



***Boston Borough Council  
Annual Status Report 2016***

*Bureau Veritas*





*October 2016*

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**Document Control Sheet**

Issue/Revision	Issue 1	Issue 2
Remarks	DRAFT	FINAL
Date	October, 2016	October, 2016
Submitted to	John Chapman	John Chapman
Prepared by	Vincent Yeung – Assistant Consultant	Fang Lin – Assistant Consultant
Signature		
Approved by	Jamie Clayton – Senior Consultant	Jamie Clayton – Senior Consultant
Signature		
Project number	369143	369143

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## 2016 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the  
Environment Act 1995  
Local Air Quality Management

October 2016

**Boston Borough Council**

Local Authority Officer	John Chapman
Department	Environmental and Health
Address	Municipal Buildings, West Street, Boston, PE21 8QR
Telephone	01205 314200
E-mail	John.chapman@boston .gov.uk
Report Reference number	ASR_Boston_v1
Date	October 2016

## Executive Summary: Air Quality in Our Area

Air pollution is an issue that affects everyone within the Borough with varying levels of severity, the air that we breathe is essential for health and wellbeing and it shouldn't have to be a cause of detrimental health effects. Where we live, where we work, our travel choices and journeys made can affect the concentrations of certain air pollutants that we are exposed to.

Local authorities have an obligation through the LAQM regime to review and assess the air quality within their regions. Specific measures are implemented by way of Air Quality Action Plans (AQAPs) if there are shown areas of poor air quality, but action by community engagement through education and promotion also helps to benefit air quality at a local level. Good air quality begins at a local level, with actions being replicated on regional and national scales benefitting wider scale air quality and helping to meet the Air Quality Strategy (AQS) objectives that are set out in European and UK law.

## Air Quality in Boston Borough Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

Boston Borough Council currently has two designated Air Quality Management Areas (AQMAs) at Haven Bridge and at Bargate Bridge. Both have been declared in relation to exceedences of the AQS annual mean objective for NO<sub>2</sub>, this is due to traffic emissions from major roads, notably the A16 and A52.

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

The two AQMAs can be seen online at [https://uk-air.defra.gov.uk/aqma/local-authorities?la\\_id=27](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=27), details are provided in Table 2.1, a boundary map for Haven Bridge AQMA and Bargate Bridge AQMA are presented in Figure D.1 and Figure D.2 respectively.

An AQAP has been completed and is in force within Boston Borough Council that outlines measures to be completed in order to pursue of the annual mean AQS objective for NO<sub>2</sub> thus improving air quality within the AQMAs and also the Borough as a whole. Many of the measures have been set up to include the input and support of Lincolnshire County Council, mainly these are transport based measures that aim to reduce road traffic emissions and achieve improvements in air quality.

### Actions to Improve Air Quality

The AQAP for Boston Borough Council is the main action to drive a reduction in air pollution within the Borough. The measures set out within the AQAP have been developed as actions to help Boston work towards achieving compliance with the NO<sub>2</sub> annual mean AQS objective..

The Council are undertaking these key air quality measures:

- An outer distributor road to lower traffic density within the city
- Develop and expand on current walking and cycle route
- Reviewing of an “Into Town Bus Service”
- Explore and development of a rail-freight interchange, also the investigation on the use of inland waterways as a distribution methods for freights
- Promotion of sustainable travel plans for large employers
- Discouraging use of bonfires for disposal of waste

In addition the 4<sup>th</sup> Lincolnshire Local Transport Plan incorporates a Transport Strategy for Boston: ‘The Transport Strategy for Boston 2006 – 2021 and beyond’. This includes a high level of consideration throughout the plan in relation to the reconfiguration of roads, sustainable transport plans and modes of transport, alternative modes of transport to private vehicles and to overall reduce the impact of the transport system on air quality within the local area.

## **Local Priorities and Challenges**

Within the Council area concentrations of NO<sub>2</sub> remain above the AQS annual mean objective only within the designated AQMAs. The AQMAs are located on the main arterial routes around the city. Annual mean NO<sub>2</sub> concentrations will be continued to be monitored with diffusion tubes to enable the impacts of the AQAP to be measured.

The priority for the coming year is to progress the measures that are set out within the AQAP which have been designed to address these elevated concentrations with the overall goal of ensuring pollution levels are below the AQS objectives.

The Lincolnshire Local Travel Plan aims to reduce the impact of transport on local air quality, cooperation with all the Boroughs within Lincolnshire is essential for this to be able to be completed. The plan was developed with engagement with a wide range of people, community groups and organisations.

## **How to Get Involved**

As the main source of air pollution within Boston Borough Council arises from transport sources, a way for the public to get involved with helping improving air quality within the area would be to look at alternatives to the way they usually travel.

The following are suggested alternatives to private travel that are given within the AQAP measures that would contribute to improving the air quality within the Borough:

- Use of public transport – The use of the bus facilities, which in turn reduces pollutant concentration through the number of vehicles and reducing congestion;
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy.
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and
- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient

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cars are available and all have different levels benefits by reducing the amount of emissions being released.



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## **1. Local Air Quality Management**

This report provides an overview of air quality in Boston Borough Council during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Boston Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

## 2. Actions to Improve Air Quality

### 2.1. Air Quality Management Areas

Air Quality Management Areas (AQMA) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Boston Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <http://www.boston.gov.uk/index.aspx?articleid=3720>. See full list of AQMA's at <http://uk-air.defra.gov.uk/aqma/list>.

The Council proposes to keep the designated AQMAs in place due to exceedences of the AQS annual mean NO<sub>2</sub> objective that were experienced at monitoring sites with these current AQMAs (see monitoring section).

**Table 2.1 – Declared Air Quality Management Areas**

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA 1 - Haven Bridge	NO <sub>2</sub> annual mean	Boston Borough Council	A major highway consisting of John Adams Way(A16), Queen Street and Liquorpond Street(A52).	Boston Borough Council, Air Quality Action Plan, 2006
AQMA 2 - Bargate Bridge	NO <sub>2</sub> annual mean	Boston Borough Council	Key roundabout for the A16 and A1137.	

### 2.2. Progress and Impact of Measures to address Air Quality in Boston Borough Council

Boston Borough Council has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in Boston Borough Council, Local Air Quality Management – Air Quality Action Plan and Boston Transport Strategy.

Key measures which have already been undertaken include:

- Transport:
  - Traffic management improvements;
  - Reduce impact of HGV's;
  - Improvements for pedestrians and cyclists;
  - Better integration of public transport; and
  - Promoting alternatives to singular private vehicle use.
- Infrastructure:
  - Include planning policies within the Boston Transport Strategy and AQAP;
- Awareness:
  - Campaigns to raise awareness of air quality and travel plans;
  - Make monitoring data and LAQM reports available online;
- Enforcement:
  - Maintain an air quality non-automatic monitoring network within the Borough;

Progress on the following measures has been slower than expected due to resourcing and funding issues. Key actions and priorities for the coming year include:

- Continue to maintain and expand the network of promotional information sources available for sustainable transport modes;
- The implementation and ongoing monitoring of the Travel Plan Policy;
- Investigate further opportunities for the improvement of local bus services, the delivery of identified new cycle routes, improving sustainable transport provision, and for traffic management improvements; and
- Continue of non-automatic NO<sub>2</sub> diffusion tubes monitoring across Boston Borough Council and the AQMAs, ensuring high level of data capture.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
AQAP 1	Building of the Boston Docks Link Road	Traffic Management	Strategic highway improvements	LLC / BBC	The scheme has been abandoned	-	Traffic counts, non-automatic NO <sub>2</sub> monitoring	Reduction of 2µg/m <sup>3</sup> per year	-	-	Scheme has been abandoned
AQAP 2	Provision of the Outer Distributor Road for Boston	Traffic Management	Strategic highway improvements	LLC / BBC	The Boston Transport Strategy I considers the Distributor Road as a longer term aspiration	Further investigations into the feasibility of such a scheme will be carried out in association with the development of the new Local Development Framework.	Traffic counts, non-automatic NO <sub>2</sub> monitoring	Significantly reduce levels of Heavy Good Vehicles, achievement of annual target mean. <40 µg/m <sup>3</sup>	-	LCC Local Transport Plan 4	-
AQAP 3	Development of a Transport Strategy for Boston	Policy Guidance and Development	Air Quality Planning and Policy Guidance	LLC / BBC	Short term (up to 2010) and longer term measures have been proposed, which are expected to reduce congestion and deliver air quality benefits.	During 2007 and 2008, traffic signals at the Liquorpond Street and Bargate roundabouts were switched off (initial on an experimental basis, but later made permanent) which resulted in improved traffic flows through these areas.	Traffic counts, non-automatic NO <sub>2</sub> monitoring	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Create two lane traffic travelling north into Boston on the A16 Spalding Road to Liquorpond Street roundabout.  Widening of Liquorpond Street roundabout.	-	-
AQAP 4	Expansion of the Community Travel Zone	Promoting Travel Alternatives	Promotion of walking and cycling	LLC	Schemes to encourage walking and cycling implemented during 1st LTP period	A Non-Motorised User study for the town has been completed. This has identified several prospective walking and cycling schemes which are currently being prioritised for deliver as funding become available.	Traffic counts, non-automatic NO <sub>2</sub> monitoring	General public accepting change and raise awareness on different forms of sustainable transport.	-	Enhanced cycling and walking facilities in Boston have been approved and are going ahead such as the Spa Trail connect and Black Sluice Path	-

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
AQAP 7	Provision of Liquid Petroleum Gas (LPG) pumps at filling station	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	BBC	No policy in Interim Plan	Potential inclusion involving Local Development Framework – The South East Lincolnshire Joint Planning Unit is involved.	Non-automatic NO <sub>2</sub> monitoring	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Joint LDF Preferred Options Consultation until June 2013	South East Lincolnshire Strategic Planning Committee * which was established on the 5 July 2011 with its inaugural meeting scheduled for the 9th September 2011.	-
AQAP 9	Park & Ride Schemes for applicability to Boston	Alternatives to private vehicle use	Bus based Park & Ride	LCC	The Boston Transport Strategy does not support the merits of a Park & Ride for Boston. However, the adopted Boston Transport Strategy does propose other improvements to public transport	The new 'IntoTown' town bus service was introduced in 2008. As well as more frequent service using low floor buses, this has included improvements to bus stops and timetable information, together with real time information. The service has seen a threefold increase in patronage since its introduction.		Annual mean reduction achieved <40 µg/m <sup>3</sup>	3 cross town loops every 30 minutes Operate Mon-Sat 0700-1900 passengers has risen over 300% and now carrying 24,000/month	Scheme abandoned	-

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
AQAP 10	Development of a rail-freight interchange through the Local Plan	Freight and Delivery Management	Other	LCC / BBC	Joint LDF with South Holland preference for Deeping St Nicholas	Site allocated in Interim Plan. Site currently being assessed as part of Employment Land Review as evidence for the Local Development Framework	-	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Join LDF Preferred Options Consultation until June 2013	South East Lincolnshire Strategic Planning Committee	-
AQAP 11	Designate a senior officer responsibility for transport-related issues within BBC	Policy Guidance and Development Control	Other policy	BBC	Director of Development appointed	Director of Development Phil Drury representing BBC on Boston Transport Strategy	-	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Complete	Complete	-
AQAP 12	Controlled Parking Zone (CPZ) Framework	Traffic Management	UTC, Congestion management, traffic reduction	LCC / BBC	Feasibility study carried out.	Following an earlier feasibility study and ongoing discussions with District Councils, the County Council is looking to implement Civil Parking Enforcement.	-	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Additional signage to direct drivers to most appropriate car parks.  New pricing charges introduced in 2013	-	A multi-storey car park was proposed, but the developer pulled out on funding.
AQAP 13	Encouraging walking and cycling routes for new development	Transport Planning and Infrastructure	Cycle network	LCC / BBC	Joint LDF	An ongoing objective when considering planning applications for new development, to achieve adequate facilities within the developments	Traffic counts at major roads	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Implementation started 2010/2011, examples are Sleaford Road cycleway, Toucan crossing at Bargate Bridge.	Ongoing	-



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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
AQAP 14	Discouraging development within the town-centre than places an emphasis on private vehicle use over public transport.	Promoting Travel Alternatives	Other	BBC	Policy RTC1 in Interim Plan	This is an ongoing objective when considering planning applications for new development, to achieve adequate facilities within the developments and linkages to existing networks.	-	Annual mean reduction achieved <40 µg/m <sup>3</sup>	Joint LDF	Ongoing	-
AQAP 15	Request detailed air quality assessments for proposed development that is likely to have a significant impact on local air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	BBC	Policy G1(8) Interim Plan	Air quality assessments are required of developers where a significant impact is likely.	-	-	Ongoing development control	Ongoing	-
AQAP 16	Use of Planning Conditions or S106 Agreements	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	BBC	Policy G1(8) Interim Plan	These tools are used where appropriate and according to the scale of the problem.	-	-	Joint LDF	Ongoing	-

## Boston Borough Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
AQAP 18	Production of a Council Sustainable Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	BBC		The County Council is working in partnership with Boston Borough Council to implement a Travel Plan for the Municipal Buildings in Boston (which are also sub-let to the East Lincolnshire Primary Care Trust and the County Council's Divisional staff).  A staff survey was carried out in March 2004 which identified employees travel patterns and a Travel Plan was adopted in the summer of 2005	-	-	Smarter Driving Courses commencing 2010/2011  Adopted Carbon Management Plan 2010 -2014	Complete	-
AQAP 19	Promotion of Sustainable Travel Plans for large employers (more than 500 employees)	Promoting Travel Alternatives	Workplace Travel Planning	BBC	Policy T5 Interim Plan	These tools are used where appropriate and according to the scale of the problem.	Number of employers that joins the programme	-	Two childrens centres in the Borough have submitted travel plans to LCC	Ongoing	-
AQAP 20	Promotion of walking as a healthy alternative to car use for short journeys within the town-centre	Promoting Travel Alternatives	Promotion of walking	BBC		Promotion of walking has been delivered through the LTP through Safe Routes to School and Community Travel Zones in Boston  The Boston Transport Strategy proposes a number of measures to promote walking. In addition, all schools in the Boston area now have an approved School Travel Plans to encourage walking, cycling and bus use.	Increase in number of participants/ partners.  Traffic counts on major roads	-	£30000 funding secured  Numbers participating in social walking groups ( 258 new members April 09 – Jan 2010) against target of 108	Ongoing	Boston Walking Scheme has received NHS Lincolnshire Award 2010

## Boston Borough Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
AQAP 22	Investigation of inland waterways as complementary distribution methods for freight	Promoting Travel Alternatives	Promote use of rail and inland waterways	BBC	Policy T7 Interim Plan  River Witham and Fens Waterways	Outline planning permission has been granted for the construction of a tidal barrage and a lock link to encourage greater use of the River Witham and to provide a navigable link to the South Forty Foot Drain. This will ultimately link to the R. Welland, R Nene and R. Ouse, known as the Fens Waterway Link.	Non-automatic NO <sub>2</sub> monitoring	-	Proposal for Lock link to Haven  Lock link completed. Barrier position being finalised	Barrier to be built by 2015/2017  Subject to funding	-
AQAP 23	Discourage use of bonfires for disposal of waste	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	BBC	Statutory Nuisance enforcement ongoing. Garden waste recycling scheme introduced 2012	Statutory Nuisance enforcement ongoing. Recycling of green waste at 52%	-	-	Statutory nuisance enforcement ongoing	Ongoing	-
AQAP 24	Maintenance of current monitoring stations and networks	Promoting Low Emission Plant	Other	BBC	Haven Bridge continuous monitoring station and non-automatic NO <sub>2</sub> monitoring across the council	Haven Bridge continuous monitoring station closed due to lack of funds.	Non-automatic NO <sub>2</sub> monitoring	Annual mean reduction achieved <40 µg/m <sup>3</sup>	15 Diffusion tube sites	Ongoing	-

LLC – Lincolnshire County Council

BBC – Boston Borough Council

## 2.3. PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

There are no automatic PM<sub>2.5</sub> monitoring stations currently within Boston Borough Council, but the council is working to reduce emissions of air pollutant across the Borough, many of the measures used to reduce emissions of NO<sub>2</sub> also impact the emissions of PM<sub>10</sub> and PM<sub>2.5</sub>. The following pollutant emission reduction measures included within Boston's existing AQAP are also likely to reduce emissions of PM<sub>2.5</sub>:

- To support and enhance sustainable travel and alternatives to the private car through widening choice, improving public transport and increasing provision for cycling and walking.
- To provide an efficient, convenient and accessible transport network for all, reducing the adverse impacts of travel, particularly from private cars and road-based freight.
- To support the sustainable development, regeneration and growth of Boston, helping to attract inward investment and meeting current and future housing and business needs.
- To reduce carbon emissions from personal travel and freight transport.
- To protect and enhance the quality and attractiveness of the built and natural environment of Boston and the surrounding area.

## 3. Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

### 3.1. Summary of Monitoring Undertaken

#### 3.1.1. Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives. Boston Borough Council did not undertake any automatic (continuous) monitoring during 2015.

The automatic monitoring station located within the Haven Bridge AQMA was closed at the end of 2011 due to budget constraints.

#### 3.1.2. Non-Automatic Monitoring Sites

Boston Borough Council undertook non-automatic (passive) monitoring of NO<sub>2</sub> at 15 sites during 2015. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

### 3.2. Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

#### 3.2.1. Nitrogen Dioxide (NO<sub>2</sub>)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>. For diffusion tubes, the full year 2015 dataset of monthly mean values is provided in Table B.1 in Appendix B.

Figure 3.1 below demonstrates the five year trend for non- automatic NO<sub>2</sub> concentrations across Boston Borough Council.

Figure 3.1– Long Term Trend Graph of NO<sub>2</sub> concentrations at monitoring locations of past 5 years.

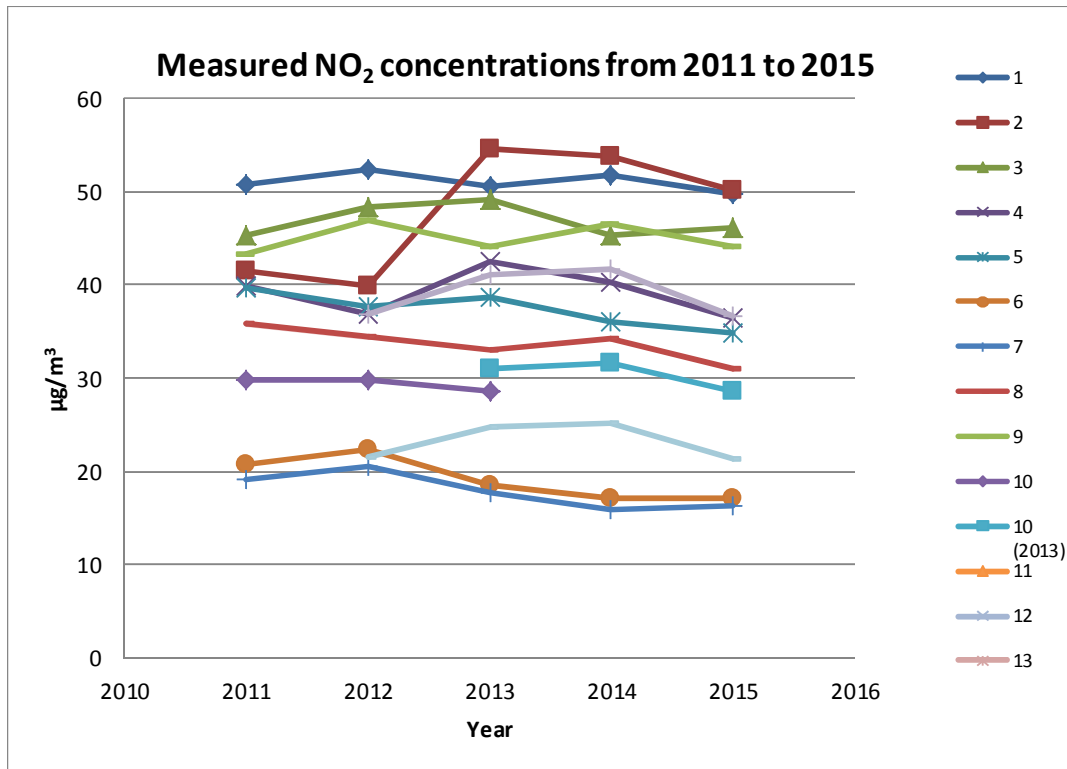


Figure 3.1 and Table B.1 demonstrates there has been a general reduction of NO<sub>2</sub> in 2015 from 2014 across the Council area.

There has been 4 exceedences of the annual mean concentration of 40µg/m<sup>3</sup>, where the highest recorded concentration was at site 2, on the North side of Heaven Bridge Road, at 50.1µg/m<sup>3</sup>, which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

**AQMA 1 – Haven Bridge**

Three out of five monitoring locations within the Haven Bridge AQMA were observed to have an annual mean NO<sub>2</sub> concentration that exceeded the annual mean AQS objective of 40µg/m<sup>3</sup> in 2015, as shown in Table A.2. Figure A.2 shows that at sites 2, 4 and 5, a gradual decline in NO<sub>2</sub> concentration is observed from 2013 to 2015. The NO<sub>2</sub> concentration at site 1 has remained relatively consistent since 2011 around 50µg/m<sup>3</sup>.

As such the Council will continue to implement progress measures set out in the AQAP, including seeking further highway improvements within the Boston Transport

Strategy with regards to the Haven Bridge/Queen Street area and continual NO<sub>2</sub> monitoring. An air quality monitoring station, which was shut down at the end of 2011 due to funding would be a preferable method of monitoring however due to funding issues, NO<sub>2</sub> diffusion tubes will also provide sufficient monitoring data for the AQMA.

**AQMA 2 – Bargate Bridge**

One of four monitoring locations within the Bargate Bridge AQMA, site 9, was observed to have an annual mean NO<sub>2</sub> concentration that exceeded the annual mean AQS objective of 40µg/m<sup>3</sup> in 2015, shown in Table A.2 and Figure A.3.

The NO<sub>2</sub> annual mean concentration for 2015 is lower than that recorded in 2014 for all four monitoring sites in the AQMA as show in Figure A.3.

As reported previously, properties in the AQMA are set back from the A16 Spilsby Road. Site 9 is not representative of public exposure. In order to estimate the actual NO<sub>2</sub> annual mean concentration at relevant exposure within the AQMA, the NO<sub>2</sub> fall-off with distance calculator provided by Defra on the LAQM Support website has been used. Prior to distance correction, the annual mean NO<sub>2</sub> concentration at sites 9 was 44.2µg/m<sup>3</sup>.

Based on the tool, and considering a distance of 6 m from the façade of properties to the kerb (which is conservative), the NO<sub>2</sub> concentration at relevant nearby exposure is predicted to be 36.8µg/m<sup>3</sup> at site 9, as shown in Table C.3 and Figure C.1. These results indicate that annual mean NO<sub>2</sub> concentrations were below the objective at locations relevant for public exposure at site 9 within the AQMA.

**3.2.2. Particulate Matter (PM<sub>10</sub>)**

Boston Borough Council did not undertake any monitoring for PM<sub>10</sub> within the local authority boundary and have not indentified any new specific sources of particulates at this time.

## Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
1	Adjacent to former AQMS, North side of Haven Bridge Road	RS	532575	343696	NO <sub>2</sub>	Y	0	1.5	N	3
2	Opposite former AQMS, North side of Haven Bridge Road	RS	532656	343716	NO <sub>2</sub>	Y	N/A	0.5	N	3
3	Adjacent to 68 Liquorpond Street	RS	532470	343736	NO <sub>2</sub>	Y	0.1	0.5	N	3
4	Adjacent to 18 Queen Street	RS	532331	343848	NO <sub>2</sub>	Y	0.1	1.5	N	3
5	John Adams Way intersection with Haven Bridge	RS	532859	343760	NO <sub>2</sub>	Y	3.5	2.2	N	3
6	Adjacent to 37 Spayne Road	BG	533124	343939	NO <sub>2</sub>	N	6.8	2.7	N	3
7	29 Manor Gardens	BG	533324	344044	NO <sub>2</sub>	N	10.0	26.8	N	3
8	Bargate Roundabout	RS	533112	344476	NO <sub>2</sub>	Y	N/A	2.3	N	3
9	Roadside adjacent to 30 Spilsby Road	RS	533251	344642	NO <sub>2</sub>	Y	4	2.0	N	3
10	Façade of 23 Spilsby Road	RS	533312	344665	NO <sub>2</sub>	N	0	5.0	N	3
11	41 Spilsby Road	RS	533368	344728	NO <sub>2</sub>	N	8.5	0.3	N	3
12	Junction of New Asda Road and Sleaford Road	RS	532168	343987	NO <sub>2</sub>	N	8.9	1.5	N	3
13	Façade of 42 Spilsby Road	RS	533287	344675	NO <sub>2</sub>	N	0	7.0	N	3
14	Roadside adjacent to 20 Spilsby Road	RS	533226	344624	NO <sub>2</sub>	Y	3.0	2.0	N	3
15	Façade of 32 Spilsby Road	RS	533253	344653	NO <sub>2</sub>	Y	0.1	10.0	N	3

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.



Table A.2 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
1	Roadside	Diffusion Tube	92%	92%	<b>50.7</b>	<b>52.3</b>	<b>50.5</b>	<b>51.7</b>	<b>49.7</b>
2	Roadside	Diffusion Tube	92%	92%	<b>41.4</b>	39.9	<b>54.6</b>	<b>53.7</b>	<b>50.1</b>
3	Roadside	Diffusion Tube	92%	92%	<b>45.3</b>	<b>48.3</b>	<b>49.2</b>	<b>45.3</b>	<b>46.0</b>
4	Roadside	Diffusion Tube	100%	100%	39.8	36.8	<b>42.5</b>	<b>40.2</b>	36.4
5	Roadside	Diffusion Tube	92%	92%	39.6	37.7	38.7	36.1	34.9
6	Background	Diffusion Tube	92%	92%	20.8	22.4	18.5	17	17.1
7	Background	Diffusion Tube	100%	100%	19.2	20.5	17.7	15.9	16.3
8	Roadside	Diffusion Tube	100%	100%	35.8	34.4	33.1	34.2	31.1
9	Roadside	Diffusion Tube	100%	100%	<b>43.3</b>	<b>46.9</b>	<b>44.1</b>	<b>46.6</b>	<b>44.2</b>
10	Roadside	Diffusion Tube	100%	100%	29.8	29.7	31	31.7	28.5
11	Roadside	Diffusion Tube	92%	92%	37.9	35.6	37.4	36.3	33.0
12	Roadside	Diffusion Tube	100%	100%	33.3	33.3	34.6	30.7	28.6
13	Roadside	Diffusion Tube	100%	100%	35.1	33.7	24.1	23.3	22.0
14	Roadside	Diffusion Tube	100%	100%	N/A	36.9	<b>41.1</b>	<b>41.6</b>	36.6
15	Roadside	Diffusion Tube	92%	92%	N/A	21.5	24.7	25.2	21.4

Notes: Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in bold.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at all Diffusion Tube Monitoring Sites in the Boston Council Area

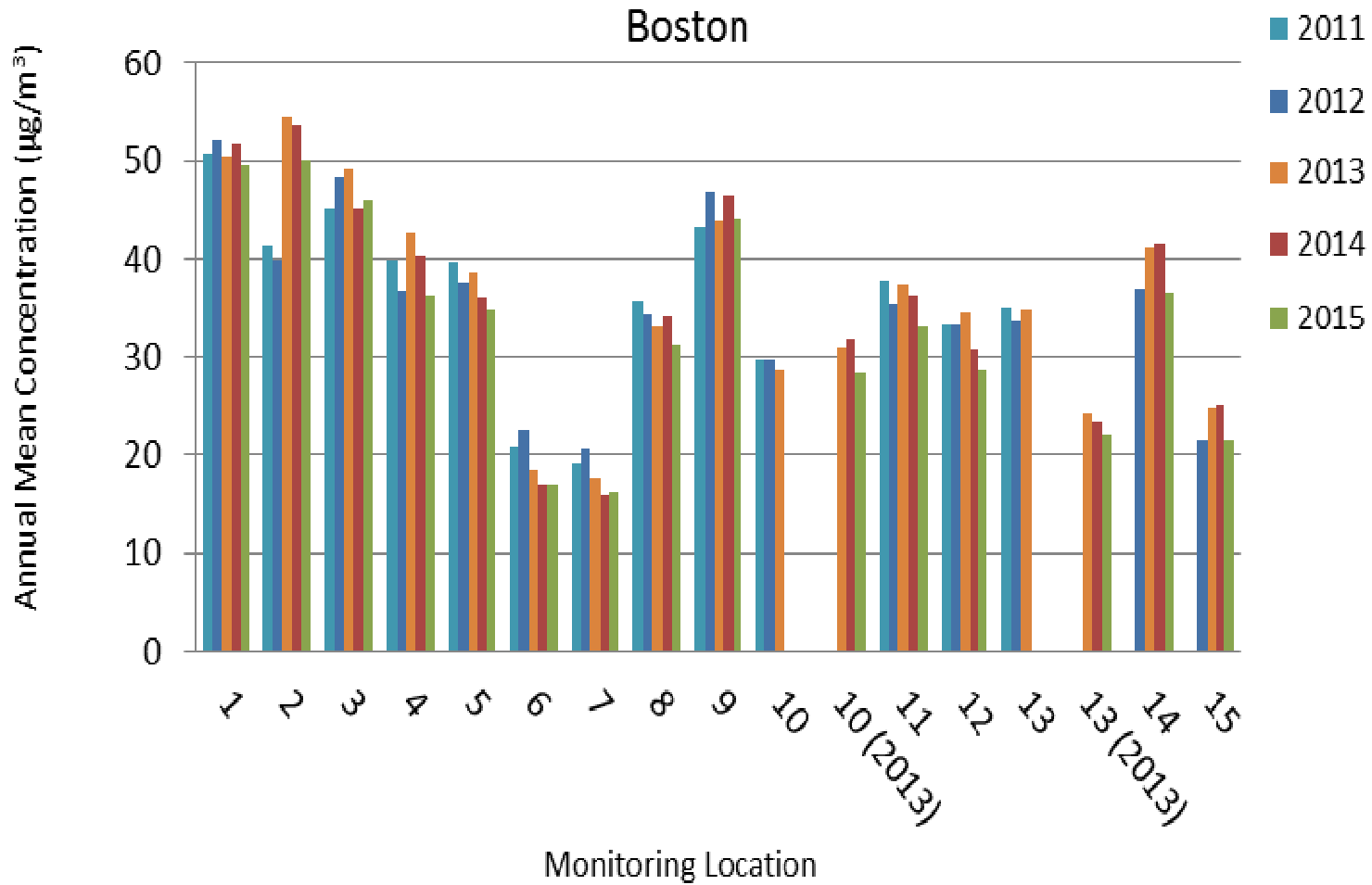


Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Diffusion Tube Monitoring Sites Located in AQMA 1

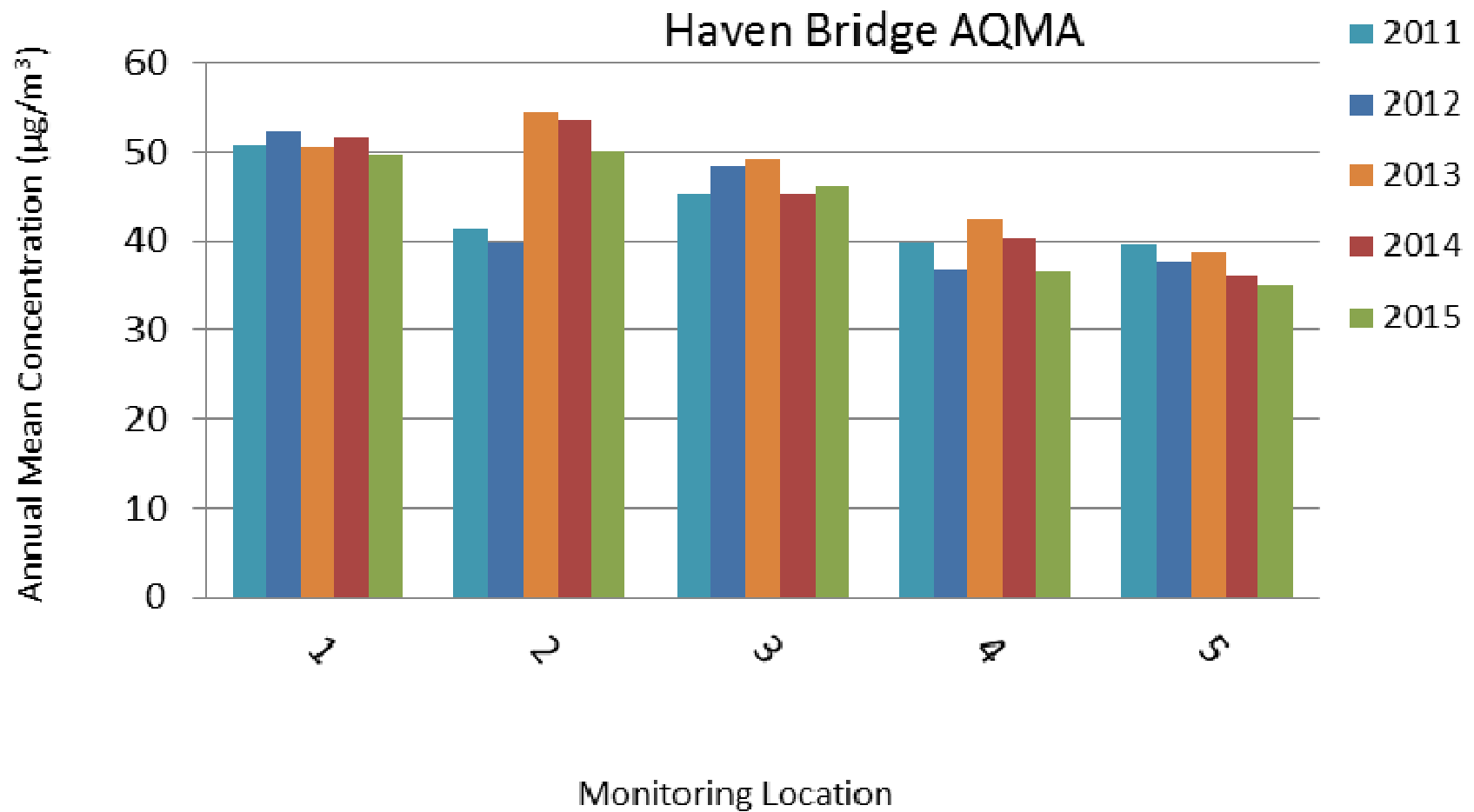
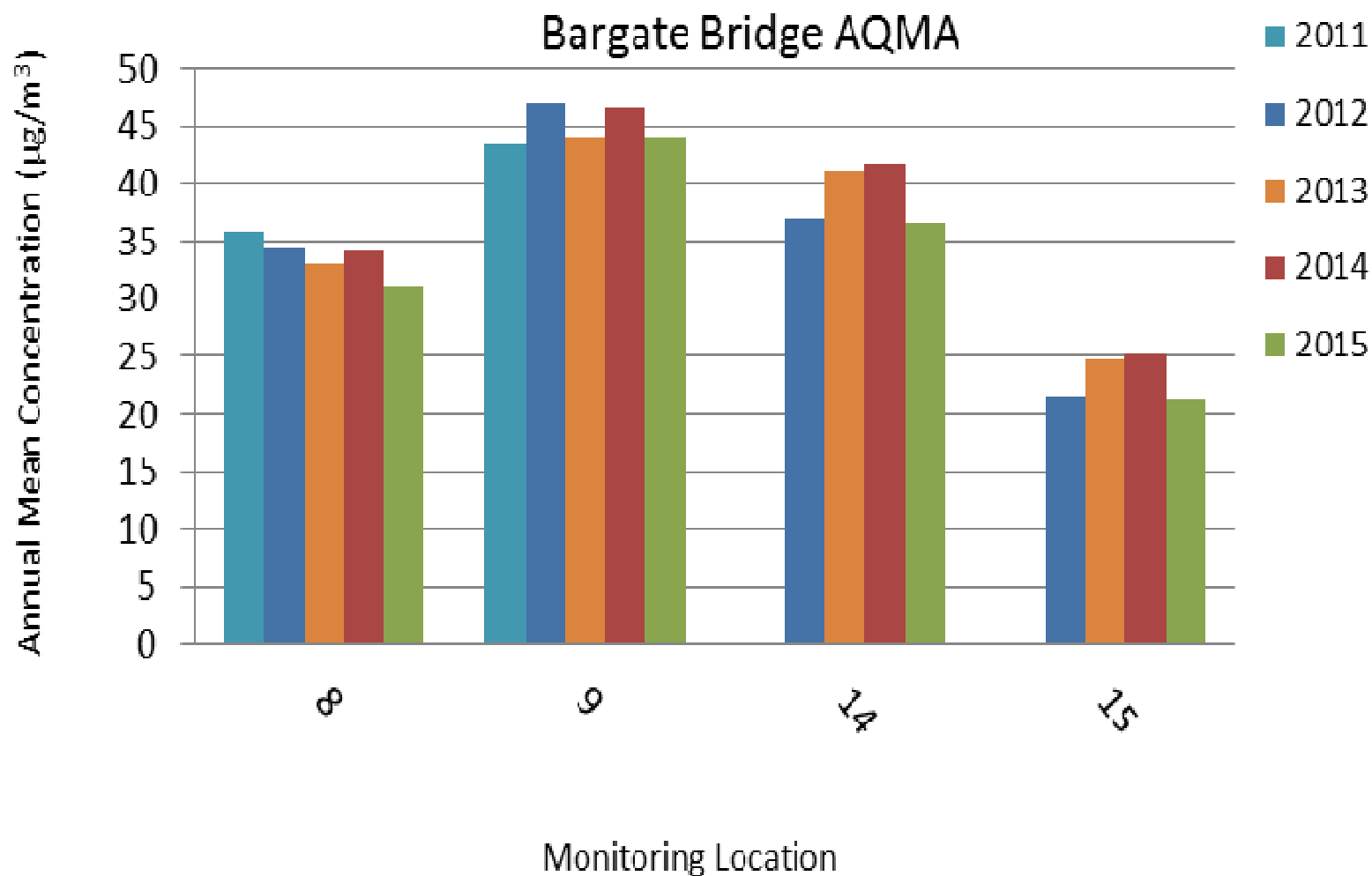


Figure A.3 – Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Diffusion Tube Monitoring Sites Located in AQMA 2



## Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results – 2015

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted <sup>(1)</sup>
1	65.6	54.8	65.9	48.0	N/R	38.2	58.3	61.4	56.3	55.6	44.1	52.0	54.6	49.7
2	54.0	55.6	51.5	69.8	57.8	43.8	50.8	58.3	56.4	68.0	N/R	39.1	55.0	50.1
3	57.8	72.6	47.9	50.3	N/R	38.5	52.9	50.0	51.9	55.7	34.9	43.7	50.6	46.0
4	40.5	45.3	40.0	44.7	34.6	29.9	40.8	42.3	44.0	46.8	35.8	35.4	40.0	36.4
5	39.6	46.4	N/R	42.0	36.8	34.4	38.5	35.7	37.6	46.0	32.7	32.4	38.4	34.9
6	24.9	27.7	23.0	19.0	14.8	12.4	15.3	12.8	17.0	N/R	18.8	21.4	18.8	17.1
7	26.4	28.9	18.5	15.5	13.7	12.1	12.1	13.6	15.9	19.1	20.4	18.2	17.9	16.3
8	37.4	40.6	30.9	33.9	31.4	28.7	33.3	37.4	33.8	38.7	24.9	38.9	34.2	31.1
9	59.5	67.0	39.5	41.0	44.8	35.9	50.1	47.3	44.4	42.4	45.6	65.0	48.5	44.2
10	32.4	37.2	30.6	36.6	29.6	24.7	30.3	33.4	29.7	32.2	25.5	34.1	31.4	28.5
11	42.9	42.9	33.7	31.7	N/R	25.7	35.3	37.7	36.7	40.2	36.0	36.3	36.3	33.0
12	32.3	39.6	36.9	35.8	26.7	24.1	29.3	29.1	34.2	41.7	24.4	23.1	31.4	28.6
13	28.7	30.2	26.1	24.5	18.8	17.6	21.3	23.0	19.5	23.2	27.7	29.3	24.2	22.0
14	40.8	48.2	38.5	43.0	36.8	33.9	43.5	40.4	40.5	41.1	37.8	38.4	40.2	36.6
15	19.7	35.3	N/R	24.4	17.9	18.8	22.3	23.2	21.8	26.1	23.1	26.2	23.5	21.4

(1) See Appendix C for details on bias adjustment

## Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

### Sources of Pollution

Boston Borough Council have not identified any new or significant changes to sources as described in Chapter 7, Section 1 of the Technical Guidance LAQM.TG(16). A number of planning applications were granted during 2015 that were identified as having the potential to affect air quality within the Borough, those that were required to complete an Air Quality Assessment (AQA) returned conclusions that the impacts would be of a negligible significance.

**Table C.1 – 2015 Planning Applications with the Potential to Affect Air Quality**

Planning Application Reference	Description of Development	Was an AQA Completed?	Conclusions of AQA
B/15/0009	<b>Former (NHS) Site, Cork Tree Crescent</b> Demolition of existing building and outline consent (up to 60 residential units)	No	-
B/15/0213	<b>Broadfield Lane</b> 75 residential units with associated infrastructure.	No	-
B/15/0100	<b>Boston College De Montfort Campus,</b> Demolition of university campus, and erection of 108 residential units with associated infrastructure.	No	-
B/14/0103	<b>Land to the West of Toot Lane,</b> 340 residential units and a School Nursery building with associated infrastructure.	No	-
B/15/0211	<b>Land at the junction of Woodthorpe Avenue and Toot Lane</b> 32 residential units and surface water attenuation pond with associated roads infrastructure.	No	-
B/15/0280	<b>Land adjacent and south of Hawthorn Tree Corner School</b> 79 residential units with associated infrastructure.	No	-
B/14/0210	<b>South of Hawthorn Tree Corner School, east side of Toot Street</b> Children's Centre, Group Room buildings and play area for school.	No	-
B/15/0391	<b>Mani Firs, London Road</b> Outline application of 105 residential units with associated infrastructure.	No	-

### Poultry Farms

Boston Council received a planning application for the construction of two poultry rearing buildings (planning application B/13/0384 registered on 03/10/2013 with full planning permission granted on 10/01/2014) at:

- Bank Farm, Silvertoft Lane; and
- Frampton Fen, Boston.

The proposed buildings will house 17,500 birds, which is well below the screening criteria for Poultry Farms provided in Technical Guidance LAQM.TG (16). As such, the developments are not considered to give rise to significant emissions of particulate matter (PM<sub>10</sub>).

One existing site, Amber Hill does however meet the criteria specified in TG (16) for poultry assessment, in that it houses 168,000 turkeys and there is relevant exposure on site, within 100m. Therefore it is necessary for the Council to proceed to a screening assessment for this site, as summarised below in Table C.2.

**Table C.2 – Poultry Assessment**

Site Name	Number of Birds	Threshold for DA consideration	Closest Receptor (from farm centre)	Threshold	DA Necessary?
Amber Hill Farm	168,000 Turkeys	100,000 Turkeys	95.8	Within 100m	Yes

The screening methodology in LAQM TG16 Box 7.2 was used for the screening assessment of PM<sub>10</sub> emissions from the poultry farm.

The 90.4th percentile contribution (PC) to the daily mean PM<sub>10</sub> concentration is calculated as follows:

$$\begin{aligned}
 PC_{90.4} &= 0.62 \times (-0.000161 \ln (d) + 0.000793) \times (b)) \\
 &= 0.62 \times ((-0.000161 \ln (95.8) + 0.000793) \times (168,000 \times 1.5)) \\
 &= 9.1\mu\text{g}/\text{m}^3
 \end{aligned}$$

The background annual mean PM<sub>10</sub> concentration at Amber Farm is 17.5µg/m<sup>3</sup>. Therefore, the total 90.4<sup>th</sup> percentile PM<sub>10</sub> daily mean concentration (PEC<sub>90.4</sub>) is then calculated as:

$$\begin{aligned}
 PEC_{90.4} &= PC_{90.4} + \text{annual mean PM}_{10} \text{ background} \\
 &= 9.1+17.5 \\
 &= 26.6 \mu\text{g}/\text{m}^3
 \end{aligned}$$

The calculated total 90.4<sup>th</sup> percentile daily mean PM<sub>10</sub> concentration of 26.6µg/m<sup>3</sup> is below the 24-hour mean PM<sub>10</sub> objective limit value of 50µg/m<sup>3</sup> for England.

In this instance, the screening assessment has thus concluded that there is no significant risk of exceeding the 24-hour mean PM<sub>10</sub> objective as a consequence of PM<sub>10</sub> emissions from the poultry farm. Therefore no further detailed consideration is considered necessary.

### **Diffusion Tube Bias Adjustment Factors**

The diffusion tubes are supplied and analysed by Gradko utilising the 20% triethanolamine (TEA) in water preparation method. A bias adjustment of 0.91 for the year 2015 (based on 29 studies) has been derived from the national bias adjustment calculator<sup>4</sup>.

### **Discussion of Choice of Factor to Use**

Historically the Council has used a local bias adjustment factor based on results from the diffusion tube co-located with the automatic air quality monitoring site that was installed within the Haven Bridge AQMA. However the site was decommissioned at the end of 2011 and therefore the national bias adjustment factor has been applied to the monitoring results since 2012.

### **QA/QC of Diffusion Tube Monitoring**

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. Gradko previously participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO<sub>2</sub> diffusion tube analysis and the Annual Field Inter-Comparison Exercise. In April 2014, a new scheme, AIR PT<sup>5</sup>, was introduced. This is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

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<sup>4</sup> National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/15 published in March 2015.

<sup>5</sup> [http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-\(April-2013--February-2015\)-NO2-report.pdf](http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf)



Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme. Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

Gradko International Ltd's performance for 2014 is covered by the last round of the WASP scheme, WASP R124 and the first four rounds of AIR PT, AR001-004. In each of these rounds, 100% of samples submitted by Gradko were deemed satisfactory.


**Fall-off Distance Correction of Sites Exceeding the NO<sub>2</sub> Annual Mean Objective**

The NO<sub>2</sub> fall-off with distance calculator was used to estimate the NO<sub>2</sub> concentration at the nearest locations relevant for exposure for site 9. The Details for the NO<sub>2</sub> fall-off distance correction calculation for the site 9 are shown in Table C.3 and Figure C.1.

**Table C.3 – Fall off with Distance Correction of Relevant Sites Exceeding the NO<sub>2</sub> Annual Mean AQS Objective**

Site ID	Site Type	Within AQMA	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	2015 Annual Mean Concentration (µg/m <sup>3</sup> )	Distance Corrected 2015 Annual Mean Concentration (µg/m <sup>3</sup> )
9	Roadside	Yes	4	2	44.2	36.8

**Figure C.1 – Fall-off Distance Correction of Sites Exceeding the NO<sub>2</sub> Annual Mean Objective (2015)**

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph. 

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	6	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	15.4	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	(Note 2)	44.2	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	(Note 3)	36.8	µg/m <sup>3</sup>

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

LAQM 2016/17 Created by Dr Ben Moran. Approved by Prof David L. Jones. Contact: ben.moran@airquality.co.uk

# 1. Appendix D: Map(s) of Monitoring Locations

Figure D.1 – Map of Boston AQMA 1 – Haven Bridge

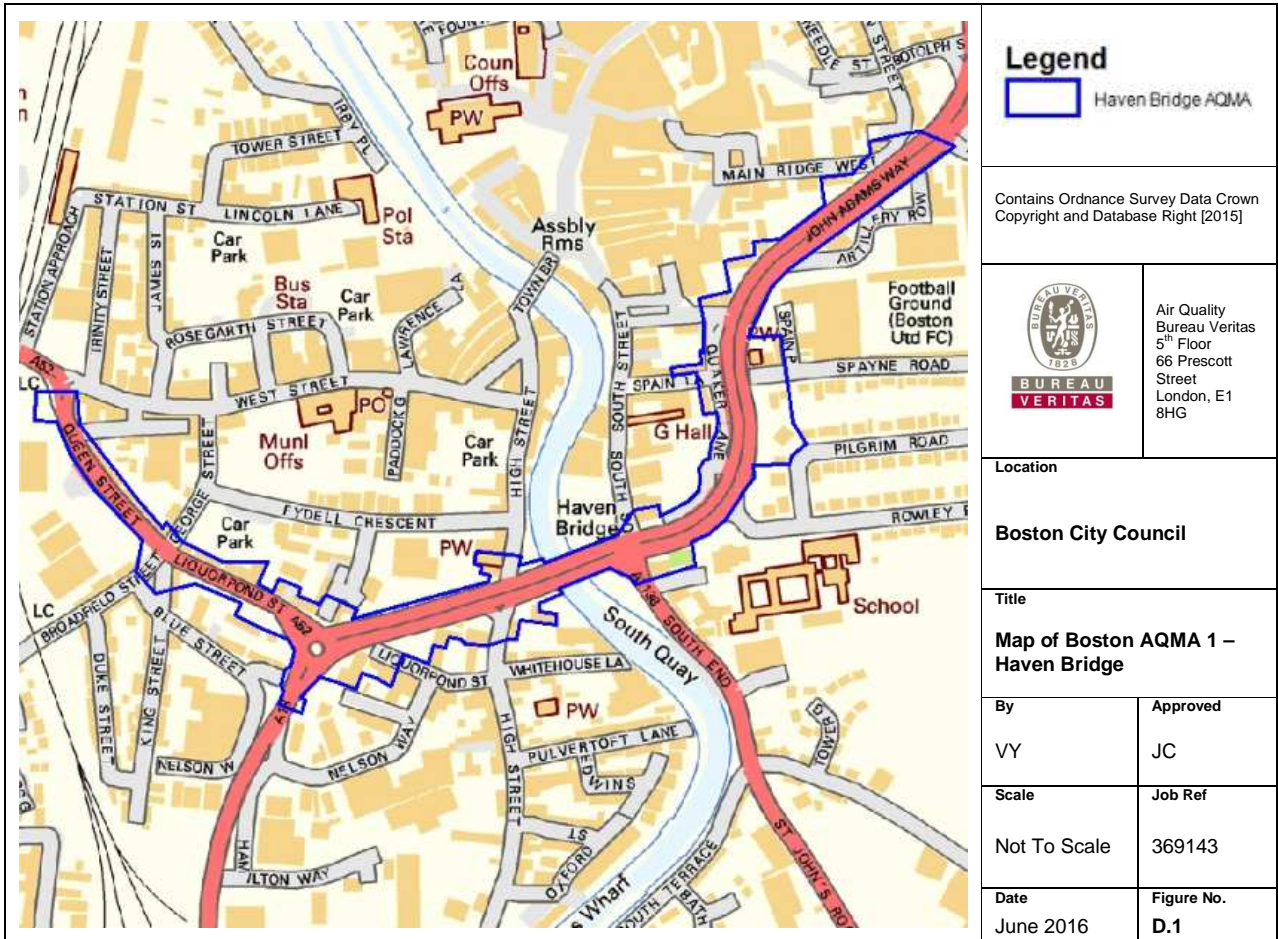


Figure D.2 – Map of Boston AQMA 2 – Bargate Bridge

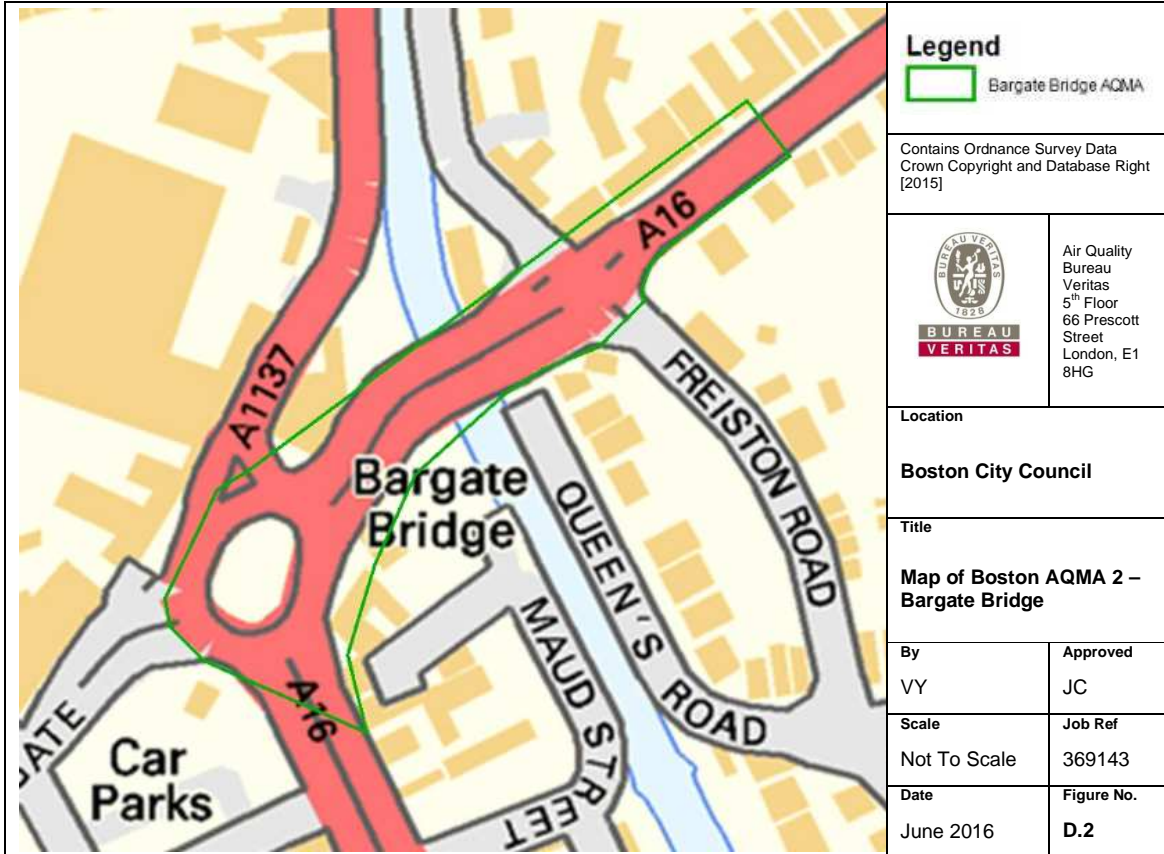
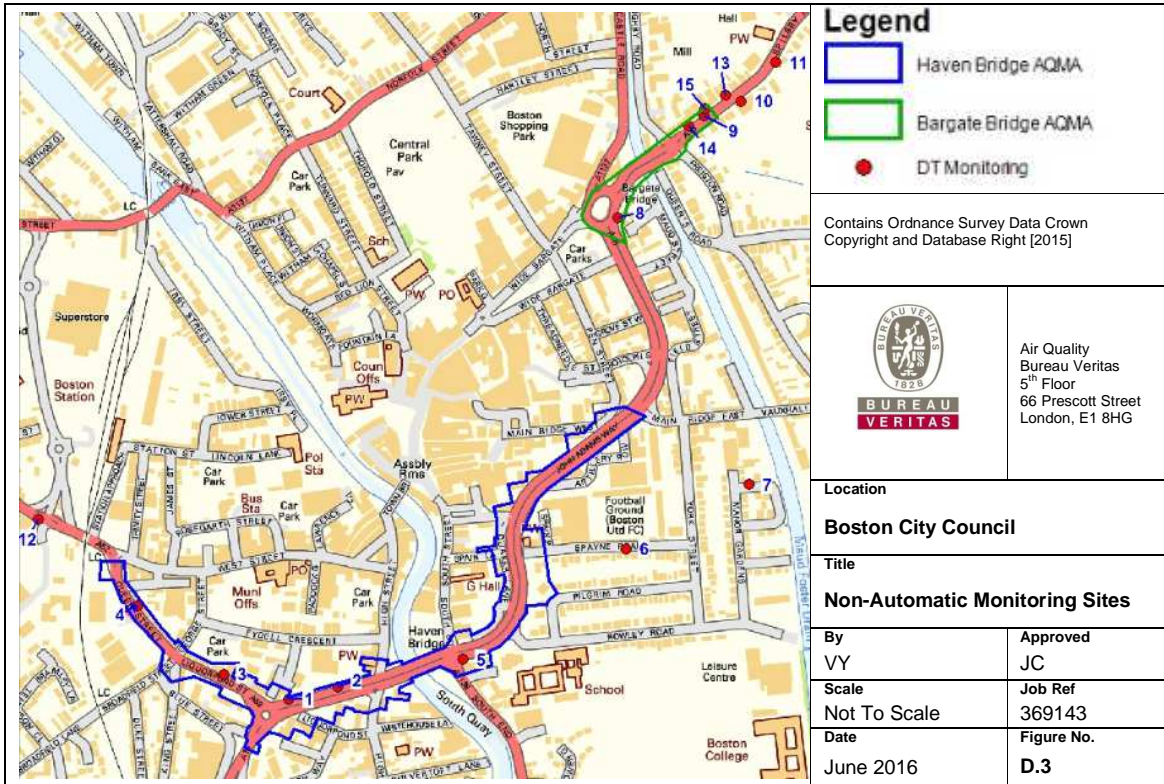


Figure D.3 – Map of Non-Automatic Monitoring Sites



## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQMS	Air quality monitoring station
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

- Local Air Quality Management Technical Guidance LAQM.TG(16). Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG(16). Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- NO<sub>2</sub> Fall off With Distance Tool, available at <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>
- National Diffusion Tube Bias Adjustment Spreadsheet, version 03/16 published in March 2016.
- [http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-\(April-2014-February-2016\)-NO2-report.pdf](http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-(April-2014-February-2016)-NO2-report.pdf)
- Boston Borough Council 2015 Updating and Screening Assessment.
- Boston Borough Council 2014 LAQM Progress Report.
- Boston Borough Council 2015 LAQM Progress Report.
- Boston Borough Council 2006 Local Air Quality Management – Air Quality Action Plan.
- Boston Transport Strategy, 2016.