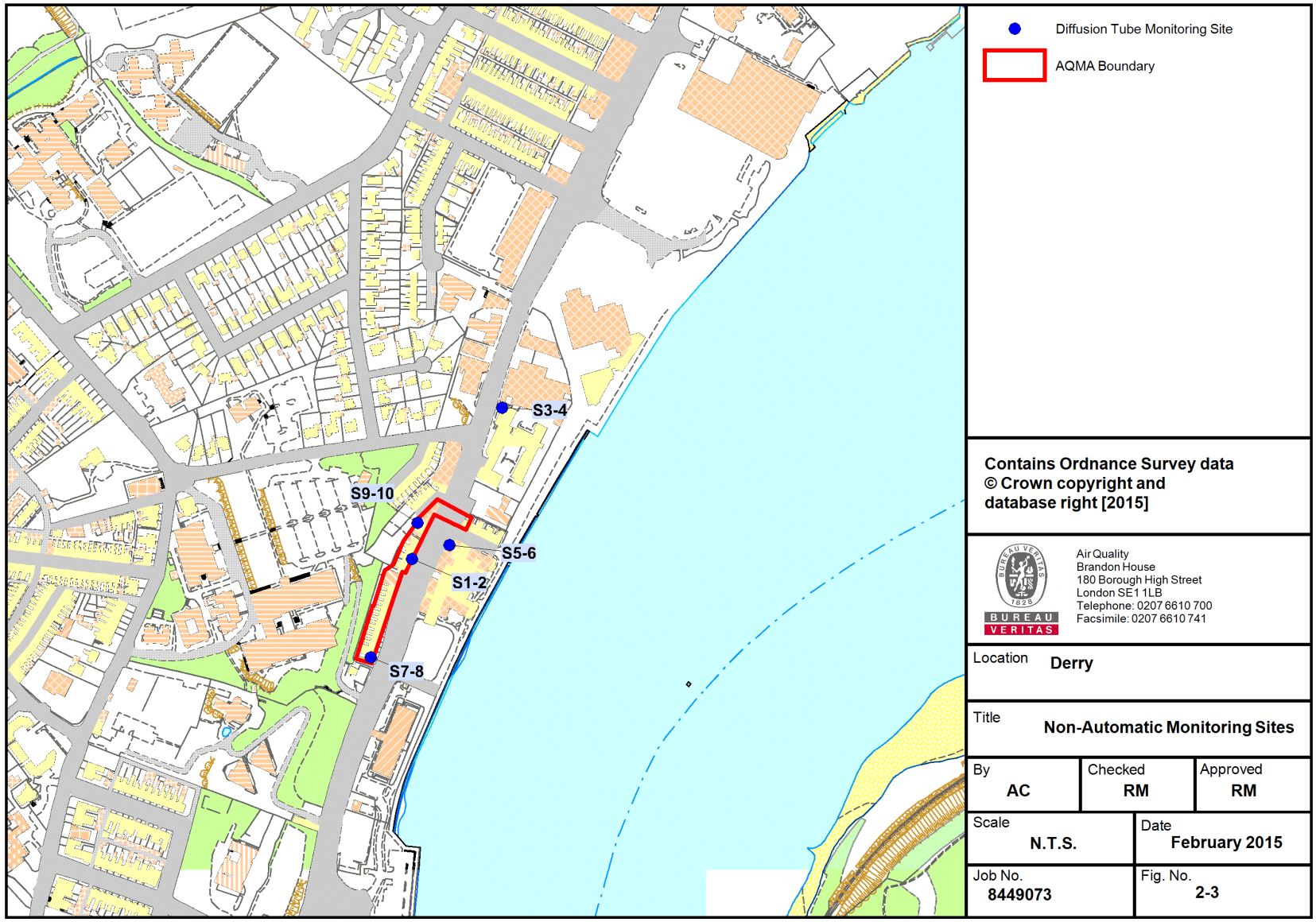


Figure 2-4 Map of Diffusion Tube Locations – Francis Street, Marlborough Terrace, Creggan Road

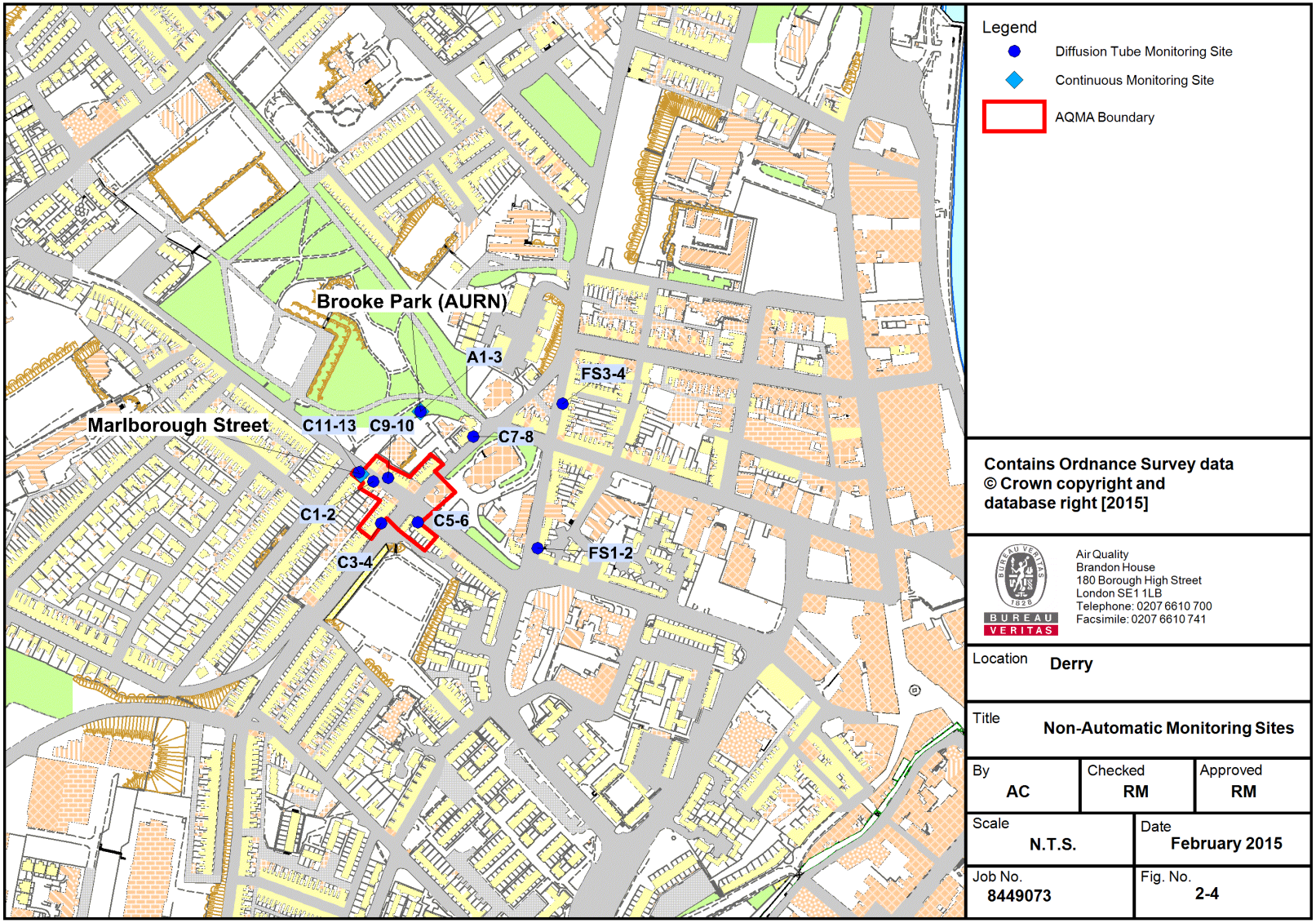


Figure 2-5 Map of Diffusion Tube Locations – Dale's Corner

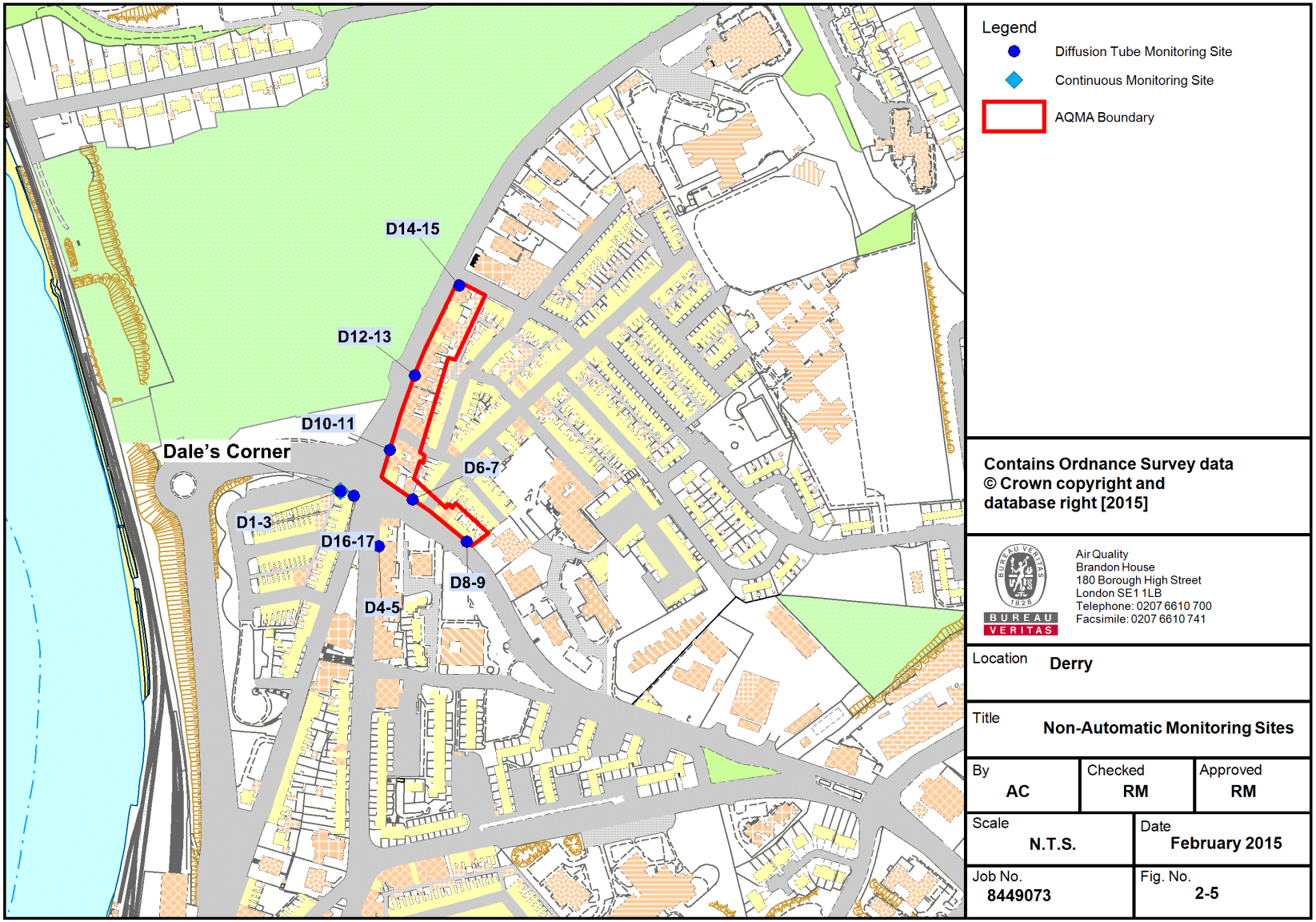


Figure 2-6 Map of Diffusion Tube Locations – South Derry

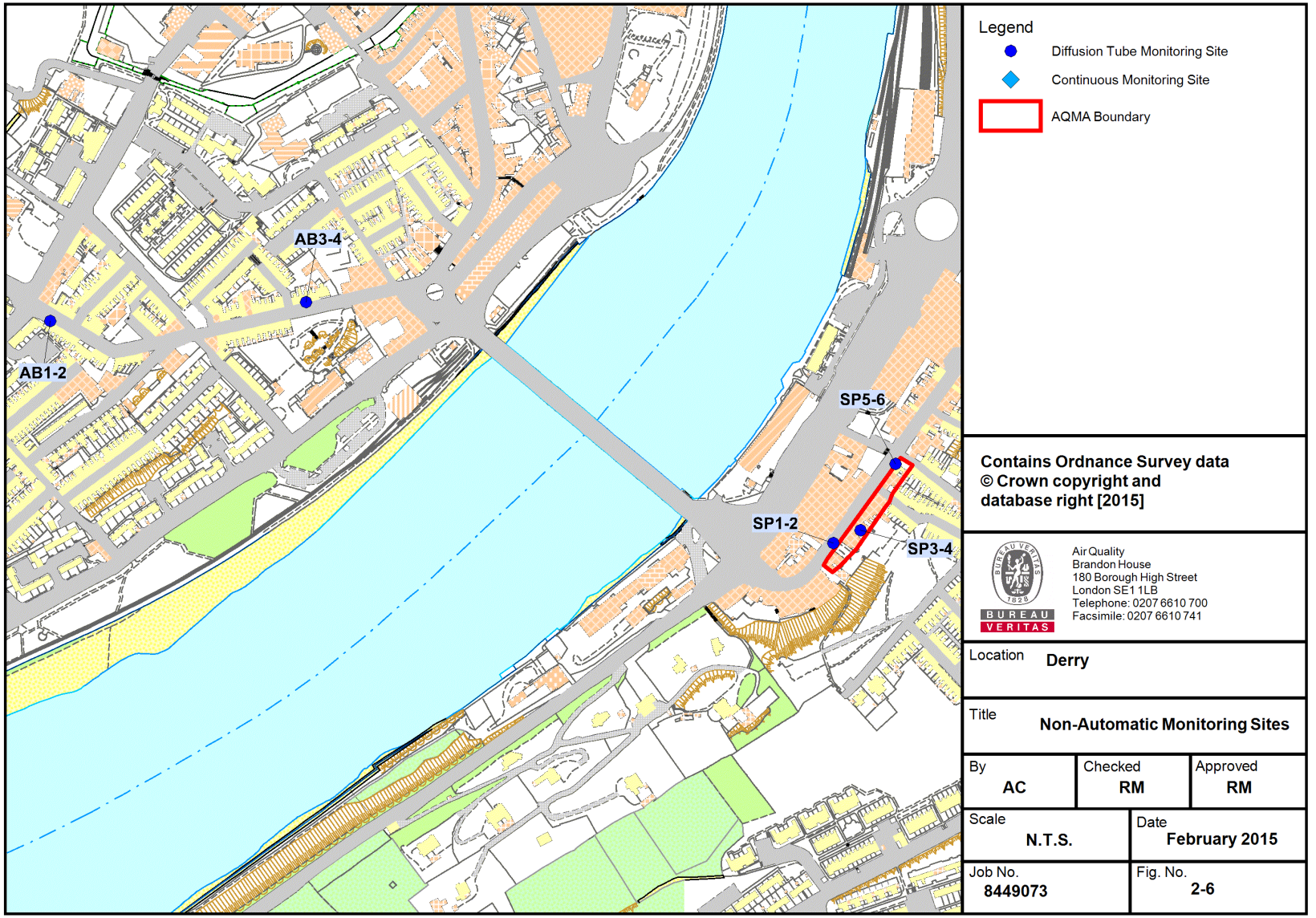


Table 2-2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Duplicate/Triplicate Tube or Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to Kerb of Nearest Road *(N/A if not applicable)*	Does this Location Represent Worst-case Exposure?
Brooke Park AURN										
A1-3	Brooke Park Continuous Monitoring Site (AURN)	Urban Background	242962	417217	NO_2	N	Y (triplicate & co-located)	N	55m	N/A
Cathedral										
C1-2	3 Creggan Road	Roadside	242913	417144	NO_2	Y	Duplicate	Y- 0m	2m	Y
C3-4	6 Marlborough Terrace	Roadside	242921	417101	NO_2	Y	Duplicate	Y- 0m	4.5m	Y
C5-6	22A Creggan Street	Urban Background	242959	417102	NO_2	Y	Duplicate	Y-0m	5.5m	Y
C7-8	1 Windsor Terrace	Roadside	243017	417191	NO_2	N	Duplicate	Y -0m	3m	Y
C9-10	14 Creggan Road	Roadside	242928	417148	NO_2	Y	Duplicate	Y-0m	4m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Duplicate/Triplicate Tube or Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to Kerb of Nearest Road *(N/A if not applicable)*	Does this Location Represent Worst-case Exposure?
C11-13	2 Marlborough Street	Roadside	242898	417154	NO_2	Y	Y (triplicate & co-located)	Y- 0m	2m	Y
Dale's Corner										
D1-3	Dale's Corner Continuous Monitoring Site	Roadside	244178	416760	NO_2	N	Y (triplicate & co-located)	Y-1.5m	3m	Y
D4-5	52 Clooney Terrace	Urban Centre	244210	416714	NO_2	N	Duplicate	Y-0m	6.5m	Y
D6-7	5 Glendermott Road	Roadside	244238	416753	NO_2	Y	Duplicate	Y-0m	2m	Y
D8-9	19 Glendermott Road	Roadside	244283	416718	NO_2	Y	Duplicate	Y- 0m	3m	Y
D10-11	4 Ebrington Terrace	Roadside	244219	416794	NO_2	Y	Duplicate	Y-0m	4m	Y
D12-13	12 Ebrington Terrace	Roadside	244240	416856	NO_2	Y	Duplicate	Y-0m	3m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Duplicate/Triplicate Tube or Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to Kerb of Nearest Road *(N/A if not applicable)*	Does this Location Represent Worst-case Exposure?
D14-15	9 Columba Terrace	Roadside	244277	416931	NO_2	Y	Duplicate	Y-0m	6m	Y
D16-17	17 Melrose Terrace	Roadside	244189	416756	NO_2	N	Duplicate	Y-0m	3m	Y
Pennyburn										
P1-2	53 Messines Park	Suburban	243449	419013	NO_2	N	Duplicate	Y-0m	14m	Y
P3-4	57 Messines Park	Suburban	243418	419016	NO_2	N	Duplicate	Y-0m	11m	Y
P5-6	8 Maybrook Terrace	Roadside	243571	418910	NO_2	Y	Duplicate	Y-0m	5m	Y
P7-8	19 St Patricks Terrace	Roadside	243480	418970	NO_2	Y	Duplicate	Y-0m	5m	Y
P9-10	1 Collon Terrace	Roadside	243539	418908	NO_2	Y	Duplicate	Y-0m	5m	Y
P11-12	5 Collon Terrace	Roadside	243519	418921	NO_2	Y	Duplicate	Y-0m	5m	Y
Strand Road										

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Duplicate/Triplicate Tube or Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to Kerb of Nearest Road *(N/A if not applicable)*	Does this Location Represent Worst-case Exposure?
S1-2	99 Strand Road	Roadside	243522	417894	NO_2	Y	Duplicate	Y-0m	3m	Y
S3-4	Rockmills	Roadside	243607	418037	NO_2	Y	Duplicate	Y-0m	10m	Y
S5-6	1 Baronet Street	Roadside	243557	417907	NO_2	Y	Duplicate	Y-0m	6m	Y
S7-8	35 Aberfoyle Terrace	Roadside	243483	417801	NO_2	Y	Duplicate	Y-0m	6m	N
S9-10	1 Rock Terrace	Roadside	243527	417928	NO_2	Y	Duplicate	Y-0m	8m	Y
Abercorn Road										
AB1-2	63 Abercorn Road	Roadside	243166	416211	NO_2	N	Duplicate	Y-0m	2m	Y
AB3-4	65 Abercorn Road	Roadside	243422	416230	NO_2	N	Duplicate	Y-0m	4.5m	Y
Francis Street										
FR1-2	3 Francis Street	Roadside	243084	417075	NO_2	N	Duplicate	Y-0m	2m	Y
FR3-4	45 Francis Street	Roadside	243110	417225	NO_2	N	Duplicate	Y-0m	1.5m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Duplicate/Triplicate Tube or Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to Kerb of Nearest Road *(N/A if not applicable)*	Does this Location Represent Worst-case Exposure?
Spencer Road										
SP1-2	32 Spencer Road	Roadside	243949	415989	NO_2	Y	Duplicate	Y-0m	2m	Y
SP3-4	48 Spencer Road	Roadside	243976	416002	NO_2	Y	Duplicate	Y-0m	2m	Y
SP5-6	70 Spencer Road	Roadside	243557	417907	NO_2	Y	Duplicate	Y-0m	2m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

The Council monitored NO_2 at three locations during 2013, Brooke Park, Dale's Corner and Marlborough Street.

The monitoring data can be seen in Tables 2-3 and 2-4 below. As data capture was greater than 75% during 2013 annualisation was not required. Full details of the QA/QC procedure are provided in Appendix A.

Results from 2013 indicate that both the annual mean objective and the 1-hour objective were met at the two monitoring locations outside the AQMAs – urban background Brooke Park site and roadside Dale's Corner site.

The annual mean NO_2 objective was exceeded at Marlborough Street, located within the existing Creggan Road AQMA. Despite the high annual mean concentration monitored, the hourly mean objective was met at this site, with no exceedences of the 200µg/m^3 limit recorded in 2013.

Figure 2.7 shows the trend in NO_2 concentration from 2008 through to 2013 at the three monitoring locations. The concentrations at Dale's Corner and Broke Park showed two peaks in concentrations in 2008 and 2010, following which concentrations reduced. Concentrations in 2013 were below 2012 levels at both sites. The concentrations at Marlborough Street showed a large reduction in 2012 when compared to the 2011 levels. The 2013 concentrations reduced marginally from 2012.

Table 2-3 Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Period of Monitoring, %	Valid Data Capture 2013, %	Annual Mean Concentration (µg/m^3)						
					2007	2008	2009	2010	2011	2012	2013
Brooke Park (AURN)	Urban Background	N	97.0	97.0	12.6	18.5	15.8	19.2	15.6	15.0	14.1
Dale's Corner	Roadside	N	96.6	96.6	38.5	**40.2**	39.0	**43.2**	33.6	34.5	30.3
Marlborough Street	Roadside	Y	91.3	91.3	-	-	-	-	**71.3**	**63.4**	**60.3**

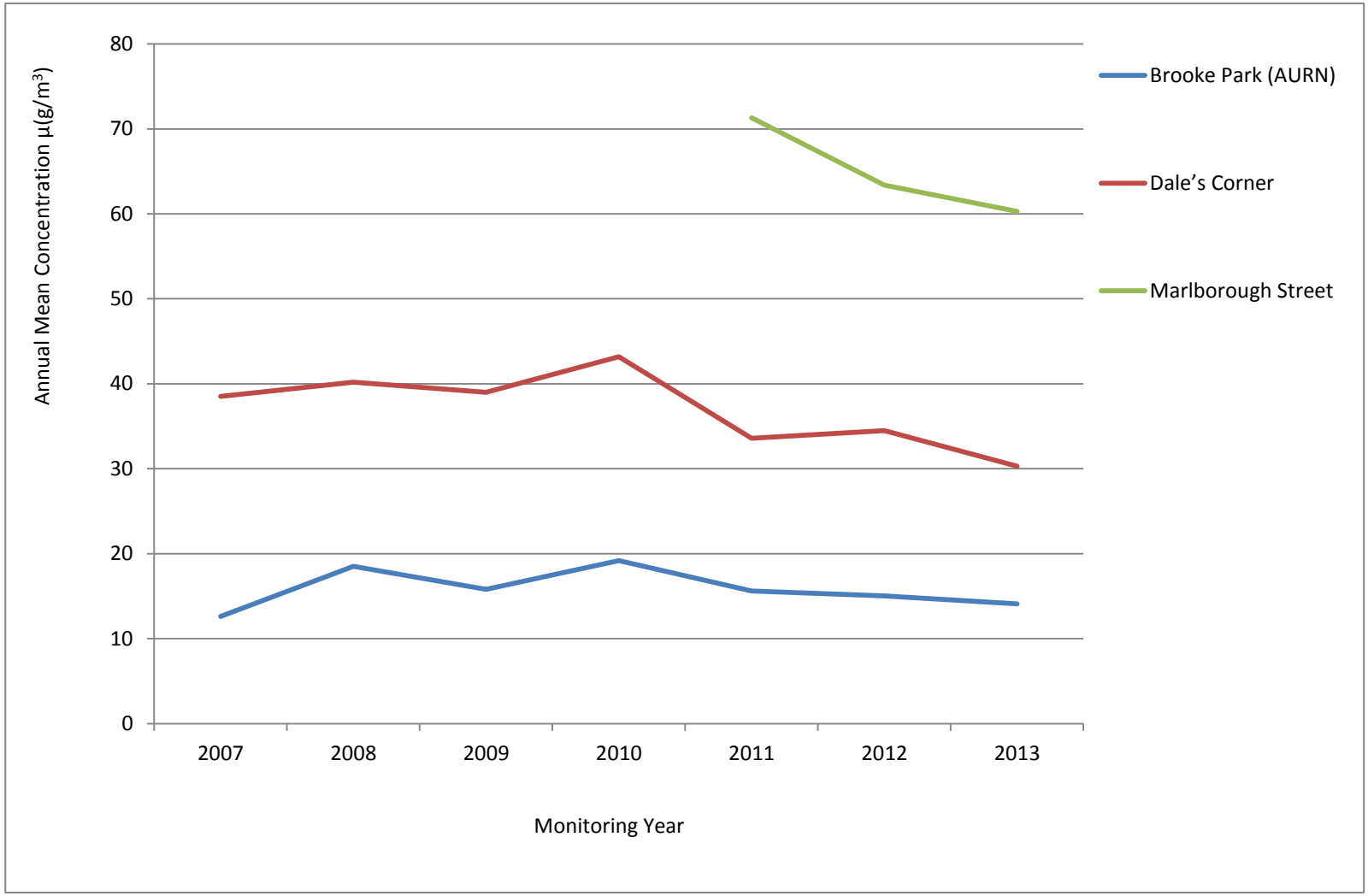
In **bold**, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Table 2-4 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Period of Monitoring, %	Valid Data Capture 2013, %	Number of 1-Hour Means > 200 µg/m^3 (if % data > 90% the 99.8th percentile shown in brackets)						
					2007	2008	2009	2010	2011	2012	2013
Brooke Park (AURN)	Urban Background	N	97.0	97.0	0 (63)	0	0 (79.6)	0	0	0	0
Dale's Corner	Roadside	N	96.6	96.6	0 (155)	11	0	8 (138)	1	0	0
Marlborough Street	Roadside	Y	91.3	91.3	-	-	-	-	0 (181)	3	0

In **bold**, exceedence of the NO_2 1-hour mean AQS objective (200µg/m^3 – not to be exceeded more than 18 times per year)

Figure 2-7 Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites



Diffusion Tube Monitoring Data

The NO_2 diffusion tube data for the past seven years are summarised in Table 2.5. The full dataset (monthly mean values) are included in Appendix A.

Results for year 2013 have been bias adjusted using the local bias adjustment factor. Data capture for 2013 was very good at most sites, with annualisation required for five sites only: AB1, AB2, AB3, AB4 and SP6. Full details of the annualisation, bias adjustment and QA/QC procedure are provided in Appendix A.

For the 2013 data set, there were nine sites where the NO_2 annual mean AQS Objective was exceeded. All locations of exceedence were within the current AQMAs.

The following sites were found to be exceeding in 2013:

- C1-2 at 3 Creggan Road (Creggan Road AQMA);
- C9-10 at 14 Creggan Road (Creggan Road AQMA);
- C11-13 at 2 Marlborough Street
- D6-7 at 5 Glendermott Road (Dale's Corner AQMA);
- D8-9 at 19 Glendermott Road (Dale's Corner AQMA);
- D10-11 at 4 Ebrington Terrace (Dale's Corner AQMA);
- D12-13 at 12 Ebrington Terrace (Dale's Corner AQMA);
- P11-12 at 5 Collon Terrace (Buncrana Road AQMA); and
- SP1-2 at 32 Spencer Road (Spencer Road AQMA).

Of the nine sites exceeding in 2013, six also exceeded in 2012. SP1-2 is a new site, set up in 2013 in the Spencer Road AQMA.

Previous Progress Report recommended further monitoring in Abercorn Road to confirm existing concentrations. However, the two monitoring sites AB1-2 and AB3-4 did not show any exceedences in 2013.

Creggan Road AQMA

Exceedences of the annual mean NO_2 objective continue to occur within the AQMA as shown by the monitoring results from most diffusion tube sites. Whilst diffusion tube monitoring site C1-2 showed concentrations greater than 60µg/m^3 in 2013 and previous years, it is not recommended that this area is declared as an AQMA for the short-term NO_2 objective as the Marlborough Street continuous monitoring site showed no exceedences of

200µg/m^3 in 2013 (3 in 2012 and none in 2011), with 18 allowed. Whilst the 60µg/m^3 concentration is a guide to whether the short-term objective may be exceeded, in this case it has not.

Dale's Corner AQMA

Exceedences of the annual mean NO_2 objective continue to occur within the AQMA as shown by the monitoring results from all diffusion tube sites except one (D14-15).

Buncrana Road AQMA

Exceedence of the annual mean NO_2 objective was recorded at one site within the AQMA in 2013 (P11-12). This site has also shown (or was close to) exceedences in previous years. However, two other sites within the AQMA showed concentrations above 36.0 µg/m^3 in 2013 (P7-8 and P9-10); therefore monitoring should continue in this area and the AQMA should remain.

Spencer Road AQMA

Site SP1-2 exceeded the annual mean NO_2 objective in 2013. The two other diffusion tube monitoring sites within this AQMA showed concentrations above 36.0 µg/m^3 in 2013 (SP3-4 and SP3-5); therefore monitoring should continue in this area and the AQMA should remain. However, as the 2014 Detailed Assessment of Derry AQMAs determined that the properties in the south west of the AQMA were not relevant receptors for the annual mean objective, it is recommended that the extent of this AQMA is amended.

Strand Road AQMA

All sites within this AQMA met the objective in 2013 and two previous years. However, site S1-2 was above 36.0 µg/m^3 during 2011-2013; therefore it is recommended that the Council continues monitoring in this area to confirm existing concentrations and considers potential revocation of this AQMA.

Table 2-5 Results of NO_2 Diffusion Tubes 2007-2013

Site ID	Site Type	2013 Data Capture	Within AQMA ?	Annual mean concentration (adjusted for bias) µg/m^3						
				2007	2008	2009	2010	2011	2012	2013
				(National Bias Adjustment Factor = 0.88)	(Local Bias Adjustment Factor = 1.002)	(Local Bias Adjustment Factor = 0.93)	(Local Bias Adjustment Factor =0.99)	(Local Bias Adjustment Factor = 0.90)	(Local Bias Adjustment Factor = 0.86)	(Local Bias Adjustment Factor = 0.87)
Brooke Park AURN										
A1-3	Urban Background	12	N	15	19	16	20	15.6	19.9	15.3
Cathedral										
C1-2	Roadside	11	Y	**58**	**76**	**64**	**94**	**68.1**	**62.0**	**61.1**
C3-4	Roadside	12	Y	31	**45**	37	**48**	34.8	39.2	34.6
C5-6	Suburban	11	Y	38	**49**	**42**	**54**	**41.5**	**41.8**	39.5
C7-8	Roadside	12	N	25	37	23	23	26.4	23.3	23.1
C9-10	Roadside	12	Y	37	**46**	**41**	**63**	39.8	**46.3**	**40.5**
C11-13	Roadside	11	Y	-	**-**	**-**	**-**	-	**54.2**	**51.9**
Dale's Corner										
D1-3	Roadside	12	N	31	**40**	35	**44**	33.5	32.8	32.0
D4-5	Urban Centre	12	N	25	33	30	**41**	28	27.0	29.1
D6-7	Roadside	12	Y	**44**	**64**	**48**	**71**	**44**	**50.0**	**50.0**
D8-9	Roadside	12	Y	-	-	-	-	**50.4**	**53.2**	**55.2**
D10-11	Roadside	11	Y	-	**57**	**54**	**68**	**46.6**	**51.9**	**49.6**
D12-13	Roadside	12	Y	-	-	-	-	37.6	35.4	**40.7**

D14-15	Roadside	12	Y	-	-	-	-	31.8	32.6	32.6
D16-17	Roadside	12	N	-	-	27	**41**	32	31.9	33.2
Pennyburn										
P1-2	Suburban	11	N	20	25	27	29	21.8	21.4	22.2
P3-4	Suburban	12	N	27	31	28	**41**	25.8	27.6	27.6
P5-6	Roadside	12	Y	-	-	-	-	25.2	27.0	28.7
P7-8	Roadside	12	Y	32	**51**	28	**51**	32.4	33.0	36.1
P9-10	Roadside	11	Y	-	-	-	-	37.4	33.7	38.2
P11-12	Roadside	12	Y	37	**52**	**42**	**52**	**45.7**	39.8	**43.7**
Strand Road										
S1-2	Roadside	12	Y	39	**44**	37	**52**	39.5	37.3	36.7
S3-4	Roadside	12	Y	29	**44**	37	**48**	33.2	30.0	31.7
S5-6	Roadside	12	Y	-	-	-	-	-	-	30.5
S7-8	Roadside	12	Y	-	-	-	-	-	-	30.3
S9-10	Roadside	12	Y	-	-	-	-	-	-	31.6
Abercorn Road										
AB1-2	Roadside	4	N	33	**46**	36	**47**	39.2	**40.4**	33.9[a]
AB3-4	Roadside	4	N	-	-	-	-	-	25.5	20.2[a]
Francis Street										
FR1	Roadside	12	N	-	-	31	**42**	26.2	26.5	31.4
FR3-4	Roadside	11	N	-	-	39	**44**	29.4	26.1	32.7
Spencer Road										
SP1-2	Roadside	12	Y	-	-	-	-	-	-	**43.0**

SP3-4	Roadside	10	Y	-	-	-	-	-	-	39.8
SP5-6	Roadside	12/8	Y	-	-	38.2	38.2	38.2	38.2	37.2[a]

[a] Results were annualised in accordance with the methodology set in TG(09) Box 3.2.
In **bold**, exceedence of the NO_2 annual mean AQS objective of 40 µg/m^3

2.2.2 Particulate Matter (PM_{10})

PM_{10} is measured at the Brooke Park (AURN) site. As data capture was greater than 75% during 2013 annualisation was not required. However, as data capture was below 90%, the 90.4th percentile has also been reported for the hourly objective for this site.

Results are presented in Tables 2-6 and 2-7 below. The results of PM_{10} monitoring indicate that the AQS objectives are currently being met at the Brooke Park (AURN) location.

Table 2-6 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period, %	Valid Data Capture 2013, %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration (µg/m^3)						
						2007	2008	2009	2010	2011	2012	2013
Brooke Park (AURN)	Urban Background	N	88.9	88.9	Y	20.6	23.2	22.3	22.5	18.6	18.4	14.8

In **bold**, exceedence of the PM_{10} annual mean AQS objective of 40 µg/m^3

Table 2-7 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period, %	Valid Data Capture 2013, %	Confirm Gravimetric Equivalent	Number of 24-Hour Means > 50 µg/m^3 *						
						2007	2008	2009	2010	2011	2012	2013
Brooke Park (AURN)	Urban Background	N	88.9	88.9	Y	6	13 (36.7)	10 (39.0)	21 (39.7)	6	2 (32.0)	1 (25.3)

In **bold**, exceedence of the PM_{10} 24-hour mean AQS objective (50µg/m^3 – not to be exceeded more than 35 times per year)
If data capture for full calendar year is less than 90%, the 90.4th percentile of 24-hour means is shown in brackets.

2.2.3 Sulphur Dioxide (SO_2)

Sulphur dioxide is measured at the Brooke Park (AURN) site. Results for 2013, which are provided in Table 2-8 below, show that concentrations did not exceed the 15 minute, 1-hour or 24-hour objectives.

Table 2-8 Results of Automatic Monitoring for SO_2: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period, %	Valid Data Capture 2013, %	Number of Exceedences*		
					15-minute Means > 266µg/m^3	1-hour Means > 350µg/m^3	24-hour Means > 125µg/m^3
Brooke Park (AURN)	Urban Background	N	94.1	94.1	0	0	0

In **bold**, exceedence of the relevant AQS objective (15-min mean = 35 allowed/year; 1-hour mean = 24 allowed/year; 24-hour mean = 3 allowed/year)
* If data capture for full calendar year is less than 90%, the percentiles are shown in brackets (15-min mean = 99.9th ; 1-hour mean = 99.7th ; 24-hour mean = 99.2th percentile)

2.2.4 Benzene

No monitoring of benzene takes place in the City. All previous LAQM reports have identified that there is no likely exceedence of the benzene AQS objectives.

2.2.5 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ is measured at the Brook Park (AURN) site. $PM_{2.5}$ objectives have been set out in the UK Air Quality Regulations. Although there is no requirement for local authorities to review and assess $PM_{2.5}$ against these objectives as part of the LAQM regime, results have been reported as recommended by Technical Guidance LAQM.TG(09).

The $PM_{2.5}$ results indicate that concentrations are well below the target value of 25µg/m^3 in 2012.

Table 2-9 Results of Automatic Monitoring for Particulates ($PM_{2.5}$)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2013, %	$PM_{2.5}$ Annual Mean 2013 (µg/m^3)*
Brooke Park (AURN)	Urban Background	N	76.4	11.5
* As a comparison, the UK Air Quality Standard objective for $PM_{2.5}$ is 25µg/m^3 (target value) for England				

2.2.6 Ozone (O_3)

Ozone is measured at the Brooke Park (AURN) site. O_3 is a transboundary pollutant; the sources of O_3 are frequently spatially distant from the measured site of the concentrations. This pollutant is not a prescribed air quality objective for LAQM purposes; however, it has been reported as recommended by Technical Guidance LAQM TG(09).

The results from 2013 indicate the AQS objective for O_3, of 10 8-hour running mean exceedences of 100µg/m^3 per year has been met.

Table 2-10 Results of Automatic Monitoring for Ozone: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Description	Valid Data Capture 2013, %	Number of Exceedences in 2013
Brooke Park (AURN)	Urban Background	N	Maximum 8-hour running mean > 100 µg/m^3	99.2	7
Exceedence of the ozone AQS objective (100µg/m^3 10 exceedences allowed per year)					

2.2.7 Summary of Compliance with AQS Objectives

Derry City Council has examined the results from monitoring in the City.

Concentrations within four of the AQMAs still exceed the annual mean objective for NO_2 at relevant receptor locations and the AQMAs should remain.

All sites within Strand Road AQMA met the objective in 2013 and two previous years. The Council can consider potential revocation of this AQMA.

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

3 New Local Developments

3.1 Road Traffic Sources

Since the previous Review and Assessment report, there have been none of the following new or newly identified developments:

- Narrow congested streets with residential properties close to the kerb;
- Busy streets where people may spend one hour or more close to traffic;
- Roads with a high flow of buses and/or HGVs;
- Junctions;
- New roads constructed or proposed;
- Roads with significantly changed traffic flows; or
- Bus or coach stations.

3.2 Other Transport Sources

Since the previous Review and Assessment report, there have been none of the following new or newly identified developments:

- Airports;
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m;
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m; or
- Ports for shipping.

3.3 Industrial Sources

The Council have identified two planning application for an industrial source which may have an impact upon air quality.

- Waste Gasification Plant at Enviroparc, Electra Road, Derry. An air quality impacts report has been carried out for this development and concluded no adverse impact upon air quality will occur as a result of this development.
- Evermore renewable Energy Biomass plant at Lisahally. An air quality impact assessment has been carried out and concluded that there will be no adverse impact upon air quality as a result of this development.

3.4 Commercial and Domestic Sources

Since the previous Review and Assessment report, there have been none of the following new or newly identified developments:

- Biomass combustion plant – individual installations;
- Areas where the combined impact of several biomass combustion sources may be relevant; or
- Areas where domestic solid fuel burning may be relevant.

3.5 New Developments with Fugitive or Uncontrolled Sources

Since the previous Review and Assessment report, there have been none of the following new developments:

- Landfill sites;
- Quarries;
- Unmade haulage roads on industrial sites;
- Waste transfer stations etc; or
- Other potential sources of fugitive particulate emissions.

Derry City Council confirms that there is one newly identified local development which may have an impact on air quality within the Local Authority area.

Derry City Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Local / Regional Air Quality Strategy

Local Strategy

The Derry Area Plan 2011 is a Development Plan prepared by the Planning Service, an agency within the Department of the Environment under the provisions of Part III of the Planning (NI) Order 1991. The Plan promotes the concept of sustainable development based on the belief that conservation and development are not mutually exclusive alternatives. As part of the plan a City Development Limit has been established around all future development area beyond which there is a presumption of no further development. This separates Derry City from Culmore, Newbuildings and Strathfoyle and restricts future development to the periphery of the City although it is assumed that this will provide sufficient land for these developments to take place. Thirteen small settlements have been identified in the district which are smaller than villages and do not possess the same range of service provision; these have been selected for limited development such that the character will be reflected in the scale and style of each settlement. The total theoretical provision of future dwellings is 11,500 which is greater the 8,500 dwellings anticipated need.

The Plan outlined development zones within the City Development Limit in which future developments could take place provided that such developments met a number of conditions relating to design. These included the provision of open spaces in housing and commercial developments, satisfactory layouts for pedestrian and cycling linkages and roads layout and car parking and access provision. Proposals close to the City and preserving future access to adjacent parcels would be given greater importance. New Industrial developments in existing industrial areas would only be granted permission if they make full use of the existing infrastructure. Commercial development should consolidate the commercial centre of the City and would not lead to the detrimental impacts on the air quality and traffic movements.

Regional Strategy

"*Shaping Our Future*" is a Regional Development Strategy (RDS) (updated in January 2011) which offers a strategic and long-term perspective on the future development of Northern Ireland up to the year 2035. The RDS strategy for Derry is the improvement and the enhancement of the natural environment, the economic and social opportunities and the encouragement of tourism to the area through improvements in the built environment and transport infrastructure and linkage to the natural gas network. The rural community has greater relevance to maintain the rural way of life whilst providing transport and economic opportunities in a sustainable way. Its overall aim is:

"to develop an attractive and prosperous rural area, based on a balanced and integrated approach to the development of town, village and countryside, in order to sustain a strong and vibrant rural community, contributing to the overall well-being of the Region as a whole as part of the review process an analysis of significant spatial trends was carried out to determine new challenges along with key policy drivers."

Specifically, changes to the policy, updated in January 2011, with regard to air quality are summarised below:

- Consideration needs to be given to ways to reduce energy consumption towards more sustainable methods of production;
- Reduce the need to use the car by designating neighbourhoods that have shops, offices, schools, churches, parks and other amenities near homes so that there are greater opportunities to use sustainable modes of transport;
- Adapt the existing transport network to facilitate the modal shift away from cars;
- Increase the use of renewable energies;
- Develop strong linkages between policies for managing air pollution and climate change; and
- Improve energy efficiency of buildings.

5 Planning Applications

The Council keeps a log of all planning applications for which an air quality assessment will be provided. Planning applications that could have an impact on air quality have been identified below.

Details of the four planning applications are provided below.

Planning Application No. A/2010/0241/O

Development:

Mixed use development including hotel, offices, start-up business units, healthcare facilities, housing, retail and associated highway, footpath, landscape and other works and improvements.

Location:

Lands to the east of Crescent Link and north of Sevenoaks, Londonderry.

An air quality assessment was conducted as part of an Environmental Statement and found that there were no predicted exceedences of any of the relevant pollutant limit values.

Planning Application No. A/2011/0207/F

Development:

310 dwellings (41 detached, 216 semi-detached, 47 townhouses and 6 apartments), landscaping and ancillary works including access from signalised junction on Crescent Link incorporating Sperrin Park.

Location:

Lands east of Crescent Link, north of Ballyoan cemetery, west of Rossdowney Road and South east of Caw roundabout Londonderry.

An air quality assessment is currently pending for the above application.

Planning Application No. A/2011/0226/F

Development:

Food Superstore and 100 bed hotel with associated access. (including a new roundabout on Gransha Park) and carparking, servicing arrangements, landscaping, general site works and demolition of left hand entrance building at the entrance to the Gransha Estate.

Location:

Lands at Gransha Londonderry, fronting onto Madams Bank Road (A515) & Clooney Road (A2) BT47 6TB.

An air quality assessment was conducted and found that there were no predicted exceedences of any of the relevant pollutant limit values.

Planning Application No. A/2012/0335/O

Development:

Major mixed use development to include residential; office, leisure, Light industrial; education; community facilities; retail; cafes, bars and restaurants; associated multi-storey and surface car parking; landscaping and environmental and roads infrastructure (including an enhanced Pennyburn roundabout).

Location:

Site of former army base (known as Fort George) to the east of Strand Road south of Bay Road and bounded by Lough Foyle to the east Strand Road Derry Londonderry.

An air quality assessment was conducted and found that there were no predicted exceedences of any of the relevant pollutant limit values.

Planning Application No. A/2012/0037/PREAPP

Development :

Development of 5MW agricultural Centralised Anaerobic Digestion(CAD) plant and Combined Heat and Power (CHP)

Location:

Lisahally Dock 40m North of 24 Maydown Road,

An air quality assessment was conducted and found that there were no predicted exceedences of any of the relevant pollutant limit values.

Planning Application No: A/2012/0547/PREAPP

Development:

Major mixed use development to include residential, office, leisure, education, community facilities, arts, cultural, museum, cafes, restaurants, bars etc.

Location:

Ebrington Site Derry

An air quality assessment is currently pending for the above application.

Planning Application No: A/2012/0569/O

Development:

Proposed new distillery and factory for the distilling of whiskey and production of cream liquer and cocktail products.

Location:

Lands approciametely 190m to the West of McLean Road Campsie Industrial Estate, Campsie.

An air quality assessment is currently pending for the above application.

Planning Application No: A/2013/0396/F

Development:

Proposed 500KW Anaerobic Digestion (AD) and combined Heat and Power (CHP) Plant, silage clamp, access and ancillary site works (amendment to 350kw AD plant approved under A/2011/0247/F

Location:

Land at 150m South of W illsborough House, Willsborough Estate, Donneybrewer Road, Campsie.

An air quality odour assessment was conducted and found that there were no predicted exceedences of relevant odour limit values.

Planning Application No: A/2013/0433/F

Development:

Proposed co-location of Foyle and Londonderry College and Ebrington Primary School and nursery unit.

Location:

Former Clooney Military Base, Limavady Road.

An air quality assessment was conducted and found that there were no predicted exceedences of any of the relevant pollutant limit values.

Planning Application No: A/2013/0474/PREAPP

Development:

Ebrington Development Framework

Location:

Ebrington Site

An air quality assessment is currently pending for the above application.

Planning Application: A/2014/0629/F

Development:

Proposed mixed use regeneration of the Arntz Belting Co. Ltd and Eurocentre West site to provide 4 no retail warehouses (totalling 4.459 gross sq m) Medical Building, Superstore (totalling 6503 gross sq m), Educational Research & Development building, etc

Location:

Arntz Belting Company Ltd site, Pennyburn Pass and former Eurocentre West site, Pennyburn Industrial Estate Road.

An air quality assessment is currently pending for the above application.

6 Air Quality Planning Policies

Northern Ireland development plans are prepared by the Planning Service rather than local authorities. Derry Area Plan 2011 (refer to Section 5) sets out a number of policies in areas such as housing, industry and transport;

- **Policy TR1 Public Transport:** The Department will seek to ensure the development of a high quality public transport system accessible to all.
- **Policy TR 2 Traffic Management/Bus Measures**: The Department will seek to encourage public transport usage by according priority to bus movements where practicable.
- **Policy TR3 Cycling:** The Department will seek to increase cycle activity and provide safe facilities for cyclists.
- **Policy TR 5 Car Parking Provision in New Developments**: Car parking provision in new developments will be controlled on a zonal basis as follows:
    - Zone A - the Commercial Core, in which only operational car parking (servicing and other essential operations) will normally be permitted.
    - Zone B - the remainder of the Central Area and areas of mixed use elsewhere in the urban area, in which both operational and non-operational car parking will be required as determined by the Department.
    - Zone C - all other areas in which full operational and non-operational car parking will normally be required.
- **Policy IND 1 Assessment of Industrial Proposals:** The Department will consider the scale of the development, any impact on amenity, heritage or nature conservation interest, the design and layout of the scheme, and whether the proposal is appropriate to the character of the area or settlement. The Department will require that all industrial development is carried out to the highest design standards including the provision of access and car parking arrangements.
- **Policy IND 4 Environmental Impact:** In considering planning applications for new industrial development, the potential impact on the environment will be assessed.

7 Local Transport Plans and Strategies

Sub-Regional Transport Plan

The Sub-Regional Transport Plan 2015 (SRTP) was developed following the guidance of the Regional Development Strategy and the Regional Transport Strategy. Its purpose is to provide more detailed plans for the urban and rural areas with the Sub-Region and highlights proposals specifically designed for Londonderry. The package of schemes needed to incorporate current and future transport needs and be flexible to accommodate future Government policy.

The SRTP identified separate packages of measures for walking and cycling, bus, rail and highways. These will be subject to availability of land and financial resources and relevant statutory procedures such as planning guidance.

- **Walking** – proposals include: the provision of a continuous pedestrian network, designed and maintained to an appropriate standard and the in-fill of gaps in rural networks, footpaths which accommodate more easily buggies and mobility aids, additional crossing facilities with consideration to traffic flow and safety, upgrades to the existing pedestrian network from town centres to bus and rail stations. Traffic calming measures to facilitate crossing in rural areas. Provision of pedestrian links in new developments to the urban centres.

- **Cycling** – proposals include: networks of cycling routes taking into consideration existing road widths and physical constraints of route sharing, cycling parking at rail and bus stations.

- **Highway Measures** – town centres need to include traffic measures to lessen the forecast increase in traffic flows, reduction of bottlenecks at junctions, re-direction of traffic away from high-pedestrian flow areas. This may include new roads to new development areas which may be financed by the developer if the need is directly consequential to the new development, and /or new roads to reduce congestion in town centres or other sensitive areas.

- **Parking Measures** – provision of short term car parking close to town centres with long stay parking sited further from urban centres, additional provision for blue badge holders, taxi ranks and loading bays, convenience to bus and rail stations.

- **Public Transport Measures** – upgrade number of bus stops in town centres and well used routes from housing centres, improved accessibility for wheelchairs and buggies with low floor buses and better access to rail stations and platforms, bus priority for bus services especially at entry / exit of stations, the refurbishment or new bus and rail stations, if necessary, with disability parking to improve use. Additional taxi ranks with at least one on-street rank wherever practicable. In rural areas every settlement to have at least two modern stops with information on services, a canopy and close access to safe crossing if possible and may require the extension of routes into previously un-serviced settlements. The provision of Demand Responsive Services for mobility impaired residents in rural areas.

The improvement of the highways network through link road provisions is considered to lead to the improvement of air quality as adjacent roads would be relieved of traffic flow but may lead to dispersion over a wider area leading to diffuse worsening of air quality. Widening and junction improvements would reduce congestion and improve air quality on these roads and immediately adjacent roads.

Specifically for Derry-Londonderry there is limited provision of rail services to Belfast and there are no current plans to improve service provision. The co-ordinated bus service is inconvenient for the town centre so commuters have spilled into residential areas for free, unrestricted parking. A commuter coach service running between Derry and Belfast has proved very popular and taxi provision is good. The current problem for Derry is the increasing traffic flow, fuel tourism from the Republic of Ireland and long delays at junctions to the north of the City which have lead to worsening air quality. The Derry Local Transport Study looked at the limitations of the transport network in 2006 and proposed measures to improve transport and air quality. These were further outlined in the Derry Area Plan.

Derry Area Plan 2011

The Derry Area Plan 2011 outlined transportation needs in the immediate future in Derry City and the wider Derry-Londonderry district. The strategy of the Regional Transport Plan seeks to:

- encourage the use of alternative transport modes and reduce dependency on the private car;
- encourage accessible, reliable and popular public transport;
- maximise the efficiency of the existing transport network through review and implementation of low cost improvements;

- the development of appropriate road networks especially with regard to new industrial and housing developments;
- Implement road works focusing on improvement and upgrading of key strategic routes; and
- Improve pedestrian links in the area.

Specific policies for the region are:

- **Policy TR 1: Public Transport** – supporting developments in public transport by local operators to take advantage of improvements to the road network.
- **Policy TR 2: Traffic Measures and Bus Measures** – bus priority measures will be considered in association with traffic management measures and may include bus priority signals and bus lanes along the Core Public Transport Route.
- **Policy TR 3: Improve cycling** facilities and encourage cycling – by the development of a national Cycle Network, the implementation of a Riverside Strategy, new cycle routes, integration of cycling in new housing developments were possible, safe routes to school initiatives, and provision of cycle facilities.
- **Policy TR 4**: Access to Main Traffic Routes
- **Policy TR 5: Car parking provision in new developments** taking into consideration existing provision – zone A (commercial) in which operational parking would be permitted, Zone B (central and mixed use developments) operational and no-operational parking would be permitted, Zone C (all other areas) in which full operational and non-operational parking would be permitted.

    - **Proposal TR 1:** Strategic Highway Proposals include the recommendations of the Derry Transportation Study and include the following schemes:
        - Strand Road widening – now complete;
        - Culmore Road widening;
        - Queens Quay widening;
        - Buncrana Road widening;
        - Glendermott Road and Dungiven Road widening;
        - Skeoge Link Road;
        - Crescent Link dualling;
        - Maydown to Broadbridge dualling;
        - Culmore Road improvements.

Local strategies for transportation are included in the Action Plan, specifically the following Measures:

- M1 to restrict the number of HGV vehicles on Creggan Road;
- M2 a targeted Travel Plan to promote alternatives to private car travel;
- M3, a car-sharing scheme in association with DRD Roads Service (NI), Travelwise Group and Donegal; and
- M25 and M16, to encourage cycling through the creation of a Cycling Forum.

Integrated Transport Strategy

The Urban Regeneration Company, ILEX-URC, was established to promote the physical, economic and social regeneration of the city with specific responsibility to manage and re-develop two former military bases of Ebrington (26 acres) and Fort George (14 acres).

ILEX-URC, as a lead partner in a steering group, commissioned the development of an Integrated Transport Strategy (ITS) for the Derry-Londonderry City region. The Steering Group was formed by an appointed transport planning consultancy with members including ILEX-URC, Derry City Council, Donegal CC, Londonderry Chamber of Commerce, Department of Social Development, North West Regeneration Office, DoE Planning Service, Department of Regional Development Roads Service, Translink and Sustrans. The remit of the group was to prepare the ITS, giving consideration to all modes of transport, integrated with land-use and regeneration for the city and city region including cross-border. The draft ITS was published in April 2009.

In February 2009 ILEX facilitated a Future Search visioning exercise with a representative cross section of our community with varied resources, expertise and formal authority to have a respectful and meaningful conversation about our past, our present and our future. 120 people from the City, the region and other parts of Northern Ireland worked together, to agree a single, shared vision and a set of clear regeneration objectives and priorities for the City. This led to the formation of 12 Sector Working Groups to look at common areas going forward with the development of a Regeneration Plan entitled ‘the One Plan’ for the City and its region area. These included:

- Education& Skills;
- Marketing the Derry Opportunity;
- Development of City Region Assets;

- Children and Young People;
- Successful Neighbourhoods;
- River Asset;
- Enterprise and Employment;
- Health and Well Being;
- Environment & Conservation;
- Citizenship and Civic Pride;
- Transport and Infrastructure; and
- Tourism, Arts, Culture and Leisure.

The sector working group on Transport and Infrastructure reviewed the ITS in the context of the proposed Regeneration Plan and identified the following priorities:

- Reduce congestion and reliance on the private car;
- Create an integrated public transport system;
- Promote safe and sustainable modes of transport; and
- Enhance access and connectivity to, from and within the region.

The Regeneration Plan, launched on 24 June 2011, makes the following recommendations:

"As part of an overarching Integrated Transport Strategy a number of major projects have been proposed to create a fully integrated transport network. To ensure that there is an effective and efficient transport system operating it is essential that all of the elements of the strategy are implemented, one element will provide minor improvements but it is only through a co-ordinated approach that all elements will be implemented and real transformational changes to the network are achieved that will help target issues of accessibility"

The key projects are:

- Quality Bus Corridors (QBCs) and Feeder Taxi Services;
- Upgrade of the Rail Line and Rolling Stock;
- Upgrade of the A5 and A6 (to include the Atlantic Corridor);
- Orbital Link with the 3rd Road Bridge; and
- Implementation of Walking and Cycling Masterplan.

One of the key objectives of the strategy is to achieve a modal shift from the private car to other forms of transport. By offering a fully integrated network people have more attractive and efficient modes of travel to chose from and are less likely to rely on private transport and align with the City's commitment to sustainability."

The above proposals are a mixture of short, medium and long term objectives. Benefits to the AQMAs (existing and proposed) are difficult to assess but expected outcomes from their implementation will include:

- Improved Public Transport;
- The proposed orbital route will remove HDV traffic from the city centre and congested areas associated with the AQMA;
- Travel across the City will be more efficient and less congested; and
- Increased use of cycling and walking.

The proposed steps are City wide proposals and will not negate the need to take other specific measures already mentioned in the Air Quality Action Plan.

8 Climate Change Strategies

The Northern Ireland Climate Change Impacts Partnership (NICCIP) was established following the release of the 2007 DOE/Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) report “Preparing for Climate Change in Northern Ireland”. The NICCIP membership includes business, voluntary and government sectors to widen knowledge and impacts of climate change in Northern Ireland. It promotes adaptation of business and society to climate change and the development of discussion and ideas for the possibility and relevance of mitigation measures and cross-community strategies. The NICCIP produces a regular newsletter and is in the process of compiling a web-based list of contacts in Northern Ireland. It has also published “Climate Change: what will you do?” which is the findings of a survey of people, politicians and key decision makers.

The SNIFFER report on climate change addressed the two key challenges: to reduce emissions and to mitigate emissions. It outlined the likely future impacts on rain, soil moisture, weather patterns and wind speeds and sea level. It also outlined the impacts of climate change on:

- Biodiversity;
- Agriculture;
- Forestry;
- Fisheries;
- Water resources;
- Coastal and flood risk;
- Buildings, construction and planning;
- Economic infrastructure – business, insurance, transport, tourism and energy; and
- Social wellbeing – health, sport and recreation.

The report recommended a multi-party approach to adapt to the climate change through the assessment of adaptive capacity and the delivery of adaptive actions:

Adaptive Capacity

- Increasing awareness, training and knowledge;
- Contribute to the development and use of climate change, and socio-economic scenarios;

- Review the regulatory and legislative frameworks with respect to climate change and the provision of incentives for adaptation;
- Contingency/ emergency planning;
- Incorporation of climate change into models, and impacts and adaptations into scheme – specific assessments; and
- Consideration of cross-sector implications of responses.

Delivery of Adaptive Actions

- Increasing resilience through diversification and buffer zones;
- Avoidance of losses (e.g. altering building materials) and the acceptance of unavoidable losses;
- Embracing changes through maximising opportunities, and exploiting new opportunities e.g. forestry management;
- Planning for risks and opportunities in new infrastructure projects (e.g. transport and construction);
- Changes to management practices to accommodate climate change;
- Managing heat gain, energy use and water and environmental deficiencies in building design and construction; and
- Enhance health surveillance and responses to heat waves.

9 Implementation of Action Plans

The Council is currently amending its Air Quality Action Plan (AQAP) to incorporate additional measures at the two additional AQMAs at Spencer Road and Strand Road (however, should Strand Road AQMA be revoked, it will not be necessary to consider thjis location in the Action Plan. The Council has also conducted remodelling of all AQMAs to take account of revised, more accurate traffic data. Previous data may have been over-conservative in that some traffic volumes have decreased rather than increased. Some of the AQMAs were marginally exceeding the annual mean AQS objective for NO_2 and the remodelling has resulted in revocation/reduction in size of some of the AQMAs. The remodelling report will be submitted to Defra imminently. An update of the revised AQAP will be provided in the next round of Review and Assessment.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The review of 2013 monitoring data has identified no exceedences of the AQS Objectives outside of the AQMAs at any of the Derry City Council's diffusion tube or continuous monitoring locations. Exceedences of the annual mean NO_2 objective continue to occur within four of the AQMAs. All diffusion tube monitoring sites within Strand Road AQMA met the objective in 2013 and two previous years; as such the Council can consider potential revocation of this AQMA.

Continuous monitoring results for 2013 indicate that both the annual mean objective and the 1-hour objective for nitrogen dioxide were met at the two monitoring locations outside the AQMAs – urban background Brooke Park site and roadside Dale's Corner site. The annual mean NO_2 objective was exceeded at Marlborough Street in the Creggan Road AQMA. Despite the high annual mean concentration monitored, the hourly mean objective was met at this site, with no exceedences of the 200µg/m^3 objective recorded in 2013.

Results from diffusion tube sites showed that there were nine sites where the NO_2 annual mean AQS Objective was exceeded. All locations of exceedence were within the current AQMAs and most sites had also exceeded the objective in the previous year.

The 2013 results for PM_{10} show that the annual mean and the 24-hour mean continue to be met at the Brook Park (AURN) monitoring site.

10.2 Conclusions relating to New Local Developments

Air quality from new developments will continue to be monitored in the City. There is currently no need to carry out a Detailed Assessment at this time as a result of any new developments.

10.3 Proposed Actions

Proposed actions based up findings in this assessment are:

- Continue to monitor within and around the AQMAs;
- Finalise the Air Quality Action Plan; and
- Proceed to the Updating and Detailed Assessment 2015.

11 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
- Derry City Council 2013 Local Air Quality Management Annual Progress Report
- Derry City Council 2012 Updating and Screening Assessment

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B – Diffusion Tube Monitoring Results

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Environmental Scientifics Group (ESG) Glasgow utilising the 50% triethanolamine (TEA) in acetone preparation method. A bias adjustment of 0.73 for the year 2013 (based on one – Marylebone Road -study) has been obtained from the national bias adjustment calculator[1].

Factor from Local Co-location Studies

Three local co-location studies have been undertaken in Derry at the Brooke Park AURN, Dale's Corner and Marlborough Street automatic sites. Calculations of the local bias adjustment factors are presented below.

Brooke Park AURN co-location

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
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	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	04/01/2013	29/01/2013	22.6	29.8	28.8	27	3.9	14	9.7	15.45987	100	Good	Good
2	29/01/2013	27/02/2013	26.8	27.9	26.6	27	0.7	3	1.7	9.190691	95.82733813	Good	Good
3	27/02/2013	26/03/2013	21.1	19.0	16.3	19	2.4	13	6.0	20.57911	100	Good	Good
4	26/03/2013	25/04/2013	16.7	18.4	16.6	17	1.0	6	2.5	19.26117	100	Good	Good
5	25/04/2013	31/05/2013	11.2	10.7	11.5	11	0.4	4	1.0	10	97.68786127	Good	Good
6	31/05/2013	29/06/2013	11.3	11.7	12.4	12	0.6	5	1.4	11	100	Good	Good
7	29/06/2013	01/08/2013	11.1	12.2	11.3	12	0.6	5	1.5	10	100	Good	Good
8	01/08/2013	28/08/2013	10.7	11.0	10.2	11	0.4	4	1.0	9	99.84496124	Good	Good
9	28/08/2013	27/09/2013	13.0	14.2	13.6	14	0.6	4	1.5	12	76.59279778	Good	Good
10	27/09/2013	31/10/2013	21.1	19.1	22.3	21	1.6	8	4.0	17	95.07389163	Good	Good
11	31/10/2013	04/12/2013	23.6	23.3	22.4	23	0.6	3	1.6	21.38977	99.8783455	Good	Good
12	04/12/2013	13/01/2014	19.5	21.4	15.2	19	3.2	17	7.9	14.63379	100	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

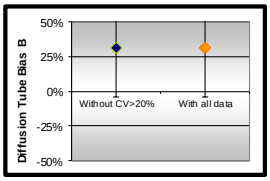
Site Name/ ID:

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.8 (0.62 - 1.12)
Bias B: 25% (-10% - 60%)
Diffusion Tubes Mean: 18 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 14 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 14 (11 - 20) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.8 (0.62 - 1.12)
Bias B: 25% (-10% - 60%)
Diffusion Tubes Mean: 18 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 14 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 14 (11 - 20) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

[1] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/14 published in March 2014.

Dale's Corner co-location

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
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	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	04/01/2013	01/02/2013	48.1	38.7	45.3	44	4.8	11	12.0	39.66617	100	Good	Good
2	01/02/2013	01/03/2013	47.2	42.3	52.9	47	5.3	11	13.2	43.18393	96.13670134	Good	Good
3	01/03/2013	27/03/2013	43.2	37.5	36.9	39	3.5	9	8.6	35.25641	99.84	Good	Good
4	27/03/2013	25/04/2013	39.9	38.7	31.7	37	4.4	12	11.0	35.48321	98.41954023	Good	Good
5	25/04/2013	31/05/2013	33.4	33.0	34.0	33	0.5	2	1.3	27	97.33487833	Good	Good
6	31/05/2013	27/06/2013	29.0	31.8	33.2	31	2.1	7	5.3	28	94.76117103	Good	Good
7	27/06/2013	01/08/2013	27.4	28.8	31.2	29	1.9	7	4.8	30	94.99404052	Good	Good
8	01/08/2013	28/08/2013	27.7	29.3	29.6	29	1.0	4	2.5	26	99.22360248	Good	Good
9	28/08/2013	27/09/2013	32.9	31.2	34.9	33	1.9	6	4.6	23	98.89807163	Good	Good
10	27/09/2013	31/10/2013	43.5	44.1	39.3	42	2.6	6	6.5	27	82.57668712	Good	Good
11	31/10/2013	04/12/2013	40.4	46.5	42.7	43	3.1	7	7.7	31.04791	99.87730061	Good	Good
12	04/12/2013	09/01/2014	33.2	30.8	32.3	32	1.2	4	3.0	20.92263	99.88465975	Good	Good
13													
										Overall survey -->		Good precision	Good Overall DC

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

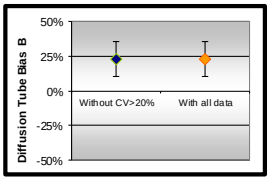
Site Name/ ID:

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.75 - 0.93)
Bias B	20% (8% - 33%)
Diffusion Tubes Mean:	37 µgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	30 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	30 (28 - 34) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.75 - 0.93)
Bias B	20% (8% - 33%)
Diffusion Tubes Mean:	37 µgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	30 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	30 (28 - 34) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Marlborough Street co-location

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
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	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	04/01/2013	29/01/2013	70.0	77.9	61.6	70	8.2	12	20.2	66.39478	96.47651007	Good	Good
2	29/01/2013	27/02/2013	69.1	70.3	71.1	70	1.0	1	2.5	60.65175	73.95683453	Good	or Data Capture
3	27/02/2013	26/03/2013	49.9	51.9	46.4	49	2.8	6	6.9	44.68827	49.76958525	Good	or Data Capture
4	26/03/2013	25/04/2013	66.7	51.7	59.1	59	7.5	13	18.6	54.61736	98.18435754	Good	Good
5	25/04/2013	31/05/2013	62.8	43.2	54.1	53	9.8	18	24.4	54	98.03468208	Good	Good
6	31/05/2013	27/06/2013	69.6	59.2	69.3	66	5.9	9	14.7	63	95.67901235	Good	Good
7	27/06/2013	01/08/2013	45.6	47.8	47.9	47	1.3	3	3.2	54	96.68246445	Good	Good
8	01/08/2013	28/08/2013	60.7	65.2	61.2	62	2.5	4	6.1	66	91.9379845	Good	Good
9	28/08/2013	27/09/2013	75.1	69.6	71.7	72	2.8	4	6.9	65	99.44598338	Good	Good
10	27/09/2013	31/10/2013	61.4	60.1	68.2	63	4.4	7	10.8	57	95.93596059	Good	Good
11	31/10/2013	04/12/2013	62.1		52.8	57	6.6	11	59.1	76.42838	93.43065693	Good	Good
12	04/12/2013	10/01/2014	49.3	27.9		39	15.1	39	136.0	55.74829	99.32126697	Poor Precision	Good
13													
										Overall survey -->		Good precision	Good Overall DC

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

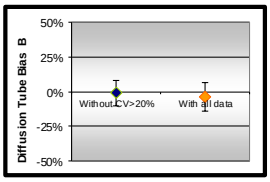
Site Name/ ID:

Precision: 11 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 9 periods of data	
Bias factor A	1.01 (0.93 - 1.12)
Bias B	-1% (-10% - 8%)
Diffusion Tubes Mean:	61 µgm^{-3}
Mean CV (Precision):	9
Automatic Mean:	62 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	62 (57 - 69) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 10 periods of data	
Bias factor A	1.04 (0.94 - 1.17)
Bias B	-4% (-14% - 7%)
Diffusion Tubes Mean:	59 µgm^{-3}
Mean CV (Precision):	12 caution
Automatic Mean:	61 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	61 (55 - 69) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

The local bias adjustment factor of 0.87 was calculated as the regression of the three available local co-locations carried out in 2013.

Location	Local Bias Adjustment Factor
Brooke Park AURN	0.80
Dale's Corner	0.83
Marlborough Street	1.01
Regression	**0.87**

Discussion of Choice of Factor to Use

Data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentrations and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The technical guidance LAQM.TG (09) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tubes. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from NO_x / NO_2 continuous analysers. Alternatively, the national database[2] of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

The use of bias adjustment factors over the past few years has varied; mainly local bias adjustment factors have been used. A summary of factors used since 2007 is provided below.

Year	Local or National	Bias adjustment factors
2007	National	0.88
2008	Local	1.00
2009	Local	0.93
2010	Local	0.99
2011	Local	0.90
2012	Local	0.86
2013	Local	0.87

The local bias adjustment was used for the 2013 data for the following reasons:

- All three co-location surveys had good precision and data capture;
- Local bias adjustment factor was used in most previous years;
- National bias adjustment factor for 2013 was calculated using only one study.

[2] http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html

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For previous data, years 2008 to 2012, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used were 0.88 (2007), 1.00 (2008), 0.93 (2009) and 0.99 (2010), 0.90 (2011) and 0.86 (2013).

PM Monitoring Adjustment

No adjustment to the PM_{10} monitoring data was required.

Short-Term to Long-term Data Adjustment

Diffusion tube data with less than 9 months of recorded data was annualised using background continuous data from two sites (Derry Brooke Park, AURN site and Belfast Centre AURN site). The results of the annualisation are provided below.

Site	Uncorrected Diffusion Tube Mean (µg/m^3)	Annualisation Factor Derry (Brooke Park)	Annualisation Factor Belfast Centre	Average Annualisation Factor	Annualised Bias Adjusted Concentration (µg/m^3)
AB1	46.4	0.859	0.925	0.892	36.0
AB2	36.8	0.977	1.008	0.992	31.7
AB3	26.3	0.859	0.925	0.892	20.4
AB4	25.8	0.859	0.925	0.892	20.0
SP6	42.7	0.982	1.037	1.010	37.5

QA/QC of Automatic Monitoring

The sites are managed to the UK Automatic Urban and Rural Network (AURN) QA procedures and standard.

AEA Energy and Environment undertake the Quality Assurance/Quality Control (QA/QC) procedures at the three monitoring sites, ensuring that measurements from the analysers are as accurate as possible, and that measurements recorded at each site can be compared with other sites.

Manual calibration of automatic monitors is undertaken every two weeks by the Council's officers. This allows the instrument drifts to be fully quantified and documented using traceable calibration gas standards and the results are used to scale data.

The analysers are checked and serviced every six months by the appointed equipment support contractors. The reports are then sent to AEA.

QA/QC of Diffusion Tube Monitoring

ESG Glasgow participates in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis. This provides strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. In WASP data rounds 120 through to 123 (January to December 2013) ESG Glasgow have scored 50% (R120), 25% (R121) and 100% (R122 and R123). The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$. The co-location study from Marylebone Road from the national database in 2013 was rated as ‘good’ (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

Appendix B – Diffusion Tube Monitoring Results

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Months of Data	Period Mean
A1	AURN	22.6	26.8	21.1	16.7	11.2	11.3	11.1	10.7	13.0	21.1	23.6	19.5	12	17.4
A2	AURN	29.8	27.9	19.0	18.4	10.7	11.7	12.2	11.0	14.2	19.1	23.3	21.4	12	18.2
A3	AURN	28.8	26.6	16.3	16.6	11.5	12.4	11.3	10.2	13.6	22.3	22.4	15.2	12	17.3
C1	3 Creggan Rd	82.9	84.4	59.5	69.7	55.3	72.4		31.2	73.7	76.3	91.9	70.4	11	69.8
C2	3 Creggan Rd	84.2	88.9	58.9	67.4	58.4	72.3		33.4	78.2	74.1	90.0		10	70.6
C3	6 Marlborough Terrace	47.6	47.4	37.9	39.0	38.5	37.4	27.1	30.6	39.1	43.8	58.0	36.0	12	40.2
C4	6 Marlborough Terrace	41.0	50.3	41.7	39.3	39.8	36.6	26.8	30.1	38.8	43.9	54.2	28.4	12	39.2
C5	22A Creggan Street		55.9	39.3	42.9	41.9	43.3	39.6	38.2	43.9	42.7	59.3	51.1	11	45.3
C6	22A Creggan Street		52.8	39.0	43.3	42.8	42.6	38.0	41.1	42.3	51.4	60.0	48.1	11	45.6
C7	1 Windsor Terrace	33.8	32.6	30.4	24.6	17.0	23.6	19.1	23.4	24.7	30.6	34.4	20.6	12	26.2
C8	1 Windsor Terrace	29.7	37.2	27.3		20.6	27.6	19.2	21.3	25.2	30.6	36.1	20.9	11	26.9
C9	14 Creggan Road	55.7	60.3	67.3	56.1	50.2	51.7	40.2	33.8	42.1	58.5	52.3	40.5	12	50.7
C10	14 Creggan Road	3.1	28.2	59.6	49.7	50.5	52.8	40.9	35.0	43.2	48.9	47.5	49.1	12	42.4
C11	2 Marlbourough Street	70.0	69.1	49.9	66.7	62.8	69.6	45.6	60.7	75.1	61.4	62.1	49.3	12	61.9
C12	2 Marlbourough Street	77.9	70.3	51.9	51.7	43.2	59.2	47.8	65.2	69.6	60.1		27.9	11	56.8
C13	2 Marlbourough Street	61.6	71.1	46.4	59.1	54.1	69.3	47.9	61.2	71.7	68.2	52.8		11	60.3
D1	Continuous Monitor	48.1	47.2	43.2	39.9	33.4	29.0	27.4	27.7	32.9	43.5	40.4	33.2	12	37.2
D2	Continuous Monitor	38.7	42.3	37.5	38.7	33.0	31.8	28.8	29.3	31.2	44.1	46.5	30.8	12	36.1
D3	Continuous Monitor	45.3	52.9	36.9	31.7	34.0	33.2	31.2	29.6	34.9	39.3	42.7	32.3	12	37.0
D4	52 Clooney Terrace	41.7	46.1	42.7	41.1	25.9	26.8	23.5	21.1	26.8	43.7	37.7	25.4	12	33.5
D5	52 Clooney Terrace	44.1	51.2	40.6	38.0	26.0	29.4	27.1	21.1	24.0	38.6	34.8	26.3	12	33.4
D6	5 Glendermott Road	68.5	76.8	75.6	64.5	54.6	60.6	46.9	44.8	52.9	62.7	60.8	34.9	12	58.6

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Months of Data	Period Mean
D7	5 Glendermott Road	63.9	73.2	71.2	56.3	60.0	63.4	49.0	20.0	53.7	65.8	62.3	37.6	12	56.4
D8	19 Glendermott Road	63.3	84.3	80.4	69.1	56.0	69.3	56.5	48.1	60.1	72.0	62.7	35.8	12	63.1
D9	19 Glendermott Road	59.8	84.8	81.8	69.6	60.9	70.4	53.5	50.7	58.2	71.2	67.3	35.8	12	63.7
D10	4 Ebrington Terrace	78.3	79.6	80.8	69.2	52.7	68.1	56.6	46.8	50.0	75.5	15.2	56.9	12	60.8
D11	4 Ebrington Terrace	73.1	84.7	67.6	77.3	53.2	62.2		20.6	47.9	5.1		40.3	10	53.2
D12	12 Ebrington Terrace	53.4	52.0	50.1	53.5	1.2	93.4	41.8	35.3	40.7	48.3	51.1	40.5	12	46.8
D13	12 Ebrington Terrace	52.9	52.8	50.8	50.0	0.7	100.1	40.3	34.7	38.5	53.7	51.0	37.3	12	46.9
D14	9 Columba Terrace	41.4	48.6	27.6	38.4	31.6	31.2	29.3	30.5	29.7	37.7	49.7	46.2	12	36.8
D15	9 Columba Terrace	46.8	41.5	31.0	38.7	32.1	30.3	29.4	30.6	34.4	44.2	49.7	50.0	12	38.2
D16	17 Melrose Terrace	37.4	45.4	42.7	39.3	33.0	31.6	31.2	28.4	35.7	43.5	49.6	34.9	12	37.7
D17	17 Melrose Terrace	44.5	49.5	43.3	41.2	35.6	33.4	25.8	29.6	34.2	41.8	46.8	36.4	12	38.5
P1	53 Messines Park	37.8	35.4	28.5	26.4	12.7	21.1	16.8	19.0	20.7	29.2		22.2	11	24.5
P2	53 Messines Park	41.2	37.5	25.9	24.7		21.9	15.6	18.6	20.5	29.1	29.1	26.7	11	26.4
P3	57 Messines Park	39.6	41.7	38.5	32.9	26.3	29.8	25.0	25.0	26.2	35.3	33.7	22.6	12	31.4
P4	57 Messines Park	40.7	40.7	37.7	32.0	27.3	29.9	25.5	24.5	27.2	34.5	40.5	24.7	12	32.1
P5	8 Maybrook Terrace	43.4	41.4	42.1	35.9	26.0	32.3	24.8	23.9	29.3	38.9	38.0	19.7	12	33.0
P6	8 Maybrook Terrace	41.2	47.1	43.9	38.5	23.7	30.9	20.9	25.1	29.5	37.0	38.7	19.6	12	33.0
P7	19 St Patricks Terrace	51.1	54.1	54.4	43.8	32.0	37.8	32.6	30.0	36.8	48.1	46.1	28.3	12	41.3
P8	19 St Patricks Terrace	54.1	50.0	50.9	46.8	34.4	36.6	38.3	30.6	35.6	48.9	45.9	29.0	12	41.8
P9	1 Collon Terrace	45.9	55.8	37.7	40.3		38.3	34.7	43.5	47.6	47.8	53.6	37.9	11	43.9
P10	1 Collon Terrace		51.3	39.3	39.2	42.5	41.7	34.7	41.9	57.0	42.5	56.3	36.3	11	43.9
P11	5 Collon Terrace	59.2	52.6	40.4	45.8	48.4	50.6	38.3	48.9	48.8	49.4	62.7	51.8	12	49.7
P12	5 Collon Terrace	60.0	54.0	35.9	47.0	43.9	47.3	40.7	49.9	53.4	52.8	68.6	55.2	12	50.7

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Months of Data	Period Mean
S1	99 Strand Road	47.3	53.0	38.9	38.7	42.0	39.6	35.6	37.2	39.3	48.4	55.4	38.9	12	42.9
S2	99 Strand Road	45.1	45.1	38.2	42.1	40.5	40.0	32.1	37.4	41.7	45.8	49.4	40.7	12	41.5
S3	Rockmills	45.1	50.0	26.6	37.3	31.6	28.8	27.3	28.6	28.7	39.3	46.5	53.5	12	36.9
S4	Rockmills	51.2	54.7	27.0	40.1	29.8	33.7	29.7	32.9	31.0	35.6	41.9	23.6	12	35.9
S5	1 Baronet Street	43.8	39.2	23.7	29.6	34.0	23.1	24.4	32.4	35.6	35.9	49.5	48.2	12	35.0
S6	1 Baronet Street	45.0	44.9	28.1	29.0	32.6	23.2	24.5	32.0	33.9	36.9	47.0	44.2	12	35.1
S7	35 Aberfoyle Terrace	36.8	45.5	35.0	32.5	31.1	28.2	27.3	31.4	29.7	40.2	44.1	35.5	12	34.8
S8	35 Aberfoyle Terrace	38.6	45.4	35.0	33.1	33.6	30.4	24.5	31.3	35.0	40.6	36.5	33.8	12	34.8
S9	1 Rock Terrace	40.2	59.7	40.9	35.2	34.5	37.2	25.0	32.3	38.6	39.6	29.7	26.8	12	36.6
S10	1 Rock Terrace	34.5	55.9	42.2	34.5	34.8	33.7	29.3	20.2	34.9	35.8	46.7	29.1	12	36.0
AB1	63 Abercorn Road									33.9	49.8	63.6	38.4	4	46.4
AB2	63 Abercorn Road									38.7	48.9		22.7	3	36.8
AB3	65 Abercorn Road									21.9	31.7	33.1	18.6	4	26.3
AB4	65 Abercorn Road									23.2	28.6	33.9	17.5	4	25.8
SP1	32 Spencer Road	59.7	86.5	60.5	55.1	40.8	0.7	67.2	37.0	39.8	57.3	51.4	50.2	12	50.5
SP2	32 Spencer Road	68.0	63.2	57.2	57.3	40.9	0.9	67.3	40.5	37.0	56.0	52.3	38.2	12	48.2
SP3	48 Spencer Road	48.6	53.7	57.0	49.7		37.1	35.7	36.5	34.9	50.9	45.1		10	44.9
SP4	32 Spencer Road	48.8	60.5	65.1	49.2		40.7		16.7	36.1	52.3	50.0		9	46.6
SP5	70 Spencer Road	42.9	56.2	52.2	52.4	38.8	41.1	3.8	35.6	36.7	60.1	50.1	38.2	12	42.3
SP6	70 Spencer Road				54.0		45.4	35.1	36.4	36.8	52.8	44.0	36.7	8	42.7
FR 1	3 Francis Street	42.8	48.8	45.4		27.9	33.9	28.5	27.1	29.4	45.8	34.5	38.7	11	36.6
FR2	3 Francis Street	20.1	68.7	42.9	40.1	28.8	33.7	28.5	25.9	29.7	46.8	37.7	23.5	12	35.5
FR 3	45 Francis Street	47.3	52.1	40.5			33.8	30.9	30.5	29.4	46.2	42.1	29.3	10	38.2
FR 4	45 Francis Street	45.9	43.8	43.8	45.8	27.4	33.6	30.5	29.6	29.4	40.6	43.3	29.4	12	36.9