2018 Updating and Screening Assessment for Derry City and Strabane District Council

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

June 2018

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Executive Summary

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment (Northern Ireland) Order 2002, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. Results from monitoring by the Council are presented and sources of air pollution are identified.

This report confirms that air quality within Derry City and Strabane District Council area continues to meet the relevant air quality objectives at locations of relevant exposure, with the exception of locations within existing Air Quality Management Areas (AQMAs). There were no exceedances of any objectives outside the existing AQMA boundaries, or within the Strand Road AQMA.

Following on from previous LAQM reports, Council is now in process of reducing the extent of the Spencer Road AQMA and also revoking the Strand Road AQMA as well as the three AQMAs in Strabane, Newtownstewart and Castlederg. Although Nitrogen Dioxide (NO2) concentrations in Spencer Road have been shown to be below the annual mean NO2 objective since 2014 using both the local and national bias adjustment factors for the diffusion tubes, monitoring shall continue as a precaution. The remaining AQMAs are considered appropriate and shall remain unchanged. There is no requirement to proceed to a Detailed Assessment for any pollutant.

The report has not identified any significant changes in emissions sources within Derry City and Strabane District Council area. There have been no new relevant industrial installations and no new significant commercial, domestic or fugitive sources of emissions.

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1 Introduction

1.1 Description of Local Authority Area

Derry City and Strabane District Council was formed in 2015 by the merger of Derry City Council and Strabane District Council (DCSDC), and is located in the west of Northern Ireland. Derry City is the second-largest city in Northern Ireland, situated on the River Foyle, and includes Foyle Port and the City of Derry Airport within its boundaries. Road transport emissions have previously been found to be the dominant source of air pollution in the Derry City area. The remainder of the district is largely rural in character, the largest population centre outside Derry being Strabane Town.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment (Northern Ireland) Order 2002, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedances 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 Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre μg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances 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	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

As part of the review and assessment process, Derry City Council has prepared a number of air quality reports. A summary is provided in Table 1.2. In 2005 an AQMA was declared at the Creggan Road / Infirmary Road junction in Derry City, in 2011 two additional AQMAs were declared 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 for exceedances of the annual mean NO_2 objective. The declared AQMAs are shown in Figures 1.1 to 1.6.

Strabane District Council has also completed a number of air quality review and assessments. Three AQMAs were declared in Strabane, Newtownstewart and Castlederg in 2004 for exceedances of the annual and 24-hour mean PM_{10} objectives due to domestic heating. The declared AQMAs are shown in Figures 1.7 to 1.9. An Action Plan was developed in order to identify measures to reduce ambient concentrations of particles and to attempt to comply with the objectives for PM_{10}.

The Council has also completed updating and screening assessments which did not highlight any other areas of concern that required a detailed assessment to be undertaken.

Table 1.2 summarises the Review and Assessment work carried out by the former Derry City Council up to and including 2014. After the new DCSDC was formed in April 2015, a single report was produced – "the 2015 Updating and Screening Assessment, 2016 Progress Report and 2017 Progress Report" and showed all the required LAQM report data including updated monitoring for both former Councils.

Table 1.2 Summary of Review and Assessment by Derry City Council

Report	Summary
2004 Detailed Air Quality Modelling of Domestic Fuel Use and Road Traffic Emissions in Derry (Stage 3)	Exceedances 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} exceedances were not expected; however, it was not possible to rule out potential exceedances 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 exceedances, 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 exceedance 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 exceedances 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 exceedances 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 exceedances 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.
2009 Updating & Screening Assessment	The Updating & Screening Assessment reviewed and assessed new monitoring data and potential new sources of pollutants within the Council area. There were no new or significantly changed sources identified which may cause potential exceedances 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 exceedances 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 NO2. 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 exceedances 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 exceedances of the annual mean NO_2 objective within all AQMAs, with the exception of the Strand Road AQMA. The area of exceedance in the Creggan Road and Buncrana Road AQMAs is smaller than when they were declared, therefore, amended AQMA boundaries were recommended.
2014 Progress Report	Review of updated monitoring data showed that sites within the existing AQMAs were still exceeding the annual mean NO_2 objective, with the exception of the Strand Road AQMA. It was therefore concluded that the Council could consider potential revocation of the Strand Road AQMA. All other AQMAs are to remain in place.

2015 Updating and Screening Assessment, 2016 Progress Report and 2017 Progress Report	The report confirmed that air quality within the Derry City and Strabane District Council (DCSDC) area continued to meet the relevant air quality objectives at locations of relevant exposure, with the exception of locations within existing Air Quality Management Areas (AQMAs). There were no objectives exceedances outside the existing AQMA boundaries, or within the Strand Road AQMA. It was recommended that the extent of the Spencer Road AQMA be reduced to reflect the 2014 Detailed Assessment and that the Strand Road AQMA be revoked. The remaining AQMAs were considered appropriate and should remain unchanged with no requirement to proceed to a Detailed Assessment. No significant changes in emissions sources within the DCSDC area were identified with no new relevant industrial installations/ significant commercial, domestic or fugitive sources of emissions.
2015- 2017 Action Plan Progress Report	DCSDC is now in the process of revoking the AQMA's declared for Strabane, Newtownstewart and Castlederg in relation to exceedances of the air quality objectives for particulates (PM_{10}). The former SDC Action Plan measures have now been realised and pollution levels have reduced to well below health limit values. However, the Smoke Control Areas shall be maintained and enforced. The AQMA at Strand Road, declared due to nitrogen dioxide emissions, shall be revoked and the AQMA at Spencer Road shall be reduced in size to reflect updated monitoring and modelling results. The Council is currently revising the Air Quality Action Plan to reflect the new Council boundary. The Action Plan shall contain measures to be introduced to work towards achieving air quality objectives within the remaining AQMAs to improve health and wellbeing across the Council area.

The following Figures 1.1 – 1.9 show the AQMA's that have been declared by the former Derry City Council for NO_2 from traffic sources and the former Strabane District Council for PM_{10} from domestic solid fuel burning.

Figure 1.5 shows the proposed reduction in Spencer Road AQMA.

Maps of the AQMA's declared for Nitrogen Dioxide (Annual Mean)

Figure 1.1 – Creggan Road Air Quality Management Area

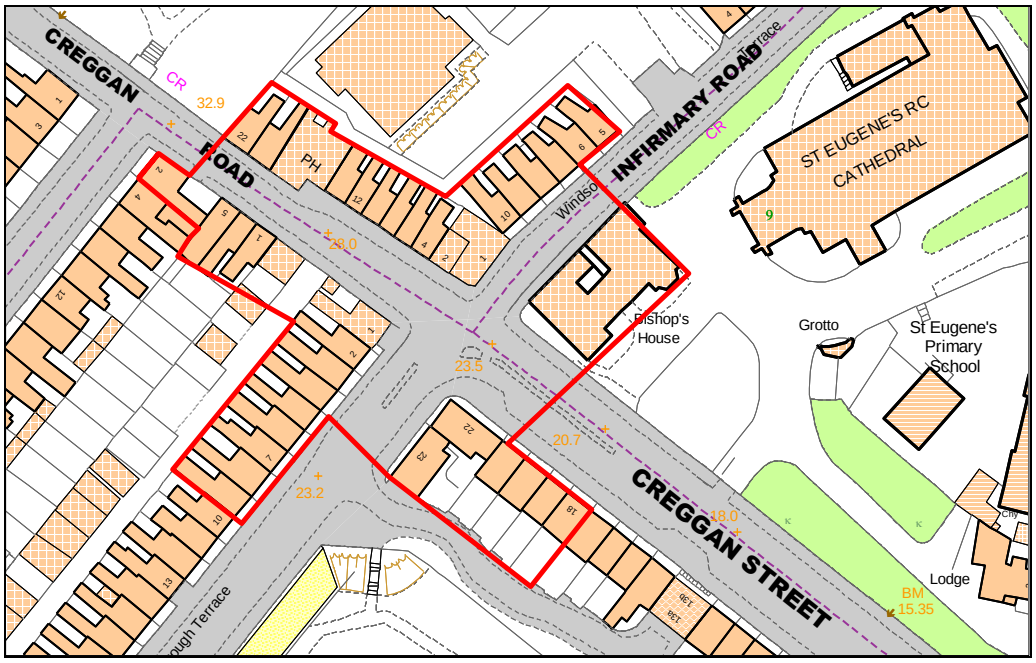

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Figure 1.2 – Dale's Corner Air Quality Management Area

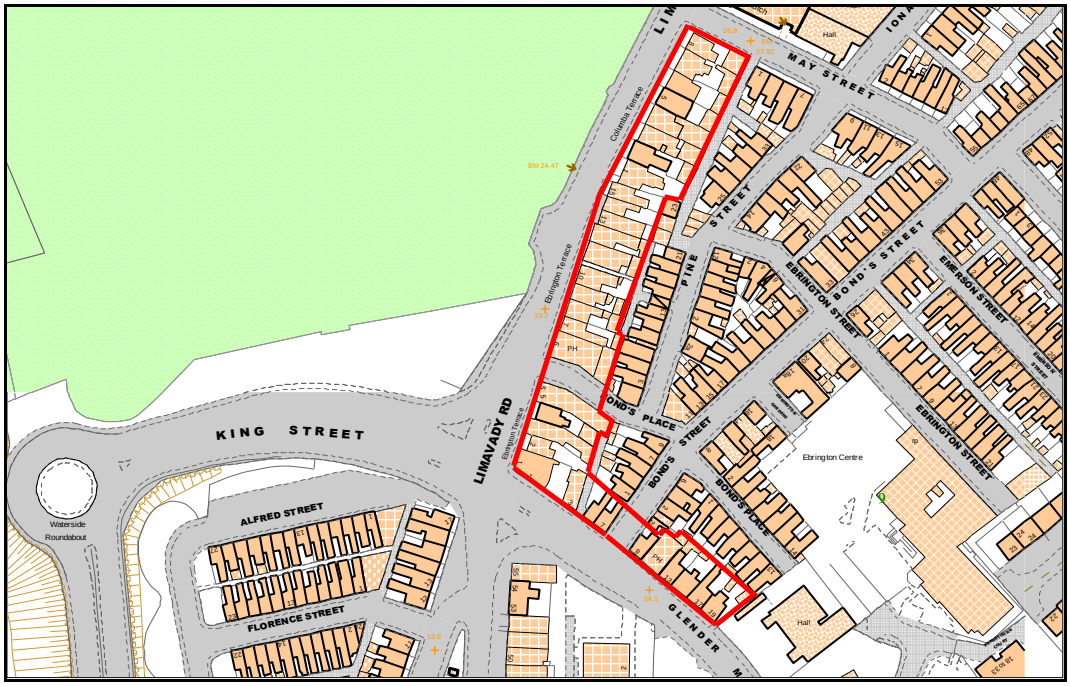

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Figure 1.3 – Buncrana Road Air Quality Management Area

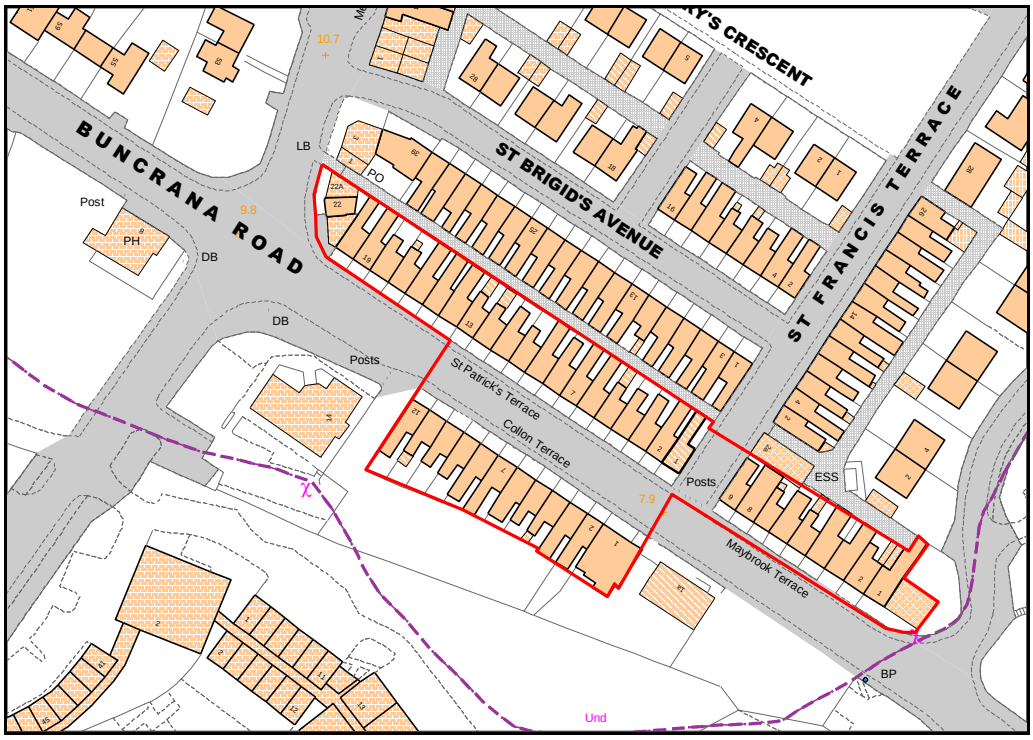

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Figure 1.4 – Spencer Road Air Quality Management Area

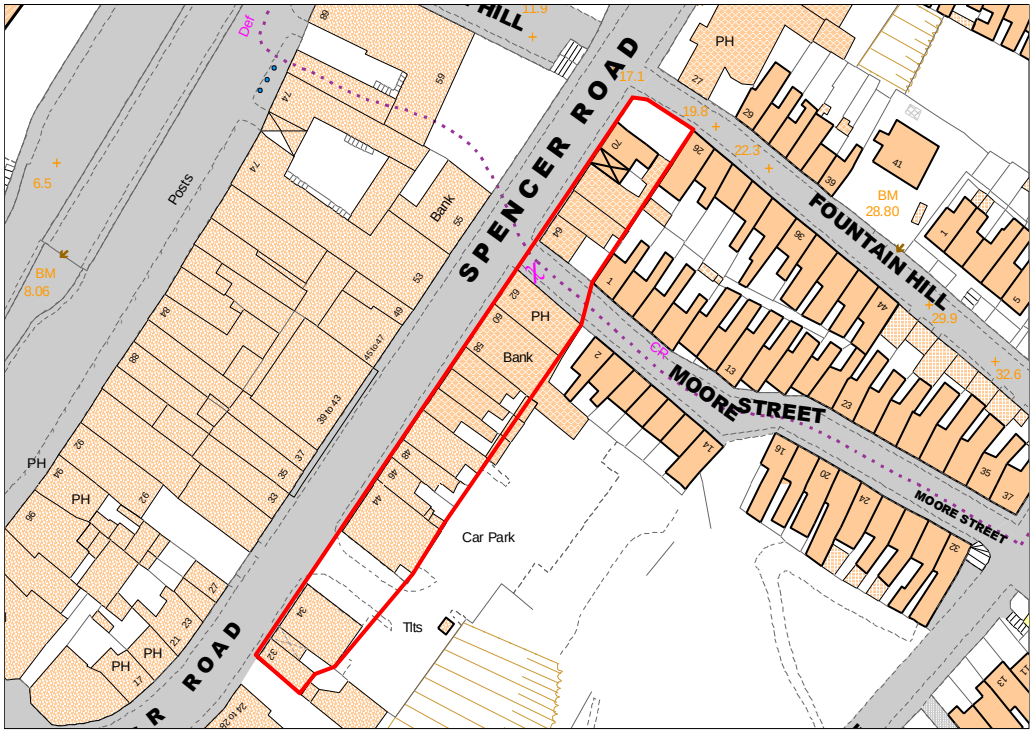

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Figure 1.5 – Proposed Amended Spencer Road Air Quality Management Area

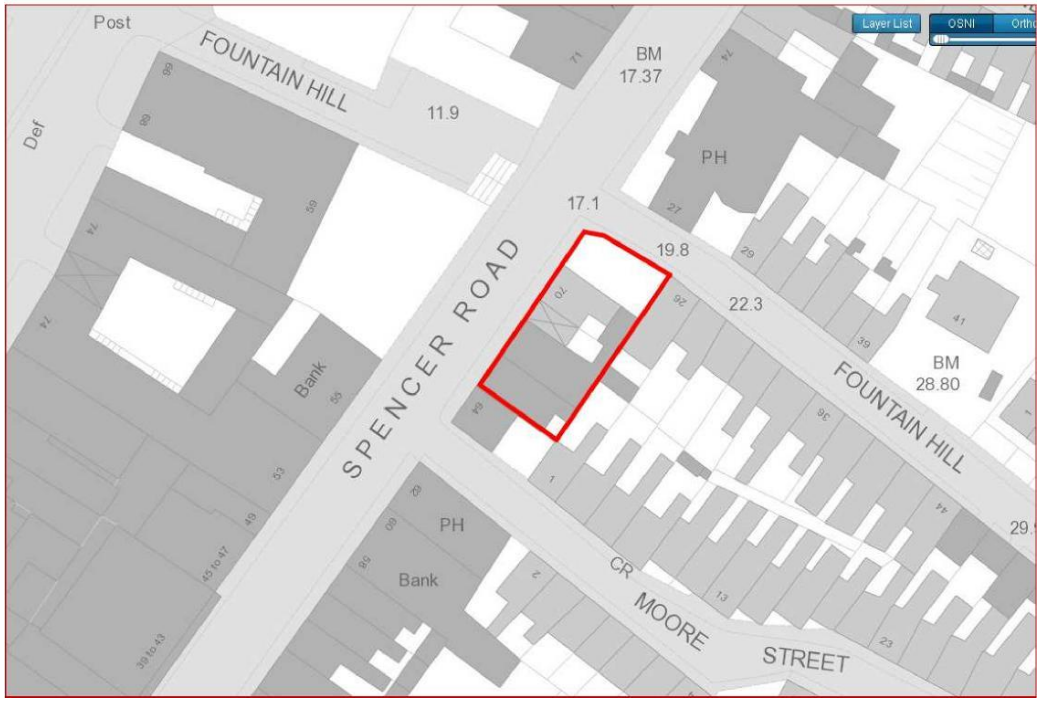

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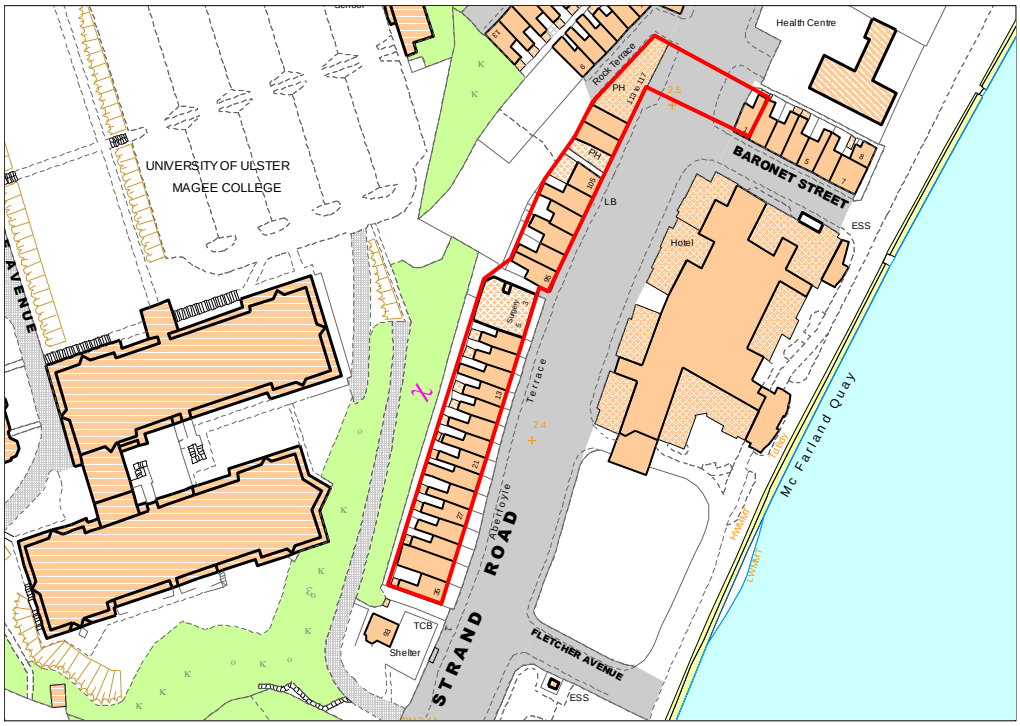
Figure 1.6 – Strand Road Air Quality Management Area



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Maps of the AQMA's declared for Particulate Matter (PM_{10})

Figure 1.7 – Strabane Town Air Quality Management Area

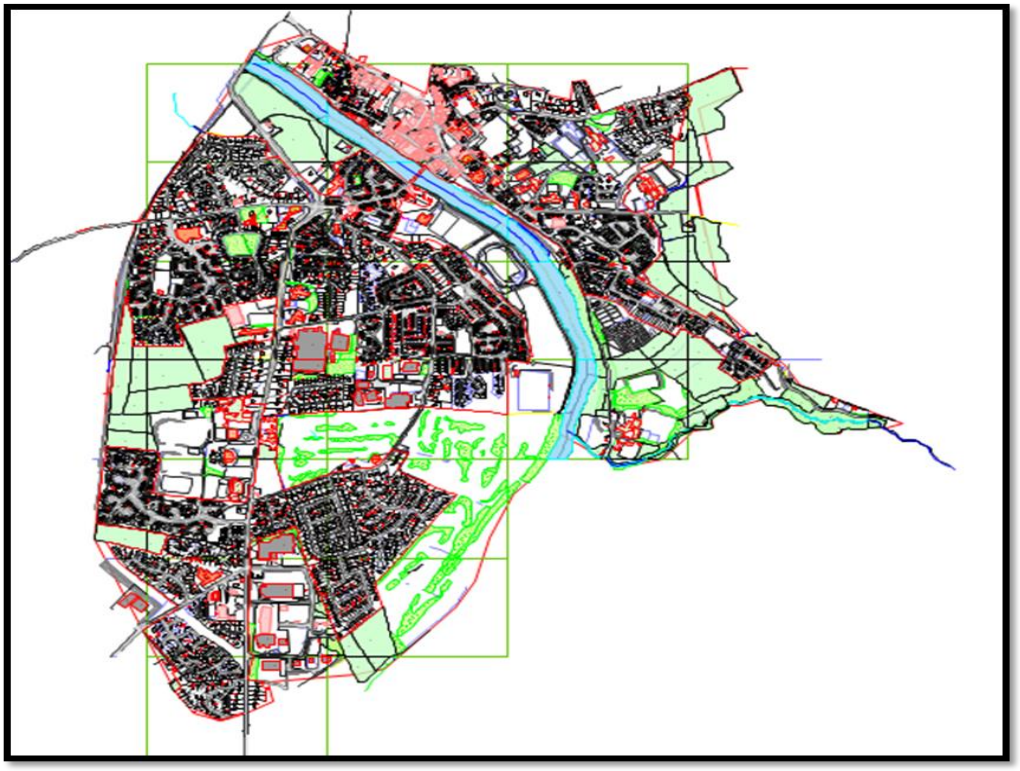

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Figure 1.8 – Castlederg Air Quality Management Area

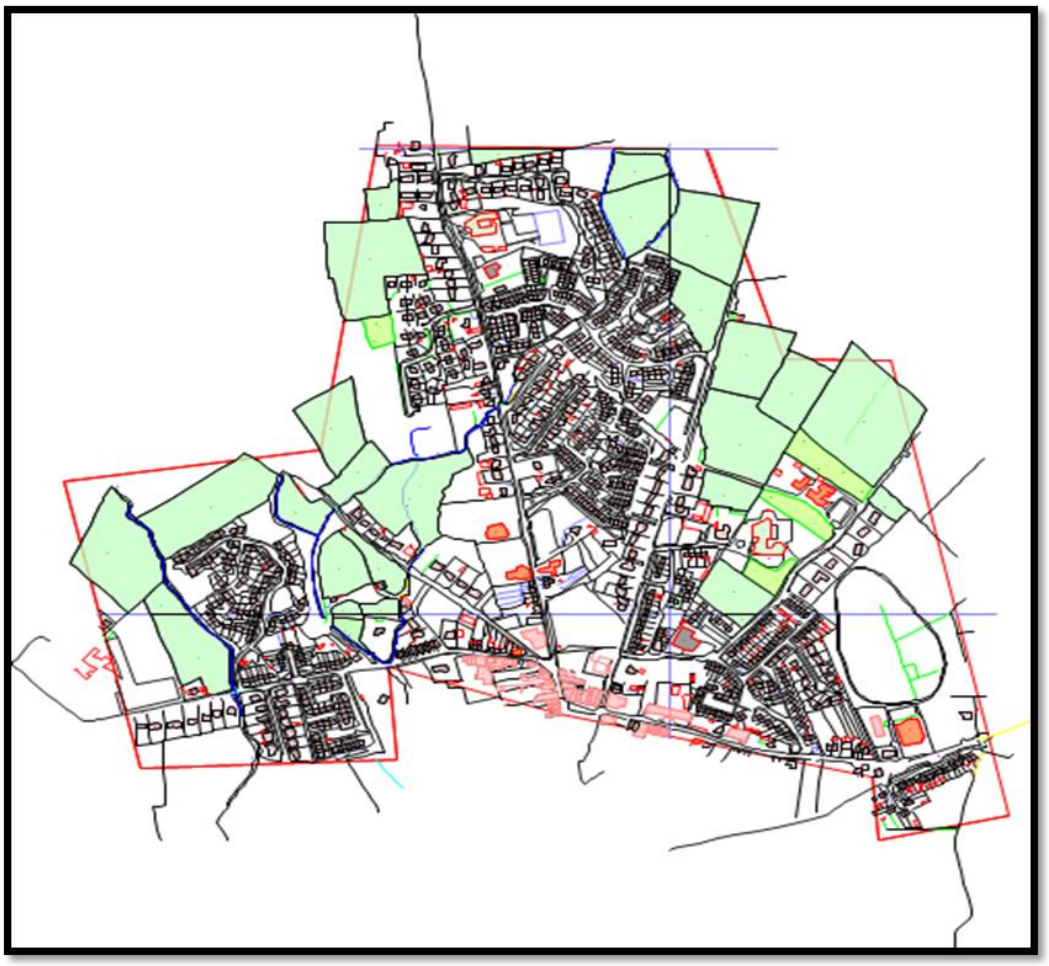
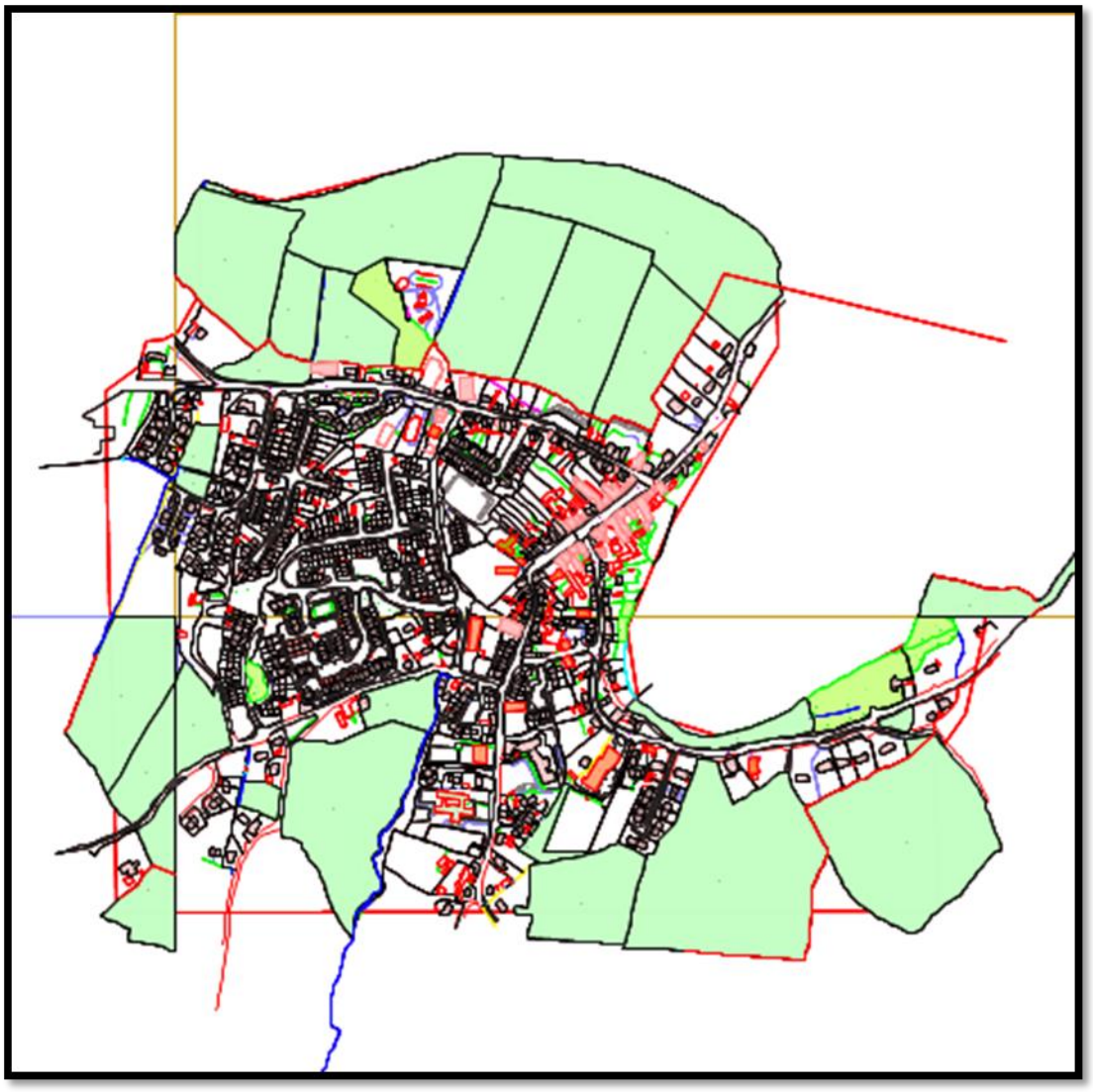


Figure 1.9 – Newtownstewart Air Quality Management Area



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2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

The Council monitored NO_2 at two locations in 2017; Derry Rosemount and Dale's Corner. PM10 was monitored at Derry Rosemount, as well as the Springhill Park site in Strabane. Details of the automatic monitoring sites are summarised in Table 2.1 and shown in Figures 2.1 and 2.2. The Marlborough Street monitoring station was installed in 2011 and ceased operating in 2015 and results from this site have been reported in a previous report.

Monitoring techniques used at the sites include; chemi-luminescent monitors at Dale's Corner, FDMS and chemi-luminescent at Derry Rosemount and beta ray attenuation and UV florescence at Springhill Park, Strabane.

NO_2 concentrations were below both the annual mean at the Rosemount and Dale's Corner sites in all years and 1-hour objectives were below the threshold at Rosemount. However, there was 1 exceedance of the 1-hour objective at the Dale's Corner site in 2017 and 4 exceedances of the of the 1-hour objective in 2016.

QA/QC details and overview monitoring graphs and exceedance statistics for the non-AURN sites are included in the Appendices.

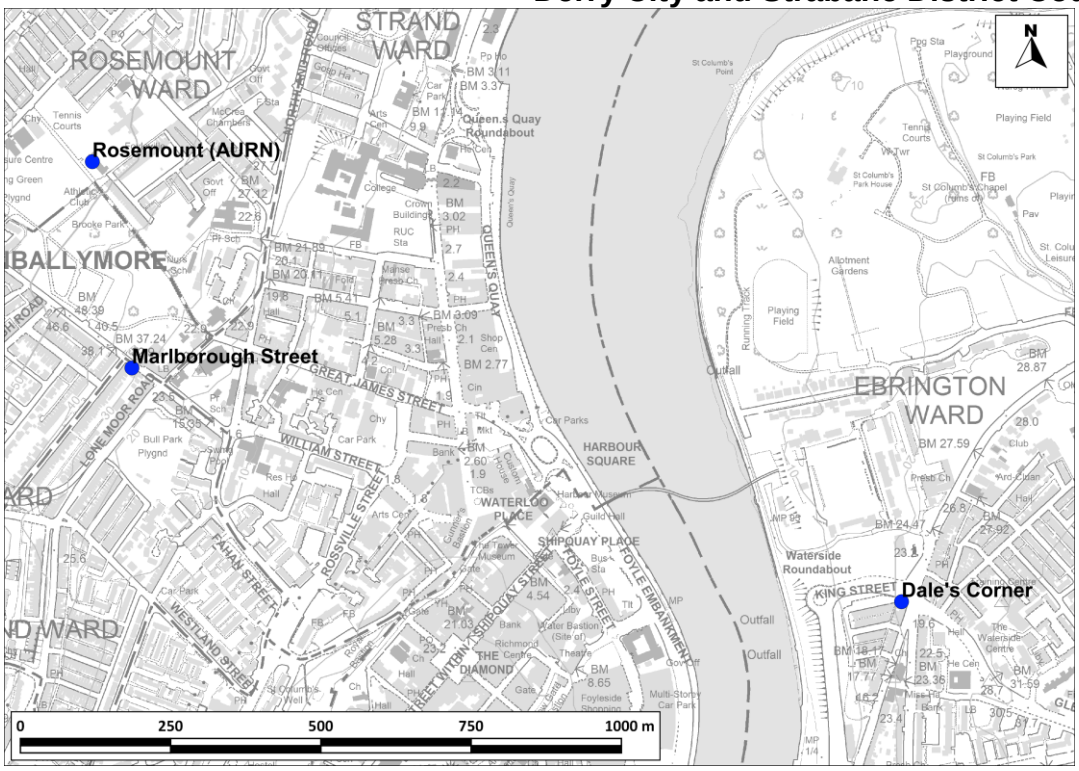

Figure 2.1 Map of Automatic Monitoring Sites in Derry

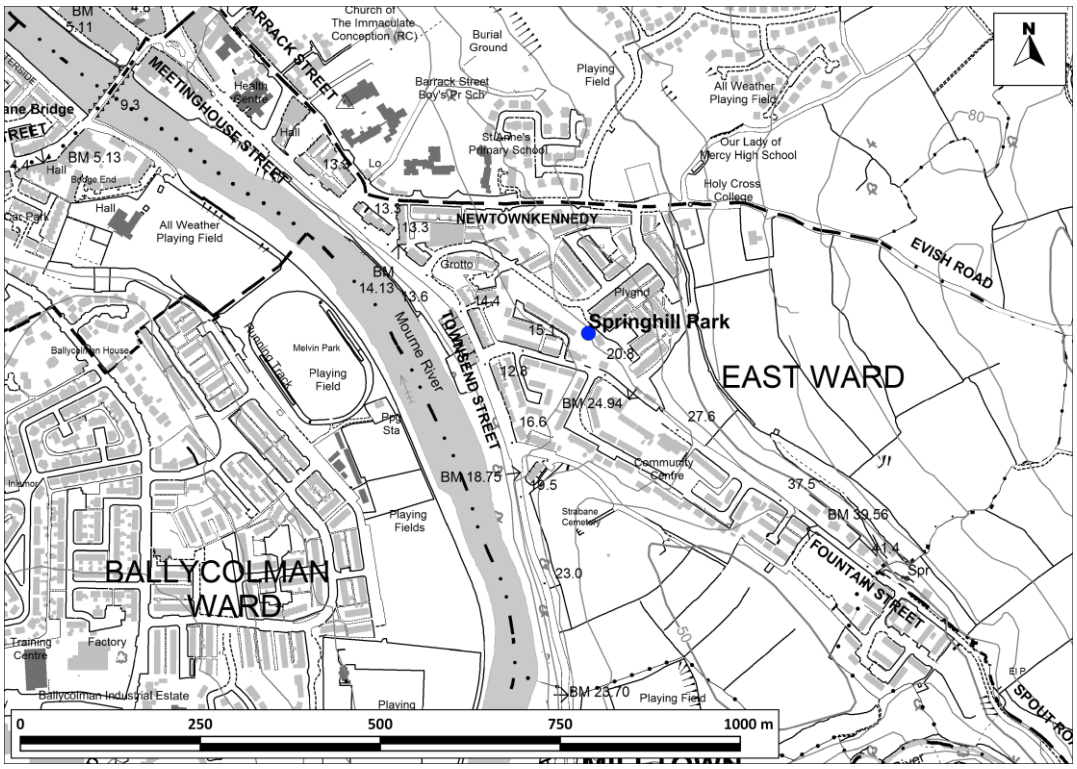

Figure 2.2 Map of Automatic Monitoring Site in Strabane

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Dales Corner	Roadside	244178	416760	NO_2	N	chemiluminescence monitor	Y	3m	Y
Derry Rosemount	Urban background	242962	417217	O3, NO_2, NOx, SO_2, PM_{10}, $PM_{2.5}$	N	FDMS and chemiluminescence monitor	Y	161m	N/A
Springhill Park, Strabane	Urban Background	235100	397200	PM_{10}, SO_2	Y	beta ray attenuation and UV florescence	Y	2m	Y

2.1.2 Non-Automatic Monitoring Sites

Derry City and Strabane District Council operated 50 Nitrogen Dioxide (NO_2) diffusion tube monitoring sites within its area in 2017, situated across Derry City. The locations of these sites are shown in Figures 2.3 to 2.7 and described in detail in Table 2.2. The maps show current and historical monitoring locations since 2014.

Due to updated monitoring results indicating that there was no threat to exceedance of the NO2 annual mean concentration, the following monitors were discontinued in 2014:

- AB1, AB2, AB3, AB4.

and the following monitors were discontinued in 2015 for the same reason:

- C11, C12, C13;
- S1, S2, S3, S4, S5, S6, S9, S10;
- SP3, SP4, SP5, SP6; and
- HB1, HB2.

Full details of the QA/QC procedure are provided in Appendix A.

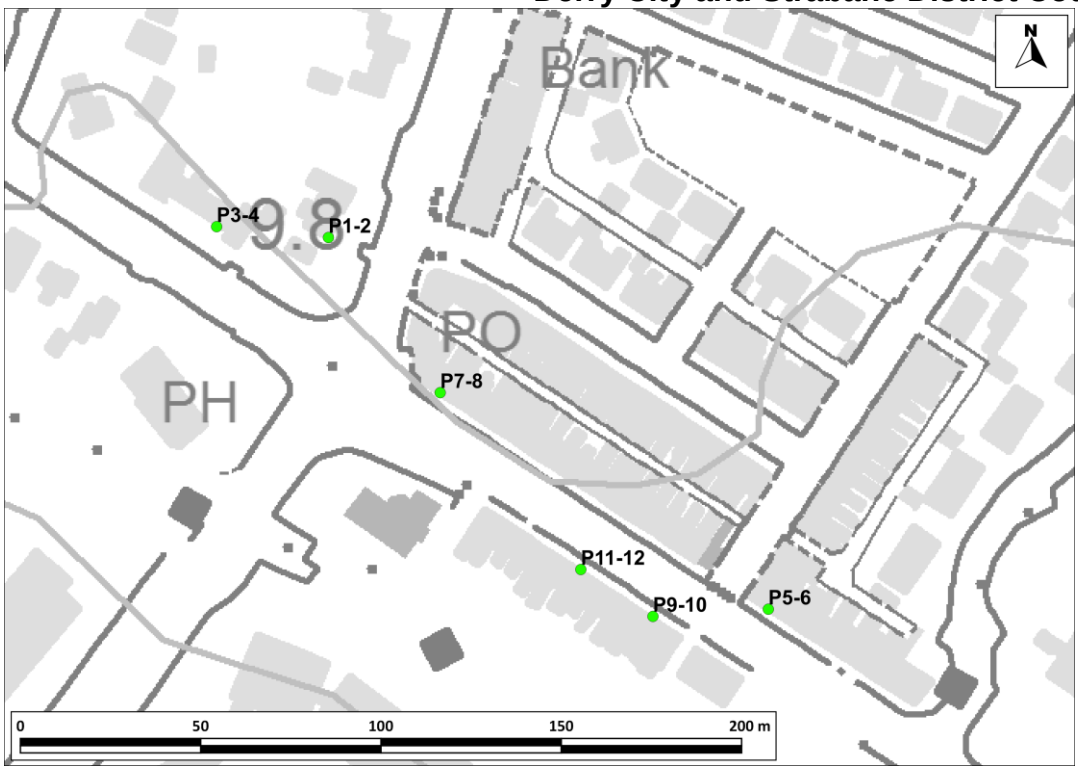

Figure 2.3 Map of Non-Automatic Monitoring Sites – Buncrana Road

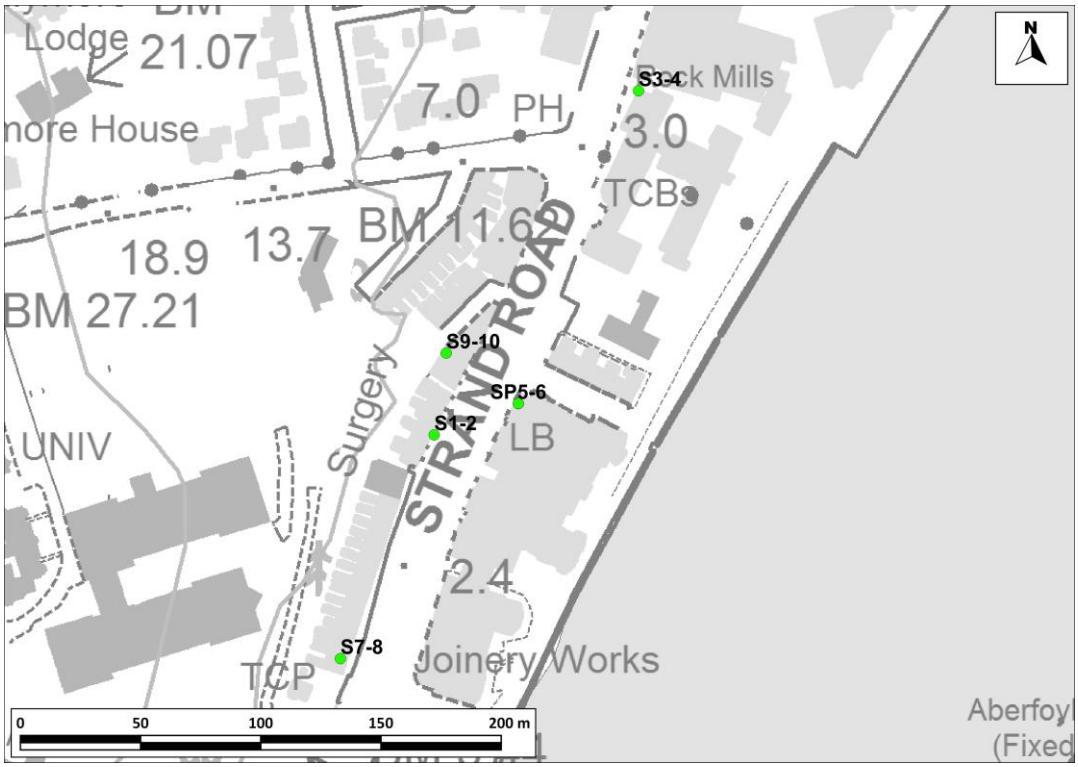

Figure 2.4 Map of Non-Automatic Monitoring Sites – Strand Road

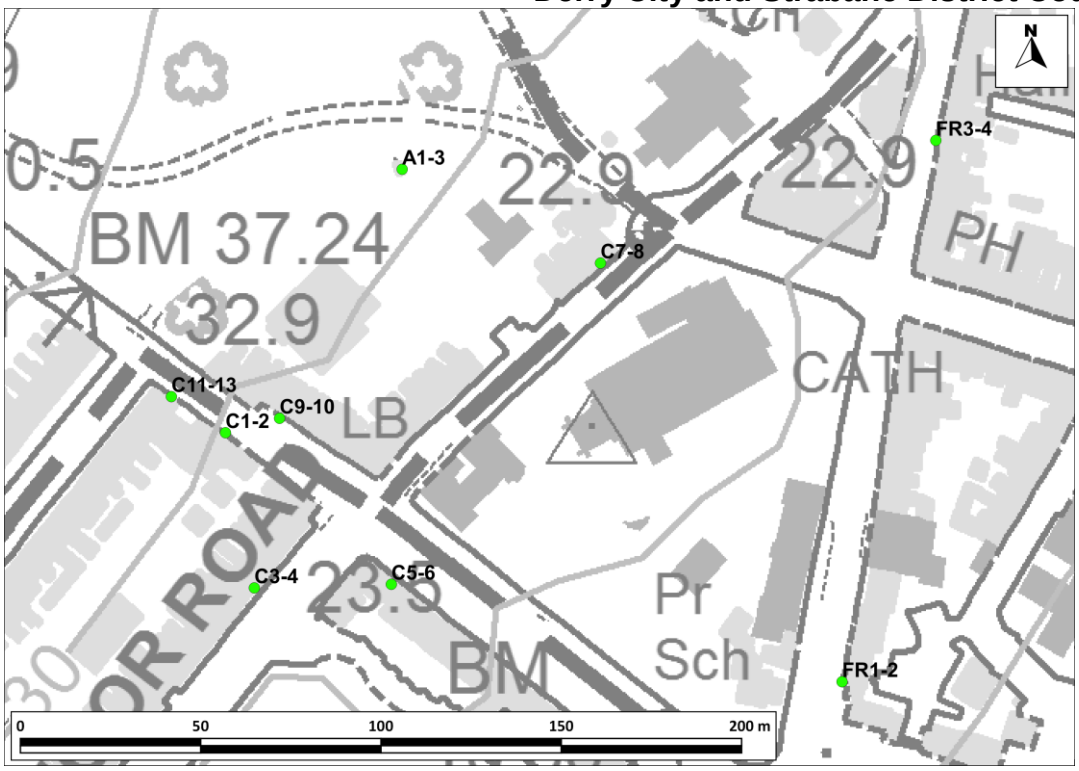

Figure 2.5 Map of Non-Automatic Monitoring Sites – Creggan Road

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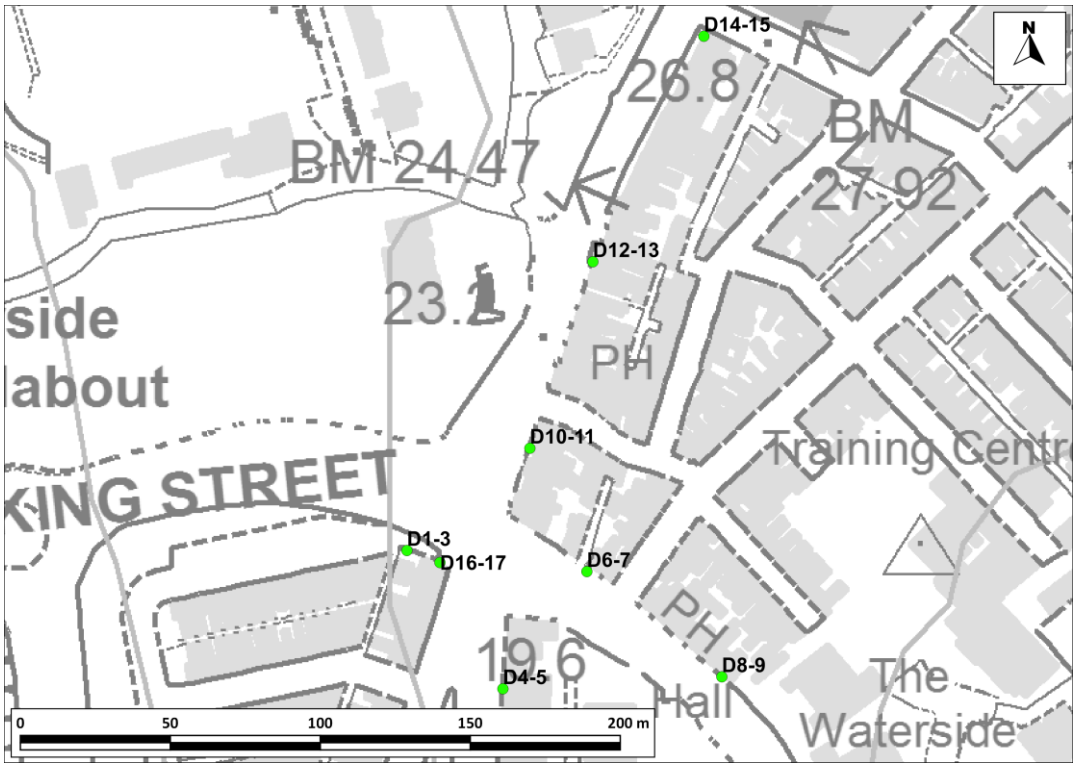

Figure 2.6 Map of Non-Automatic Monitoring Sites – Dale's Corner

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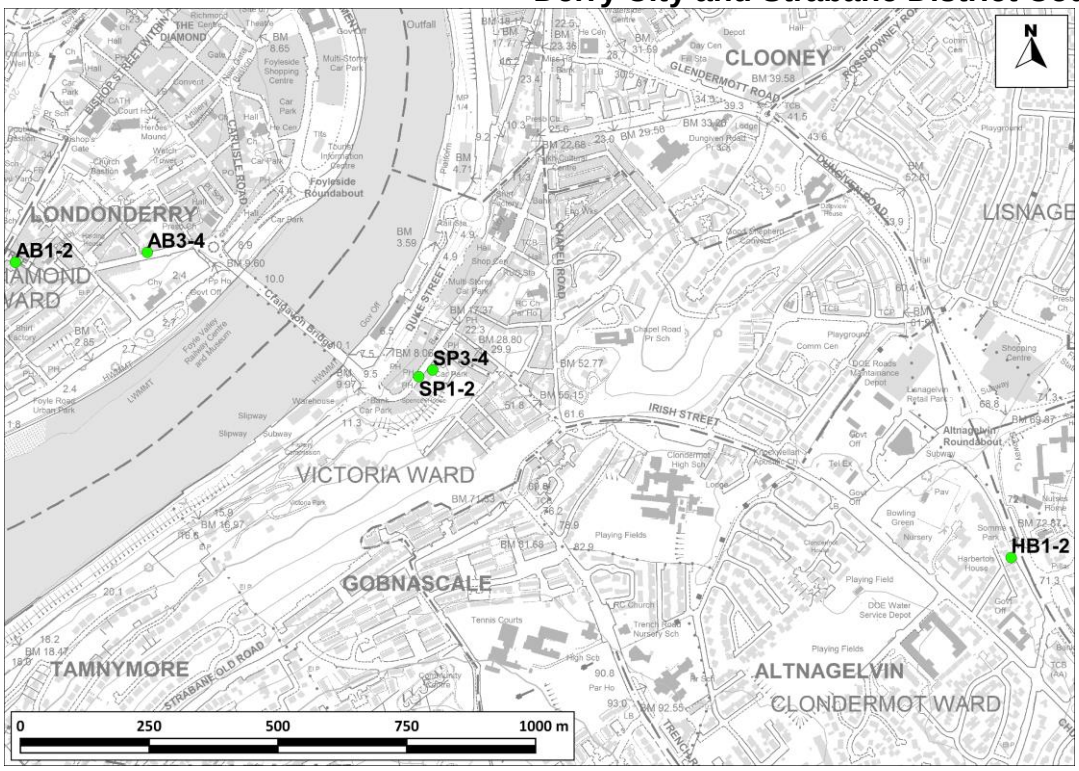


Figure 2.7 Map of Non-Automatic Monitoring Sites – South Derry

Table 2.2 Details of Non-Automatic Monitoring Sites

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?
A1-3	Urban background	242962	417217	NO2	N	Y (triplicate)	Y (161m)	161m	Y
C1-2	Roadside	242913	417144	NO2	Y	N (duplicate)	Y (0m)	1m	Y
C3-4	Roadside	242921	417101	NO2	Y	N (duplicate)	Y (0m)	4m	Y
C5-6	Urban Background	242959	417102	NO2	Y	N (duplicate)	Y (0m)	3m	Y
C7-8	Roadside	243017	417191	NO2	N	N (duplicate)	Y (0m)	3m	Y
C9-10	Roadside	242928	417148	NO2	Y	N (duplicate)	Y (0m)	3m	Y
D1-3	Roadside	244178	416760	NO2	N	N (triplicate)	Y (0m)	3m	Y
D4-5	Roadside	244210	416714	NO2	N	N (duplicate)	Y (0m)	5m	Y
D6-7	Roadside	244238	416753	NO2	Y	N (duplicate)	Y (0m)	1m	Y
D8-9	Roadside	244283	416718	NO2	Y	N (duplicate)	Y (0m)	1m	Y
D10-11	Roadside	244219	416794	NO2	Y	N (duplicate)	Y (0m)	4m	Y
D12-13	Roadside	244240	416856	NO2	Y	N (duplicate)	Y (0m)	4m	Y
D14-15	Roadside	244277	416931	NO2	Y	N (duplicate)	Y (0m)	4m	Y

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?
D16-17	Roadside	244189	416756	NO2	N	N (duplicate)	Y (0m)	7.3m	Y
P1-2	Roadside	243449	419013	NO2	N	N (duplicate)	Y (0m)	5m	Y
P3-4	Roadside	243418	419016	NO2	N	N (duplicate)	Y (0m)	5m	Y
P5-6	Roadside	243571	418910	NO2	Y	N (duplicate)	Y (0m)	5m	Y
P7-8	Roadside	243480	418970	NO2	Y	N (duplicate)	Y (0m)	4m	Y
P9-10	Roadside	243539	418908	NO2	Y	N (duplicate)	Y (0m)	4m	Y
P11-12	Roadside	243519	418921	NO2	Y	N (duplicate)	Y (0m)	4m	Y
S7-8	Roadside	243483	417801	NO2	Y	N (duplicate)	Y (0m)	6m	N
SP1-2	Roadside	243557	417907	NO2	Y	N (duplicate)	Y (0m)	2m	Y
FR1-2	Roadside	243084	417075	NO2	N	N (duplicate)	Y (0m)	2m	Y
FR3-4	Roadside	243110	417225	NO2	N	N (duplicate)	Y (0m)	2m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Details of results from both automatic monitoring sites, compared with the annual mean objective from 2013-2017, are documented in Table 2.3 and shown in Figure 2.8. Comparison with the 1-hour mean Objective is also documented in Table 2.4. The Derry Rosemount site was commissioned in 2016, thus the limited data set for this site. There is an upward trend at the Dale's Corner site due to increased pollutant concentrations in the period 2014-2016. However, the annual mean has decreased slightly in 2017.

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 %[a]	Valid Data Capture 2017 % [b]	Annual Mean Concentration μg/m³				
					2013* [c]	2014* [c]	2015* [c]	2016* [c]	2017 [c]
Derry Dale's Corner	Roadside	N	99%	99%	30	23	29	38	36
Derry Rosemount	Urban background	N	98%	98%	-	-	-	10	8

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] Means should be "annualised" as per Boxes 7.9 and 7.10 of LAQM.TG16, if monitoring was not carried out for the full year.
*Annual mean concentrations for previous years are optional.

Figure 2.8 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

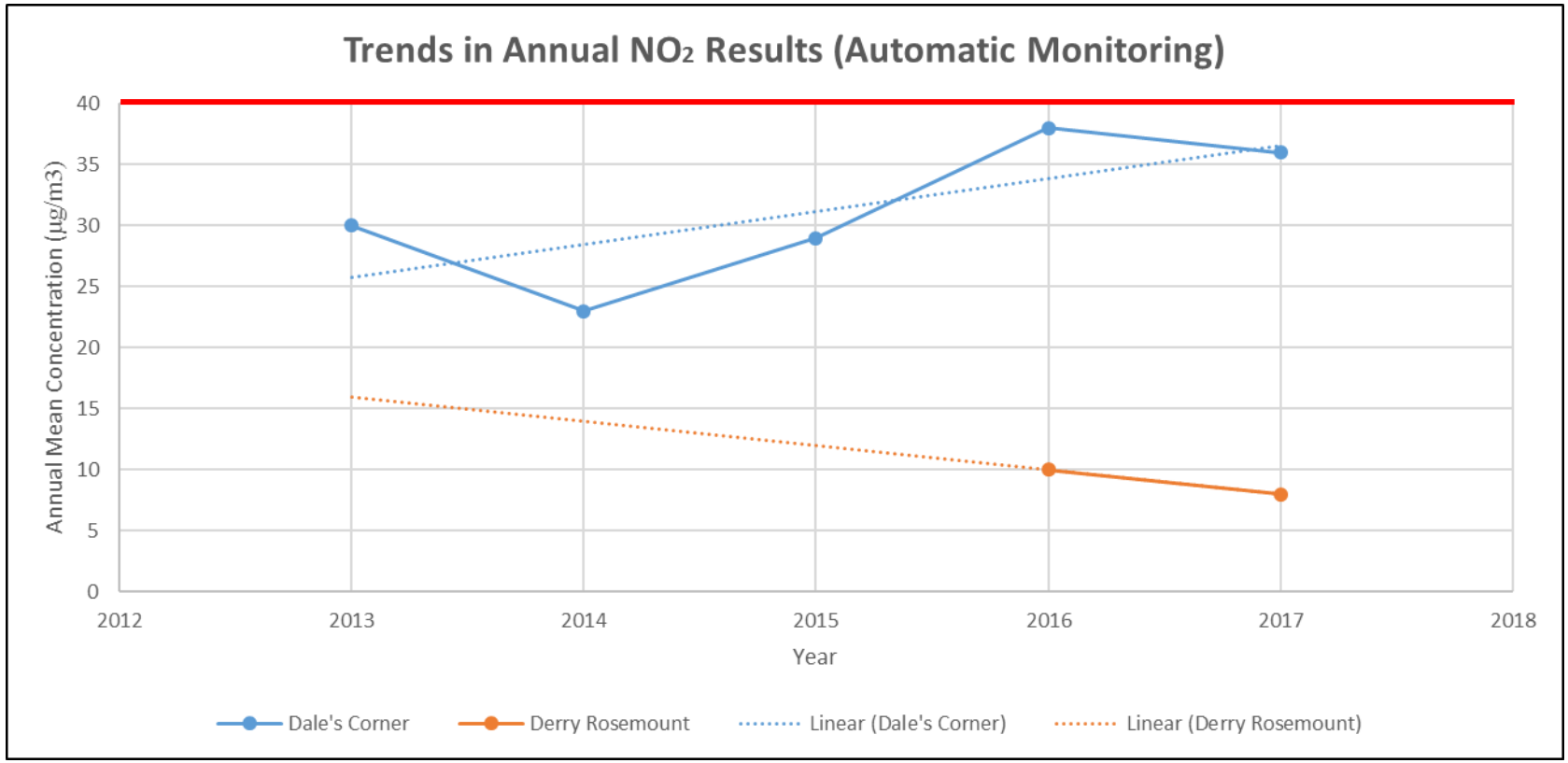


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2017 % [b]	Number of Exceedances of Hourly Mean (200 μg/m^3)				
					2013* [c]	2014* [c]	2015* [c]	2016* [c]	2017 [c]
Derry Dale's Corner	Roadside	N	99%	99%	0 (172)	0 (172)	0 (183)	4 (224)	1 (205)
Derry Rosemount	Urban background	N	98%	98%	-	-	-	0 (121)	0 (87)

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] If the period of valid data is less than 85%, include the 99.8th percentile of hourly means in brackets
*Number of exceedances for previous years are optional.

Diffusion Tube Monitoring Data

Results of monitoring trends over the period 2013-2017 show that most locations with elevated pollutant concentrations within the AQMA's are projected to display decreases to below the pollutant objective values. This is encouraging and it is hoped that these trends continue. It must be acknowledged that the trends can be affected by several important parameters, not least the choice of bias correction factor. The local bias correction factor has shown a decrease to 0.71 in 2013 but has been increasing since 2014 reaching 0.86 in 2017.

Having used local bias adjustment factors for LAQM reports since 2008, the Council choose to use the latest National Diffusion Tube Bias Adjustment Factor Spreadsheet for this report. This is due to the notable difference in the 2017 local bias adjustment factor for the ESG laboratory at Didcot using the 50% triethanolamine (TEA) in acetone preparation method as used for DCSDC's tube analyses (which factor includes both background and roadside sites) of 0.86 compared to the 2017 national factor of 0.77. The above spreadsheet also provides the breakdown that, for over 20 roadside studies the bias adjustment factor was 0.78 compared to Dale's Corner roadside localised factor of 0.99. Of 7 background sites, the spreadsheet provided a factor of 0.84 compared to 0.72 at Derry Rosemount. It is argued that, although localised data is considered more representative than national data, there is lower confidence in using the 2017 local bias adjustment factor for the above reasons.
DCSDC will however continue to monitor these trends as new monitoring data becomes available.

All diffusion tube monitors are located on façade of dwellings with the exception of the Rosemount AURN site and the Dale's Corner continuous roadside monitoring site. The tubes at the AURN site cannot be distance corrected as they are over 50m from kerb. At Dale's Corner, the distance correction calculator shows a reduction of over 4 ug/m^3 to give an NO_2 annual mean concentration of 23 ug/m^3 at façade.

The NO2 diffusion tube data are summarised in Table 2.5, 2.6 and 2.61 (Exceedances shown in red). The annual mean objective was exceeded at eight sites in each of 2014, 2015, 2016 and 2017. No exceedances have been recorded outside the existing AQMAs within the past number of years.

The following sites were found to be exceeding in 2014:
· C1-2 (Creggan Road AQMA);
· C11-13 (Creggan Road AQMA);
· D6-7 (Dale's Corner AQMA) only when using the national bias adjustment factor;
· D8-9 (Dale's Corner AQMA);
· D10-11 (Dale's Corner AQMA); and
· P11-12 (Buncrana Road AQMA) only when using the national bias adjustment factor.

The following sites were found to be exceeding in 2015:
· C1-2 (Creggan Road AQMA);
· D6-7 (Dale's Corner AQMA);
· D8-9 (Dale's Corner AQMA);
· D10-11 (Dale's Corner AQMA) and
· P11-12 (Buncrana Road AQMA)

The following sites were found to be exceeding in 2016:
· C1-2 (Creggan Road AQMA);
· C9-10 (Creggan Road AQMA);
· D6-7 (Dale's Corner AQMA);
· D8-9 (Dale's Corner AQMA);
· D10-11 (Dale's Corner AQMA);
· D14-15 (Dale's Corner AQMA) only when using the local bias adjustment factor and
· P11-12 (Buncrana Road AQMA);

The following sites were found to be exceeding in 2017:
· C1-2 (Creggan Road AQMA);
. C3-4 (Creggan Road AQMA);

· D6-7 (Dale's Corner AQMA);
· D8-9 (Dale's Corner AQMA);
· D10-11 (Dale's Corner AQMA);
· D12-13 (Dale's Corner AQMA); and
· P11-12 (Buncrana Road AQMA)

Creggan Road AQMA

Exceedances of the annual mean NO_2 objective continue to occur within the AQMA as shown by the monitoring results. Diffusion tube monitoring site C1-2 showed concentrations greater than 60µg/m3 using the local bias adjustment factor in 2017 but this figure was less than 60µg/m3 using the national bias adjustment factor. It is therefore recommended that this AQMA remains as declared.

Dale's Corner AQMA

Exceedances of the annual mean NO_2 objective continue to occur within the AQMA as shown by the monitoring results. It is therefore recommended that this AQMA remains as declared.

Buncrana Road AQMA

Exceedance of the annual mean NO_2 objective was recorded at one site within the AQMA (P11-12) since 2013. When using the national bias adjustment factor, this site was only marginally exceeding the pollutant objective value in 2017 with a concentration of 40.6 ug/m^3.

Measurements at all other sites within this AQMA have remained below the objective in the last 5 years. A proposed road widening scheme for this section of the A2 is currently undergoing public consultation. The preferred route would appear to follow the existing road with vesting of all properties along Collon Terrace and the construction of a roundabout at the current cross junction at Buncrana Road/ Racecourse Road. As exceedance of the pollutant objective value is only occurring at one location on Collon Terrace, relevant public exposure will be removed at this location and it may be possible to revoke the AQMA. However, monitoring shall continue at other residential locations within the AQMA to determine the effects on air quality from the new road scheme.

Spencer Road AQMA

No exceedances have been recorded within the Spencer Road AQMA since 2014. However, site SP1-2 showed concentrations close to the annual mean NO_2 objective using the local bias adjustment factor in 2016 and 2017. Using the national bias adjustment factor for 2017, the NO_2 concentration was 34.5 ug/m^3.

As a precaution, Council shall continue monitoring in this area and the AQMA shall remain. In the next LAQM report, updated monitoring results may result in the recommendation to revoke this AQMA also. Council is currently in process of passing an Order to reduce the extent of this AQMA to reflect the findings of a previous Detailed Assessment.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2017

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2017 (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 2017 (µg/m³)	
								National Bias Adjustment factor = 0.77	Local Bias Adjustment factor = 0.86
A1-3	AURN	B	N	Triplicate	12 months	N	N/A	10.6	11.8
C1-2	3 Creggan road	R	Y	Duplicate	12 months	N	N/A	**59.2**	**66.1**
C3-4	6 Marlborough Terrace	R	Y	Duplicate	12 months	N	N/A	**46.7**	**52.2**
C5-6	22a Creggan Street	R	Y	Duplicate	12 months	N	N/A	35.6	39.8
C7-8	1 Windsor Terrace	R	N	Duplicate	10 months	N	N/A	28.6	31.9
C9-10	14 Creggan Road	R	N	Duplicate	12 months	N	N/A	27.7	30.9
D1-3	Dale's Corner	R	N	Duplicate	12 months	N	Y(23µg/m³)	27.2	30.4
D4-5	52 Clooney Terrace	R	N	Duplicate	12 months	N	N/A	25.8	28.8
D6-7	5 Glendermott Road	R	Y	Duplicate	12 months	N	N/A	**43.6**	**48.7**
D8-9	19 Glendermott Road	R	Y	Duplicate	11 months	N	N/A	**44.5**	**49.7**
D10-11	4 Ebrington Terrace	R	Y	Duplicate	12 months	N	N/A	**45.4**	**50.7**
D12-13	12 Ebrinton Terrace	R	Y	Duplicate	12 months	N	N/A	**40.2**	**44.9**
D14-15	9 Columba Terrace	R	Y	Duplicate	12 months	N	N/A	33.4	37.3
D16-17	17 Melrose Terrace	R	N	Duplicate	12 months	N	N/A	29.6	33.1
P1-2	53 Messine Park	R	N	Duplicate	12 months	N	N/A	20.5	22.8
P3-4	57 Messine Park	R	N	Duplicate	12 months	N	N/A	22.2	24.8
P5-6	8 Maybrook Terrace	R	Y	Duplicate	12 months	N	N/A	24.8	27.7
P7-8	19 St Patricks Terrace	R	Y	Duplicate	12 months	N	N/A	28.5	31.9
P9-10	1 Collon Terrace	R	Y	Duplicate	12 months	N	N/A	34.2	38.2
P11-12	5 Collon Terrace	R	Y	Duplicate	12 months	N	N/A	**40.6**	**45.4**

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2017 (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 2017 (μg/m^3)	
								National Bias Adjustment factor = 0.77	Local Bias Adjustment factor = 0.86
S7-8	35 Aberfoyle Terrace	R	Y	Duplicate	12 months	N	N/A	28.9	32.3
SP1-2	70 Spencer Road	R	Y	Duplicate	10 months	N	N/A	34.5	38.5
FR1-2	3 Francis Street	R	N	Duplicate	11 months	N	N/A	26.3	29.4
FR3-4	45 Francis Street	R	N	Duplicate	12 months	N	N/A	26.7	29.8

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes, using Local and National Bias Adjustment Factors (2013 to 2017)

Site ID	Site Type	Within AQMA?	Annual Mean (mg/m3)									
			2013		2014		2015		2016		2017	
			Local Bias Adjustment Factor = 0.87	National Bias Adjustment Factor = 0.81	Local Bias Adjustment Factor = 0.71	National Bias Adjustment Factor = 0.81	Local Bias Adjustment Factor = 0.79	National Bias Adjustment Factor = 0.79	Local Bias Adjustment Factor = 0.83	National Bias Adjustment Factor = 0.77)	Local Bias Adjustment Factor = 0.86	National Bias Adjustment Factor = 0.77
A1-3	AURN	N	-		-		-		13.4	12.4	11.8	10.6
C1-2	3 Creggan road	Y	**61.1**	**56.9**	**53.4**	**60.9**	**59.3**	**59.3**	**63.2**	**58.6**	**66.1**	**59.2**
C3-4	6 Marlborough Terrace	Y	34.6	32.2	28.9	33.0	34.4	34.4	37.5	34.8	**52.2**	**46.7**
C5-6	22a Creggan Street	Y	39.5	36.8	33.7	38.4	38.4	38.4	37.6	34.9	39.8	35.6
C7-8	1 Windsor Terrace	N	23.1	**21.5**	18.5	21.1	21.2	21.2	21.2	19.7	31.9	28.6
C9-10	14 Creggan Road	N	**40.5**	37.7	34.1	38.9	39.0	39.0	**43.5**	**40.4**	30.9	27.7
D1-3	Dale's Corner	N	32.0	29.8	26.3	30.0	29.7	29.7	32.2	29.9	30.4	27.2
D4-5	52 Clooney Terrace	N	29.1	27.1	22.9	26.1	25.9	25.9	28.1	26.1	28.8	25.8
D6-7	5 Glendermott Road	Y	**50.0**	**46.6**	38.8	**44.3**	**43.5**	**43.5**	**49.6**	**46.0**	**48.7**	**43.6**
D8-9	19 Glendermott Road	Y	**55.2**	**51.4**	**42.5**	**48.5**	**47.4**	**47.4**	**52.6**	**48.8**	**49.7**	**44.5**
D10-11	4 Ebrington Terrace	Y	**49.6**	**46.2**	**43.5**	**49.6**	**45.8**	**45.8**	**46.8**	**43.4**	**50.7**	**45.4**
D12-13	12 Ebrinton Terrace	Y	**40.7**	37.9	31.9	36.4	30.8	30.8	30.1	27.9	**44.9**	**40.2**
D14-15	9 Columba Terrace	Y	32.6	30.4	26.1	29.8	36.1	36.1	**40.8**	37.9	37.3	33.4
D16-17	17 Melrose Terrace	N	33.2	30.9	25.6	29.2	28.6	28.6	31.1	28.9	33.1	29.6
P1-2	53 Messine Park	N	22.2	20.7	16.5	18.8	19.2	19.2	21.2	19.7	22.9	20.5
P3-4	57 Messine Park	N	27.6	25.7	22.4	25.6	24.5	24.5	26.8	24.9	24.8	22.2
P5-6	8 Maybrook Terrace	Y	28.7	26.7	22.0	25.1	26.7	26.7	28.1	26.1	27.7	24.8

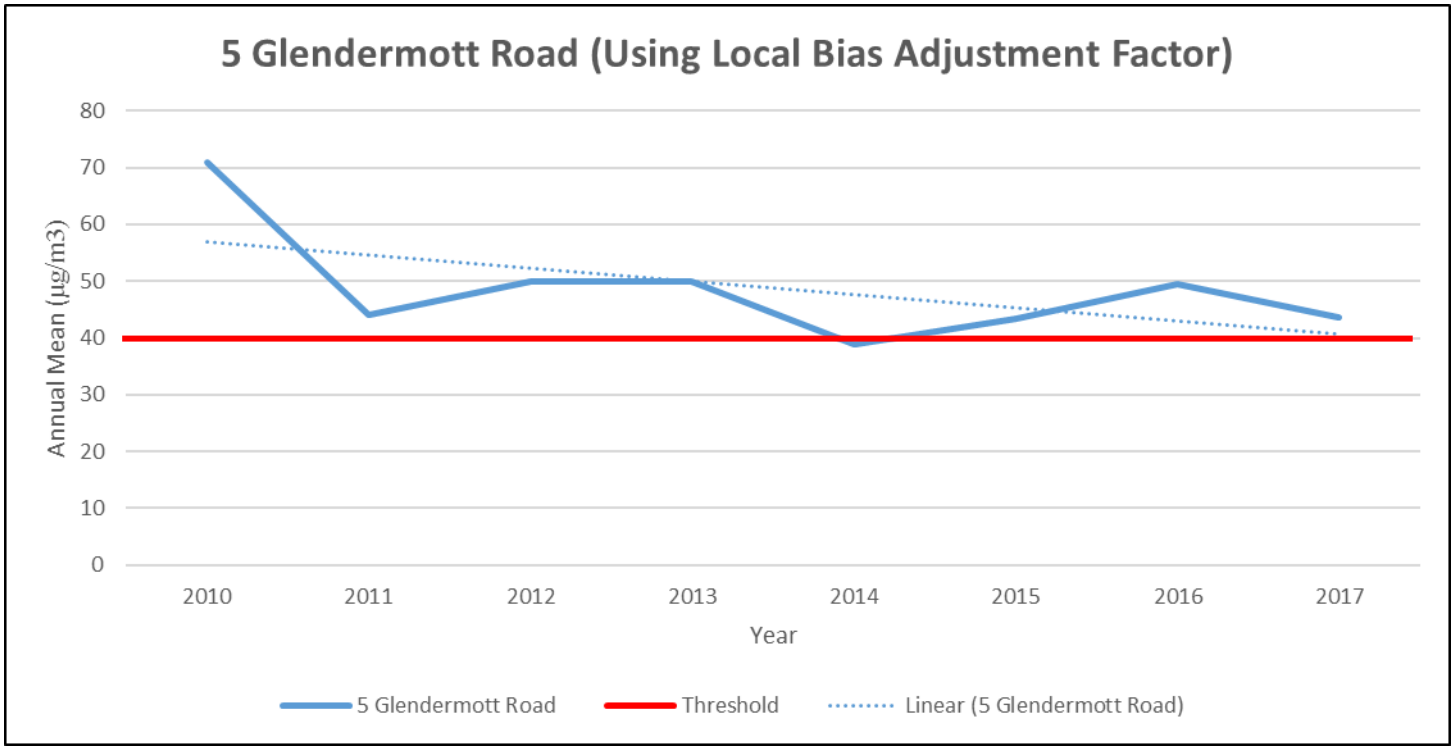
Site ID	Site Type	Within AQMA?	Annual Mean (mg/m3)									
			2013		2014		2015		2016		2017	
			Local Bias Adjustment Factor = 0.87	National Bias Adjustment Factor = 0.81	Local Bias Adjustment Factor = 0.71	National Bias Adjustment Factor = 0.81	Local Bias Adjustment Factor = 0.79	National Bias Adjustment Factor = 0.79	Local Bias Adjustment Factor = 0.83	National Bias Adjustment Factor = 0.77)	Local Bias Adjustment Factor = 0.86	National Bias Adjustment Factor = 0.77
P7-8	19 St Patricks Terrace	Y	36.1	33.6	25.2	28.7	30.9	30.9	37.3	34.6	31.8	28.5
P9-10	1 Collon Terrace	Y	38.2	35.6	30.1	34.3	36.4	36.4	37.0	34.3	38.2	34.2
P11-12	5 Collon Terrace	Y	**43.7**	**40.7**	35.4	**40.4**	**41.1**	**41.1**	**43.5**	**40.4**	**45.4**	**40.6**
S7-8	35 Aberfoyle Terrace		30.3	28.2	23.2	26.5	27.5	27.5	29.6	27.5	32.3	28.9
SP1-2	70 Spencer Road		**43.0**	**40**	32.8	37.4	37.2	37.2	39.4	36.6	38.5	34.5
FR 1-2	3 Francis Street	N	31.4	29.2	25.1	28.6	27.1	27.1	30.1	27.9	29.4	26.3
FR 3-4	45 Francis Street	N	32.7	30.4	24.7	28.2	27.5	27.5	30.8	28.6	29.8	26.7

The following section considers the use of both the local and the national bias adjustment factors to demonstrate trends in NO_2 concentrations at locations within the AQMA's. Figures 2.9- 2.19 show these trends.

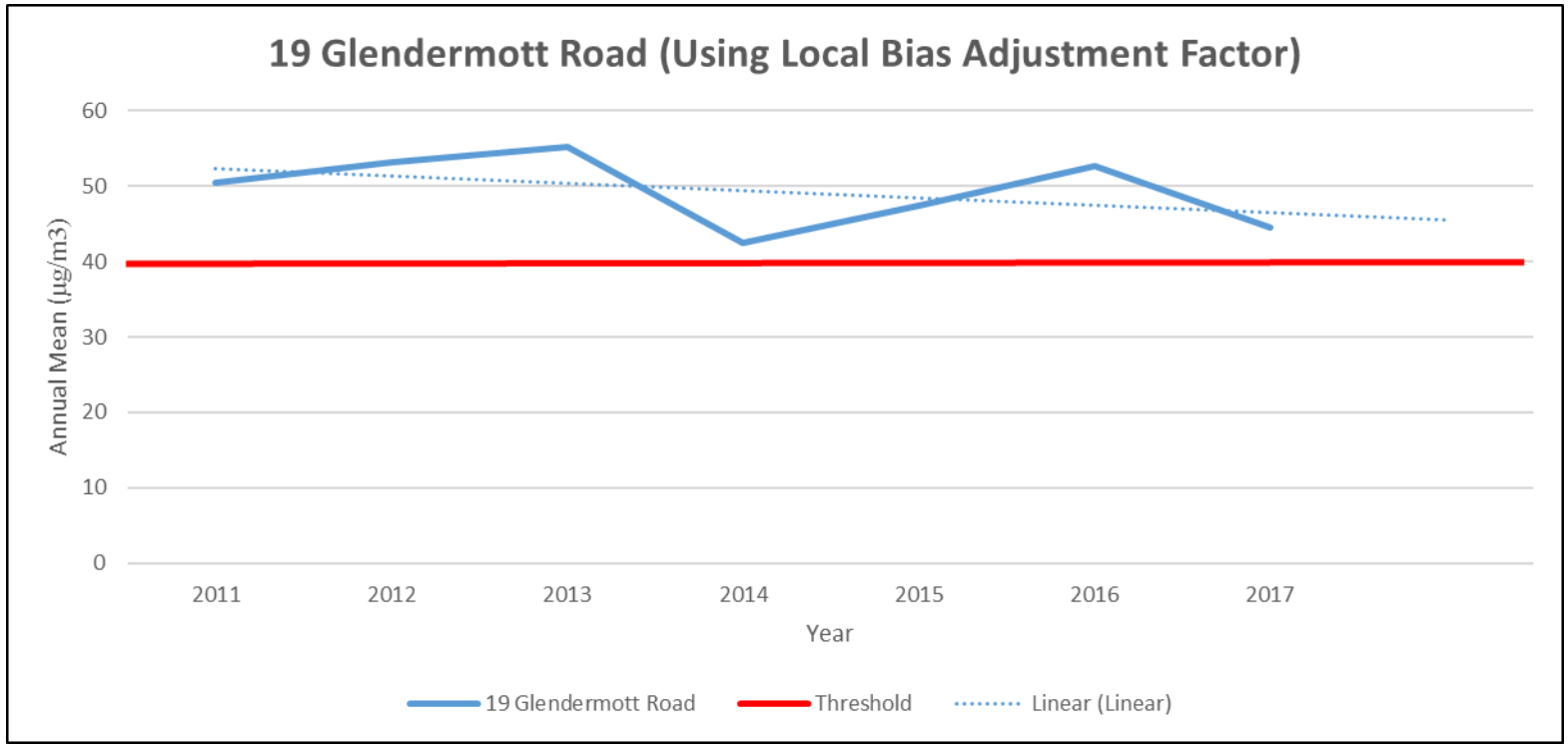
Considering longer term data and updating from the last LAQM report submitted to include 2017 data and using the local bias adjustment factor, it can be seen in Figures 2.9-2.11 that sites within the AQMA at Dale's Corner, namely No.4 Ebrington Terrace and No. 5 Glendermott Road show a larger decrease in projected pollutant concentrations than No.19 Glendermott Road (Figure 2.10), with the trend suggesting that levels should have been below the annual mean NO_2 limit value of 40ug/m3 as indicated in red on the graph, for No. 5 Glendermott Road and No.4 Ebrington Terrace by early 2017. The general increase from 2014 to 2016 has negatively altered the overall downward trend and may account for why levels are currently above the limit value.

The downward trend at No.19 Glendermott Road is less pronounced and would suggest that the limit value will be met around 2022. Figure 2.4 shows the general downward trend for all 3 sites in the Dale's Corner AQMA. Based on the above analysis, it would therefore benefit the Council to concentrate on undertaking measures to lower NO2 levels, particularly at the road link at No.19 Glendermott Road within the AQMA. This is currently being investigated in the Draft Action Plan Update.

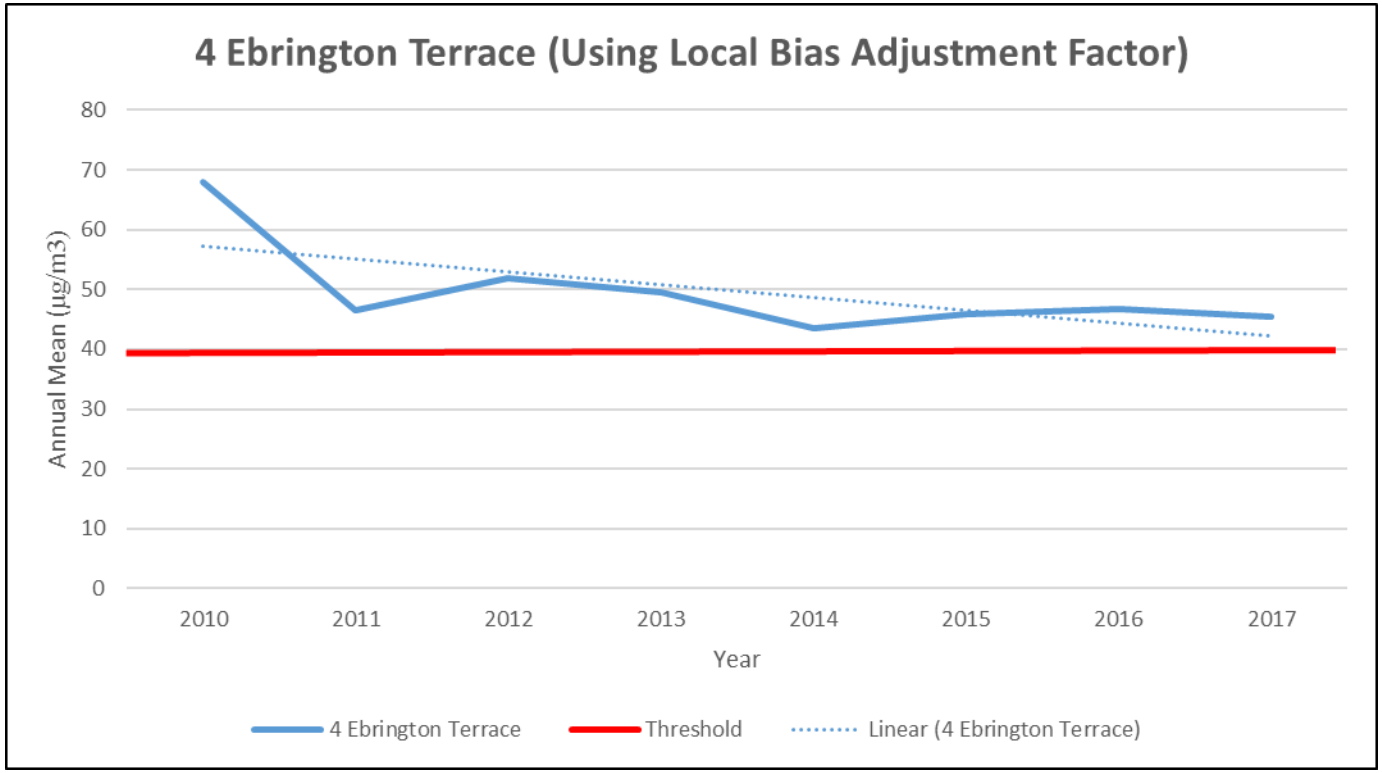
Figures 2.9- 2.19 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites



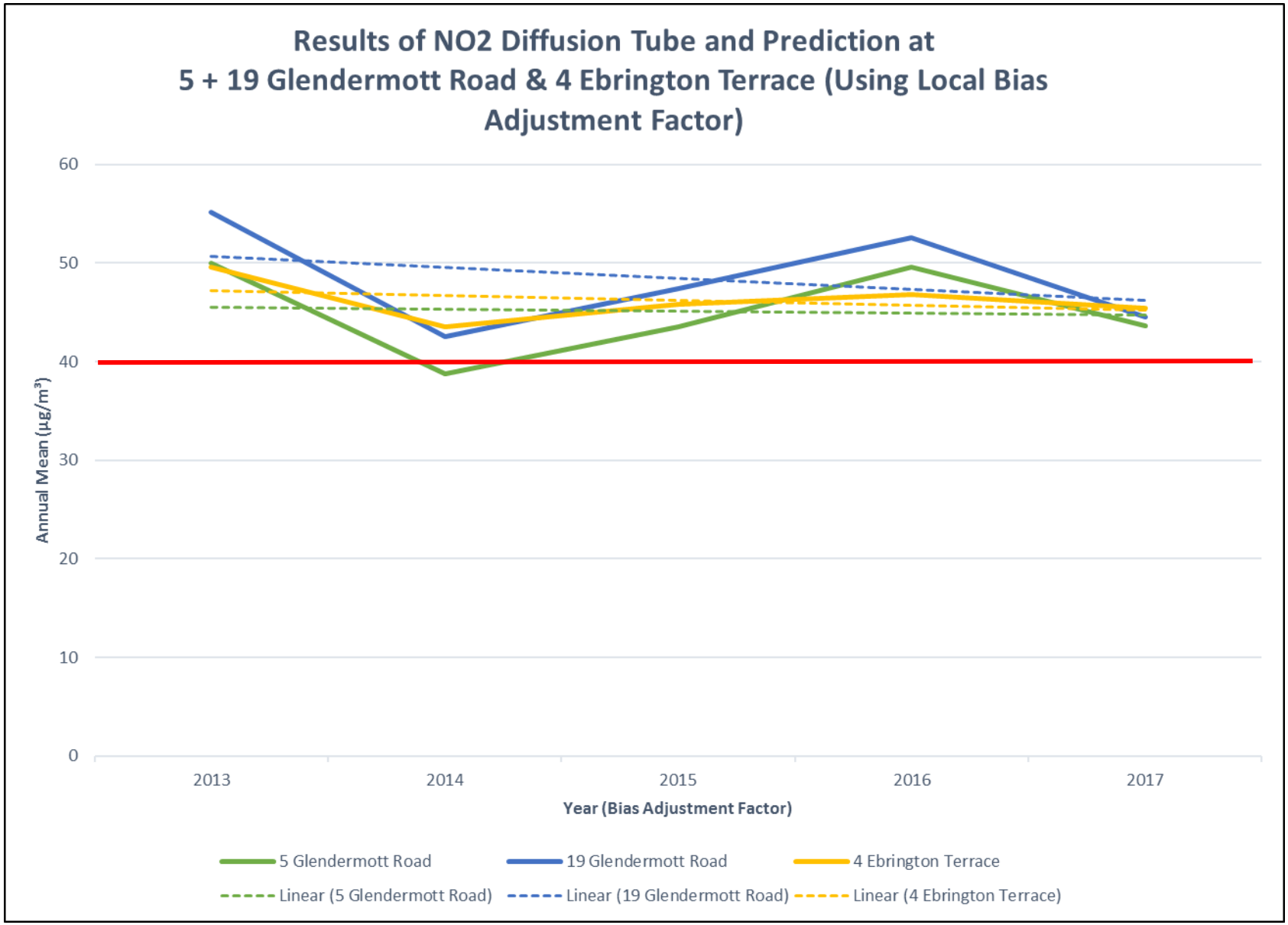
(Fig 2.9)


19 Glendermott Road (Using Local Bias Adjustment Factor)
60
50
40
30
20
10
0
Annual Mean (µg/m3)
2011
2012
2013
2014
2015
2016
2017
Year
19 Glendermott Road
Threshold
Linear (Linear)

(Fig. 2.10)

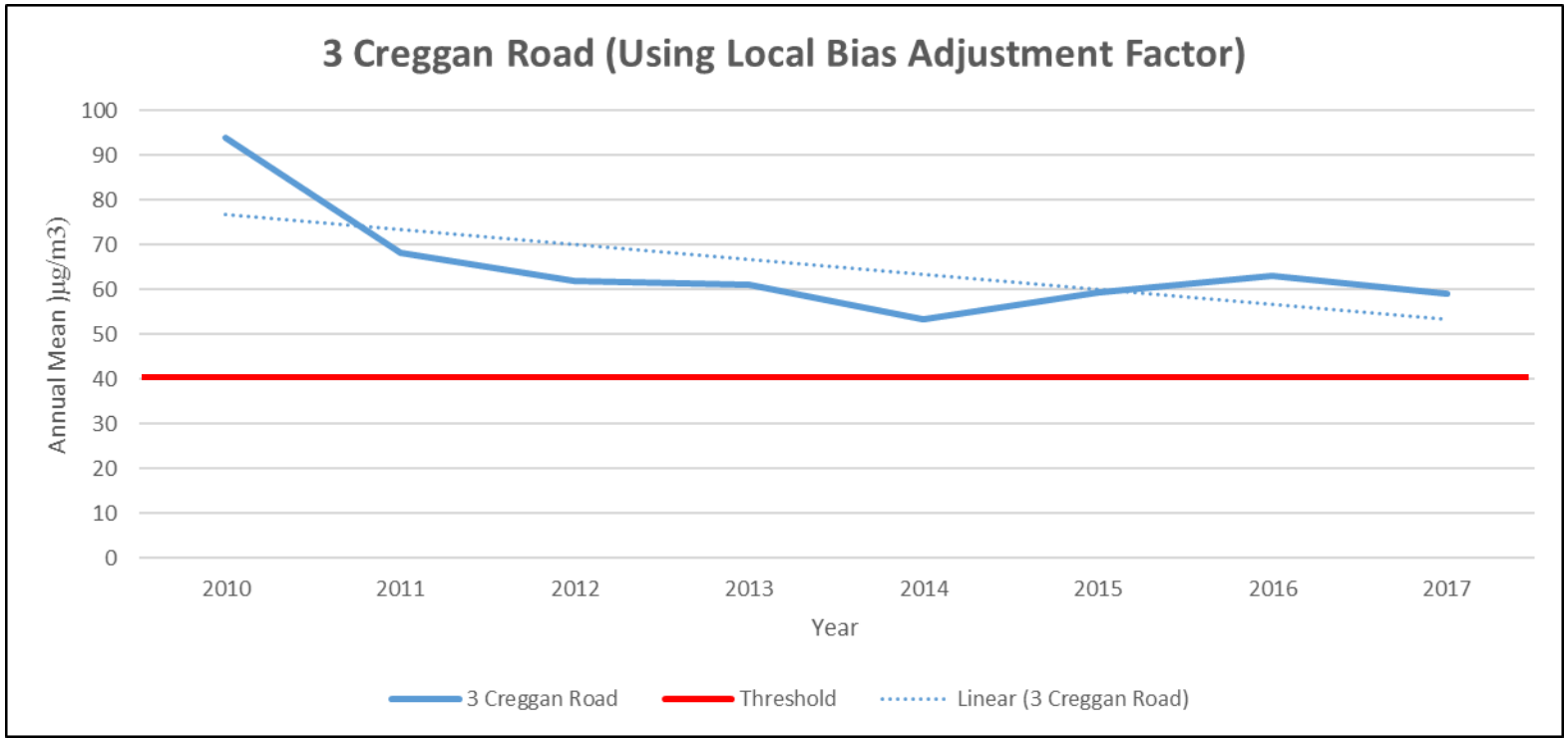

4 Ebrington Terrace (Using Local Bias Adjustment Factor)
Annual Mean (µg/m3)
80
70
60
50
40
30
20
10
0
2010
2011
2012
2013
2014
2015
2016
2017
Year
4 Ebrington Terrace
Threshold
Linear (4 Ebrington Terrace)

(Fig 2.11)

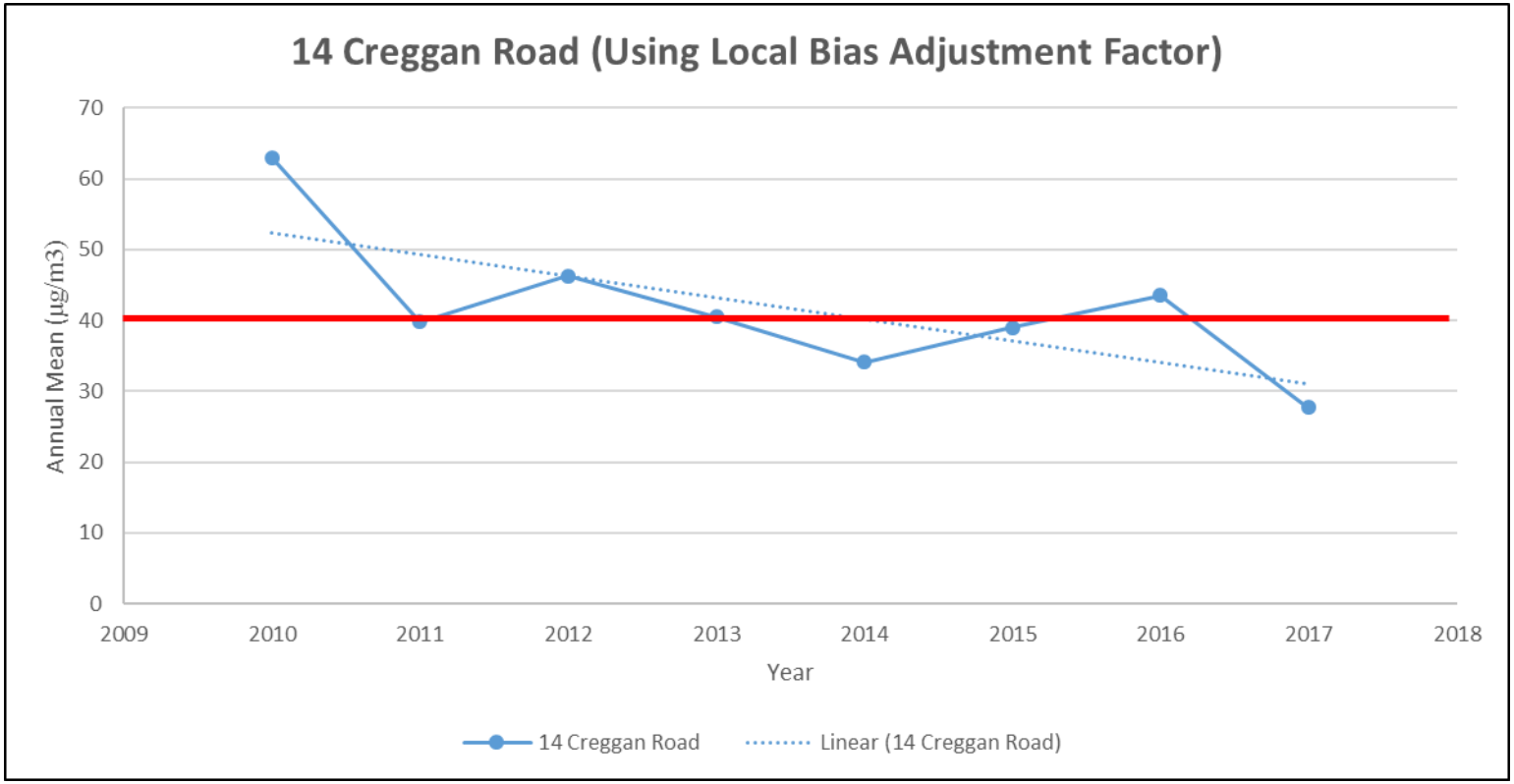

Results of NO2 Diffusion Tube and Prediction at 5 + 19 Glendermott Road & 4 Ebrington Terrace (Using Local Bias Adjustment Factor)
60
50
40
30
20
10
0
Annual Mean (µg/m³)
2013
2014
2015
2016
2017
Year (Bias Adjustment Factor)
5 Glendermott Road
19 Glendermott Road
4 Ebrington Terrace
Linear (5 Glendermott Road)
Linear (19 Glendermott Road)
Linear (4 Ebrington Terrace)

(Fig 2.12)

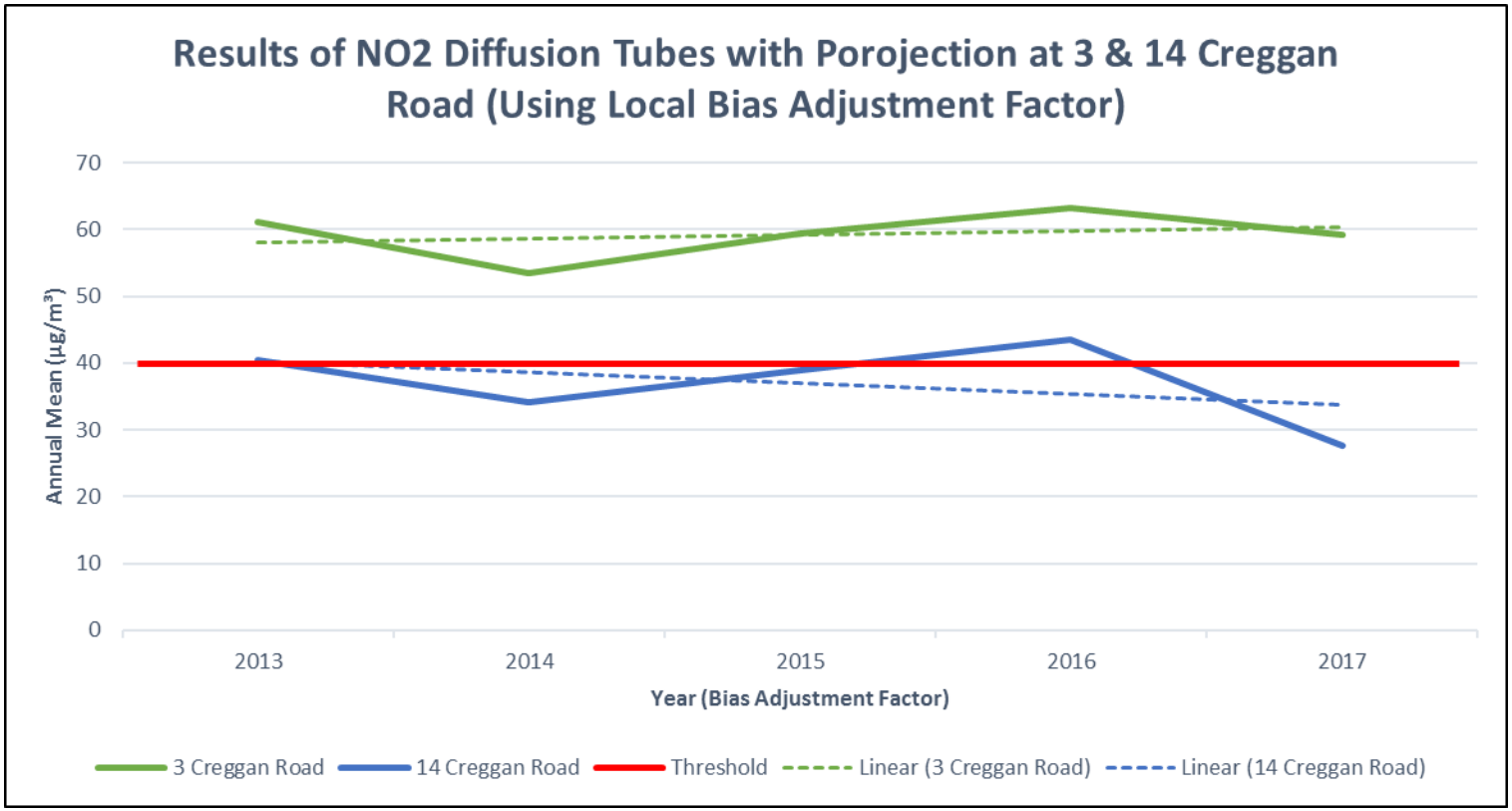
Again, considering longer term data since 2010 and updating from the last LAQM report submitted to include 2017 data (using the local bias correction factor), it can be seen in Figure 2.13 that No.3 Creggan Road is projected to be below the annual mean NO2 limit value of 40ug/m3 as indicated in red on the graph, by mid-2019. At No.14 Creggan Road (Figure 2.14), it is projected that concentrations should have been below the annual mean NO2 limit value by 2013 and to continue to be below the threshold. As for Dale's Corner, the general increase from 2014 to 2016 has negatively altered the overall downward trend and may account for why levels should not go or stay below the limit value earlier. Although the longer term data for 2010-2017 for No.3 Creggan Road shows the downward trend, the 5 period 2013-2017, shows an upward trend. This is reflective of how the pollutant concentrations can vary over the years.


3 Creggan Road (Using Local Bias Adjustment Factor)
Annual Mean)µg/m3)
100
90
80
70
60
50
40
30
20
10
0
2010
2011
2012
2013
2014
2015
2016
2017
Year
3 Creggan Road
Threshold
Linear (3 Creggan Road)

(Fig 2.13)


14 Creggan Road (Using Local Bias Adjustment Factor)
Annual Mean (µg/m3)
70
60
50
40
30
20
10
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Year
14 Creggan Road
Linear (14 Creggan Road)

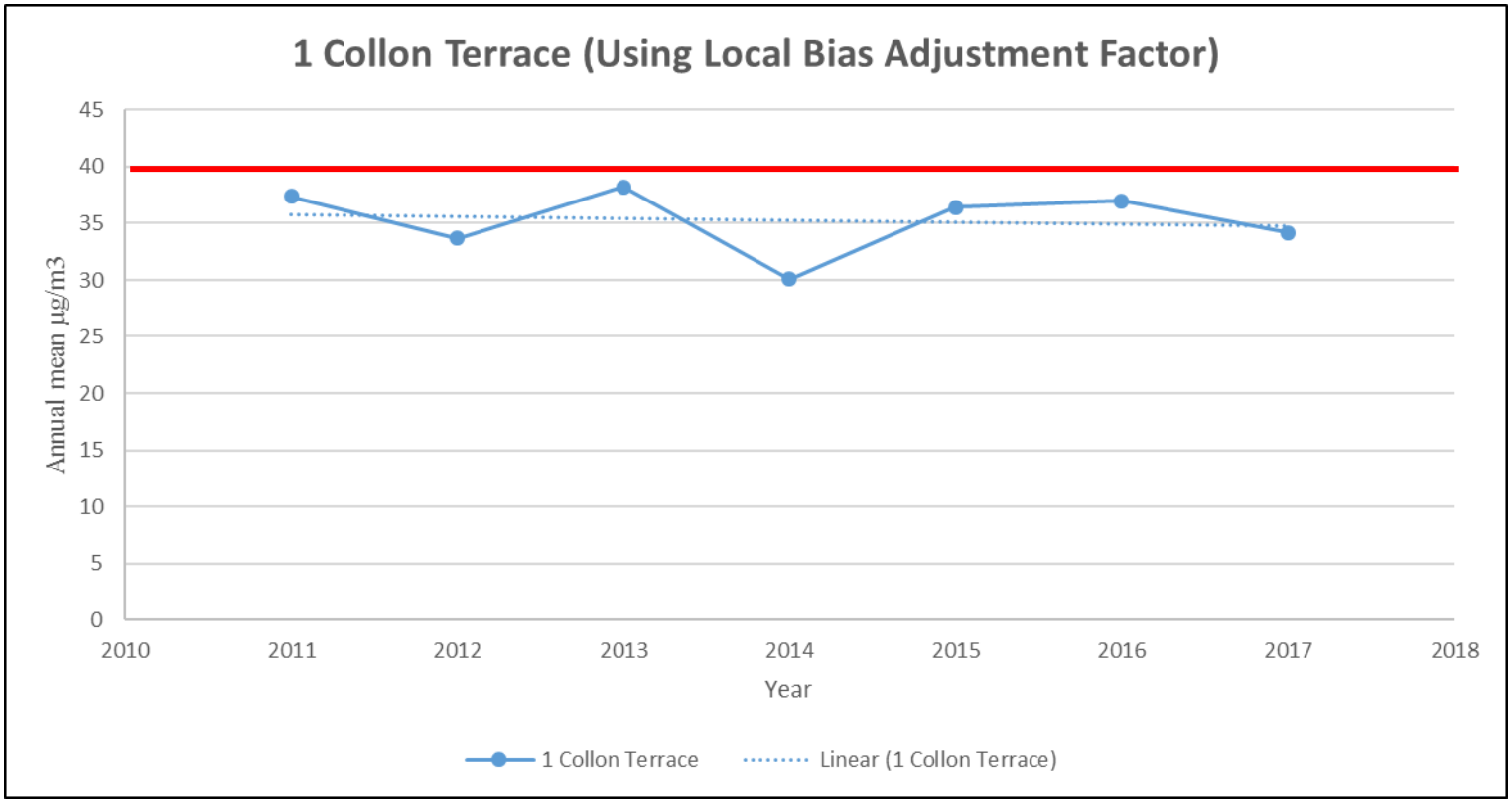
(Fig 2.14)


Results of NO2 Diffusion Tubes with Porojection at 3 & 14 Creggan Road (Using Local Bias Adjustment Factor)
70
60
50
40
30
20
10
0
Annual Mean (µg/m³)
2013
2014
2015
2016
2017
Year (Bias Adjustment Factor)
3 Creggan Road
14 Creggan Road
Threshold
Linear (3 Creggan Road)
Linear (14 Creggan Road)

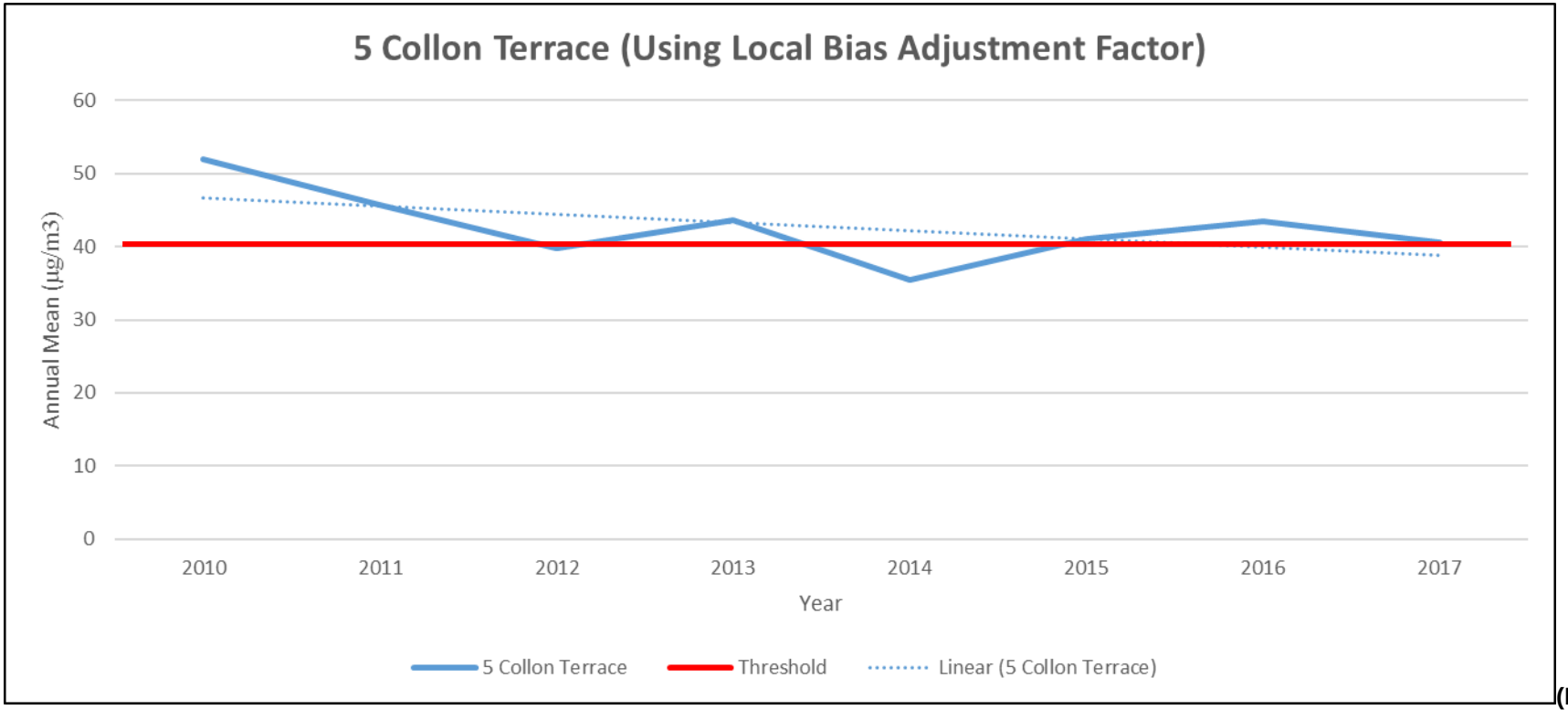
(Fig 2.15)

Again, considering longer term data since 2010 and updating from the last LAQM report submitted to include 2017 data (using the local bias correction factor), Figure 2.16 shows that No.1 Collon Terrace is below the annual mean limit value whilst No. 5 Collon Terrace (Figure 2.17) is projected to have been below the annual mean NO_2 limit value of 40ug/m^3 as indicated in red on the graph, by start of 2016. Using the national bias correction factor, this trend was almost realised in 2016.

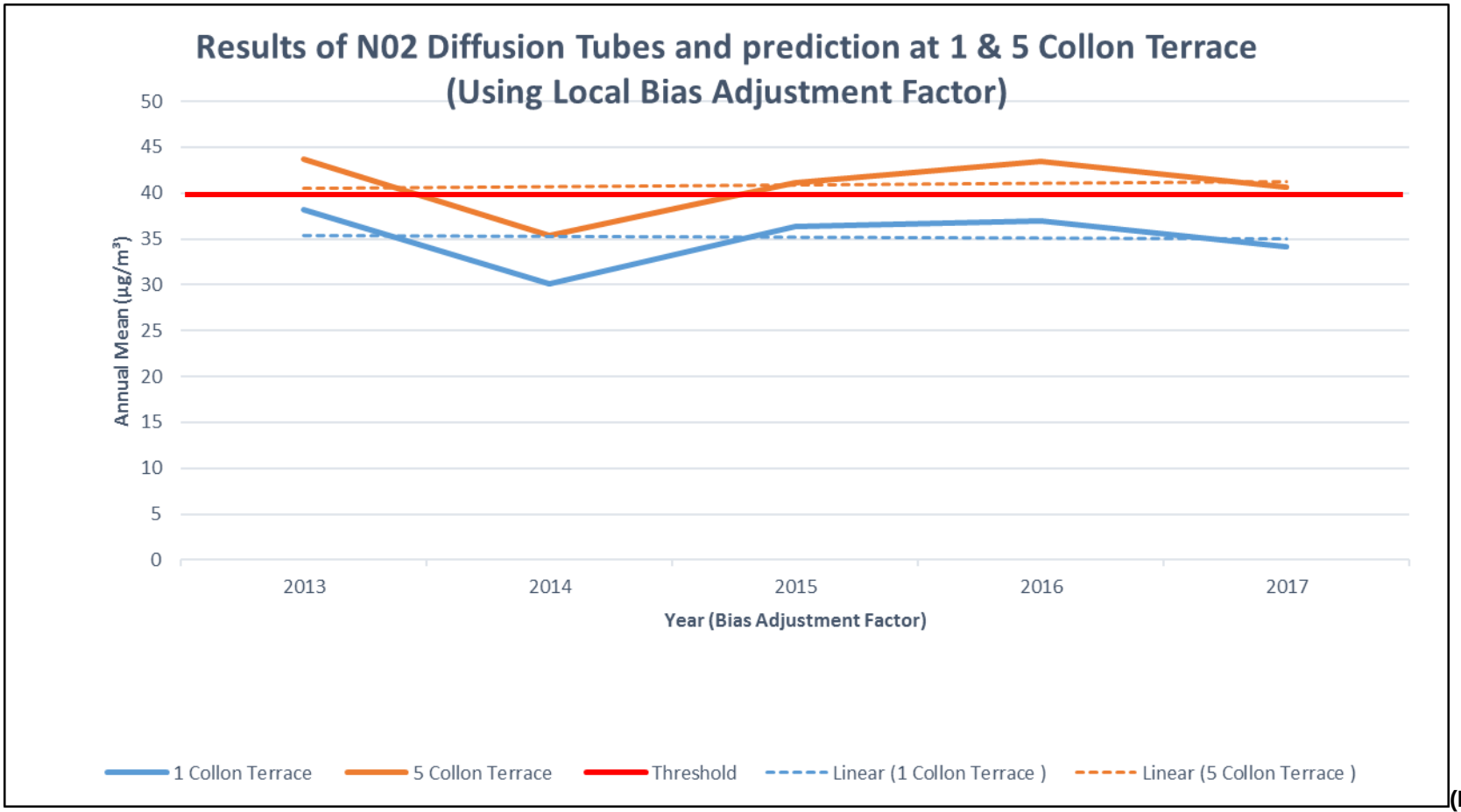
As is the case for the other 2 AQMA's, the general increase at the Buncrana Road AQMA from 2014 to 2016 has negatively altered the overall downward trend and may account for why levels were not below the limit value earlier. The trend suggests that concentrations at No 1 Collon Terrace would appear to have evened out whilst there is a pronounced downward trend at No. 5 Collon Terrace. However, the 5 period 2013-2017, shows a slight upward trend at No. 5 Collon Terrace. This is reflective of how the pollutant concentrations can vary over the years.


1 Collon Terrace (Using Local Bias Adjustment Factor)
45
40
35
30
25
20
15
10
5
0
Annual mean µg/m3
2010
2011
2012
2013
2014
2015
2016
2017
2018
Year
1 Collon Terrace
Linear (1 Collon Terrace)

(Fig 2.16)


5 Collon Terrace (Using Local Bias Adjustment Factor)
60
50
40
30
20
10
0
Annual Mean (µg/m3)
2010
2011
2012
2013
2014
2015
2016
2017
Year
5 Collon Terrace
Threshold
Linear (5 Collon Terrace)

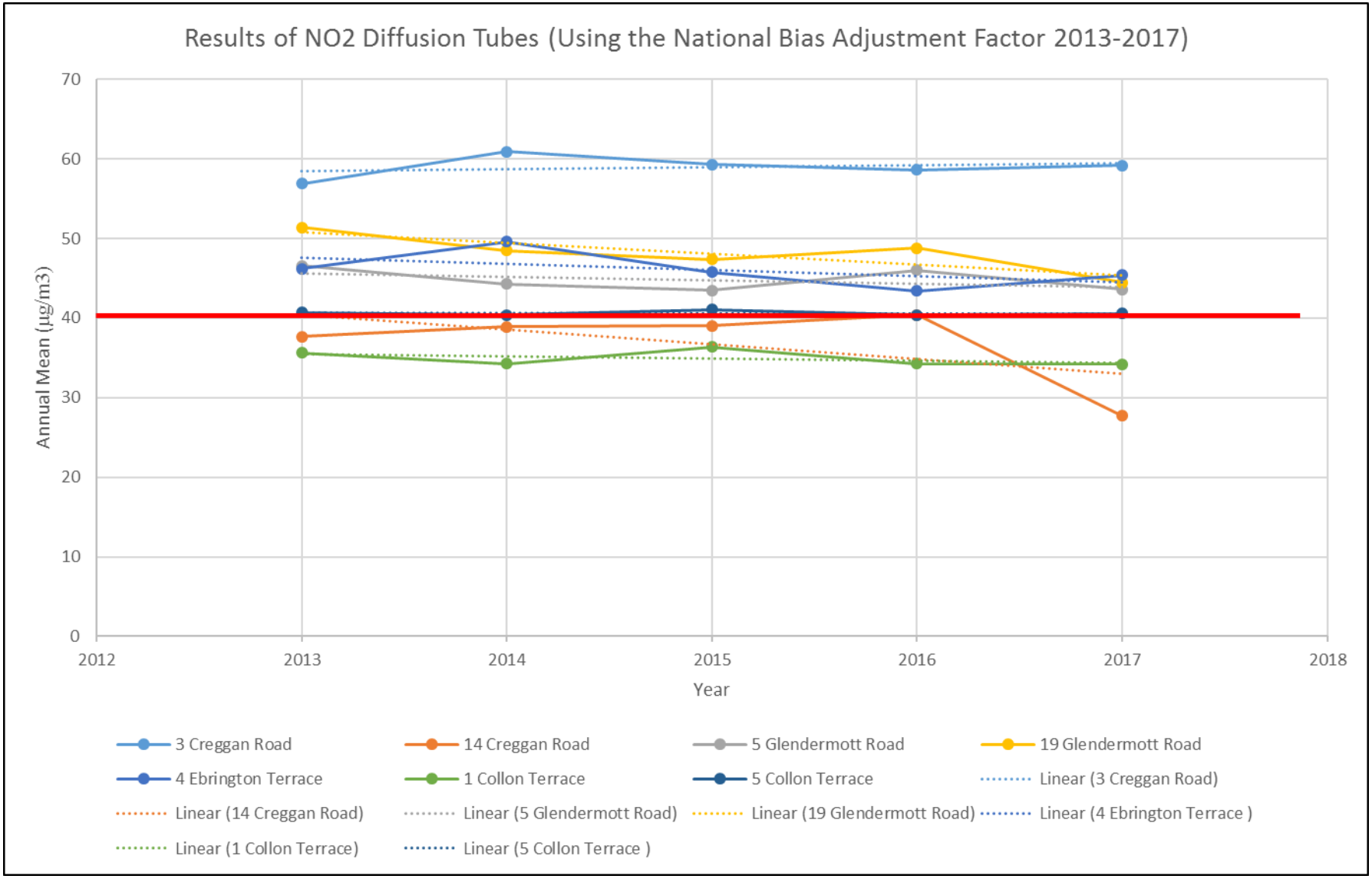
(Fig 2.17)


Results of N02 Diffusion Tubes and prediction at 1 & 5 Collon Terrace
(Using Local Bias Adjustment Factor)
Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year (Bias Adjustment Factor)
1 Collon Terrace
5 Collon Terrace
Threshold
Linear (1 Collon Terrace)
Linear (5 Collon Terrace)

(Fig 2.18)

Figure 2.19 shows data collected from the reviewed monitoring sites, using the National Bias Adjustment Factor for 2013-2017.

14 Creggan Road and 1 Collon Terrace have been consistently below the annual mean NO2 limit value of 40ug/m3. 5 Collon Terrace is shown to be just above the annual mean objective. 3 Creggan Road, 4 Ebrington Terrace and 19 Glendermott Road have been recorded consistently higher than the annual mean objective of 40ug/m3. A general downward trend was observed from 2013-2017, however, 3 Creggan road shows a slight increase over the 5-year period.


Results of NO2 Diffusion Tubes (Using the National Bias Adjustment Factor 2013-2017)
Annual Mean (µg/m3)
70
60
50
40
30
20
10
0
2012
2013
2014
2015
2016
2017
2018
Year
3 Creggan Road
14 Creggan Road
5 Glendermott Road
19 Glendermott Road
4 Ebrington Terrace
1 Collon Terrace
5 Collon Terrace
Linear (3 Creggan Road)
Linear (14 Creggan Road)
Linear (5 Glendermott Road)
Linear (19 Glendermott Road)
Linear (4 Ebrington Terrace)
Linear (1 Collon Terrace)
Linear (5 Collon Terrace)

(**Fig 2.19)**

2.2.2 PM_{10}

The Council monitors PM_{10} at two locations in the district;

- Derry Rosemount
- Springhill Park, Strabane.

The monitoring data is summarised in Table 2.7 for PM_{10} Annual Mean Concentrations in comparison to its Objective and in Table 2.8 for the 24-hour Mean number of exceedances.

Figure 2.20 shows the trends in annual mean PM_{10} concentrations at both sites. Concentrations at Springhill Park show a general downwards trend. There are limited results from Derry Rosemount site due to it only being operational from mid-2016. Both sites were found to be below the annual mean objective for 2017, whereas the Springhill Park monitoring site has been below the annual mean objective in all years (2013-2017). PM10 concentrations had fallen to 15ug/m3 in 2017 at the Springhill Park monitoring site and the downward trend is likely to continue. There was 1 exceedance in 24-hour Mean concentrations at Rosemount and 2 exceedances at the Springhill Park site in 2017.

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 %[a]	Valid Data Capture 2017 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m³				
						2013* [c]	2014* [c]	2015* [c]	2016* [c]	2017 [c]
Derry Rosemount	Urban background	N	92%	92%*	Y	-	-	-	-	11
Springhill Park, Strabane	Urban background	Y	95%	95%	Y	20	17	18	18	15

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] Means should be "annualised" as in Boxes 7.9 and 7.10 of LAQM.TG16, if monitoring was not carried out for the full year.
* Optional

Figure 2.20 Trends in Annual Mean PM_{10} Concentrations

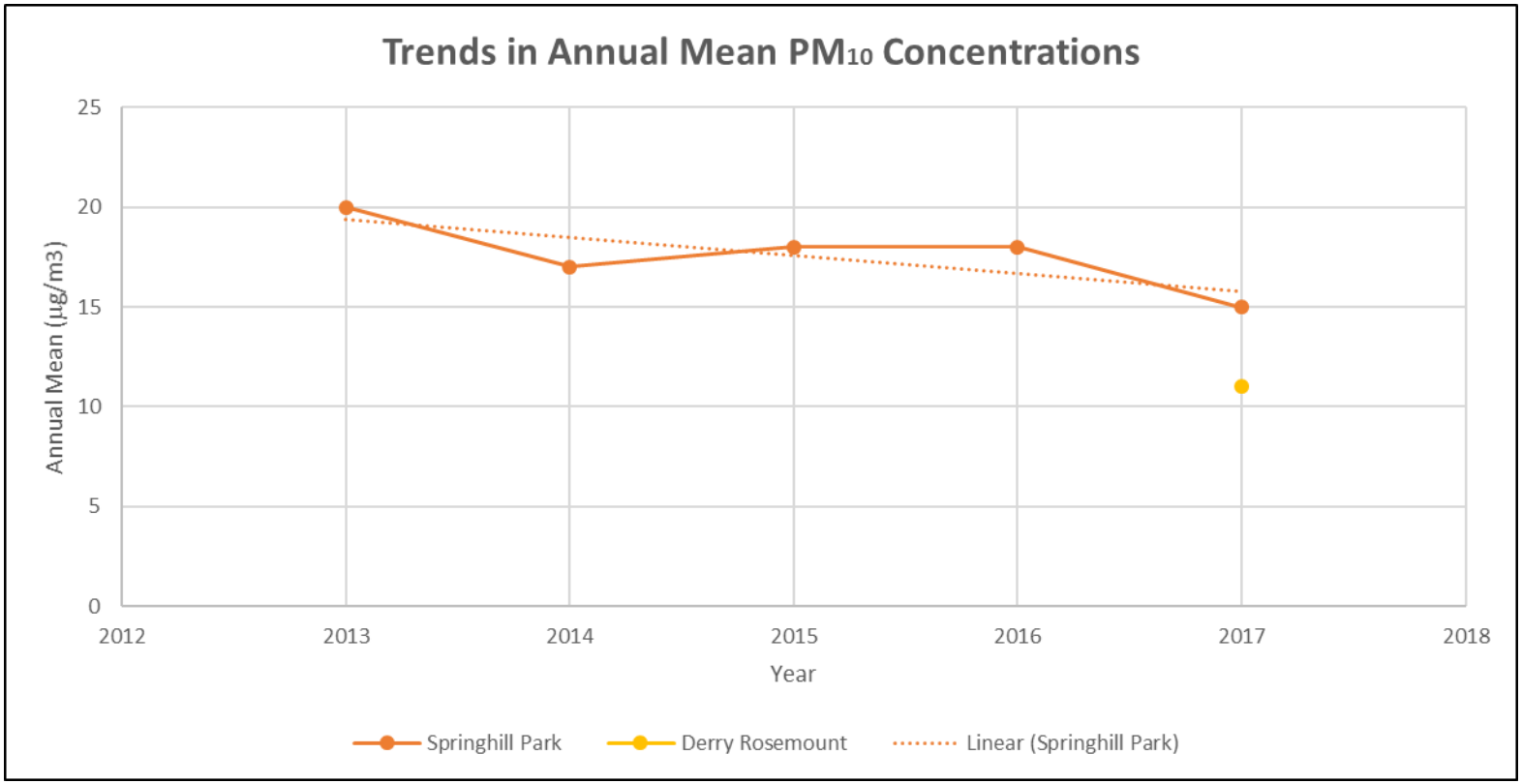


Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2017 %[b]	Confirm Gravimetric Equivalent	Number of Exceedances of 24-Hour Mean (50 μg/m³)				
						2013* [c]	2014* [c]	2015* [c]	2016* [c]	2017 [c]
Derry Rosemount	Urban Background	N	92%	92%	Y	-	-	-	4	1
Springhill road, Strabane	Urban Background	Y	95%	95%	Y	4	2	0	3	2

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] if data capture is less than 85%, include the 90.4th percentile of 24-hour means in brackets
* Optional

2.2.3 Sulphur Dioxide

The monitoring data are shown in Table 2.9. There were no exceedances of the objectives at either site in 2017.

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

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2017 %[b]	Number of Exceedances (percentile in bracket μg/m³)[c]		
					15-minute Objective (266 μg/m³)	1-hour Objective (350 μg/m³)	24-hour Objective (125 μg/m³)
Derry Rosemount	Urban Background	N	96%	96%	0	0	0
Springhill Road, Strabane	Urban Background	Y	98%	98%	0	0	0

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] if data capture is less than 85%, include the relevant percentile in brackets

2.2.4 Benzene

No benzene monitoring takes place within Derry City and Strabane District Council.

2.2.5 Other pollutants monitored

$PM_{2.5}$

$PM_{2.5}$ is measured at the Derry Rosemount 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.TG16, shown in Table 2.10.

Table 2.10 Results of Automatic Monitoring of $PM_{2.5}$: Comparison with Annual Mean Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2017 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m³				
						2013	2014	2015	2016	2017
Derry Rosemount	Urban background	N	96%	96%	Y	-	-	-	-	8

Ozone (O3)

Ozone is measured at the Derry Rosemount site. O3 is a transboundary pollutant; the sources of O3 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.TG16.

The monitoring data are shown in Table 2.11. There were no exceedances of 8-Hour Running Mean in 2016/ 2017.

Table 2.11 Results of Automatic Monitoring of Ozone: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2017 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Number of exceedances of 8-Hour Running Mean (100 μg/m^3)				
						2013	2014	2015	2016	2017
Derry Rosemount	Urban background	N	99%	99%	Y	-	-	-	0	0

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

2.2.6 Summary of Compliance with AQS Objectives

Derry City and Strabane District Council has examined the results from monitoring in the district. Concentrations outside of the AQMAs are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment. The results within the Strand Road AQMA have not exceeded the objective since 2010 and Council is in process of passing an Order to revoke the AQMA. Council is also, in the same Order, reducing the extent of the Spencer Road AQMA and furthermore revoking the 3 AQMA's declared for PM_{10} in the Strabane district of the Council area.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Narrow congested streets were considered in previous assessments.

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

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

Busy streets where people may spend 1-hour or more close to traffic were considered in previous assessments.

Derry City and Strabane District 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.

Roads with a high flow of buses and/or HGVs were considered in previous assessments.

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

3.4 Junctions

Junctions were considered in previous assessments.

Derry City and Strabane District 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

No new roads have been identified.

Derry City and Strabane District Council confirms that there are no new/proposed roads that have not been considered in previous reports.

3.6 Roads with Significantly Changed Traffic Flows

No roads with significantly changed traffic flows have been identified.

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

3.7 Bus and Coach Stations

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

4 Other Transport Sources

4.1 Airports

Airports were considered in previous assessments.

Derry City and Strabane District Council confirms that there are no new airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Stationary trains were considered in previous assessments.

Derry City and Strabane District 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

Moving trains were considered in previous assessments.

Derry City and Strabane District 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)

Ports and shipping were considered in previous assessments.

Derry City and Strabane District 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 installations have been identified.

Derry City and Strabane District 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 relevant installations have been identified.

Derry City and Strabane District 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

All installations were considered in previous assessments.

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

5.2 Major Fuel (Petrol) Storage Depots

Major fuel storage depots were considered in previous assessments.

There are major fuel (petrol) storage depots within Derry City and Strabane District Council area, but these have been considered in previous reports.

5.3 Petrol Stations

Petrol stations were considered in previous assessments.

Derry City and Strabane District Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

No relevant poultry farms have been identified.

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Biomass combustion was considered in previous assessments.

Derry City and Strabane District 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

Biomass combustion was considered in previous assessments.

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

6.3 Domestic Solid-Fuel Burning

Domestic solid-fuel burning was considered in previous assessments.

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

7 Fugitive or Uncontrolled Sources

Fugitive sources were considered in previous assessments.

Derry City and Strabane District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area other than quarries which are detailed in Section 7.1.

7.1 Planning Applications

Derry and Strabane District Council considers all planning applications that are submitted in the district. If any proposed development has the potential to adversely affect air quality in relation to the relevant public exposure criteria, as described in the most recent Technical Guidance LAQM.TG16, the developer is requested to submit an air quality assessment.
The following developments have the potential to adversely affect air quality:

Planning application No. A/2006/0441/O
Development: Site for residential development to include: mix of house types, local community facilities, open space, pedestrian and vehicular access, primary school, drainage and other infrastructure. (Revised Concept Masterplan September 2008)

Location: Land west of Buncrana Road between Whitehouse Road and Benview, Coshquin (identified as part of zone)

The normal assessment format is for the developer to submit an air quality report before commencement of the development, predicting worst case scenario effects in future years (completion of the development) on pollutant concentrations at relevant receptors. The developer intimated that the above proposed development is projected to take in excess of 20 years to complete and a number of Reserved Matters applications are to be submitted at different stages as the work progresses. To more accurately take account of changes in air quality modelling inputs such as background pollutant levels, traffic fleet factors, sustainable travel initiatives etc. over

the long period of construction, Council attached a condition to the planning permission stipulating that an air quality impact assessment shall be undertaken at each Reserved Matters application to quantify localised effects on air quality and also the effects of the additional traffic emanating from the H2 development on the existing Air Quality Management Area (AQMA) at Buncrana Road/Racecourse Road.

Planning application No. A/ LA11/2017/0665/RM

Development: Proposed residential development of 241 no dwellings comprising a mix of 102 detached; 124 semi-detached and 15 apartments, associated domestic garages, new right hand turn lane; public open space including equipped children's play area; all associated landscaping and site and access works.

Location: Lands situated to the north and east of The Beeches; and north east of Old School Field Glenshane Road Drumahoe Country Londonderry (Lands part of H25 housing zoning in Derry Area Plan 2011)

An air quality addendum assessment was undertaken to quantify the effects of traffic from the proposed development on the existing AQMA at Dale's Corner in the Waterside district of the city.

The results of the assessment have shown that the proposed development, in its operational phase, is expected to have a moderate adverse impact, as the estimated concentrations at two relevant receptors within the AQMA are above the Air Quality Strategy (AQS) objective for Nitrogen Dioxide (NO_2). The report predicted the impact at both receptors to amount to 0.1ug/m^3 and concluded that the proposed development is not likely to have a significant effect on local air quality at existing receptors within Dales Corner AQMA.

Whilst Council acknowledges the very small increase in NO_2 pollutant concentrations, it is accepted that the authors of this air quality assessment have used a conservative approach, namely the Highways Agency's Design Manual for Roads and Bridges (DMRB) screening model, so it is possible that results have been overestimated and present a worst-case scenario.

There are a number of applications for quarries/ extensions to quarries in the Council district where the potential exists for PM_{10} emissions to affect nearby dwellings. The quarries have been screened in accordance with Table 7.5 – Screening Assessment of Fugitive or Uncontrolled Sources of the Technical Guidance LAQM.TG16**.**

Planning Application No. A/2011/0115/F

Development: (Additional information received) Extension to quarry including consolidation and deepening of extraction areas previously approved under planning consents A/1998/0635/F and A/442/75, retention of entrance gates and security fence, installation of wheel-wash, weighbridge and office use, use of mobile crushing and screening plant (mobile jaw crusher, mobile cone crusher and mobile screener), native species planting, landscaping and full site restoration

Location: Gortree Quarry Gortree Road Gorticross Londonderry BT47 3LN

A condition was attached to the planning permission stipulating that all dust mitigation measures specified in the document entitled '*Dust Impact Assessment*' prepared by Envest Environmental Ltd and dated 23rd June 2014, shall be instigated to minimise the generation and movement of dust from the proposed development to surrounding residential dwellings. Council will monitor compliance with the specified dust mitigation measures in response to any complaints at the quarry.

Planning Application No. J/2007/0416/F

Development: Proposed sand and gravel extraction with on-site processing plant and associated access road and settlement ponds

Location: 360m North East of 35 Castlewarren Road, Donemana, Co. Tyrone (Church Hill & Fawney Townlands), BT82 0PJ

A dust management plan has recently been submitted in support of the above application. Subject to Council approval a condition shall be attached to any planning approval stipulating that all dust mitigation measures specified in the plan are

adhered to. Compliance monitoring shall be undertaken in response to any complaints.

Planning Application No. LA11/2015/0642/F

Development: Removal of condition 1 from application J/2004/0435/F to allow time for extraction until 18th July 2022

Location: 65 Moorlough Road, Strabane

Council granted permission that condition 1 of planning reference J/2004/0435/F be removed to allow for the extraction of material to be extended until 18th July 2022 and all conditions and in-formatives attached to the original decision notice (J/2004/0435/F) in relation to dust/air quality remain applicable to all processing within the red line of the application.

Planning Application No. LA11/2015/0655/F

Development: Removal of condition 1 from application J/2009/0501/F to allow for extraction to be extended until 23rd May 2022

Location: Lands west and adjacent to 65 Moorlough Road, Strabane

Planning permission was granted in relation to a time extension for extraction and processing of materials. Council attached conditions and in-formatives attached to the original decision notice (J/2009/0501/F) in relation to dust/air quality remain applicable to all processing within the red line of the application.

Planning Application No. LA11/2016/0342/F

Development: Leitrim Hill Quarry

Location: Leitrim Hill Aghnadoo Road Killeter Castlederg Co Tyrone

Council stipulated that, within 3 months of the development becoming fully operational, a 'Dust Management Plan' shall be submitted to Council for written

approval and that the dust control measures identified within the Plan shall be adhered to at all times.

Planning Application No. LA11/2017/0101/F

Development: Variation of condition No. 2 of planning permission A/2005/0467/F

Location: 380m South of 528 Glenshane Road, Claudy

Council granted permission and suggested mitigation measures be undertaken to ensure suppression of dust.

Planning Application No. LA11/2018/0259/DETEIA

Development: Sand and gravel quarry, including internal haul road and associated works

Location: lands north of St James Church, Longland Road & East of Duncastle Road, Donemana

Council is currently assessing this application.

Planning Application No. LA11/2016/1019/F

Development: Proposed extension to existing sand and gravel quarry, access and associated works

Location: Lands 85 metres to the North West of 42 Longlands Road, Donemana, Co Derry

Council granted permission and conditioned mitigation measures be undertaken to ensure suppression of dust.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

There were no exceedances of any objectives outside the existing AQMA boundaries, or within the Strand Road AQMA.

8.2 Conclusions from Assessment of Sources

No significant changes in emissions sources within the Derry and Strabane District Council area have been identified. No new developments have been identified which would significantly impact on air quality at relevant locations.

8.3 Proposed Actions

DCSDC is now in the process of revoking the AQMA's declared for Strabane, Newtownstewart and Castlederg in relation to exceedances of the air quality objectives for particulates (PM10). The former SDC Action Plan measures have now been realised and pollution levels have reduced to well below health limit values. However, the Smoke Control Areas shall be maintained and enforced.
The AQMA at Strand Road, declared due to nitrogen dioxide emissions, is in process of revocation and the AQMA at Spencer Road shall be reduced in size to reflect updated monitoring and modelling results. The remaining AQMAs are considered appropriate and should remain unchanged for the time-being.

The Council is currently revising the Air Quality Action Plan to reflect the new Council boundary. The Action Plan shall contain measures to be introduced to work towards achieving air quality objectives within the remaining AQMAs to improve health and wellbeing across the Council area.

9 References

Defra (2007*) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Defra.

Defra (2016) *Review & Assessment: Technical Guidance LAQM.TG16*, Defra.

The Environment (Northern Ireland) Order 2002, Statutory Instrument 3153 (2002), HMSO.

Appendices

Appendix A: QA/QC Data

Appendix B: Air Quality Report- Dale's Corner

Appendix C: Air Quality Report- Springhill Park, Strabane

Appendix D: Calculations of Precision and Accuracy of Triplicate Tubes- Dale's Corner

Appendix E: Calculations of Precision and Accuracy of Triplicate Tubes- Derry Rosemount

Appendix F: Distance Correction for NO_2 diffusion tubes at Dale's Corner Roadside site

Appendix A: QA/QC Data

Factor from Local Co-location Studies (if available)

Two local co-location studies have been undertaken at the Rosemount AURN and Dale's Corner automatic sites. Local bias adjustment factors of 0.71, 0.79 and 0.83 and 0.86 have been calculated for the years 2014, 2015 2016 and 2017 respectively, as shown in Table A.1.

	2014	2015	2016	2017
Rosemount AURN	0.81	0.77	0.72	0.72
Dale's Corner	0.63	0.8	0.99	0.99
Overall Factor [a]	0.71	0.79	0.83	0.86

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Environmental Scientifics Group (ESG) Didcot utilising the 50% triethanolamine (TEA) in acetone preparation method. Bias adjustment factors of 0.76, 0.78 and 0.78 for the years 2014, 2015 and 2016 respectively have been obtained from the national bias adjustment calculator[1].

Discussion of Choice of Factor to Use

The Technical Guidance LAQM.TG16 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 NOx / NO_2 continuous analysers. Alternatively, the national database[1] of diffusion tube co-location surveys provides bias adjustment factors for the relevant laboratory and preparation method.

[1] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/18, published in March 2018.

PM Monitoring Adjustment

No adjustment to the PM monitoring data was required.

QA/QC of Automatic Monitoring

The sites are managed to the UK Automatic Urban and Rural Network (AURN) QA procedures and standard.
The National Physical Laboratory (NPL) undertakes the Quality Assurance/Quality Control (QA/QC) procedures at the two monitoring sites, ensuring that measurements from the analysers are as accurate as possible.
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 NPL.

QA/QC of Diffusion Tube Monitoring

ESG Didcot has participated in the AIR NO2 PT scheme since it started in April 2014, and participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO2 diffusion tube analysis prior to this. These schemes provide strict performance criteria for participating laboratories to meet, thereby ensuring NO2 concentrations reported are of a high calibre. AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme. AIR offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air. One such sample is the AIR NO2 test sample type that is distributed to participants in a quarterly basis. AIR NO2 PT forms an integral part of the UK NO2 Network's QA/QC. The scores achieved by ESG Didcot are shown in Table A.2.
The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Laboratory summary performance for AIR NO2 PT rounds AR013, 15, 16, 18, 19, 21, 22 and 24

AIR PT Round	AIR PT AR013	AIR PT AR015	AIR PT AR016	AIR PT AR018	AIR PT AR019	AIR PT AR021	AIR PT AR022	AIR PT AR024
Round conducted in the period	April – May 2016	July – August 2016	September – October 2016	January – February 2017	April – May 2017	July – August 2017	September – October 2017	January – February 2018
Environmental Services Group, Didcot [1]	75 %	75 %	100 %	100 %	100 %	100 %	100 %	100 %

[1] Participant subscribed to two sets of test samples (2 x 4 test samples) in each AIR PT round.

Appendix B

Air Quality Report

Produced by AQDM on behalf of Derry

DERRY DALE'S CORNER 2017

These data have been fully ratified by AQDM to the LAQM (TG16) standards

Site Environment and Description

KERBSIDE: Corner of King Street and Melrose Terrace

Statistical Summary Report

This 2017 report contains all the statistics required for the LAQM reporting.

First table – Air Quality Statistics

The top four lines show the duration within the bands of the Daily Air Quality Index (DAQI). This was introduced by Defra on January 2012 and revised April 2013. The number of occasions within each band is summarised as follows.

DAQI Pollutant	Moderate	High	Very High
NO_2	1 hour	0	0

Nitrogen Dioxide was Moderate on 4th Jan with an hourly mean reaching 205 µg m^{-3}.

Data Captures

The annual data captures are shown on the bottom line. These were above the 85% target.

Second table – Air Quality Exceedences

NO_2 – annual data capture was 98.8 %

The annual mean was 36 µg m^{-3} which did not exceed the 40 µg m^{-3} Objective.

The maximum hourly mean was 205 µg m^{-3} so there were no exceedences of the NO_2 hourly limit of 200 µg m^{-3}. There is an annual allowance of 18 hours so this Objective was not exceeded.

Air Quality Report
DERRY DALE'S CORNER 2017

Air Quality Statistics

Pollutant	NO_2	NO	NO_x
Number Very High #	0	-	-
Number High #	0	-	-
Number Moderate #	1	-	-
Number Low #	8652	-	-
Maximum 15-min mean	241 µg m^{-3}	759 µg m^{-3}	1350 µg m^{-3}
Maximum hourly mean	205 µg m^{-3}	515 µg m^{-3}	941 µg m^{-3}
Maximum running 8-hr mean	134 µg m^{-3}	266 µg m^{-3}	515 µg m^{-3}
Maximum running 24-hr mean	94 µg m^{-3}	168 µg m^{-3}	345 µg m^{-3}
Maximum daily mean	88 µg m^{-3}	115 µg m^{-3}	255 µg m^{-3}
Average	36 µg m^{-3}	27 µg m^{-3}	77 µg m^{-3}
Data capture	98.8 %	98.8 %	98.8 %

Daily Air Quality Index (DAQI) as defined by COMEAP January 2012 and revised April 2013
Mass units for the gases are at 20'C and 1013mb
NO_x mass units are NO_x as NO_2 µg m^{-3}

Air Quality Exceedences

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Max Conc	Number	Days	Allowed	Exceeded
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	36 µg m^{-3}	0	-	-	No
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	205 µg m^{-3}	1	1	18 hours	No

Air Quality Report
DERRY DALE'S CORNER 2017

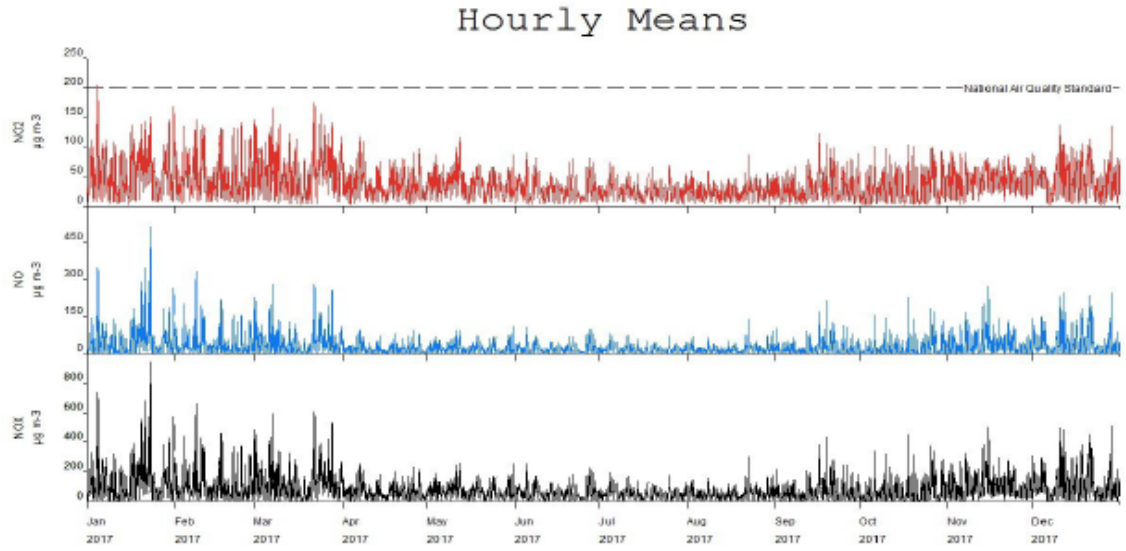
Monthly Data Captures %

Pollutant	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nitrogen Dioxide	99.3	98.8	99.6	100.0	98.1	98.1	94.5	98.0	99.3	99.9	99.9	100.0

Monthly Means

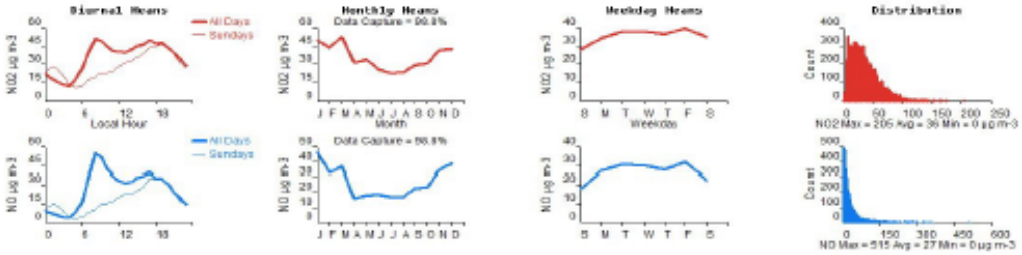
Pollutant	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nitrogen Dioxide µg m^{-3}	49	44	52	31	34	26	23	23	29	31	42	42

Air Quality Report
DERRY DALE'S CORNER 2017



Air Quality Report

DERRY DALE'S CORNER 2017



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Appendix C

Air Quality Report

Produced by AQDM on behalf of Strabane

STRABANE SPRINGHILL PARK 2017

These data have been fully ratified by AQDM to the LAQM (TG16) standards

Site Environment and Description

URBAN BACKGROUND: Springhill Park

Statistical Summary Report

This 2017 report contains all the statistics required for the LAQM reporting.

First table – Air Quality Statistics

The gravimetric PM_{10} (BAM / 1.21) is shown in the 2nd column while the uncorrected BAM PM_{10} is in the 3rd.

The top four lines show the duration within the bands of the Daily Air Quality Index (DAQI). This was introduced by Defra on January 2012 and revised April 2013. The number of occasions within each band is summarised as follows.

DAQI Pollutant	Moderate	High	Very High
Gravimetric PM_{10}	2 days	0	0
SO_2	0 15-minutes	0	0

Gravimetric PM_{10} was Moderate on 22nd Jan, 14th Feb with a daily mean reaching 61 $\mu g\ m^{-3}$.

Data Captures

The annual data captures are shown on the bottom line. These were above the 85% target.

Second table – Air Quality Exceedences

Gravimetric PM_{10} – annual data capture was 95.2 %

The maximum daily mean was 61 $\mu g\ m^{-3}$ so the daily mean limit value of 50 $\mu g\ m^{-3}$ was exceeded on 2 days. The annual allowance is 35 days so this Objective was not exceeded.

The annual mean was 15 $\mu g\ m^{-3}$ which did not exceed the 40 $\mu g\ m^{-3}$ Objective.

SO_2 – annual data capture was 97.9 %

The maximum 15-minute mean was 85 $\mu g\ m^{-3}$ so the 266 $\mu g\ m^{-3}$ limit was not exceeded. There is an annual allowance of 35 15-minute means so the Objective was not exceeded.

The maximum hourly mean was 32 $\mu g\ m^{-3}$ so the 350 $\mu g\ m^{-3}$ limit was not exceeded. There is an annual allowance of 24 hours so the Objective was not exceeded.

The maximum daily mean was 10 $\mu g\ m^{-3}$ so the 125 $\mu g\ m^{-3}$ limit was not exceeded. There is an annual allowance of 3 days so the Objective was not exceeded.

The annual mean was 3 $\mu g\ m^{-3}$ which did not exceed the 20 $\mu g\ m^{-3}$ Objective.

Air Quality Report
STRABANE SPRINGHILL PARK 2017

Air Quality Statistics

Pollutant	PM_{10}^{+}	PM_{10}^{*}	SO_2
Number Very High #	0	-	0
Number High #	0	-	0
Number Moderate #	2	-	0
Number Low #	347	-	34285
Maximum 15-min mean	-	-	85 µg m^{-3}
Maximum hourly mean	152 µg m^{-3}	182 µg m^{-3}	32 µg m^{-3}
Maximum running 8-hr mean	81 µg m^{-3}	98 µg m^{-3}	22 µg m^{-3}
Maximum running 24-hr mean	61 µg m^{-3}	74 µg m^{-3}	11 µg m^{-3}
Maximum daily mean	61 µg m^{-3}	73 µg m^{-3}	10 µg m^{-3}
Average	15 µg m^{-3}	19 µg m^{-3}	3 µg m^{-3}
Data capture	95.2 %	95.2 %	97.9 %

Daily Air Quality Index (DAQI) as defined by COMEAP January 2012 and revised April 2013
+ PM_{10} as measured by a BAM using a gravimetric factor of 0.833 for Indicative Gravimetric Equivalent
* PM_{10} as measured by a BAM
Mass units for the gases are at 20'C and 1013mb

Air Quality Exceedences

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Max Conc	Number	Days	Allowed	Exceeded
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	61 µg m^{-3}	2	2	35 days	No
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	15 µg m^{-3}	0	-	-	No
Sulphur Dioxide	15-minute mean > 266 µg m^{-3}	85 µg m^{-3}	0	0	35 15 mins	No
Sulphur Dioxide	Hourly mean > 350 µg m^{-3}	32 µg m^{-3}	0	0	24 hours	No
Sulphur Dioxide	Daily mean > 125 µg m^{-3}	10 µg m^{-3}	0	0	3 days	No
Sulphur Dioxide	Annual mean > 20 µg m^{-3}	3 µg m^{-3}	0	-	-	No

Air Quality Report
STRABANE SPRINGHILL PARK 2017

Monthly Data Captures %

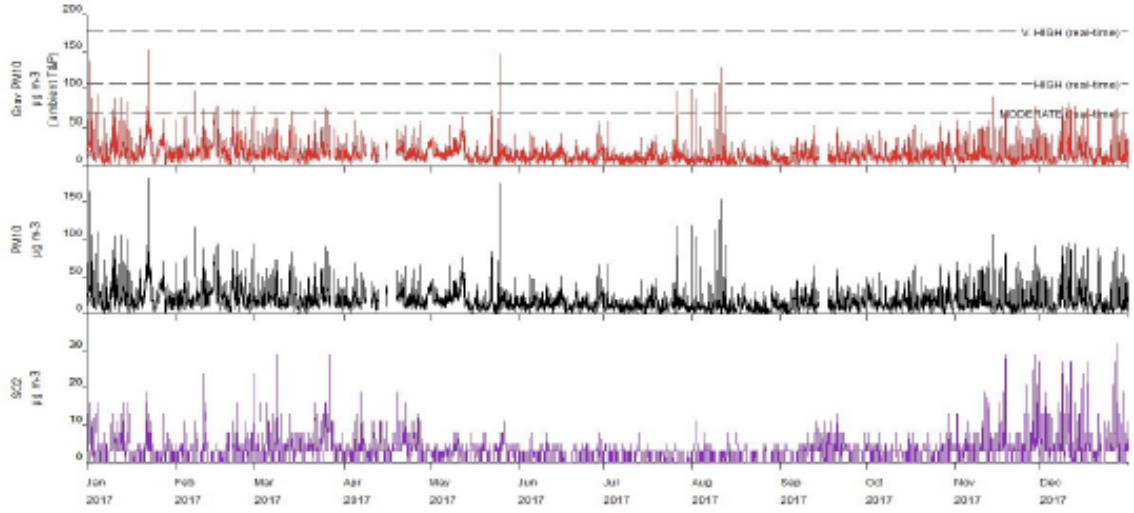
Pollutant	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PM_{10}	99.2	99.4	94.4	74.9	99.7	98.5	94.6	96.1	88.2	97.8	99.4	99.5
Sulphur Dioxide	95.7	95.5	94.0	99.2	97.3	99.3	98.1	98.8	98.8	98.9	99.7	99.9

Monthly Means

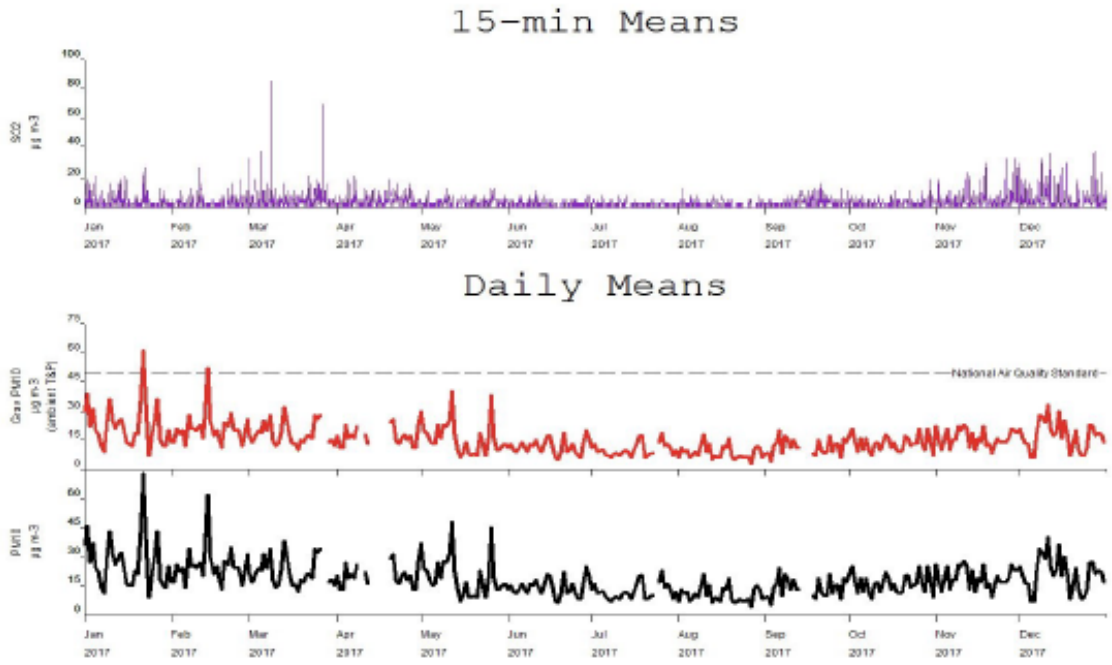
Pollutant	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PM_{10} µg m^{-3}	23	21	18	17	16	12	10	9	12	13	16	17
Sulphur Dioxide µg m^{-3}	4	3	5	4	3	2	2	2	3	3	5	5

Air Quality Report
STRABANE SPRINGHILL PARK 2017

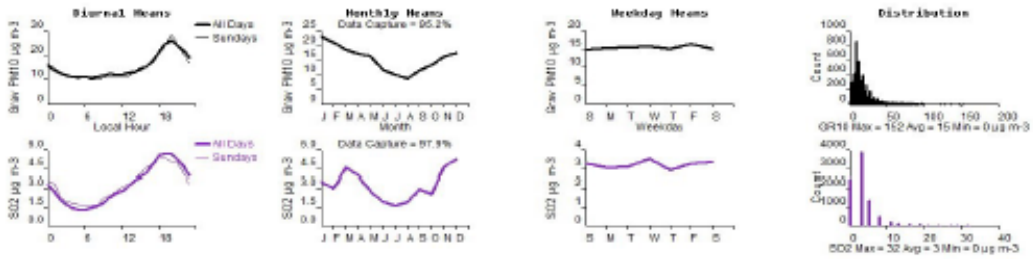
Hourly Means



Air Quality Report
STRABANE SPRINGHILL PARK 2017



Air Quality Report
STRABANE SPRINGHILL PARK 2017



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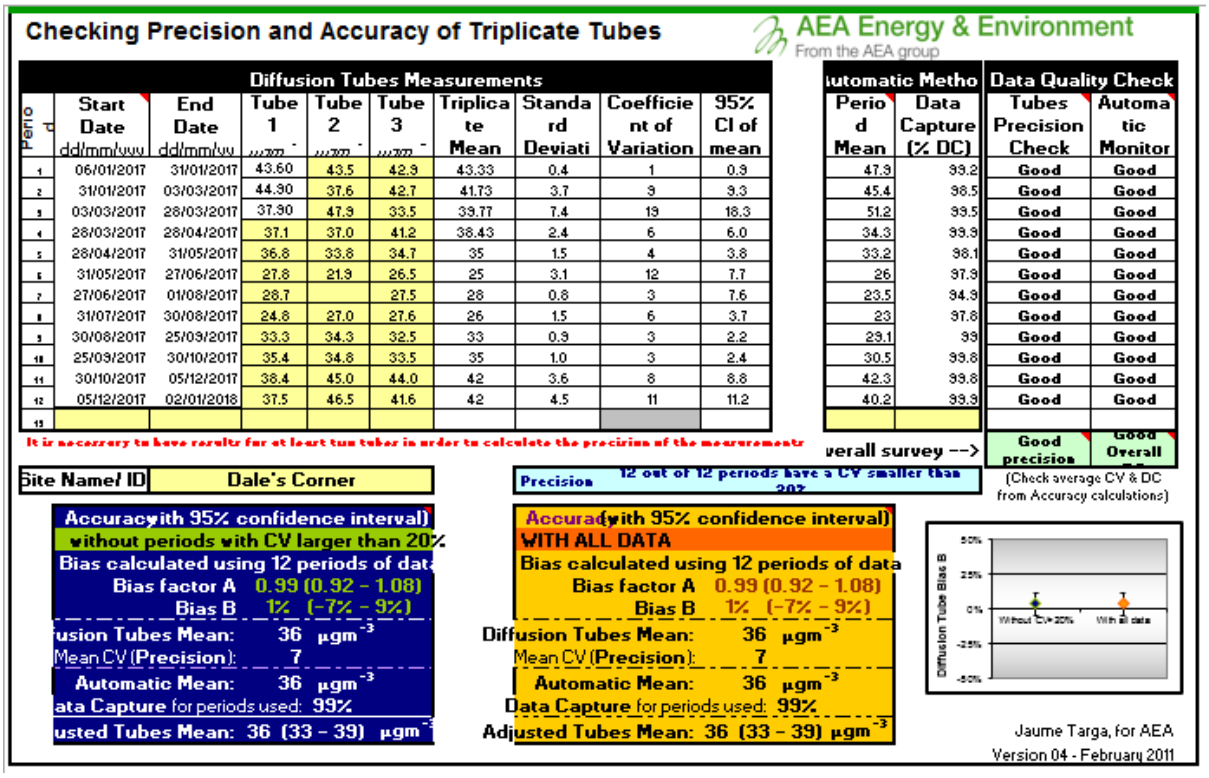
Appendix D: Calculations of Precision and Accuracy of Triplicate Tubes- Dale's Corner



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	06/01/2017	31/01/2017	43.60	43.5	42.9	43.33	0.4	1	0.9
2	31/01/2017	03/03/2017	44.90	37.6	42.7	41.73	3.7	9	9.3
3	03/03/2017	28/03/2017	37.90	47.9	33.5	39.77	7.4	19	18.3
4	28/03/2017	28/04/2017	37.1	37.0	41.2	38.43	2.4	6	6.0
5	28/04/2017	31/05/2017	36.8	33.8	34.7	35	1.5	4	3.8
6	31/05/2017	27/06/2017	27.8	21.9	26.5	25	3.1	12	7.7
7	27/06/2017	01/08/2017	28.7		27.5	28	0.8	3	7.6
8	31/07/2017	30/08/2017	24.8	27.0	27.6	26	1.5	6	3.7
9	30/08/2017	25/09/2017	33.3	34.3	32.5	33	0.9	3	2.2
10	25/09/2017	30/10/2017	35.4	34.8	33.5	35	1.0	3	2.4
11	30/10/2017	05/12/2017	38.4	45.0	44.0	42	3.6	8	8.8
12	05/12/2017	02/01/2018	37.5	46.5	41.6	42	4.5	11	11.2
13									

Automatic Metho Period Mean	Automatic Metho Data Capture (% DC)	Data Quality Check Tubes Precision Check	Data Quality Check Automatic Monitor
47.9	99.2	Good	Good
45.4	98.5	Good	Good
51.2	99.5	Good	Good
34.3	99.9	Good	Good
33.2	98.1	Good	Good
26	97.9	Good	Good
23.5	94.9	Good	Good
23	97.8	Good	Good
29.1	99	Good	Good
30.5	99.8	Good	Good
42.3	99.8	Good	Good
40.2	99.9	Good	Good
		Good precision	Good Overall

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

Overall survey -->

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Dale's Corner

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

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.99 (0.92 - 1.08)
Bias B 1% (-7% - 9%)
Diffusion Tubes Mean: 36 µgm⁻³
Mean CV (Precision): 7
Automatic Mean: 36 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 36 (33 - 39) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.99 (0.92 - 1.08)
Bias B 1% (-7% - 9%)
Diffusion Tubes Mean: 36 µgm⁻³
Mean CV (Precision): 7
Automatic Mean: 36 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 36 (33 - 39) µgm⁻³

Jaume Targa, for AEA
Version 04 - February 2011

Appendix E: Calculations of Precision and Accuracy of Triplicate Tubes- Derry Rosemount

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	03/01/2017	01/02/2017	21.10	21.0	21.0	21.03	0.1	0	0.1
2	01/02/2017	01/03/2017	17.70	16.7	17.3	17.23	0.5	3	1.3
3	01/03/2017	28/03/2017	19.30	19.5	19.2	19.33	0.2	1	0.4
4	28/03/2017	28/04/2017	10.2	10.1	10.5	10.27	0.2	2	0.5
5	28/04/2017	31/05/2017	11.6	9.4	11.5	10.83	1.2	11	3.1
6	31/05/2017	27/06/2017	7	7.2	8.0	7.40	0.5	7	1.3
7	27/06/2017	31/07/2017	7.00	7.3	7.1	7.13	0.2	2	0.4
8	31/07/2017	30/08/2017	8.30	7.4	6.7	7.47	0.8	11	2.0
9	30/08/2017	25/09/2017	12.0	9.6	12.3	11.30	1.5	13	3.7
10	25/09/2017	30/10/2017	12.40	12.8	14.2	13.13	0.9	7	2.3
11	30/10/2017	06/12/2017	20.00	18.6	18.0	18.87	1.0	5	2.5
12	06/12/2017	02/01/2018	22.60	19.4	20.1	20.70	1.7	8	4.2
13									

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

Automatic Metho		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor
14.60	93.4	Good	Good
11.60	98.7	Good	Good
12.20	98.1	Good	Good
6.90	93.6	Good	Good
8.20	93.7	Good	Good
4.50	93.7	Good	Good
4.50	93.3	Good	Good
4.10	91.8	Good	Good
6.20	96.4	Good	Good
12.30	93.8	Good	Good
20.00	97.4	Good	Good
13.30	93.7	Good	Good
overall survey -->		Good precision	Good Overall

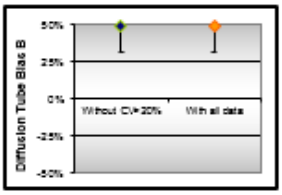
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Derry Rosemount

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

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.72 (0.64 – 0.82)
Bias B 39% (22% – 56%)
Diffusion Tubes Mean: 14 µgm⁻³
Mean CV (Precision): 6
Automatic Mean: 10 µgm⁻³
Data Capture for periods used: 98%
Adjusted Tubes Mean: 10 (9 – 11) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.72 (0.64 – 0.82)
Bias B 39% (22% – 56%)
Diffusion Tubes Mean: 14 µgm⁻³
Mean CV (Precision): 6
Automatic Mean: 10 µgm⁻³
Data Capture for periods used: 98%
Adjusted Tubes Mean: 10 (9 – 11) µgm⁻³



Jaume Targa, for AEA
Version 04 - February 2011

Appendix E: Distance Correction for NO_2 diffusion tubes at Dale's Corner Roadside site

Step 1	**How far from the KERB was your measurement made (in metres)?**	3.2	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	7.3	metres
Step 3	**What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?**	8	$\mu g/m^3$
Step 4	**What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?**	27.2	$\mu g/m^3$
Step 5	**The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor**	23	$\mu g/m^3$