



2014 Air Quality Progress Report for Castlereagh Borough Council

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

June 2014



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|--------------------------------|--|
| Local Authority Officer | Cheryl Harkness Gareth Lennox |
| | |
| Department | Environmental Health Department |
| Address | Civic & Administrative Offices Bradford Court Upper Galwally Castlereagh BT8 6RB |
| Telephone | 02890494640 |
| e-mail | cheryl.harkness@egehc.co.uk garethlennox@castlereagh.gov.uk |
| | |
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Executive Summary

The Air Quality Strategy has established the framework for air quality management in the UK. Local Authorities have a duty under the Environment Act 1995, and subsequent regulations to review and assess air quality in their areas on a periodic basis, so as to identify all areas where the air quality objectives are being or are likely to be exceeded. A phased approach has been adopted for the review and assessment process so that the level of assessment undertaken is commensurate with the risk of an exceedence of an air quality objective.

An updating and screening assessment (USA) is required to be prepared every three years by all local authorities in the UK. The last updating and screening assessment of air quality was undertaken in 2012, with two interim progress reports. This report is the 2014 (Progress Report), the assessment is fully compliant with the applicable policy and technical guidance. Castlereagh Borough lies to the southeast of Belfast in Northern Ireland. The Borough is of mixed urban and rural character. It is mainly residential with no significant industrial activity. Many residents work in Belfast and this, combined with the major arterial routes passing through the Borough, makes road transport the major air pollution concern. There is currently an Air Quality Management Area within the Borough.

Following the 2009 Update and screening assessment a detailed assessment was carried out. This concluded the NO₂ air quality objective was exceeded on A20 Upper Newtownards Road and relevant exposure was identified, ie Normandy Court.

Following this detailed assessment the triplicate NO₂ diffusion tubes positioned kerb side were moved to the façade of Normandy Court at the end of 2009. Although the levels of NO₂ have decreased by approximately 40%, they have remained slightly above or close to the objective so Castlereagh Borough Council declared the six apartments to the front of Normandy Court, an Air Quality Management area on the 30th January 2011 and an Air Quality Action plan has since been produced and submitted to the Department.

There are no other air quality exceedences at relevant exposure within the Borough

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1 Introduction

1.1 Description of Local Authority Area

Castlereagh Borough Council covers an administrative area of 84Km² to the Southeast of Belfast and in 2006 was home to a population of 66,633. The Borough is of mixed and urban rural character and the predominant wind direction is from the Southwest.

The Borough is surrounded by five neighbouring councils. Its position in relation to Belfast, has made it a very popular area to live. Commuting time to the city centre from the Borough is relatively short and this combined with major arterial routes passing through the Borough into Belfast, has made road transport the major air pollution concern.



1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Northern Ireland are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (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 Local Air Quality Management in Northern Ireland.

| Pollutant | Concentration | Measured as | Date to be achieved by |
|---------------------------------------|---|---------------------|-------------------------------|
| Benzene | 16.25 $\mu\text{g}/\text{m}^3$ | Running annual mean | 31.12.2003 |
| | 3.25 $\mu\text{g}/\text{m}^3$ | Running annual mean | 31.12.2010 |
| 1,3-Butadiene | 2.25 $\mu\text{g}/\text{m}^3$ | Running annual mean | 31.12.2003 |
| Carbon monoxide | 10.0 mg/m^3 | Running 8-hour mean | 31.12.2003 |
| Lead | 0.5 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2004 |
| | 0.25 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2008 |
| Nitrogen dioxide | 200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| | 40 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2005 |
| Particles (PM10) (gravimetric) | 50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year | 24-hour mean | 31.12.2004 |
| | 40 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2004 |
| Sulphur dioxide | 350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| | 125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| | 266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year | 15-minute mean | 31.12.2005 |

1.4 Summary of Previous Review and Assessments

Castlereagh Borough Council has completed the following reviews and assessments of air quality in earlier rounds of the assessment process:

Table 1.1 Previous reports submitted by Castlereagh Borough Council

| | |
|--|--|
| Stage 1 Report (CBC, 2000) | The first stage review and assessment found that the air quality objectives for 4 of the 7 specified parameters namely carbon monoxide, nitrogen dioxide, PM10 and sulphur dioxide were all unlikely to be achieved by 2003-2005. |
| Stage 2/3 Air Quality Review (CBC, 2003, 2004) | The stage 2/3 review for road emissions and domestic fuel combustion concluded that an Air Quality Management Area (AQMA) should not be declared for NO ₂ , PM10 and SO ₂ , as there were not predicted to be exceedences of the air quality objectives |
| Progress report (CBC2005) | The progress reported for 2004 concluding that PM10, NO ₂ and SO ₂ were not predicted to cause exceedences of the air quality objectives at relevant receptors. |
| Updating and Screening Assessment (USA, 2006) | This reported data for 2005. This indicated that current objectives in relation to SO ₂ , NO ₂ and PM10 would be achieved at the location of the automatic monitoring stations. The diffusion tube measurements at the A20 Upper Newtownards road in Dundonald indicated the possibility of exceedences in relation to NO ₂ |
| Progress report (EG, 2007) | This reported the 2006 measurements and the decommissioning of the SO ₂ automatic site in Espie way and the analyser to be replaced with an NO ₂ . The station was relocated to Dundonald, where the NO ₂ diffusion results were close to the objective . |
| Progress report (EG, 2008) | This reported the 2007 measurements. Although based on 76% data capture, the annual mean NO ₂ concentration at the Dundonald automatic monitoring site was below the objective. |
| Updating and Screening Assessment (USA, 2009) | This reported 2008 measurements. The A20 Dundonald NO ₂ diffusion tube site exceeded the the objective, and a detailed assessment was initiated. |
| Detailed assessment | A detailed assessment was carried out for NO ₂ for the A20 in the Dundonald area |
| Progress report (CBC 2010) | This reported the 2009 measurements and the relocation of the NO ₂ diffusion tubes on the A20 to the façade of the relevant exposure ie: Normandy Court |
| Progress report (CBC 2011) | This reported the continued elevated levels of NO ₂ at Normandy Court Dundonald and details of the AQMA Castlereagh Borough Council declared in January 2011. |
| Updating and Screening Assessment (USA, 2012) | This reported the 2011 measurements and further details of the AQMA and Action Plan. |
| Progress report (CBC 2013) | This reported the 2012 measurements and the submission of an action plan in January 2013. |

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Castlereagh Borough Council has one automatic site measuring NO_x using a chemiluminescence analyser.

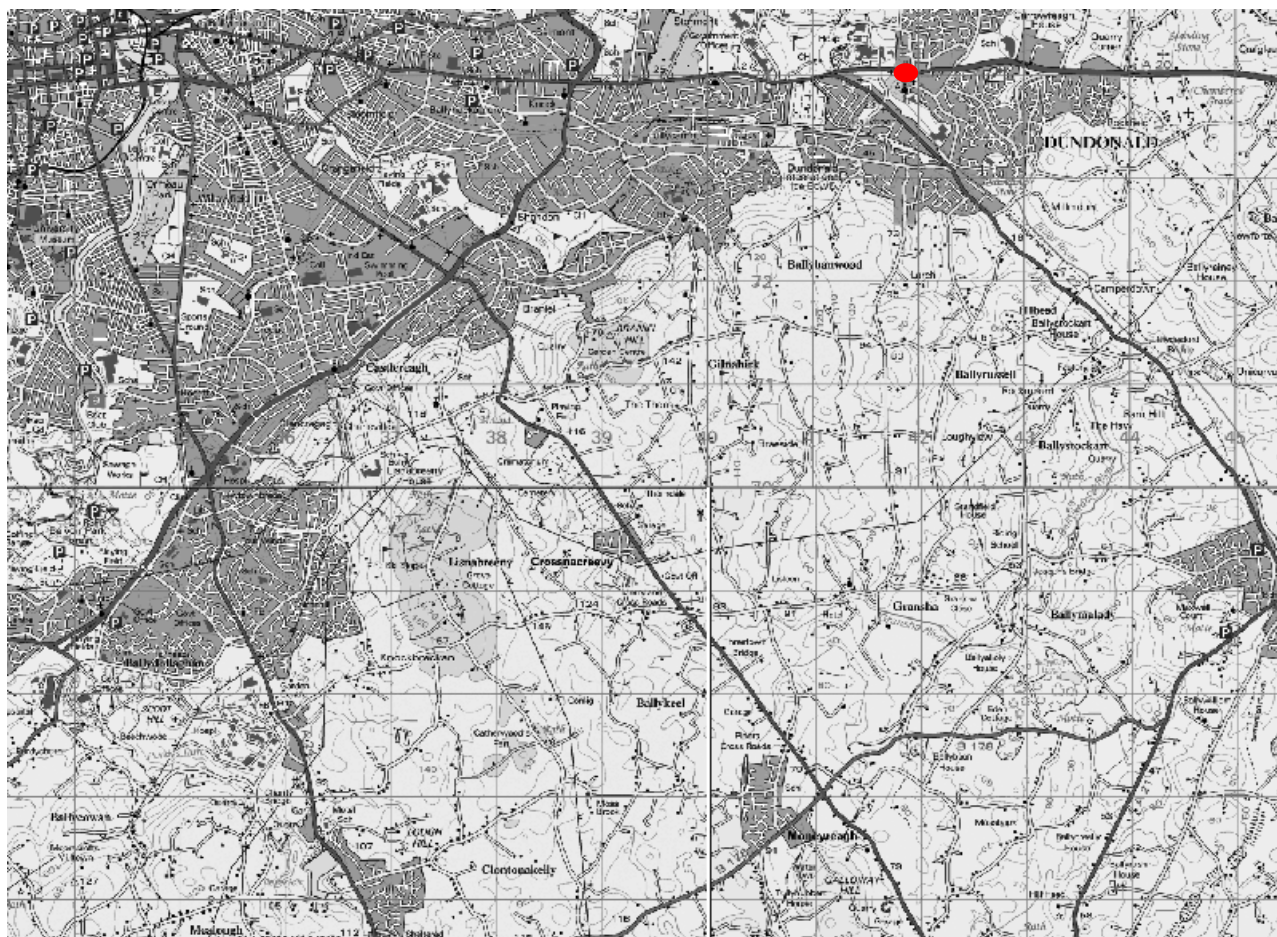
Calibrations are carried out every two weeks, and the site is independently audited by NPL (National Physical Laboratory) every six months. AQDM (Air Quality Data Management) were also employed to ratify and validate the data.

The site is located in Dundonald village 30M from the AQMA. A co-location study for the NO₂ diffusion tubes is also carried out at this site. Results from this study are submitted to the national data base and used to assist in bias correction of the NO₂ diffusion tubes within the AQMA and Borough.

See Appendix A: Details of Quality Assurance and Quality Control

Figure 2.1 Map(s) of Automatic Monitoring Sites

- Dundonald NO_x Automatic monitoring site within Borough



- AQMA
- Automatic monitoring NOx site position in Dundonald Village

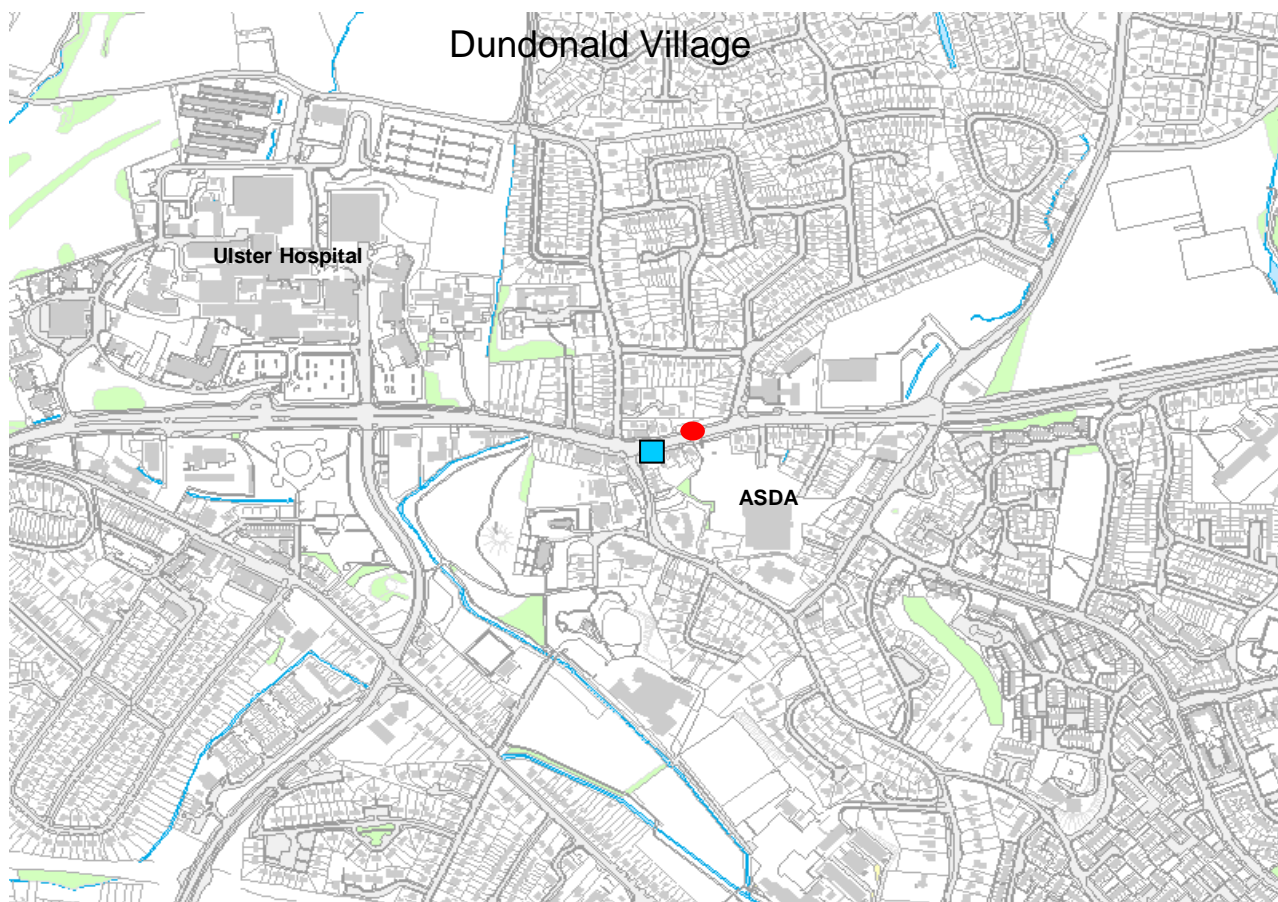


Table 2.1 Details of Automatic Monitoring Sites

| Site Name | Site Type | OS Grid Ref | | Pollutants Monitored | Monitoring Technique | In AQMA ? | 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? |
|-----------------------|-----------|-------------|---------|----------------------|----------------------|-----------|--|---|---|
| Castlereagh Dundonald | Roadside | E 342016 | N374041 | NO ₂ , | Chemiluminescence | NO | YES 22M | 3M | N (30M from AQMA YES |

2.1.2 Non-Automatic Monitoring

Castlereagh Borough Council presently has five NO₂ diffusion tube sites positioned along the main arterial routes into Belfast, and a co-location study carried out at the Dundonald automatic site.(T7) The results from this have been submitted to the national data base.

The bias adjustment factor from this co-location study is **0.65**. This was calculated using the R&A support precision and accuracy spreadsheet.

A decision was made to apply the national figure of **0.80** as this was deemed to be a more realistic figure.

Site (T5) on the Upper Newtownards Road, showed levels to be above the objective, this was a historic kerbside site and in 2009 was discontinued and triplicate diffusion tubes were situated on the façade of the nearest apartments (T6), which is now within the AQMA.

The tubes are supplied and analysed by ESG (Environmental Scientifics Group), and sited in accordance with the technical guidance.

Further information on the decision to use this bias adjustment factor and details of the QA/QC of the diffusion tubes can be found in appendix A

Picture of triplicate diffusion tubes on façade of Normandy Court



Figure 2.2 Map(s) of Non-Automatic Monitoring Sites

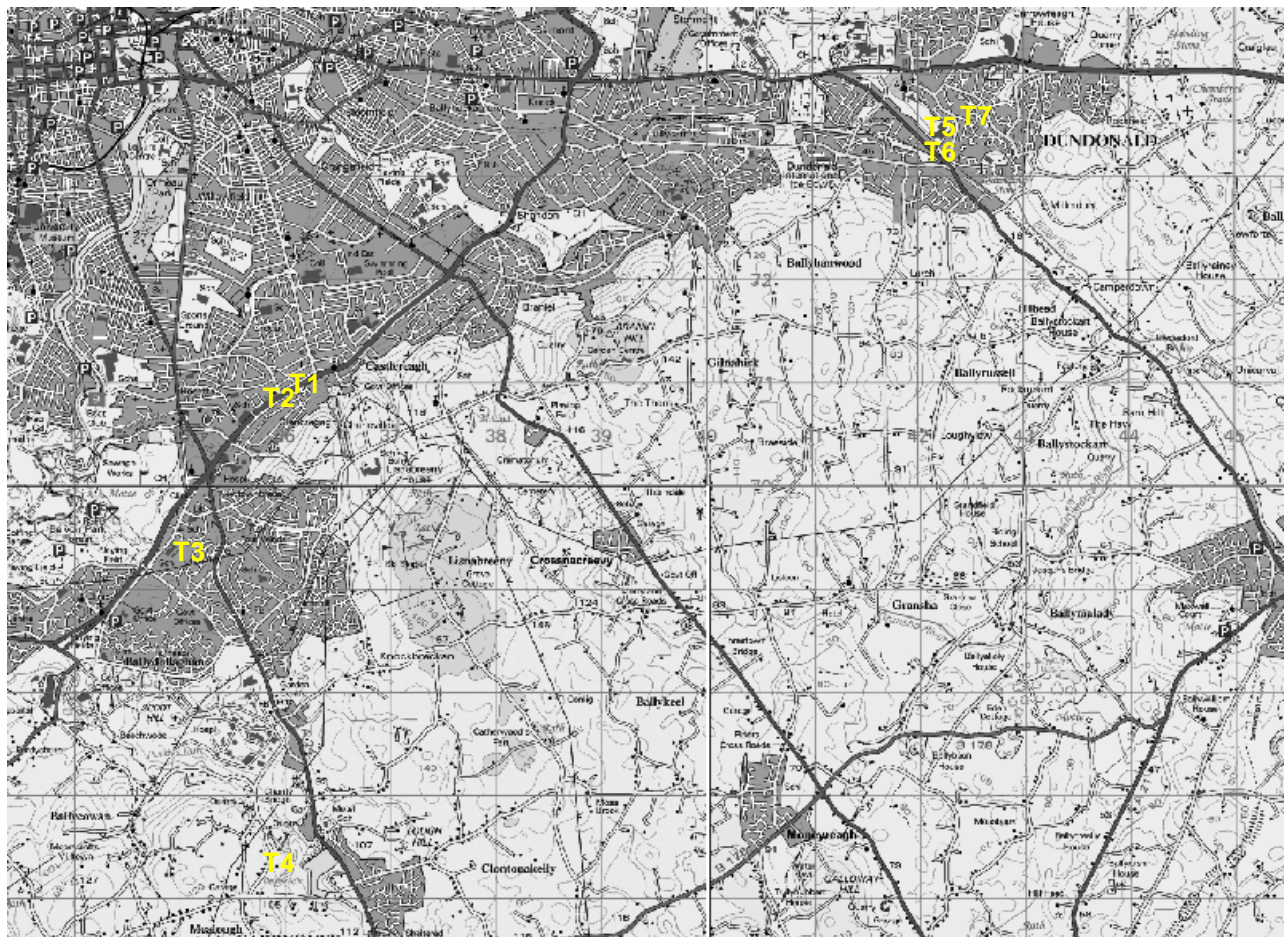


Table 2.2 Details of Non- Automatic Monitoring Sites

| Site Name | Site Type | X OS Grid Ref (Irish 1964) | Y OS Grid Ref (Irish 1964) | 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? |
|---|-------------|----------------------------|----------------------------|----------------------|----------|---|---|--|---|
| T1 Cregagh Road | Roadside | E336257 | N371278 | NO ₂ | N | Y | Y (28m) | N/A | N/A |
| T2 Everton Drive | Background | E336132 | N371141 | NO ₂ | N | N | Y (98m) | 3m | Y |
| T3 Newtownbreda Road | Roadside | E335246 | N370061 | NO ₂ | N | N | Y (12m) | 2.5m | Y |
| T4 Saintfield Road | Roadside | E336832 | N365625 | NO ₂ | N | N | Y (70m) | 10m | Y |
| T7 Castlereagh Dundonald | Co-location | E342016 | N274041 | NO ₂ | N | N | Y (22m) | 6.3m | Y |
| T5 Upper Newtownards Road (adjacent to Normandy Court) | Roadside | E341991 | N374013 | NO ₂ | N | N | Y (0m) | 1.5m | Y |
| T6 Normandy Court Facade (AQMA) | Roadside | E341991 | N374013 | NO ₂ | Y | N | Y (0m) | 0.5m | Y |

T5 site was moved to the façade of the nearest relevant exposure Normandy Court T6 in 2009

2.2 Comparison of Monitoring Results with Air Quality Objectives

In the following section results are presented for NO₂ at the automatic and diffusion tube sites and compared with the objective. The diffusion tube site within the AQMA remains close to the objective. The only site continuing to be above the objective in 2013 was the single diffusion tube site situated at the junction of the Newtonbreda / Saintfield Road (T3). This is unusual as monitoring has been carried out for a number of years at this site and it has always been below the objective. A possible explanation is there were a number of trees in the garden of the adjacent property and they were removed in 2012, some trees have NO₂ absorption capabilities. This is a historical kerbside site relevant exposure is approximately 7M away. Castlereagh Borough Council was unable to gain permission to place the tube on the façade of the nearest dwelling as planned in 2013, so the levels at relevant exposure have been distance calculated using the calculation from LAQM.TG(09) Box2.3.

2.2.1 Nitrogen Dioxide

In the following section results are presented for NO₂ at the automatic and diffusion tube sites and compared with the objective.

Automatic Monitoring results

Table 2.3a presents the annual mean concentrations of NO₂ determined at the automatic site in 2013 from the hourly measurements.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.

The automatic station was installed in Dundonald in 2008 because of high results from NO₂ tubes at the Upper Newtownards Road site at Normandy Court in the village. Results from the station increased slightly each year until 2011 when they started to decrease and have remained well below the objective in 2013

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

| Site ID | Site Type | Within AQMA? | Valid Data Capture for period of monitoring % ^a | Valid Data Capture 2011 % ^b | Annual Mean Concentration µg/m ³ | | | | |
|-----------------------|-----------|-------------------|--|--|---|------|------|------|------|
| | | | | | 2009 | 2010 | 2011 | 2012 | 2013 |
| Castlereagh Dundonald | Roadside | N (within 30M) | 97 | 97 | 36 | 41 | 39 | 30 | 32 |

Table 2.3b 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 2011 % ^b | Number of Exceedences of Hourly Mean (200 µg/m ³) | | | | |
|-----------------------|-----------|-------------------|--|--|---|------|------|------|------|
| | | | | | 2009 | 2010 | 2011 | 2012 | 2013 |
| Castlereagh Dundonald | Roadside | N (within 30M) | 97 | 97 | 0 | 0 | 5 | 3 | 0 |

Diffusion Tube Monitoring Data

Results of the NO₂ diffusion tube sites, situated within the borough are shown below in table 2.5

They are sited in accordance with the technical guidance.LAQM.TG(09)

A co-location study has been carried out at the Dundonald automatic site, and its results submitted to the LAQM data base, the 2013 local bias was **0.65**. A decision was made to apply the national bias adjustment figure of **0.80** as this was deemed to be a more realistic figure.

Details of the QA/QC for the diffusion tubes and the reason for the use of the bias adjustment factor **0.80** can be found in appendix A

All diffusion tube sites are below the objective except for the Newtonbreda Road / Saintfield Road junction. An automatic site was located the other side of this junction from 2002 until 2011 when it was decommissioned due to continuing low results. However the diffusion tube site was above the objective in 2012 and again in 2013. This is not consistent with 2011 when levels had dropped considerably at this location. This is a historical roadside site and 7M from the façade of the nearest dwelling. Castlereagh Borough Council in 2013 was unable to gain permission to locate the diffusion tube to the façade of the nearest dwelling therefore the 2013 result has been distance calculated in accordance with LAQM TG.(09). Details of how this was calculated is included in appendix A.

A trend for the five diffusion tube sites within the Borough is shown in figure 2.4.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Co-located Tube | Full Calendar Year Data Capture 2013 (Number of Months ^a) | 2013 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.80 ^b |
|---------|-----------------------|-----------|--------------|-------------------------------|---|--|
| T1 | Cregagh Road | Roadside | N | N | 10 | 21 |
| T2 | Everton Drive | Roadside | N | N | 10 | 13 |
| T3 | Newtonbreda Road | Roadside | N | N | 10 | 44*(36) |
| T4 | Saintfield Road | Roadside | N | N | 10 | 14 |
| T6 | Normandy Court Facade | Roadside | Y | Y | 10 | 39 |

*() Result when distance calculation carried out to façade of relevant exposure

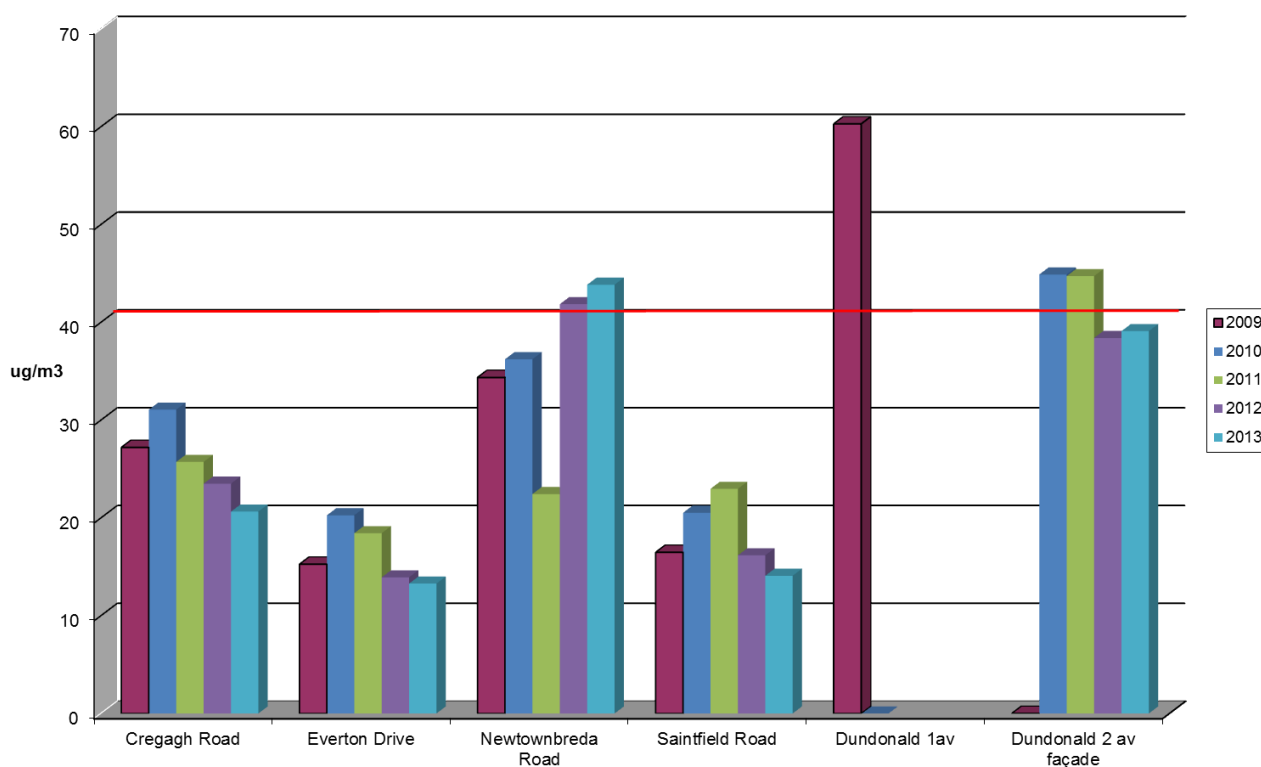
| Site ID | Site Type | Within AQMA? | Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias ^a | | | | |
|--|------------|--------------|---|--|--|---|---|
| | | | 2009* (Bias Adjustment Factor = 0.81) | 2010* (Bias Adjustment Factor = 0.84) | 2011* (Bias Adjustment Factor = 0.83) | 2012 (Bias Adjustment Factor = 0.75) | 2013 (Bias Adjustment Factor = 0.80) |
| T1 Cregagh Road | Roadside | N | 26.9 | 31 | 26 | 24 | 21 |
| T2 Everton Drive | Background | N | 15.1 | 20 | 18 | 14 | 13 |
| T3 Newtonbreda Road | Roadside | N | 33.9 | 36 | 22 | 42 | 44 *(36) |
| T4 Saintfield Road | Roadside | N | 16.3 | 21 | 23 | 16 | 14 |
| T5 Upper Newtownards Road (adjacent to Normandy Court) | Roadside | N | 57.4 | n/a | n/a | n/a | n/a |
| T6 Normandy Court Façade (AQMA) | Roadside | Y | n/a | 45 | 45 | 38 | 39 |

(T5 was relocated to T6 in 2009)

*() Result when distance calculation carried out to façade of relevant exposure

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.

NO₂ diffusion tube results have remained consistent any annual variation is more likely to be as a result of climatic conditions rather than changes in emissions.



2.2.2 PM₁₀

Castlereagh Borough Council did not carry out any monitoring for PM₁₀ in 2013

2.2.3 Sulphur Dioxide

Castlereagh borough Council did not carry out any monitoring of SO₂ in 2013

2.2.4 Benzene

No monitoring of Benzene is carried out.

2.2.5 Other pollutants monitored

In 2013 Nitrogen Dioxide was the only pollutant monitored

2.2.6 Summary of Compliance with AQS Objectives

Castlereagh Borough Council has examined the results from monitoring in the borough.

Concentrations within the AQMA are still close to objective for NO₂ at Normandy Court Dundonald and the AQMA shall remain in 2014.

Concentrations outside of the AQMA are all below the objectives at relevant exposure, therefore there is no need to proceed to a Detailed Assessment. Castlereagh Borough Council intends continuing with monitoring at all NO₂ sites.

3 New Local Developments

Castlereagh Borough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Castlereagh Borough Council confirms that all the following have been considered:

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

4 Planning Applications

Dundonald

The Council is currently undertaking a regeneration project in a number of locations throughout the Borough, including Dundonald Village. The Castlereagh Urban Integrated Development Framework (CUIDF) is a joint project with the Department for Social Development and is working up proposals for improvement and regeneration projects. In Dundonald Village this will include the following:

The proposals aim to maximise pedestrian links to and from the Park & Ride at Dunlady Road so as to encourage commuters to use shops and services in Dundonald. It is also proposed to extend and improve the pedestrian linkages and new halts associated with the Belfast Rapid Transit (BRT).

The redevelopment of vacant and under-utilised sites for residential uses along the Upper Newtownards Road. Apartment style developments are proposed. Planning permission has been secured for the site at the junction of Burton Ave/Upper Newtownards Road. 35 Apartments proposed for this development.

Enhancing the environmental quality of the Upper Newtownards Road. The proposals provide for public realm improvements for the length of the Upper Newtownards Road. The works are likely to consist of upgrading footpaths with high quality paving, tree planting, the provision of new street furniture and additional lighting in order to complement the BRT.

Enhancing the signage for Motte Park and providing information on how existing pathways within the park provide access to other parts of Dundonald. This information could also be provided at the Park & Ride.

Other Developments in Dundonald

Click and collect canopy, signage and car park panel signs at ASDA Dundonald Superstore, 1009 Upper Newtownards Road, Dundonald

Erection of single storey side/rear extension for customer toilet, with expansion of supermarket into adjoining retail unit, removal of drive-thru car wash and relocation of existing jet wash and associated siteworks.at 756 Upper Newtownards Road, Belfast.

Erection of approx.no115 dwellings in Millreagh Development off the Carrowreagh Road.

Erection of no.30 dwellings in Millmount Village Development of the Millmount Road. There is proposal for further 300 dwellings on this site.

5. Implementation of Action Plans

Table 5.1 Action Plan Progress

Castlereagh Borough Council AQMA Progress Report 2014

| Action Plan Measure | Lead Authority | Original Timescale | Implementation | On Target | Comments |
|---|-----------------------------|--------------------|--|-----------|--|
| 1.CBC to investigate using cleaner more sustainable vehicles | Castlereagh Borough Council | July 2014 | No. of vehicles purchased meeting EURO 5 standard rating | Yes | CBC continues to only purchase vehicles meeting EURO 5 classification |
| 2.Continue to provide Eco bus driver training | Translink | On-going | No of drivers trained and devices fitted | Yes | All drivers have received Eco-Driving Training and Eco-Driving is a continual part of their CPC training. |
| 3.Continue to purchase EURO 5 Classified vehicles and sustainable transport methods | Translink | On-going | Continue to upgrade vehicles | Yes | Translink continue to upgrade their vehicles and consider more sustainable transport links |
| 4.CBC to introduce/Encourage Sustainable travel | Castlereagh Borough Council | September 2013 | Production of Green Travel Plan | Yes | Castlereagh Borough Council's Travel Plan has included: <ul style="list-style-type: none"> • Bike to Work Week • Walk to Work Week • Bike to Work Scheme • Car Sharing |
| 5.Park & Ride Scheme | DRD Roads | June 2014 | Park & Ride Scheme Implemented | Yes | Currently in construction process. Due for completion in November 2014 |

| | | | | | |
|---|-----------------------------|----------|--------------------------|-----|---|
| 6. Comment on planning applications to ensure that all relevant air quality issues are highlighted and mitigation measures are considered wherever possible | Castlereagh Borough Council | On-going | No of plans commented on | Yes | Environmental Health comments on all planning applications in respective any statutory nuisance and includes Air quality issues |
| 7.Promote Sustainable initiatives in conjunction with Travelwise NI | Travelwise NI | On-going | Initiatives undertaken | Yes | 2 Years now CBC have been working with Travelwise NI in relation to Bike to work week and walk to school initiatives. |

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

The 2013 monitored data has been assessed and has indicated no exceedences of the national air quality objectives at relevant exposure. The NO₂ levels within the AQMA have reduced in 2012 and 2013 but remain close to the objective.

It is therefore not necessary to proceed to a detailed assessment, however monitoring will continue at key locations outside and within the AQMA to allow for comparison in future rounds of review and assessment.

Castlereagh Borough Council submitted their final action plan to the department in January 2013.

6.2 Conclusions relating to New Local Developments

Castlereagh Borough Council has found no new or significant new developments to have likely impacts on air quality.

6.3 Proposed Actions

Castlereagh Borough Council will continue to monitor at key locations and submit a update and screening report in 2015.

The final action plan was submitted in 2013 and approved this will be assessed again in 2015. At present there is no need to proceed to a detailed assessment for any pollutants outside of the AQMA.

5 References

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Guidance LAQM.TG(09). Guidance prepared by the Department for Environment, Food and Rural Affairs and the Devolved Administrations, February 2009

Appendices

Appendix A: QA/QC Data

Appendix A: QA/QC Data of automatic sites

Castlereagh Borough Council commissioned AQDM Technology to provide the QA/QC of the automatic measurements of NO₂ for the Dundonald A20 site. Local authority staff act as the local site operator and visit the sites on a weekly basis carrying out any manual calibration or filter changes required. Audits of the site were carried out by NPL on a six monthly basis. Supportingu were employed to service and maintain the analyser.

Produced by AQDM on behalf of Castlereagh

CASTLEREAGH DUNDONALD 2013

These data have been fully ratified by AQDM to LAQM TG(09) standards

Site Description

Near the Upper Newtownards Road but not quite classed as a roadside site

Air Quality Statistics

| Pollutant | NO ₂ | NO | NO _x |
|-------------------------------|------------------------|------------------------|-------------------------|
| Number Very High [#] | 0 | - | - |
| Number High [#] | 0 | - | - |
| Number Moderate [#] | 0 | - | - |
| Number Low [#] | 8501 | - | - |
| Maximum 15-minute mean | 166 µg m ⁻³ | 494 µg m ⁻³ | 892 µg m ⁻³ |
| Maximum hourly mean | 164 µg m ⁻³ | 564 µg m ⁻³ | 1026 µg m ⁻³ |
| Maximum running 8-hour mean | 126 µg m ⁻³ | 337 µg m ⁻³ | 636 µg m ⁻³ |
| Maximum running 24-hour mean | 79 µg m ⁻³ | 190 µg m ⁻³ | 369 µg m ⁻³ |
| Maximum daily mean | 78 µg m ⁻³ | 165 µg m ⁻³ | 330 µg m ⁻³ |
| Average | 32 µg m ⁻³ | 30 µg m ⁻³ | 78 µg m ⁻³ |
| Data capture | 97.0 % | 97.0 % | 97.0 % |

[#] 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 NO₂ 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 | 32 µg m ⁻³ | 0 | - | - | No |
| Nitrogen Dioxide | Hourly mean > 200 µg m ⁻³ | 164 µg m ⁻³ | 0 | 0 | 18 hours | No |

QA/QC of Diffusion Tube Monitoring

The NO₂ tubes are supplied by ESG (Environmental Scientific Group) in Didcot Oxfordshire. Their preparation method is listed below.

Nitrogen Dioxide Diffusion Tube Analysis Report

The samples have been analysed in accordance with ESG's standard operating procedure HS/WI/1015 issue 15. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance.'

The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection. In the WASP intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, Scientifics is currently ranked as a Category Good laboratory. This result can be found on the LAQM Support Web site <http://laqm.defra.gov.uk/diffusion-tubes/precision.html>

Diffusion Tube Bias Adjustment Factors**Factor from Local Co-location Studies**

Castlereagh Borough Council lies within the Eastern Group area. There are five neighbouring councils within the group. In 2013 only North Down Borough Council and Castlereagh Borough Council within the group carried out co-location studies. The bias adjustment factor calculation of these is shown below.

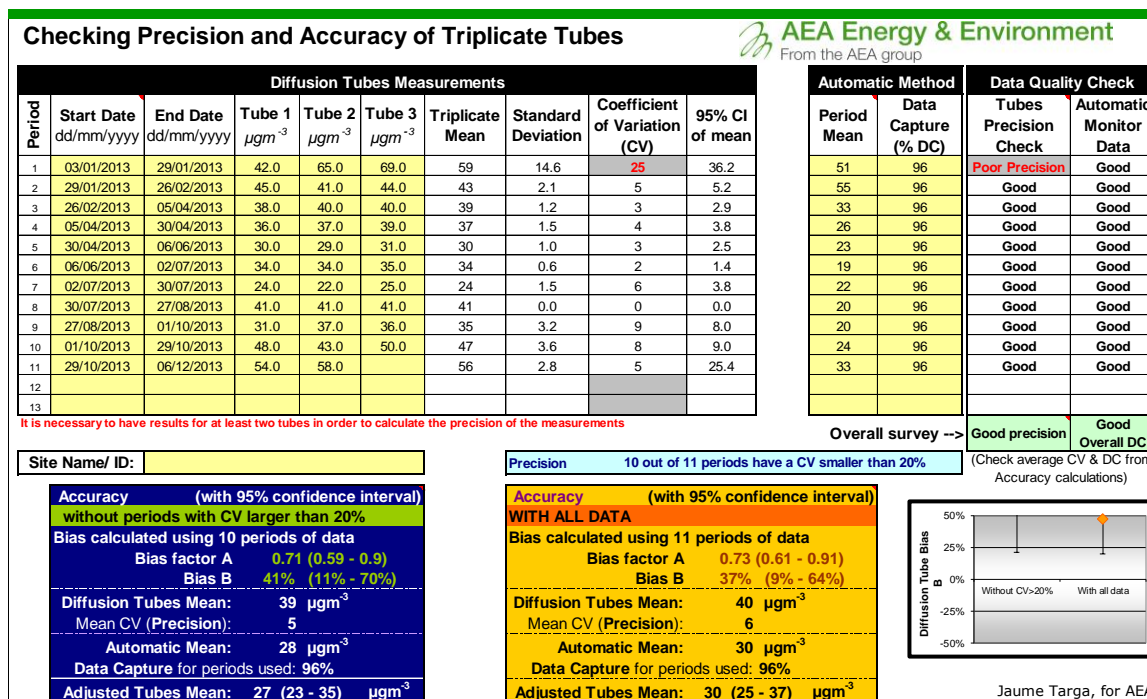
They were calculated using the R&A support precision and accuracy spreadsheet.

<http://laqm.defra.gov.uk/bias-adjustment-factors/co-location-data.html>

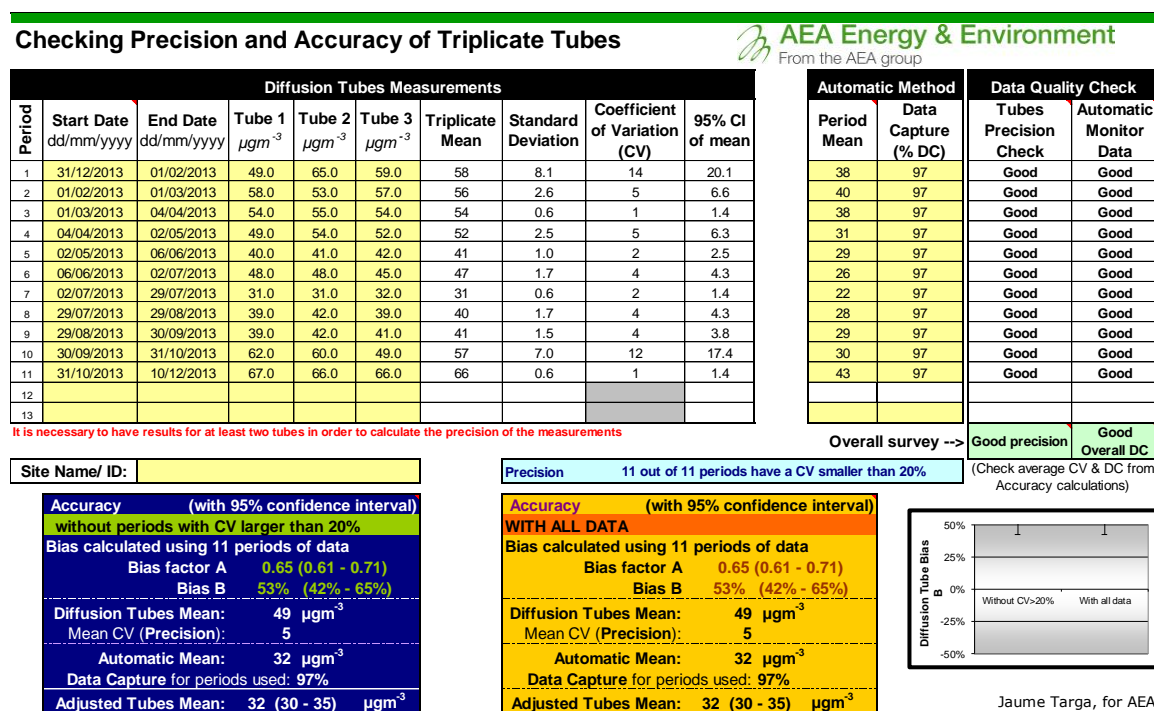
These results have been submitted for inclusion in the national bias adjustment factor database and in accordance to current guidance summarized in the

[Technical Guidance LAQM.TG\(09\)](#).

North Down Borough Council 2013



Castlereagh Borough Council 2013



Results from NO₂ diffusion tubes and method of corrections

The local bias adjustment factor from the co-location study carried out at the A20 Dundonald site in Castlereagh Borough Council is **0.65**, however a decision was made to use the national bias adjustment factor of **0.80**.

NO₂ diffusion tube results, bias applied **0.80**

| | 2009 | 2010 | 2011 | 2012 | 2013 |
|--------------------------|------|------|------|------|-----------------|
| T1 Cregagh Road | 27 | 31 | 26 | 24 | 21 |
| T2 Everton Drive | 15 | 20 | 18 | 14 | 13 |
| T3 Newtonbreds | 34 | 36 | 22 | 42 | 44 *(36) |
| T4 Saintfield Road | 16 | 21 | 23 | 16 | 14 |
| T5 Upper Newtownards Rd | 60 | 0 | 0 | 0 | 0 |
| T6 Normandy Court façade | 0 | 45 | 45 | 38 | 39 |

*() Result when distance calculation carried out to façade of relevant exposure

Method used to distance calculate in accordance to current guidance

[Technical Guidance LAQM.TG\(09\)](#) Box 2.3

$$C_z = ((C_y - C_b) / (-0.5476 \times \ln(D_y / 2.7171))) \times (-0.5476 \times \ln(D_z / 2.7171) + C_b)$$

C_z total predicted concentration at distance D_z

C_y total measured concentration at D_y = 44

C_b local background concentration = 13

D_y distance from kerb at which concentration was measured at Newtonbreds site = 2.5m

D_z distance from kerb concentrations are predicted ie. façade of nearest dwelling = 7.0m

$\ln(D_y)$ natural log = 0.916290732

$\ln(D_z)$ natural log = 1.94591015

$$C_z = 36.1020$$

Discussion of Choice of Factor to Use

The national bias adjustment factor for Environmental Scientific Group is **0.80**

In 2013 only 2 co-location studies were carried out within the area (Castlereagh **0.65** and North Down 0.73) due to the large variation in these and as 28 studies were included in the national survey this was deemed to be more accurate.