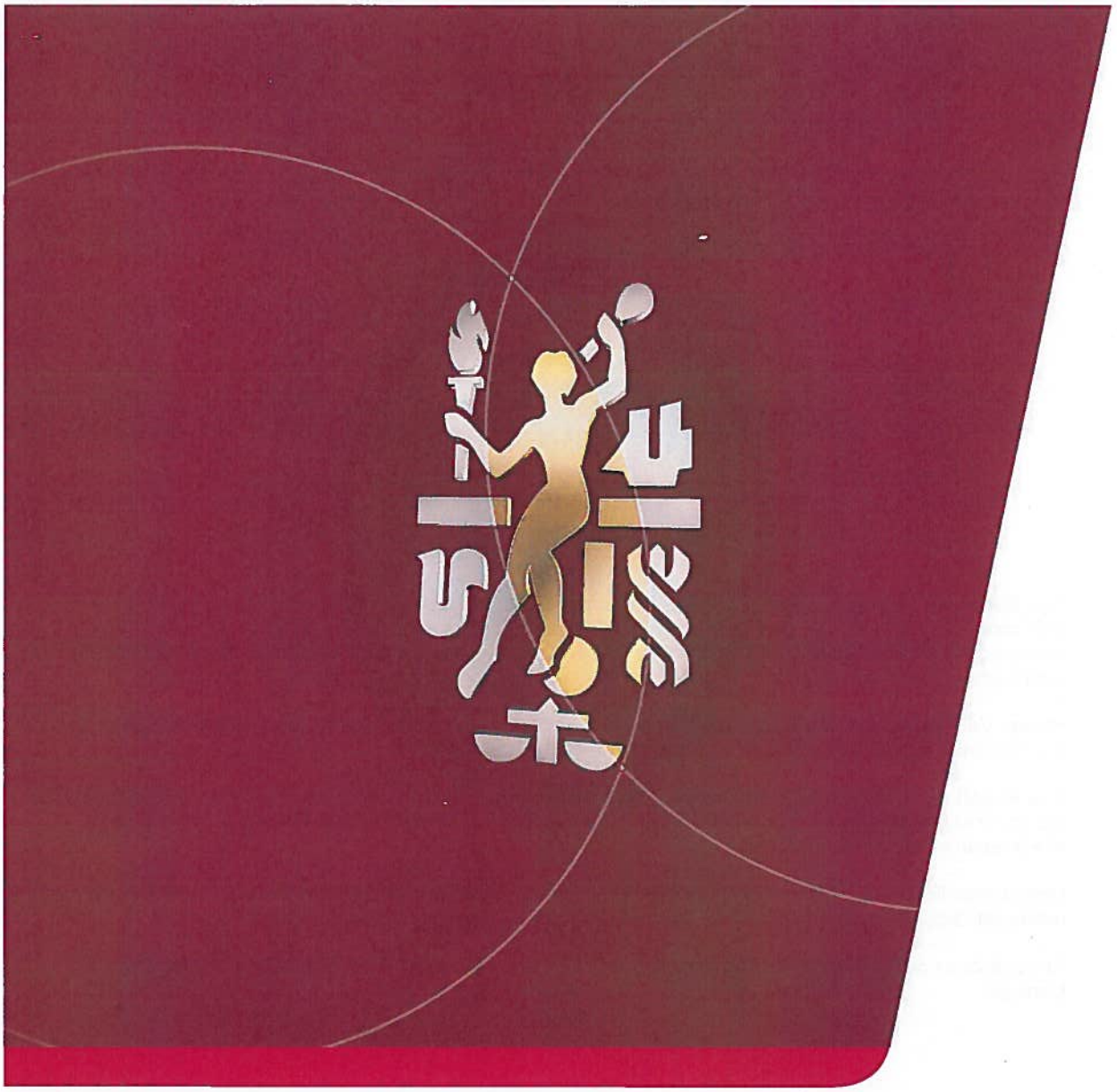

Derry City Council

Updating and Screening Assessment 2012

Bureau Veritas Air Quality

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Document Control Sheet

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Prepared by	Samantha Munn	Samantha Munn	Samantha Munn	
Signature				
Approved by	Ben Warren	Ben Warren	Ben Warren	
Signature				
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Bureau Veritas UK Limited
Brandon House
180 Borough High Street
SE1 1LB

Telephone: +44 (0) 207 902 6100
Fax: +44 (0) 207 902 6149
Registered in England 1758622
www.bureauveritas.co.uk

Registered Office
Brandon House
180 Borough High Street
SE1 1 LB

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Local Authority Officer	Mark McCrystal
Department	Environmental Health
Address	Derry City Council 98 Strand Road Derry BT48 7NN
Telephone	02871 365151
e-mail	Mark.McCrystal@derrycity.gov.uk
Report Reference number	USA 2012
Date	November 2012

Executive Summary

Part IV of the Environment Act 1995 and the Environment (NI) order 2002, places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Updating and Screening Assessment (USA) is a requirement of the 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 (as updated in 2010).

This Updating and Screening Assessment 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.

Updated monitoring showed that there was one exceedence of the Air Quality Objectives outside of existing AQMAs. The exceedence was of the NO_2 annual mean objective at Spencer Road. The general trend in NO_2 concentrations has been a general decrease in both the passive and continuous monitoring.

Continuous monitoring for PM_{10}, SO_2 and a number of other pollutants has shown to be within the Air Quality Objectives at the Brooke Park AURN station.

Proposed actions arising from the USA are as follows:

- Continue diffusion tube and continous monitoring in the district to identify future changes in pollutant concentrations;
- Proceed to a Detailed Assessment for the Spencer Road area;
- Re-instate the diffusion tube monitoring locations in Francis Street to determine if there is a potential for an exceedence of the NO_2 Air Quality Objectives;
- Proceed to a Progress Report in 2013.

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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 Londonderry 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.

1.2 Purpose of 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.

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in Northern Ireland** are set out in the Air Quality Standards Regulations (Northern Ireland) 2010 are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre,

mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 μg/m^3	Running annual mean	31.12.2003
	3.25 μg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 μg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 μg/m^3	Annual mean	31.12.2004
	0.25 μg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 μg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 μg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 μg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 μg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 μg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 μg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 μg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Table 1.2 provides a summary of the previous reports completed by Derry City Council (DCC) 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. All AQMAs are due to the exceedence of the NO_2 annual mean AQS objective. Figures 1.1 through to Figure 1.3 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 Derry City 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

Report	Summary
	declared. The Council declared the Dale's Corner AQMA in 2010.
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 Dales 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 NO2 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 also noted that this is an optimistic estimate as predicted concentrations are likely to be underestimated as shown by recent NO_2 monitoring trends across the UK.
2011 Progress Report	Review of updated monitoring data showed areas within the existing AQMAs to be exceeding the NO_2 objective, in addition there were four new areas where exceedences were recorded, Spencer Road, John Street, Strand Road and Abercorn Road, a Detailed Assessment was recommended.
2012 Air Quality Action Plan Update	The Air Quality Action Plan update is a review of 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. .

Figure 1.1 Map of AQMA Boundary - Creggan Road

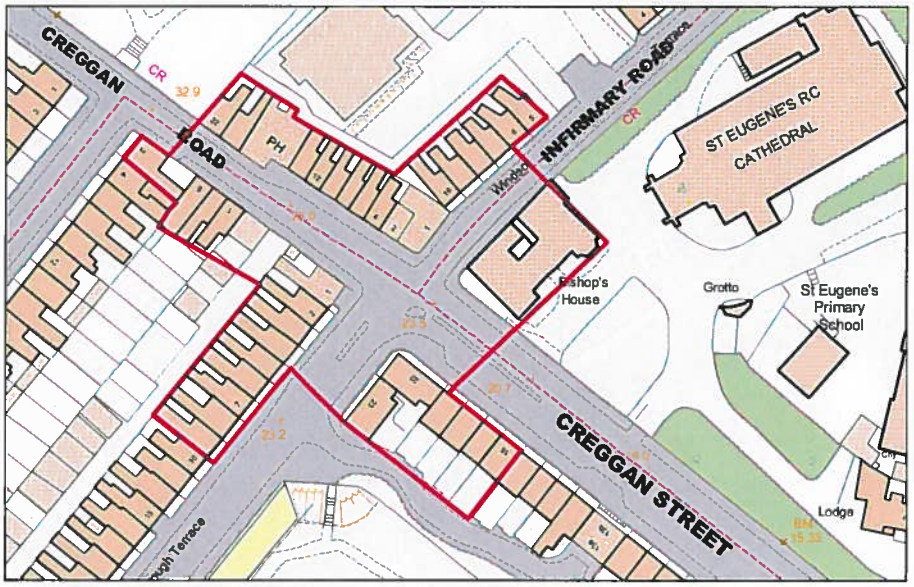

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Figure 1.2 Map of AQMA Boundary - Dale's Corner

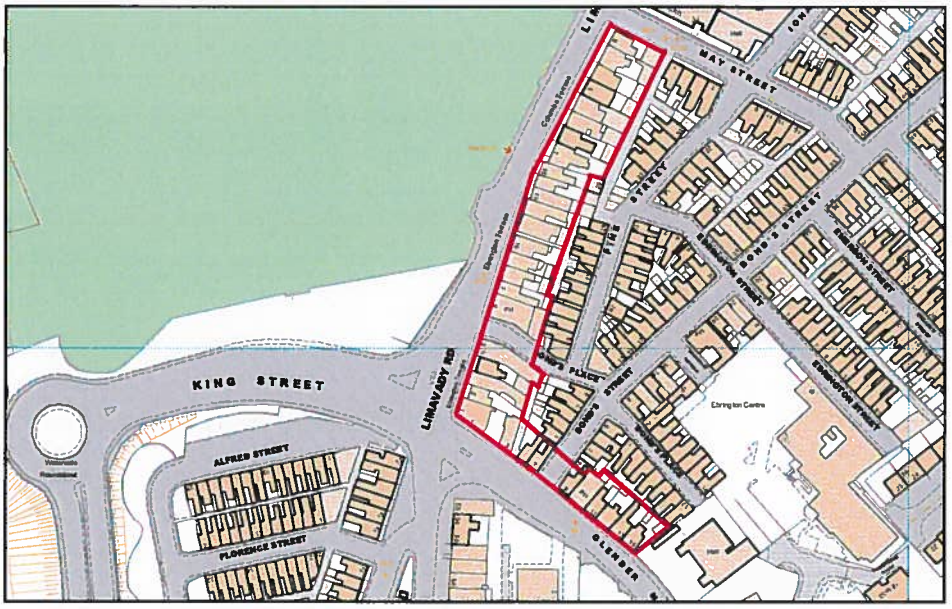

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Figure 1.3 Map of AQMA Boundary - Buncrana Road

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Derry City Council operated three automatic monitoring sites in 2011, the locations are provided in Figure 2.1 and table 2.1 provides further details.

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

AEA Energy and Environment undertake the Quality Assurance/Quality Control (QA/QC) procedures at these 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 Derry City Council 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. All calibration records are sent to AEA who conduct the QA/QC checks.

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

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

Figure 2.1 Map of Automatic Monitoring Sites

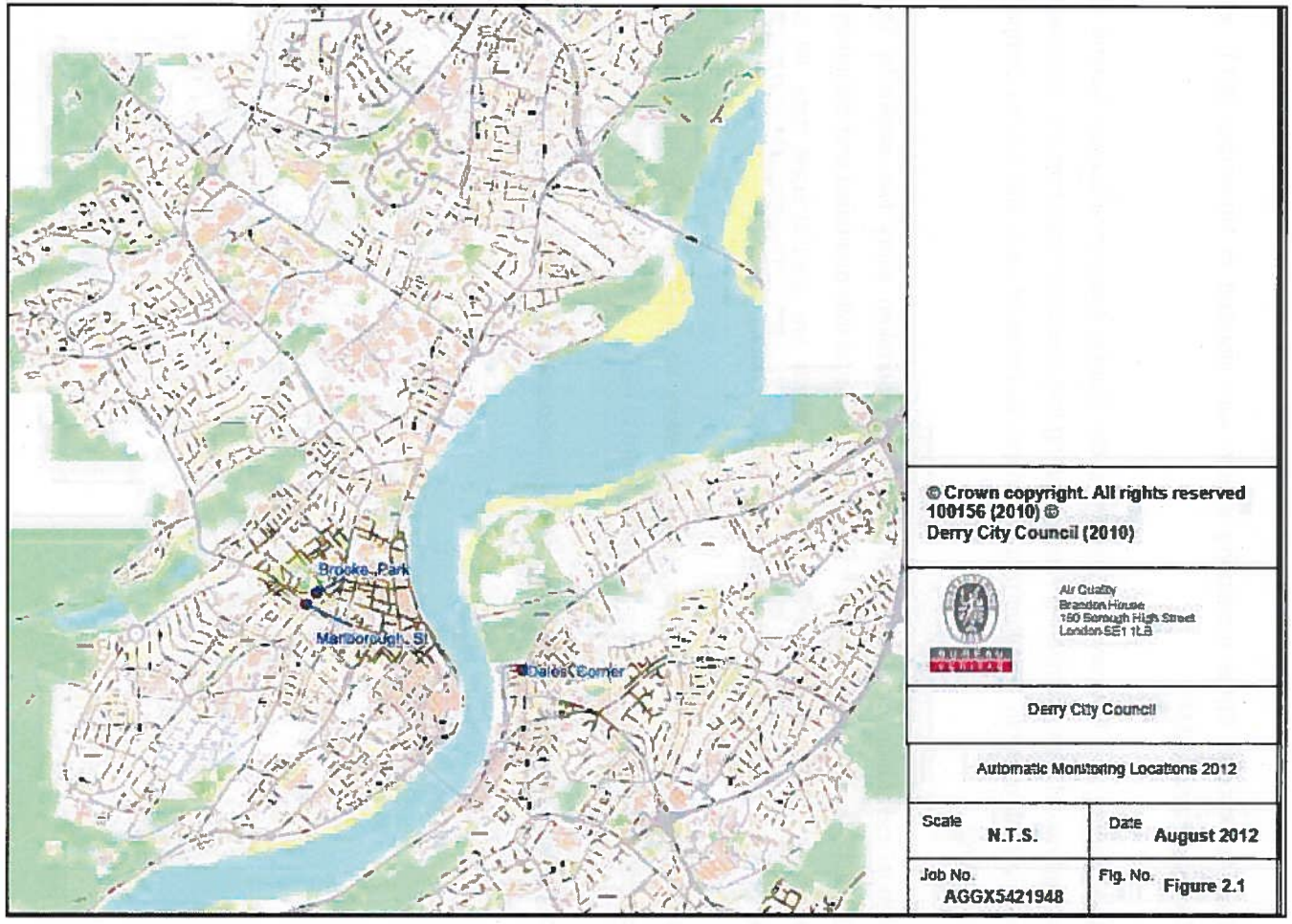


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS GridRef	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
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

In 2011 the Council monitored NO_2 at 43 sites based on passive diffusion tubes. This is an increase from 38 monitored in 2010.

The new monitoring locations are:

- 19 Glendermott Road (duplicate);
- 12 Ebrington Terrace (duplicate);
- 9 Columba Terrace (duplicate);
- 8 Maybrook Terrace (duplicate); and
- 1 Collon Terrace (duplicate).

The following sites were discontinued after March 2011:

- 10 Cheadle Park;
- 1 Clooney Terrace;
- 11 Duddy's Court;
- 3 Francis Street;
- 47 Francis Street; and
- Glendermott Road.

There are 13 duplicate diffusion tubes located within the three AQMAs; 4 within the Creggan Road AQMA, 5 within the Dale's Road AQMA and 4 within the Buncrana Road AQMA.

Diffusion tubes in 2011 were prepared and analysed by Environmental Scientific Groups (ESG). The tube preparation method is 20% TEA in water. ESG 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 112 through to 115 Environmental Scientific Groups have scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Data have 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 of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

There are two sets of triplicate co-located tubes in the Derry City Council area, Brooke Park (AURN) and Dale's Corner. The local bias-adjustment factors are 0.88 and 0.91 respectively, giving an overall factor of 0.90, as an average of the two.

The National Bias factor for this laboratory and preparation method for 2011 is 0.77, based on a single study (June 2012). The 2011 annual mean results with the National Bias adjustment factor are shown in Appendix A.

For previous data, years 2007 to 2010, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used were 0.88 (2007) 1.002 (2008), 0.93 (2009) and 0.99 (2010).

The details of the NO_2 monitoring network are shown in table 2.2 and Figure 2.2 through to Figure 2.5.

Figure 2.2 Map of Non-Automatic Monitoring Sites

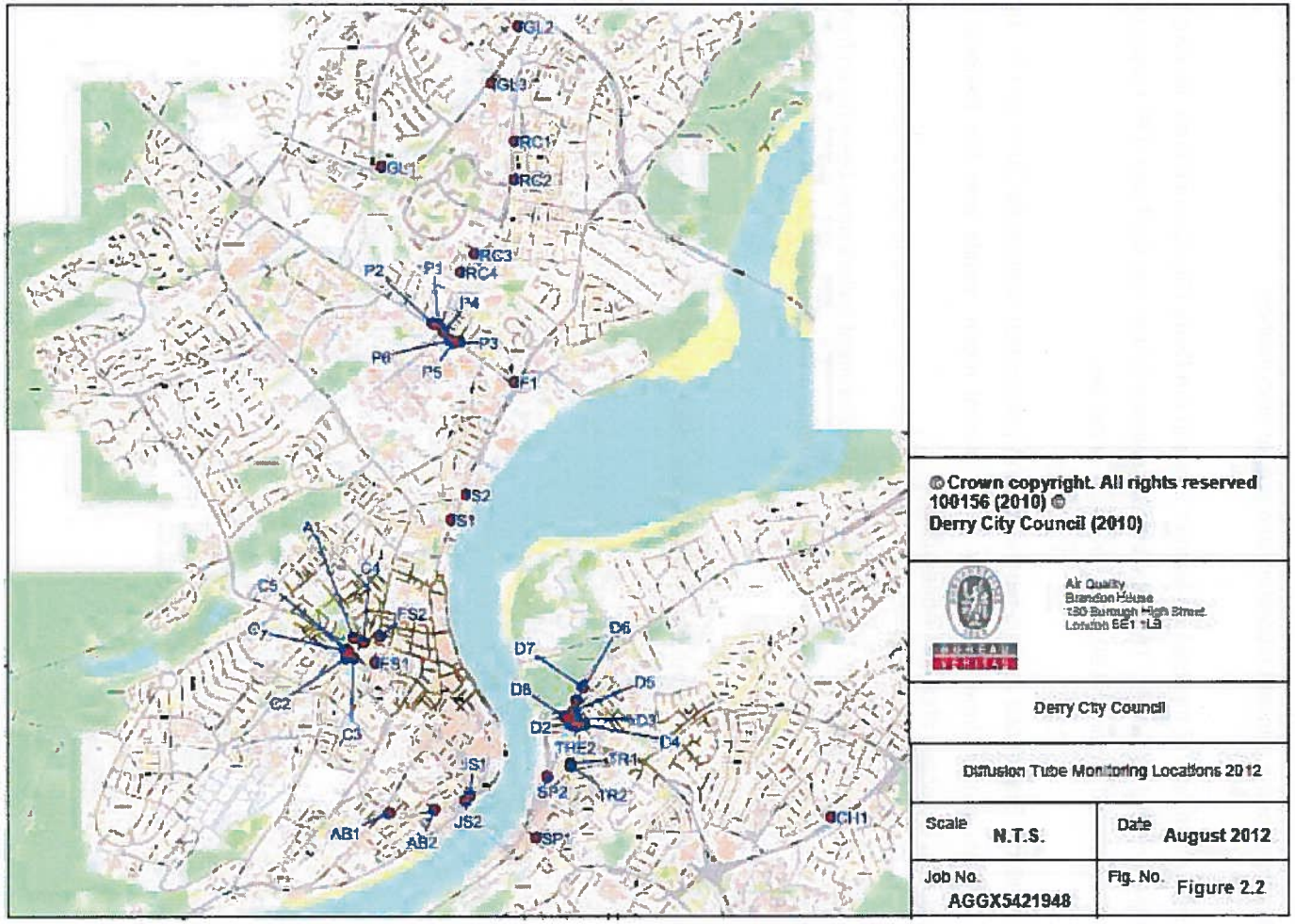


Table 2.2 Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Brooke Park AURN										
A1	Brooke Park AURN	Urban Background	242962	417217	NO_2	N	Y	N	55m	N/A
Cathedral										
C1	3 Creggan Road	Roadside	242913	417144	NO_2	Y	N	Y- 0m	2m	Y
C2	6 Marlborough Terrace	Roadside	242921	417101	NO_2	Y	N	Y- 0m	4.5m	Y
C3	22A Creggan Street	Urban	242959	417102	NO_2	Y	N	Y-0m	5.5m	Y
C4	1 Windsor Terrace	Roadside	243017	417191	NO_2	N	N	Y -0m	3m	Y
C5	14 Creggan Road	Roadside	242928	417148	NO_2	Y	N	Y-0m	4m	Y
Dales Corner										
D1	Monitor	Roadside	244178	416760	NO_2	N	Y	Y-1.5m	3m	Y
D2	52 Clooney Terrace	Urban Centre	244210	416714	NO_2	N	N	Y-0m	6.5m	Y
D3	5 Glendermott Road	Roadside	244238	416753	NO_2	Y	N	Y-0m	2m	Y
D4	Glendermott Road	Kerbside	244283	416718	NO_2	Y	N	Y- 0m	3m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
D5	4 Ebrington Terrace	Roadside	244219	416794	NO_2	Y	N	Y-0m	4m	Y
D6	12 Ebrington Terrace	Roadside	244240	416856	NO_2	Y	N	Y-0m	3m	Y
D7	9 Columba Terrace	Roadside	244277	416931	NO_2	Y	N	Y-0m	6m	Y
D8	17 Melrose Terrace	Roadside	244178	416760	NO_2	N	N	Y-0m	3m	Y
Farren Park										
F1	3 Farren Park	Suburban	243884	418678	NO_2	N	N	Y-0m	15m	Y
Pennyburn										
P1	53 Messines Park	Suburban	243449	419013	NO_2	N	N	Y-0m	14m	Y
P2	57 Messines Park	Suburban	243418	419016	NO_2	N	N	Y-0m	11m	Y
P3	8 Maybrook Terrace	Roadside	243571	418910	NO_2	Y	N	Y-0m	5m	Y
P4	19 St Patricks Terrace	Roadside	243480	418970	NO_2	Y	N	Y-0m	5m	Y
P5	1 Collon Terrace	Roadside	243539	418908	NO_2	Y	N	Y-0m	5m	Y
P6	5 Collon Terrace	Roadside	243519	418921	NO_2	Y	N	Y-0m	5m	Y
Strand Road										
S1	99 Strand Road	Roadside	243522	417894	NO_2	N	N	Y-0m	3m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
S2	Rockmills	Urban Centre	243607	418037	NO_2	N	N	Y-0m	10m	Y
Abercorn Road										
AB1	63 Abercorn Road	Roadside	243166	416211	NO_2	N	N	Y-0m	2m	Y
AB2	8 Abercorn Road	Roadside	243422	416230	NO_2	N	N	Y-0m	2.5m	Y
Cheadle										
CH1	10 Cheadle Park	Suburban	245701	416186	NO_2	N	N	Y-0m	33m	Y
Triangle										
TR1	1 Clooney Terrace	Suburban	244202	416493	NO_2	N	N	Y-0m	10m	Y
TR2	11 Duddy's Court	Suburban	244202	416479	NO_2	N	N	Y-0m	9m	Y
Francis Street										
FS1	3 Francis St	Roadside	243084	417075	NO_2	N	N	Y-0m	2m	Y
FS2	47 Francis St	Roadside	243110	417225	NO_2	N	N	Y-0m	1.5m	Y
Glengalliagh										
GL1	38 Glengalliagh Park	Suburban	243122	419915	NO_2	N	N	Y-0m	21m	Y
GL3	7 Capal Court	Suburban	243912	420720	NO_2	N	N	Y-0m	23m	Y
GL4	49 Bradley Park	Suburban	243756	420392	NO_2	N	N	Y-0m	12m	Y
John Street										
JS1	10 John St	Roadside	243627	416308	NO_2	N	N	Y-0m	2m	Y
JS2	12 John St	Roadside	243602	416279	NO_2	N	N	Y-0m	2m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Racecourse										
RC1	76 Racecourse Road	Suburban	243889	420061	NO_2	N	N	Y-0m	8m	Y
RC2	1 Castleview Park	Suburban	243886	419842	NO_2	N	N	Y-0m	9m	Y
RC3	31 Balmoral Ave	Suburban	243658	419416	NO_2	N	N	Y-0m	10m	Y
RC4	1 Maybrook Park	Suburban	243578	419311	NO_2	N	N	Y-0m	9m	Y
Spencer Road										
SP1	70 Spencer Road	Roadside	244011	416068	NO_2	N	N	Y-0m	2m	Y
SP2	92 Spencer Road	Roadside	244070	416419	NO_2	N	N	Y-0m	2m	Y
The Housing Executive										
THE1	Glendermott Road	Urban Centre	224247	416705	NO_2	N	N	Y-0m	22m	Y
THE2	Glendermott Road	Urban Centre	224238	416708	NO_2	N	N	Y-0m	20m	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

There are two Air Quality Objectives for nitrogen dioxide, namely:

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

Automatic Monitoring Data

The Council monitored NO_2 at three locations during 2011, Brooke Park, Dale's Corner and Marlborough Street (monitored from November onwards). Data capture was excellent at all sites during their operational periods in 2011. As the Marlborough site monitoring station was installed in November, the data has been annualised and the 99.8th percentile of NO_2 hourly means has also been reported. Details of the annualisation undertaken is provided in Appendix A.

The ratified monitoring data can be seen in table 2.3 and 2.4 below.

Results for 2011 indicate that the annual mean objective was exceeded at Marlborough Street, located within the existing Creggan Road AQMA. For the period in which the instrument was installed there were no instances where the hourly mean objective was exceeded, the 99.8th percentile was 181µg/m^3, close to the 200µg/m^3 exceedence level. It should be noted that due to low data capture from this instrument reliable conclusions cannot be drawn for the 2011 period.

There was a single exceedence of the 1-hour mean objective recorded at Dale's Corner; however this is below the Air Quality Strategy Objective as 18 exceedences are permitted. Figure 2.3 shows the trend in NO_2 concentration from 2007 through to 2011 at the Brooke Park and Dale's Corner monitoring sites. This shows that concentrations peaked in 2010, with concentrations in 2011 showing a decrease at both sites.

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

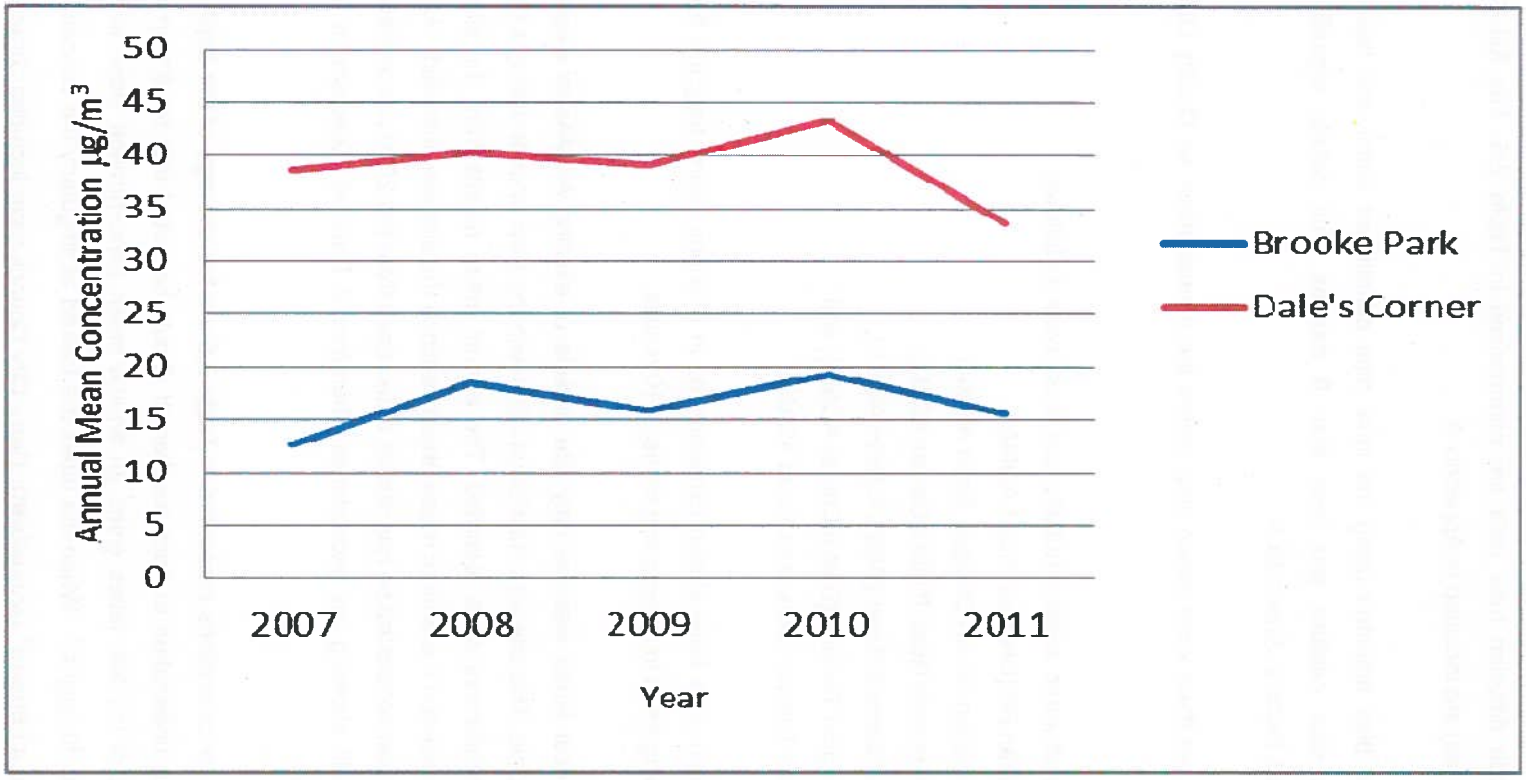
Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Annual Mean Concentration µg/m^3				
					2007	2008	2009	2010	2011
Brooke Park	Urban Background	N	99.3	99.3	12.6	18.5	15.8	19.2	15.6
Dale's Corner	Roadside	N	98.8	98.8	38.5	**40.2**	39.0	**43.2**	33.6
Marlborough Street	Roadside	Y	97.2	10.3	-	-	-	-	**71.3**

Marlborough Street instrument installed from November only, therefore data has been annualised

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

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Number of Exceedences of Hourly Mean (200 µg/m^3)				
					2007	2008	2009	2010	2011
Brooke Park	Urban Background	N	99.3	99.3	0 (63)	0	0 (79.6)	0	0
Dale's Corner	Roadside	N	98.8	98.8	0 (155)	11	0	8 (138)	1
Marlborough Street	Roadside	Y	97.2	10.3	-	-	-	-	0 (181)

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites



The above figure shows the trend in NO_2 concentrations at Brooke Park and Dale's Corner monitoring stations. Marlborough Street has only been operational from November 2011, therefore a trend analysis is not possible for the site. The trends show that for both sites there has been a decrease in concentrations from 2010. Both sites have showed similar yearly trends, with the highest annual mean NO_2 being recorded in 2010.

Diffusion Tube Monitoring Data

The nitrogen dioxide diffusion tube data are summarised in Table 2.5. The full dataset (monthly mean values) are included in Appendix A.

Results have been bias adjusted using the local bias adjustment factor and have been annualised where data capture was less than 9 months. Full details regarding the annualisation can be found in Appendix A.

For the 2011 data set there were seven sites where the annual mean Air Quality Objective was exceeded.

Six sites were located within existing AQMAs and these were as follows;

- C1 - 3 Creggan Rd (Creggan Road AQMA);
- C3 - 22A Creggan Road (Creggan Road AQMA);
- D3 – 5 Glendermott Road (Dale's Corner AQMA);
- D4 – 19 Glendermott Road (Dale's Corner AQMA);
- D5 – 4 Ebrington Terrace (Dale's Corner AQMA); and
- P6 – 5 Collon Terrace (Buncrana Road AQMA).

The majority of these sites have shown exceedences in previous years, they are however showing a decreasing trend in comparison to the 2010 results.

Site SP1, 70 Spencer Road was the only site outside of existing AQMAs to exceed the annual mean objective. This site was installed in 2009 with the view to undertaking a detailed assessment if exceedences were recorded. The annual mean results from the site have been close to or exceeded the annual mean objective since the site was installed. Although the 2011 annual mean concentration has shown a decrease from the 2010 concentration the annual mean is still showing an exceedence; therefore a Detailed Assessment will be required in this area.

The annual mean concentrations presented in Table 2.5 are the average of the duplicate or triplicate monitoring undertaken at each location. It should be noted that for S1 on Strand Road the average of the two tubes gives an annual mean concentration close to the air quality objective, at 39.5μg/m^3. When the tubes are looked at singularly the concentrations are 37.3μg/m^3 and 41.6μg/m^3 (annualised). Derry City Council have included Strand Road in current Detailed Assessment investigations.

With respect to the hourly NO_2 objective, there could be a potential risk of exceedence where the annual mean concentration is greater than 60µg/m^3. From the 2011 results site C1, 3 Creggan Road is the only site which recorded a concentration above 60µg/m^3 and so the short term objective could potentially be exceeded in this area. Derry City Council have installed a continuous monitoring site, Marlborough Street in November 2011. The site is adjacent to 3 Creggan Road diffusion tube monitoring site. The station monitors hourly mean with the 99.8th percentile for 2011 being 181µg/m^3, close to the 200µg/m^3 exceedence level, note due to limited data capture from this site in 2011 reliable conclusions cannot be drawn at this time. The data will be reviewed in the 2013 Progress Report following a full year of data capture from 2012 being available.

Derry City Council note the low concentrations reported for Sites THE1 and THE2. The Council indicates that these are a true record of the results of the two months of monitoring for these locations

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2011

Site ID	Site Type	In AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.90) 2011 (µg/m^3)
Brooke Park AURN							
A1	Urban Background	N	Y (triplicate)	11	N	N	15.6
Cathedral							
C1	Roadside	Y	N	9	N	N	**68.1**
C2	Roadside	Y	N	9	N	N	34.8
C3	Suburban	Y	N	9	N	N	**41.5**
C4	Roadside	N	N	8	Y	N	26.4
C5	Roadside	Y	N	9	N	N	39.8
Dales Corner							
D1	Roadside	N	Y (triplicate)	12	N	N	33.5
D2	Urban Centre	N	N	7	Y	N	28.0
D3	Roadside	Y	N	9	N	N	**44.0**
D4	Roadside	Y	N	9	N	N	**50.4**
D5	Roadside	Y	N	10	N	N	**46.6**

Site ID	Site Type	In AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.90) 2011 (µg/m^3)
D6	Roadside	Y	N	9	N	N	37.6
D7	Roadside	Y	N	9	N	N	31.8
D8	Roadside	N	N	8	Y	N	32.0
Farren Park							
F1	Suburban	N	N	3	Y	N	23.7
Pennyburn							
P1	Suburban	N	N	9	N	N	21.8
P2	Suburban	N	N	9	N	N	25.8
P3	Roadside	Y	N	9	N	N	25.2
P4	Roadside	Y	N	9	N	N	32.4
P5	Roadside	Y	N	9	N	N	37.4
P6	Roadside	Y	N	9	N	N	**45.7**
Strand Road							
S1	Roadside	N	N	8	Y	N	39.5
S2	Urban Centre	N	N	9	N	N	33.2
Abercorn Road							
AB1	Roadside	N	N	6	Y	N	39.2
AB2	Roadside	N	N	3	Y	N	24.3
Cheadle							
CH1	Suburban	N	N	3	Y	N	13.9
Triangle							
TR1	Suburban	N	N	3	Y	N	18.8
TR2	Suburban	N	N	3	Y	N	18.6
Francis Street							
FS1	Roadside	N	N	3	Y	N	26.2
FS2	Roadside	N	N	3	Y	N	29.4
Glengalliagh							
GL1	Suburban	N	N	11	N	N	20.9
GL3	Suburban	N	N	12	N	N	17.8
GL4	Suburban	N	N	12	N	N	18.2
John Street							
JS1	Roadside	N	N	12	N	N	35.9
JS2	Roadside	N	N	10	N	N	36.3

Site ID	Site Type	In AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.90) 2011 (µg/m^3)
Racecourse							
RC1	Suburban	N	N	12	N	N	18.0
RC2	Suburban	N	N	2	Y	N	18.1
RC3	Suburban	N	N	12	N	N	19.4
RC4	Suburban	N	N	12	N	N	25.0
Spencer Road							
SP1	Roadside	N	N	11	N	N	**42.3**
SP2	Roadside	N	N	3	Y	N	26.8
The Housing Executive							
THE1	Urban Centre	N	N	2	Y	N	0.5
THE2	Urban Centre	N	N	2	Y	N	0.9

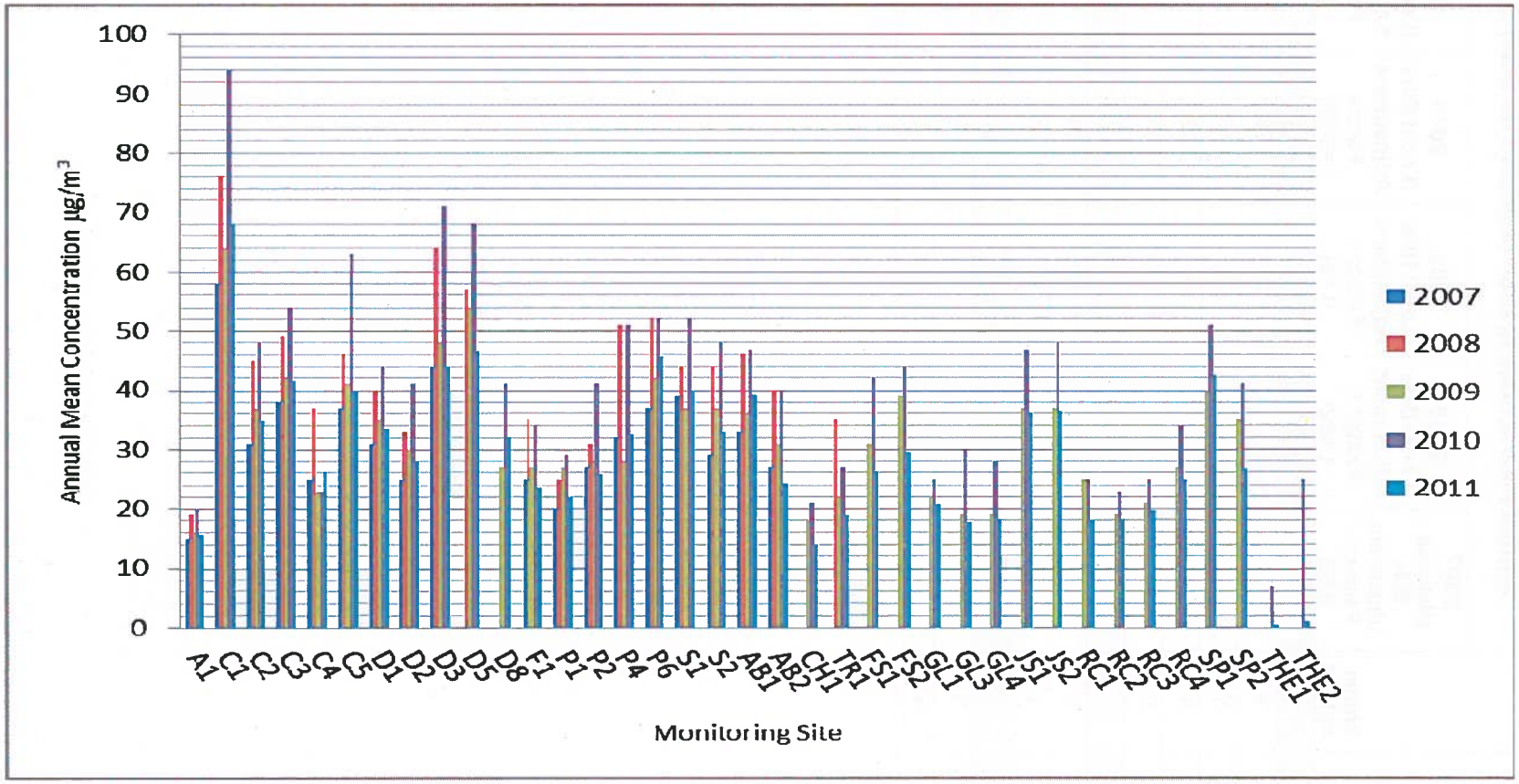
Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2007 (National Bias Adjustment Factor = 0.88)	2008 (Local Bias Adjustment Factor = 1.002)	2009 (Local Bias Adjustment Factor = 0.93)	2010 (Local Bias Adjustment Factor =0.99)	2011 (Local Bias Adjustment Factor = 0.90)
Brooke Park AURN							
A1	Urban Background	N	15	19	16	20	15.6
Cathedral							
C1	Roadside	Y	**58**	**76**	**64**	**94**	**68.1**
C2	Roadside	Y	31	**45**	37	**48**	34.8
C3	Suburban	Y	38	**49**	**42**	**54**	**41.5**
C4	Roadside	N	25	37	23	23	26.4
C5	Roadside	Y	37	**46**	**41**	**63**	39.8
Dales Corner							
D1	Roadside	N	31	**40**	35	**44**	33.5
D2	Urban Centre	N	25	33	30	**41**	28.0
D3	Roadside	Y	**44**	**64**	**48**	**71**	**44.0**
D4	Roadside	Y	-	-	-	-	**50.4**

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2007 (National Bias Adjustment Factor = 0.88)	2008 (Local Bias Adjustment Factor = 1.002)	2009 (Local Bias Adjustment Factor = 0.93)	2010 (Local Bias Adjustment Factor =0.99)	2011 (Local Bias Adjustment Factor = 0.90)
D5	Roadside	Y	-	**57**	**54**	**68**	**46.6**
D6	Roadside	Y	-	-	-	-	37.6
D7	Roadside	Y	-	-	-	-	31.8
D8	Roadside	N	-	-	27	**41**	32.0
Farren Park							
F1	Suburban	N	25	35	27	34	23.7
Pennyburn							
P1	Suburban	N	20	25	27	29	21.8
P2	Suburban	N	27	31	28	**41**	25.8
P3	Roadside	Y	-	-	-	-	25.2
P4	Roadside	Y	32	**51**	28	**51**	32.4
P5	Roadside	Y	-	-	-	-	37.4
P6	Roadside	Y	37	**52**	**42**	**52**	**45.7**
Strand Road							
S1	Roadside	N	39	**44**	37	**52**	39.5
S2	Urban Centre	N	29	**44**	37	**48**	33.2
Abercorn Road							
AB1	Roadside	N	33	**46**	36	**47**	39.2
AB2	Roadside	N	27	**40**	31	**40**	24.3
Cheadle							
CH1	Suburban	N	-	-	18	21	13.9
Triangle							
TR1	Suburban	N	-	35	22	27	18.8
TR2	Suburban	N	-	-	-	-	18.6
Francis Street							
FS1	Roadside	N	-	-	31	**42**	26.2
FS2	Roadside	N	-	-	39	**44**	29.4
Glengalliagh							
GL1	Suburban	N	-	-	22	25	20.9
GL3	Suburban	N	-	-	19	30	17.8
GL4	Suburban	N	-	-	19	28	18.2
John Street							
JS1	Roadside	N	-	-	37	**47**	35.9
JS2	Roadside	N	-	-	37	**48**	36.3

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2007 (National Bias Adjustment Factor = 0.88)	2008 (Local Bias Adjustment Factor = 1.002)	2009 (Local Bias Adjustment Factor = 0.93)	2010 (Local Bias Adjustment Factor =0.99)	2011 (Local Bias Adjustment Factor = 0.90)
Racecourse							
RC1	Suburban	N	-	-	25	25	18.0
RC2	Suburban	N	-	-	19	23	18.1
RC3	Suburban	N	-	-	21	25	19.4
RC4	Suburban	N	-	-	27	34	25.0
Spencer Road							
SP1	Roadside	N	-	-	**40**	**51**	**42.3**
SP2	Roadside	N	-	-	35	**41**	26.8
The Housing Executive							
THE1	Urban Centre	N	-	-	-	7	0.5
THE2	Urban Centre	N	-	-	-	25	0.9

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites



The above figure shows the trend in annual NO_2 concentration from 2007 through to 2011. From this it can be seen there was a peak in NO_2 concentrations in 2010. From this peak concentrations have fallen in 2011.

2.2.2 PM_{10}

There are two Air Quality Objectives for PM_{10}, namely:

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

The Council undertook monitoring of PM_{10} based on an FDMS analyser at Brooke Park AURN site during 2011. Data capture at the site was good at 93%.

The 2011 results show that the annual mean and the 24-hour mean continue to be met at the Brooke Park monitoring station. The 2011 pollutant levels show a decrease from the 2010 concentrations.

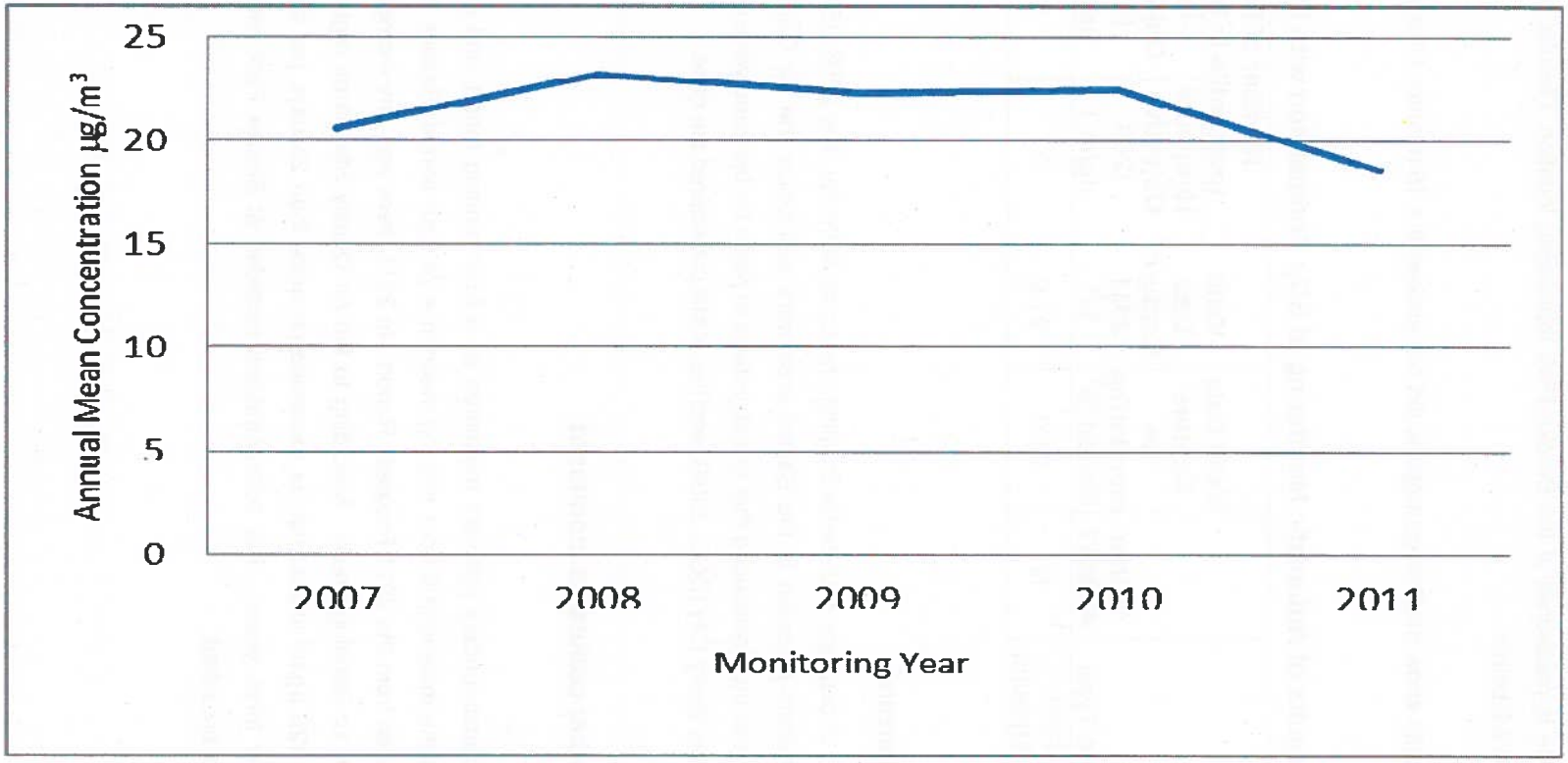
Table 2.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration µg/m^3				
						2007	2008	2009	2010	2011
Brooke Park	Urban Background	N	93.0	93.0	Y	20.6	23.2	22.3	22.5	18.6

Table 2.8 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 2011 %	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 µg/m^3)				
						2007	2008	2009	2010	2011
Brooke Park	Urban Background	N	93.0	93.0	Y	6	13(36.7)	10 (39.0)	21 (39.7)	6

Figure 2.5 Trends in Annual Mean PM_{10} Concentrations



The above figure shows the annual mean PM_{10} trend observed at the Brooke Park AURN monitoring site. The trend shows that concentrations increased from 2007 to a peak in 2008. Following this concentrations remained relatively stable between 2009 and 2010. The 2011 annual mean PM_{10} concentration has decreased resulting in the lowest concentration over the five year monitoring period.

2.2.3 Sulphur Dioxide

Sulphur dioxide is measured at the Brooke Park monitoring location. Results for 2011 are shown in table 2.9 below.

The 2011 results show that concentrations did not exceed the 15 minute, 1-hour or 24-hour objectives.

Table 2.9 Results of Automatic Monitoring of SO_2: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Number of Exceedences (percentile in bracket µg/m^3)[c]		
					15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
Brooke Park	Urban Background	N	91.9	91.9	0	0	0

2.2.4 Benzene

No monitoring of benzene is undertaken within the Local Authority. The 2006 USA concluded that concentrations recorded in the Belfast area were well below the Air Quality Strategy Standards. It was thus concluded that the objectives in place for benzene were unlikely to be exceeded within Derry City (DCC, 2006), and this is still considered the case.

2.2.5 Other pollutants monitored

Ozone

Ozone is a transboundary pollutant measured as 8-hour running mean, and exceedences calculated on the maximum 8-hour running mean in a 24 hour period. Results for 2009 and 2010 were taken from the 2011 Progress Report. In 2011 there was one exceedence of the Maximum 8 hour Running mean. According to the Air Quality Standards regulations 2010 the target of 120 µg/m^3 should not be exceeded on more than 25 days per calendar year averaged over three years. The concentrations recorded at Brooke Park reveal that this target was not breached.

Table 2.10 Results of Automatic Monitoring of Ozone: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Number of Exceedences of Maximum 8-hour Running Mean (120µg/m^3)		
					2009	2010	2011
Brooke Park	Urban Background	N	97.7	97.7	4	0	1

$PM_{2.5}$

PM 2.5 is monitored at the Brooke Park monitoring location. The target for $PM_{2.5}$ is 25µg/m^3 by 2020. Data capture at the site was too low to determine if the target would be achieved. The results have not been annualised due to the lack of available background monitoring sites for $PM_{2.5}$.

Table 2.11 Results of $PM_{2.5}$ Automatic Monitoring: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Annual Mean Concentration (µg/m^3)		
					Volatile	Non-volatile	Total
Brooke Park	Urban Background	N	55.1	55.1	2.9	11.3	14.2

Volatile and Non-volatile PM_{10}

There is no statutory requirement to report the fraction distribution of particulates. However, the FDMS at Brooke Park AURN measures both fractions, shown in Table 2.12 below. The result for 2011 show PM_{10} is largely comprised of non-volatile particulates.

Table 2.12 Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Annual Mean Concentration (µg/m^3)		
					Volatile	Non-volatile	Total
Brooke Park	Urban Background	N	93	93	3.6	15.0	18.6

Polycyclic Aromatic Hydrocarbons

Defra owns and runs a Polycyclinc Aromatic Hydrocarbon (PAH) monitor at the Brandywell monitoring location. The below provides a link to the 2012 report which provides further details and results.

http://www.airqualityni.co.uk/documents/504120308_pah_in_ni_report_final_published_version_v2.pdf

Summary of Compliance with AQS Objectives

Monitoring of NO_2 using passive diffusion tubes has shown that for 2011 there were seven sites where the annual mean Air Quality Objective was exceeded. Of the seven sites, six were located within the existing AQMAs. Site SP1, 70 Spencer Road was the only site outside of the existing AQMAs to exceed the objective. There is relevant exposure at this site and has in the past been identified as a narrow congested street, therefore a detailed assessment is required in this area.

Site C1, 3 Creggan Road, located within the Creggan Road AQMA had an annual mean concentration above 60µg/m^3, which suggests there may be a risk of exceeding the hourly NO_2 objective at this location.

Automatic monitoring at Marlborough Street has been operational for 10% of 2011; therefore the data has been annualised. The annualised results suggest that the NO_2 annual mean would be exceeded at the site and the 99.8th percentile showed to be close to the hourly limit. The site is located within the existing Creggan Road AQMA. Due to the low data capture reliable conclusions cannot be drawn from this site for the 2011 monitoring period.

Monitoring of PM_{10}, SO_2 and other pollutants monitored at Brooke Park have shown no exceedences of the Air Quality Strategy standards, and further assessment is subsequently not required for these pollutants.

Derry City Council has measured concentrations of NO_2 above the annual mean objective at relevant locations outside of the existing AQMAs, and **will need to proceed to a Detailed Assessment**, for the Spencer Road area.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

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

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

Derry City Council confirms that there have been no newly identified narrow streets with a vehicle flow of greater than 5,000 vehicles per day.

Previously identified narrow congested streets, where an AQMA has not since been declared are the following:

John Street

Diffusion tube results show that from 2009 when monitoring commenced, the Air Quality Objective was exceeded in 2010 only, with concentrations falling back to 2009 levels in 2011. It is recommended that monitoring continue at these locations to determine if a Detailed Assessment is required.

Spencer Road

Diffusion tube monitoring commenced in 2009. The results of which have shown that the Air Quality Objective was exceeded in 2010 at both locations and at one of the monitoring locations in 2011. It is recommended that a Detailed Assessment be undertaken in the area.

Francis Street

Following the 2009 USA, two monitoring locations were installed on Francis Street. Monitoring results have shown that in 2010 the Air Quality Objective was exceeded at both locations. Monitoring was undertaken only for the first 3 months of 2011, therefore the results have been annualised. The annualised results indicate the annual mean would not have been exceeded. The initial three months, monitored in the winter months when NO_2 concentrations are generally higher, did record concentrations above the annual mean limit

of 40µg/m^3. It is recommended that monitoring is re-instated at this location to determine if a Detailed Assessment is required for this area.

Infirmary Road

The diffusion tube result from 1 Windsor Terrace, located outside of the Creggan Road AQMA has shown that since 2008 the concentrations have been lower than the Air Quality Objective. Therefore no further assessment is required in this area.

Derry City Council has identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, new or not adequately considered in previous rounds of Review and Assessment, and **will need to proceed to a Detailed Assessment for Spencer Road.**

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

There will be some street locations where individuals may regularly spend 1-hour or more close to busy traffic. For example, streets with many shops and streets with outdoor cafes and bars. The assessment considers areas not assessed adequately in previous rounds of review and assessment for the nitrogen dioxide objectives.

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

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

Traffic data assessed for the Updating and Screening Assessment show no roads with high flows of buses and heavy goods vehicles >20%.

Derry City Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

The Technical Guidance TG(09) states that if a junction requires assessment the following criteria will be met.

- 'Busy' Junctions are those with more than 10,000 vehicles per day.
- Relevant exposure within 10 m of the kerb

Derry City Council has not identified any new junctions that have not been adequately considered in previous rounds.

Derry City Council confirms that there are no new/newly identified busy junctions/busy roads.

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

There are two major road schemes proposed that fall in part into Derry City Council district.

A5 Western Transport Corridor

This highways improvement scheme is one of five key transport corridors which are being proposed as part of the Regional Transportation Strategy which has the aim to develop a Regional Strategic Transport Network. The proposed scheme would involve the construction of 85km of predominantly dual carriageway between New Buildings and the border with the Republic of Ireland, south of Aughnacloy.

As part of the planning process, an Air Quality Assessment has been undertaken, assessing the impact at relevant public exposure receptors using ADMS Roads modeling software. The assessment has found that more people would benefit from the improvements in terms of local air quality than the numbers that would experience increases in emissions due to the diversion of traffic from the existing A5 onto the proposed scheme. The assessment showed that there would be no receptors where the annual mean or hourly mean limit value for NO_2 would be exceeded.

With regards to PM_{10}, the assessment modeled the Do Minimum and Do Something for the year 2015. The assessment found that there would be no locations where the annual mean objective would be exceeded.

The assessment also showed that there a number of locations where there is a chance that the 24-hour mean would be exceeded; one such location was in the Derry City Council area on the existing A5 south of Craigavon Bridge. The modelling indicated that the proposed scheme will lead to a large to very large adverse impact at the receptor location. The assessment also states that where there would be an adverse effect from the scheme, it is in an area where the 24hour mean would be in exceedence of the objective even without the scheme. The modelled impact of the development on other locations exceeding the objective would be beneficial with the majority of concentrations reducing, removing a number of receptors from areas of exceedence.

Through the model verification process it was found that the model was under predicting PM_{10} concentrations against the monitored concentrations. This is a result of the background values used in the modelling process and the emission factors available at the time of modelling, which typically lead to underestimation of particulate emissions. As such, a high adjustment factor was required to be applied, this results in greater uncertainty in the modelled predictions.

A DMRB screening assessment has been undertaken for the location identified in the air quality assessment for the year 2011 to assess if there is currently an issue with regards the PM_{10} Objectives. The result of the assessment indicated that there is likely to be no exceedence of either the annual mean or the 24-hour mean objective. The model has been run with the both the background maps and with the background monitored result from the Brooke Park AURN monitoring location. The highest annual mean was 20.0µg/m^3 with 3 occasions where the 24-hour mean would be exceeded.

A6 Londerry to Dungiven Dualling

The A6 scheme will provide a 30km dual carriageway between Londonderry and Dungiven, including a dual carriageway bypass of Dungiven; it is part of the investment program on the strategic road network. The Environmental Statement produced assessed the impact of the proposed scheme using the DMRB screening methodology. The assessment predicted that there would be no significant effect on either local or regional air quality as a result of the proposed scheme. Local air quality pollutant concentrations would remain within the relevant AQS Objectives, with the significance of the effect of the scheme being 'negligible'.

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

3.6 Roads with Significantly Changed Traffic Flows

Roads with significantly changed traffic flow (since the last round of review and assessment) should take into account the following:

- Daily traffic flow is 10,000 vehicles per day or more
- The increase in traffic flow is 25% or more

Derry City Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The assessment considers both nitrogen dioxide and PM_{10} emissions at bus stations that are not enclosed with >2500 movements per day.

There is a bus station close to Derry City centre. The number of bus movements at Derry bus station remains less than 2,500 per day.

Derry City Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

The assessment covers nitrogen dioxide emissions a result from the aircraft as a source. A Detailed Assessment is required where the total equivalent passenger throughput is more than 10 million passengers per annum and where the background NO_x concentration is above 25µg/m^3.

In 2011 Derry City Airport handled 405,000 passengers on scheduled and chartered flights, with no freight only planes.

The total equivalent passenger throughput at Derry City Airport is well below the assessment criteria of 10 million passengers per annum.

Derry City Council confirms that there are no airports in the Local Authority area which satisfy the specified criteria.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

It is not anticipated that any diesel or steam locomotives will regularly be stationary within the authority boundaries for periods of 15 minutes or more.

There is no potential for regular outdoor exposure of members of the public within 15m of the stationary locomotives.

It is unlikely that there will be three or more occasions a day when a locomotive may be stationary with its engine running for 15 minutes or more.

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

4.2.2 Moving Trains

Rail lines with a heavy traffic of diesel passenger trains are listed in in the Technical Guidance TG (09). The railway line running through Derry is not recognised on this list.

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

4.3 Ports (Shipping)

The assessment for shipping considers SO_2 emissions at busy ports with between 5,000 and 15,000 movements per year and relevant exposure within 250 meters.

Foyle Port at Lisahally lies within the boundaries of Derry City Council. In the 2009 USA considered it highly unlikely that ship movements would reach numbers making a Detailed Assessment necessary. The situation remains unchanged.

Derry City Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

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

No new/proposed industrial installations have been identified within the Local Authority since the last round of Review and Assessment.

Derry City Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

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

No existing installations where emissions have increased substantially or new relevant exposure has been introduced have been identified within Derry City Council.

Derry City Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

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

There is one new Part C (NI) processes that has been permitted in Derry City Council.

A dry cleaner called Clean 'N' Press, located at 8b Main Street, Eglinton, has been issued a permit (PPC/11/C/0048) under Regulation 10 of the Pollution Prevention and Control (NI) Regulations 2003. The permit sets out guidelines for the operation of the installations. There are a number of receptors in close proximity to the site.

The installation is located in Eglinton, over 6.5km from Derry City and therefore is unlikely to impact air quality in Derry City. Due to the size and nature of the operation the installation is considered unlikely to cause a breach of any of the air quality objectives.

Derry City Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.2 Major Fuel (Petrol) Storage Depots

This assessment considers Benzene, with respect to the 2010 objective.

There are two major fuel storage depots in Derry City Council, The LCC Oil Storage and Distribution Terminal in Maydown and a depot operated by Shell UK Ltd. Both depots were assessed in previous reports and no further assessment was deemed necessary.

There are major fuel (petrol) storage depots within the Local Authority area, but these have been considered in previous reports.

5.3 Petrol Stations

The specified criteria for petrol stations requiring assessment as stated in the Technical Guidance TG (09) is a petrol station with the following:

- Annual throughput of more than 2,000m^3 of petrol per annum
- A busy road nearby, with more than 30,000 vehicles per day

Derry City Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

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

- Farms housing in excess of:
  - 400,000 birds if mechanically ventilated

- 200,000 birds if naturally ventilated
- 100,000 birds for any turnkey unit

- Relevant exposure within 100m of the poultry units.

Derry City Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

There is one Biomass Combustion installation in Derry City Council which meets the criteria specified in TG(09).

The proposed development is the Evermore Renewable Energy thermal biomass CHP plant in Maydown, Derry. As part of the planning application an Air Quality Assessment has been undertaken. Emissions from the proposed stacks have been predicted using the AERMOD atmospheric dispersion modelling tool. The model predictions for NO_2 show that the maximum short term and annual mean ambient ground level concentrations are below the Air Quality Objective. The PM_{10} modelling results indicate that the short term and annual mean ambient ground level concentrations are well below the relevant Air Quality Objective.

Although the there are no predicted exceedences of the Air quality Objectives, when the NO_2 annual mean is considered, the impact of this development together with the existing Collkeeragh and Invista operations in the area is predicted to have a moderate adverse impact.

Derry City Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

Derry City Council confirms that the biomass combustion plant in the Local Authority area has been considered above.

6.3 Domestic Solid-Fuel Burning

The assessment considers sulphur dioxide emissions (only) from significant areas of residential properties that use solid fuel to heat their houses. 'Significant' areas are those of about 500m x 500m with more than 50 houses burning coal/smokeless fuel as their primary source of heating.

Derry City Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

There are several installations within the Derry City Council area where there is the potential for fugitive emissions to arise.

Glasdon Wastes, Campsie Industrial Estate, BT47 3PF

The installation is a waste transfer site handling non-hazardous dry recyclable municipal waste, including paper, cardboard, plastic bottles and metal cans. Receptors have been identified within 70m of the installation.

City Industrial Waste Limited, 70 Mobuoy Road, Campsie, BT47 3JQ

The installation is a waste treatment and transfer materials recycling centre for non-hazardous material. The nearest identified receptors are 400m from the installation.

Brickkiln Waste Limited, Electra Road, Maydown, BT47 6UL

The installation is a non-hazardous treatment and transfer materials recycling facility, including sorting, shredding, baling and storage. The site is also a hazardous treatment and transfer facility for end of life vehicles. Identified receptors are over 1,000m from the installation.

Derry City Council confirms that there have been no instances of dust complaints arising for any of the above installations.

Derry City Council will consider emissions data for these installations in future LAQM reporting, if evidence of potentially significant dust emissions is found, in order to thoroughly investigate the risk of any potential exceedences of the air quality objectives at the above locations.

Derry City Council confirms that there are no potential sources of fugitive particulate matter emissions which require further assessment at the current time in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Monitoring of NO_2 using passive diffusion tubes has shown that for 2011 there were seven sites where the annual mean Air Quality Objective was exceeded. Of the seven sites, six were located within the existing AQMAs. Site SP1, 70 Spencer Road was the only site outside of the existing AQMAs to exceed the objective, although the annual mean concentration has reduced significantly from the 2010 results.

Site C1, 3 Creggan Road, located within the Creggan Road AQMA had an annual mean concentration above 60µg/m^3, which suggests there may be a risk of exceeding the hourly NO_2 objective at this location.

The annualised automatic NO_2 results from the Marlborough Street monitoring site, located within the existing Creggan Road AQMA, suggests that the NO_2 annual mean would be exceeded at the site and the 99.8th percentile showed to be close to the hourly limit. However due to limited data capture at this site reliable conclusions cannot be drawn. A further review of the data will be undertaken in the 2013 Progress Report.

Monitoring of PM_{10}, SO_2 and other pollutants monitored at Brooke Park has shown no exceedences of the Air Quality Strategy standards, and further assessment is subsequently not required for these pollutants.

8.2 Conclusions from Assessment of Sources

8.2.1 Road Transport Sources

A further review of previously identified narrow congested streets was undertaken. The review looked at monitoring results from 2009 at the identified narrow streets, where an AQMA has not been declared. The majority of sites showed exceedences in 2010 with concentrations falling in 2011. Therefore monitoring should be continued at John Street and Francis Street to determine if exceedences of the NO_2 annual mean objective occur year on year of if the 2011 concentrations were high. With regards to Infirmary Road, concentrations have been consistently lower than the AQS Objective.

Annual mean NO_2 concentrations at Spencer Road have shown to have been exceeded in both 2010 and 2011; therefore a detailed assessment is required for Spencer Road.

There are two major road schemes proposed that fall in part into Derry City Council district; The A5 Western Transport Corridor and the A6 Londerry to Dungiven Dualling. Both schemes have completed air quality assessments as part of the planning process. With regards to the A6 scheme, the assessment concluded that the impact of the scheme upon air quality would be negligible, with concentrations of PM_{10} and NO_2 remaining well within the AQS Objectives at all locations.

For the A5 scheme the assessment found for NO_2 that concentrations would remain within the AQS Objectives at all receptor locations. With regards to PM_{10} the assessment identified several locations where the 24-hour mean may be exceeded. One location was within the Derry City Council area, south of Craigavon Bridge on the existing A5. The report stated that the 24-hour mean would be exceeded even if the proposed scheme did not proceed, however the scheme would have a large to very large adverse impact. A DMRB screening assessment was undertaken at this location. This found that there were unlikely to be exceedences of the annual mean or 24-hour mean objectives based on 2011 model inputs.

8.2.2 Industrial Sources

There is one new Part C (NI) process that has been permitted in Derry City Council; a dry cleaners. The process is covered under a Pollution Prevention and Control (NI) Regulations permit. The installation is not considered likely to have a significant impact upon air quality, with no requirement for a detailed assessment.

8.2.3 Commercial and Domestic Sources

There is a proposed Biomass installation, the Evermore Renewable Energy thermal biomass CHP plant in Maydown. The air quality assessment undertaken as part of the application has indicated that ground level concentrations for both NO_2 and PM_{10}, will be below the Air Quality Objectives for both the short term and annual mean, therefore there is no requirement for a detailed assessment.

8.2.4 Fugitive Emissions

Three waste transfer stations have been assessed for their potential impact upon particulate emissions; these are Glasdon Wastes, Campsie Industrial Estate, City Industrial Waste Limited, Campsie and Brickkiln Waste Limited, Maydown. There have been no instances of dust complaints from any of the above installations; therefore there is no need for a detailed assessment at any of the installations.

8.3 Proposed Actions

Proposed actions arising from the USA are as follows:

- Continue diffusion tube and continous monitoring in the district to identify future changes in pollutant concentrations;
- Proceed to a Detailed Assessment for the Spencer Road area;
- Re-instate the diffusion tube monitoring locations in Francis Street to determine if there is a potential for an exceedence of the NO_2 Air Quality Objectives;
- Proceed to a Progress Report in 2013.

9 References

- Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- Derry City Council 2009 Updating and Screening Assessment
- Derry City Council 2011 Local Air Quality Management Annual Progress Report
- Evermore Renewable Energy Proposed 16MW Biomass CHP Plant IPPC Application - Air Quality Assessment, WYG Environmental and Planning (Ireland) Limited, July 2012
- A6 Londerry to Dungiven Dualling, Section 1: Londerry to Claudy Environmental Statement, Non-Technical Summary, URS, Scott Wilson Dec 2011
- A5 Western Transport Corridor, Environmental Statement Addendum, Mouchel, March 2011

Appendices

Appendix A: QA/QC Data

Appendix B: DMRB Screening

Appendix A: QA:QC Data

Factor from Local Co-location Studies

Triplicate co-located studies are undertaken at the Dale's Corner and Brooke Park continuous analyser monitoring sites. Dale's Corner is a Roadside monitoring site while Brooke Park is classified as a background site.

Location	Diffusion Tube Data capture	Diffusion Tube Annual Mean ($\mu g/m^3$)	Continuous Monitor Annual Mean ($\mu g/m^3$)	Ratio
Brooke Park AURN	92%	17	15	0.88*
Dale's Corner	100%	37	34	0.91
			Average	0.90

*Without periods of CV greater than 20%

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Environmental Scientifics Groups (ESG) utilising the 20% Triethanolamine (TEA) in water preparation method. The bias adjustment factor for 2011 is 0.77 (based on 1 study, version 06_12) as derived from the national bias adjustment spreadsheet.

Discussion of Choice of Factor to Use

An average of the two local bias adjustment factors has been used. Data capture at both locations was good for 2011. The resulted presented in the main report will give a more conservative result. For reference the 2011 results are presented below when corrected using the National Bias factor.

	2011 Annual mean concentration (adjusted for bias) $\mu g/m^3$	
Site Ref	**Local Bias Adjustment Factor (0.90)**	**National Bias Adjustment Factor (0.77)**
A1	15.6	13.3
C1	**68.1**	**58.3**
C2	34.8	29.7
C3	**41.5**	35.5
C4	26.4	22.6
C5	39.8	34.0
D1	33.5	28.6
D2	28.0	24.0
D3	**44.0**	37.7
D4	**50.4**	**43.1**

D5	**46.6**	39.8
D6	37.6	32.1
D7	31.8	27.2
D8	32.0	27.3
F1	23.7	20.3
P1	21.8	18.7
P2	25.8	22.1
P3	25.2	21.5
P4	32.4	27.7
P5	37.4	32.0
P6	**45.7**	39.1
S1	39.5	33.8
S2	33.2	28.4
AB1	39.2	33.6
AB2	24.3	20.8
CH1	13.9	11.9
TR1	18.8	16.1
TR2	18.6	15.9
FS1	26.2	22.4
FS2	29.4	25.1
GL1	20.9	17.9
GL3	17.8	15.2
GL4	18.2	15.5
JS1	35.9	30.7
JS2	36.3	31.0
RC1	18.0	15.4
RC2	18.1	15.5
RC3	19.4	16.6
RC4	25.0	21.4
SP1	**42.3**	36.2
SP2	26.8	22.9
THE1	0.5	0.5
THE2	0.9	0.8

PM Monitoring Adjustment

The Brooke Park monitor was upgraded to an FDMS in 2008 and therefore the data has required no correction since then.

Short-term to Long-term Data adjustment

The automatic analyser was installed at Marlborough Street in November 2011; therefore the data has been annualised. The details are presented in the below table.

Site	Annual Mean	Period Mean	Ratio
Derry AURN	15.57	15.13	1.03
Belfast Centre	28.15	26.53	1.06
		Average	1.04

Data capture for $PM_{2.5}$ at the Brooke Park monitoring station was 55%, however annualisation has not taken place due to there not being sufficient $PM_{2.5}$ background monitoring sites to annualise against.

Diffusion Tube Annualisation

Monitoring Location	Uncorrected diffusion tube concentration	Brooke Park annualisation factor	Belfast Centre annualisation factor	Average annualisation factor
C4 (10)	25.9	1.207	1.098	1.153
D2 (18)	25.4	1.346	1.188	1.267
D8 (30)	30.1	1.269	1.154	1.211
F1 (31)	40.3	0.597	0.709	0.653
S1 (45)	39.5	1.220	1.123	1.171
AB1 (48)	45.1	0.952	0.969	0.961
AB1 (49)	37.7	1.210	1.118	1.164
AB2 (50)	41.3	0.597	0.709	0.653
CH1 (52)	23.7	0.597	0.709	0.653
TR1 (53)	32.0	0.597	0.709	0.653
TR2 (54)	31.7	0.597	0.709	0.653
FS1 (55)	46.3	0.597	0.709	0.653
FS1 (56)	43.0	0.597	0.709	0.653
FS2 (57)	51.3	0.597	0.709	0.653
FS2 (58)	48.7	0.597	0.709	0.653
RC2 (67)	31.5	0.575	0.700	0.638
SP2 (72)	46.3	0.597	0.709	0.653
SP2 (73)	45.0	0.597	0.709	0.653
THE1 (74)	0.9	0.645	0.752	0.699
THE2 (75)	1.5	0.645	0.752	0.699

QA/QC of automatic monitoring

AEA Energy and Environment undertook the Quality Assurance/Quality Control (QA/QC) procedures at these monitoring sites during 2011 ensuring that measurements from the analysers are as accurate as possible, and that measurements recorded at each site may be compared with other sites.

Manual calibration of automatic monitors is undertaken every two weeks by Derry City Council 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. All calibration records are sent to AEA Energy and Environment who conduct the QA/QC checks.

The analysers are checked and serviced every six months by the equipment support contractors. The reports are sent to AEA Energy and Environment who conduct the QA/QC checks.

QA/QC of diffusion tube monitoring

Diffusion tubes in 2011 were prepared and analysed by Environmental Scientific Groups (ESG). The tube preparation method is 20% TEA in water. ESG 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 112 through to 115 ESG have scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Monthly Diffusion Tube Results 2011

Site Ref	NO_2 Concentrations µg/m^3											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
a	35.0	29.0	20.0	14.0	9.0	10.0	9.0	12.0	14.0	19.0		11.0
a	41.0	30.0	21.0	18.0	11.0	12.0	10.0	10.0	14.0	17.0		10.0
a	36.0	24.0	22.0	14.0	9.0	11.0	9.0	11.0	16.0	16.0	22.0	22.0
c1	97.0	84.0	83.0	82.0	62.0	72.0	60.0	69.0	65.0	75.0	77.0	
c1	91.0	93.0	84.0	79.0	60.0	72.0	57.0	75.0		75.0		
c2	55.0	46.0	51.0	33.0	27.0	37.0	30.0	37.0	33.0	44.0	40.0	51.0
c2				34.0	25.0	40.0	32.0	36.0	31.0	44.0	40.0	50.0
c3	60.0		53.0	46.0	35.0	41.0	36.0	41.0	43.0	49.0	52.0	55.0
c3				44.0	39.0	43.0	34.0	42.0	43.0	54.0	55.0	57.0
c4	39.0	30.0		23.0		20.0		40.0	23.0	30.0	28.0	26.0
c4				21.0	16.0	21.0		41.0	21.0	28.0	28.0	31.0
c5	60.0	46.0	59.0	48.0	32.0	49.0	48.0	50.0	34.0	39.0	47.0	41.0
c5				43.0	32.0	50.0	46.0	48.0	33.0	44.0	45.0	40.0
d1	49.0	46.0	44.0	44.0	25.0	28.0	28.0	33.0	30.0	37.0	43.0	36.0
d1	55.0	48.0	45.0	34.0	23.0	34.0	26.0	33.0	31.0	35.0	43.0	39.0
d1	51.0	44.0	47.0	42.0	23.0	32.0	25.0	34.0	32.0	36.0	44.0	39.0
d2	43.0	37.0	38.0		20.0	26.0	22.0	32.0	22.0	30.0	35.0	25.0
d2					17.0	26.0	21.0	30.0	19.0	28.0	37.0	
d3			63.0	56.0	35.0	56.0	49.0	57.0	41.0	56.0	53.0	31.0
d3				51.0	39.0	52.0	51.0	54.0	40.0	53.0	46.0	47.0
d4				62.0	40.0	70.0	59.0	63.0	43.0	63.0	63.0	39.0
d4				66.0	41.0	65.0	64.0	65.0	40.0	61.0	61.0	42.0
d5			64.0	44.0	47.0	49.0	50.0	54.0	15.0	47.0	72.0	57.0
d5			66.0	60.0	44.0	48.0	43.0	48.0	46.0	54.0	71.0	56.0
d6				47.0	36.0	40.0	34.0	42.0	35.0	46.0	55.0	41.0
d6				49.0	35.0	43.0	34.0	39.0	38.0	46.0	51.0	40.0
d7				40.0	27.0	35.0	24.0	27.0	35.0	42.0	49.0	36.0
d7				41.0	25.0	34.0	26.0	31.0	36.0	38.0	48.0	42.0
d8	48.0	44.0	41.0	34.0	26.0	29.0	24.0	28.0	27.0		40.0	39.0
d8				33.0	25.0	25.0	22.0	27.0	27.0		42.0	40.0
f1	45.0	38.0	38.0									
p1	36.0	36.0	31.0	23.0	18.0	21.0	17.0	19.0	23.0	25.0	31.0	27.0
p1				24.0	14.0	25.0	16.0	19.0	21.0	27.0	34.0	26.0
p2	42.0	41.0	40.0	28.0	20.0	27.0	21.0	24.0	24.0	32.0	36.0	30.0

Site Ref	NO_2 Concentrations µg/m^3											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
p2				29.0	22.0	25.0	23.0	25.0	23.0	31.0	36.0	29.0
p3				30.0	22.0	27	28.0	28.0	21.0	26	34.0	29.0
p3				35.0	21.0	30.0	26.0	27.0	22.0	33.0	35.0	29.0
p4	53.0	48.0	51.0	38.0	28.0	34.0	35.0	33.0	26.0	40.0	42.0	32.0
p4				35.0	28.0	32.0	31.0	30.0	29.0	41.0	42.0	35.0
p5				44.0	33.0	44.0	33.0	40.0	38.0	51.0	44.0	51.0
p5				48.0	27.0	42.0	33.0	35.0	37.0	51.0	44.0	52.0
p6	66.0	58.0	55.0	53.0	44.0	47.0	39.0	46.0	48.0	61.0	44.0	53.0
p6				60.0	40.0	50.0	38.0	45.0	49.0	54.0	56.0	61.0
s1			50.0	39.0	32.0		35.0	41.0	34.0	49.0	44.0	49.0
s1				44.0	30.0		35.0	40.0	36.0	46.0	42.0	43.0
s2			48	42	39	34	27	31	38	40	42	43
s2				40	32	32	29	31	33	41	46	34
ab1	60	54	52	45	32		35	44		39		
ab1				43	26		32	44			54	27
ab2	47	33	44									
ab2												
ch1	27	24	20									
tr1	37	31	28									
tr2	37	31	27									
fs1	45	40	54									
fs1	44	42	43									
fs2	51	55	48									
fs2	53	53	40									
gl1	37	26	31	22	16		13	17	20	25	29	19
gl3	36	28	26	16	12	14	12	15	14	19	26	19
gl4	36	26	25	21	11	18	17	15	14	20	20	19
js1	45	52	51	46	31	41	29	33	39	39	44	28
js1	47	52	51	42	33	40	30	36	36	36	47	28
js2	44	56	52	44	31	39	32	35	36	36	46	30
js2	46	54	47	39	27	38	37	36			47	34
rc1	33	28	22	18	12	18	14	16	15	21	22	21
rc2	34	29										
rc3	36	30	29	18	14	16	12	17	16	24	23	23
rc4	41	37	30	25	16	24	19	24	25	30	34	28

Site Ref	NO_2 Concentrations µg/m^3											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
sp1	55	59	52	46	34	40	31	41	42		59	48
sp1	57	62	57	50	40	43	34	39	39		60	46
sp2	45	49	45									
sp2	46	49	40									
the1		1.2	0.5									
the2		1.7	1.3									

Appendix B: DMRB Calculations

Input Data – Using Background Maps

Location/ Receptor	Grid Ref	Background Concentrations	
		Year	PM_{10}
A	59784, 578752	2011	10.7

Input Data – Using Brooke Park AURN Station

Location/ Receptor	Grid Ref	Background Concentrations	
		Year	PM_{10}
A	59784, 578752	2011	18.6

Location/ Receptor	Link number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
			AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV (<3.5t GVW)	Total % HDV (>3.5t GVW)
A	1	5	12400	48	A	94.9	5.1

Verification

It is not possible to undertake verification for this model as there are no PM_{10} monitoring locations within the modelled area.

Results

Location/ Receptor	Name	Year	PM_{10}	
			Annual mean $\mu g/m^3$	Days $>50\mu g/m^3$
A (maps)	Victoria Road	2011	12.1	0
A (monitored)	Victoria Road	2011	20.0	3