Bath & North East Somerset Council

2019 Air Quality Annual Status Report (ASR)

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

June, 2019

Local Authority Officer	Dr Nicola Courthold Mr Robin Spalding
Department	Environmental Monitoring
Address	Bath & North East Somerset Council Lewis House Manvers Street Bath BA1 1JG
Telephone	01225 396622
E-mail	Environmental_Monitoring@bathnes.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Bath & North East Somerset Council

Air pollution is associated with a number of adverse health impacts, particularly respiratory conditions. It is also 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 equality issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Bath & North East Somerset is a mainly rural district with Bath as the major urban area, together with the small towns of Keynsham, Radstock and Midsomer Norton. The main pollutant source within the area is road traffic. This is exacerbated in Bath with the city being set in a valley surrounded by hills which can trap the pollution within the city.

As the source of air pollution in Bath and North East Somerset is overwhelmingly from traffic, the approach to improving air pollution is by traffic and transport improvement measures. There is a strong collaboration between the four West of England authorities in this regard and the Travel West brand acknowledges the fact that commuters don't think in terms of authority boundaries. The Sustainable Transport Transition Year fund and the Go Ultra Low (GUL) City Scheme (a West of England project) follow on from the successful Local Sustainable Transport Fund that the Travel West brand carried forward.

In Bath, through traffic travels into the Air Quality Management Area (AQMA) on four main corridors:

a) M4 junction 18 to A36 south;

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

b) M4 junction 18 to A367;
c) A4 west (Bristol) to A36 south; and
d) A4 west to A4 east (with 7.5t weight limit).

The lack of alternative routes means that the streets are often congested during peak periods, despite a very high proportion of employed Bath residents using sustainable modes for travel to work. The 2011 census indicated that only 25% of employed Bath residents working in the city, drive to work. This has been supported by substantial investments in cycling and walking infrastructure.

In Bath & North East Somerset, five Air Quality Management Areas (AQMAs) have been declared for nitrogen dioxide (NO_2), including the major road network within Bath, Keynsham High Street, a small section of the A4 in Saltford, and sections of the A37 in Temple Cloud and Farrington Gurney. Details of the AQMAs are given in Table 2.1 and maps of the AQMAs are in Appendix E. Details of the AQMAs can also be found at http://www.bathnes.gov.uk/services/environment/pollution/air-quality/.

There is no clear evidence of a safe level of exposure to particulate matter (PM) or NO_2 below which there is no risk of adverse health effects. This means that further reduction of PM or NO_2 concentrations below air quality standards is likely to bring additional health benefits[4].

Bath and North East Somerset Council had 125 NO_2 monitoring sites and 3 particulate matter monitoring sites in 2018. At the end of every year the Council reviews the information which it has collected throughout the year and applies a correction factor. Corrected data is then compared to the national air quality objectives which are detailed in Appendix G. Headlines from 2018 are:

- NO_2 – all continuous monitoring results were below the annual average objective of 40 µg/m^3 and there were no exceedances of the 1-hour objective. NO_2 reduced by 9% compared to 2017; this is higher than the average 4 % reduction across the government's national Automatic Urban and Rural Network (AURN).

[4] DEFRA, Air Quality: A Briefing for Directors of Public Health, 2017

- PM_{10} – all monitoring results were below the annual average objective of 40 µg/m^3 and there was 1 exceedance of the 24-hour mean objective (35 exceedances are allowed). The results were the same as 2017.
- $PM_{2.5}$ – monitoring was below the annual average objective of 25 µg/m^3. There was a 1 µg/m^3 reduction compared with 2017.
- Bath – NO_2 diffusion tube concentrations reduced by an average of 12% across Bath compared with 2017. There was a slight increase at one site (DT084 – Bear Flat) and only a 1% reduction at DT090 - Anglo Terrace. 5 sites remain above the annual average objective of 40 µg/m^3 at the residential facades across Bath in 2018.
- Keynsham – Diffusion tube monitoring continues to show a reduction in the NO_2 concentrations following the start of the trial for a one-way system in Keynsham. All sites were below the objective of 40 µg/m^3 in 2018.
- Saltford – All sites were below the objective of 40 µg/m^3 in 2018.
- Temple Cloud – Diffusion tube monitoring remains above the objective of 40 µg/m^3. An AQMA was declared for this area in 2018 and an Air Quality Action Plan is being developed.
- Farrington Gurney – Diffusion tube monitoring in Farrington Gurney reduced in 2018 and results were just below the objective of 40 µg/m^3 at the residential façade at 39.6 µg/m^3 along the A37. Monitoring is continuing to establish if this reduction is an ongoing trend. An AQMA was declared for this area in 2018 and an Air Quality Action Plan is being developed.
- Pensford – Diffusion tube monitoring in Pensford on the A37 has remained below the objective of 40 µg/m^3.
- Whitchurch – Diffusion tube monitoring in Whitchurch was below the objective of 40 µg/m^3. An AQMA is not being declared but monitoring is continuing at key locations.
- Batheaston/Bathampton – Diffusion tube monitoring remains below 40 µg/m^3 at all locations.
- Radstock/Midsomer Norton/Westfield - Diffusion tube monitoring remains below 40 µg/m^3 at these locations.
- Paulton/Corston - New diffusion tube monitoring locations in Paulton and Corston were well below the objective of 40 µg/m^3. No further action is required.

- 1-hour objective – All diffusion tube monitoring sites are below 60 µg/m^3 – this suggests that the 1-hour NO_2 objective is unlikely to be exceeded.
- Bath & North East Somerset has monitored at 5 locations in 2018 using AQMesh indicative samplers. Results for each location included NO_2, PM_{10} and $PM_{2.5}$ are shown in Appendix D.
    - Bath – Northampton Street
    - Bath – Terrace Walk
    - Keynsham – High Street
    - Keynsham – Bath Hill
    - Westfield – Wells Road

Actions to improve air quality

Key completed measures in 2018 are:

- Air quality work was dominated the by Clean Air Plan technical work and consultation. The Strategic Outline Business Case published in early 2018 identified three main options and the draft Outline Business Case identified a category D Charging Clean Air Zone in Bath as the only option that would enable compliance in 2021. A public consultation took place in October and November with over 750 attending drop-in events and over 8,000 consultation responses. A Cabinet decision was made in March 2019 to implement a category C Charging Clean Air Zone with Traffic Management measures, following the consultation responses, development of the model and taking account of adjustments to emission factors on gradients;
- Widespread air quality and health campaign including advertising the impact of clean air on the back of lower emission buses, bus stop shelters and online;
- Successful bid for the Clean Air Plan Early Measures Fund to implement lower resident's parking permit charges for the ultra-low emission vehicles;
- Taxi licensing policy change that now requires all licensed vehicles to be compliant, enables the use of electric vehicles and incentivises the use of lower emission vehicles;
- Successful Ultra Low Emission Vehicle Taxi Infrastructure bid submission for 10 rapid chargers;
- AQMAs declared in August 2018 for Farrington Gurney and Temple Cloud on the A37;

- Site assessments and District Network Operator (DNO) approval of Go Ultra Low funded rapid and fast charging locations across the authority area;
- Clean Air Schools Pack pilot for lesson planning on air quality, monitoring and active travel initiatives;
- 14 schools accredited with Modeshift stars Bronze, Silver or Gold. 43 schools signed-up (94 educational institutions in B&NES, excluding universities);
- Increased parking charges in central Bath to deter car use and help reduce NOx emissions;
- Keynsham one way trial scheme commenced in May 2017. The trial remained in place throughout 2018 enabling assessment of the impacts of the scheme. Air pollution levels on Keynsham High Street reduced by more than the average reduction across the area. A decision is scheduled to be made in 2019 as to whether the scheme will be made permanent.

Conclusions and priorities

In 2018, monitoring at existing locations showed a decrease in concentrations at most locations. AQMAs were declared for Temple Cloud and Farrington Gurney in 2018 and Air Quality Action Plans for the Areas are being developed. The Outline Business Case for the Clean Air Plan project was completed and work is progressing on the Full Business Case which is due to be completed in Autumn of 2019.

Bath and North East Somerset Council expects the following measures to be completed over the course of the next reporting year:

- Development and wide distribution of the Clean Air Schools Pack following the 2018 pilot;
- A37 Options and Feasibility Study for Temple Cloud and Farrington Gurney AQMAs;
- Draft and consult on an Action Plan for Temple Cloud Area;
- Draft and consult on an Action Plan for Farrington Gurney Area;
- Full Business Case and Clean Air Fund bid submission as part of the Clean Air Plan project;

- Review Air Quality Action Plan for Bath following the approval of Clean Air Plan Full Business Case and Clean Air Fund bid submission;
- Implementation of the Clean Air Plan Early Measures Funding for reduced residents' parking permit charges for ultra-low emission vehicles;
- Clean Bus Technology Fund extension spending;
- Commencement of physical works on OLEV funded charging infrastructure (GUL Cities Scheme and ULEV Taxi Infrastructure Scheme);
- Award and implementation of last-mile freight delivery scheme contract using e-cargo bikes;
- Award and implementation of an electric cycle hire scheme contract in Bath;
- Completion of Delivery Service Plan pilot to inform Clean Air Plan supporting measures;
- Installation of a variable message sign on the southbound A46 approach to Bath;
- Clean Air Day publicity campaign including encouraging pledges from third parties via social media and on-street stalls promoting active travel and lower emission vehicles;
- 'Mobility as a service' trial that provides users with credit for using car hire, bus and alternative transport modes in exchange for selling their car. This is part of a joint bid with Bristol City Council and includes mobility stations near bus stops with e-bikes, car club cars and car share parking;
- Bath Transport Study. This is a £450k study funded by the West of England Combined Authority to consider a range of options including; implementing a mass transit system in Bath as well as improvements relating to walking, cycling and existing forms of public transport;
- Public Realm Movement Strategy access restrictions are being progressed in four locations in Bath, starting with Kingsmead Square in Spring 2020, followed by Cheap Street, Westgate Street and Milsom Street;
- The Local Cycling and Walking Investment Plan is to be consulted on in summer 2019;
- Development of a shared management plan for the shared use river path;
- Further work on Metrowest following expected funding confirmation and confirmation of funding for Portishead Line;

- Delivery of the ULEV Taxi Infrastructure project including installation of 10 rapid chargers across the authority area;
- Adoption of the Joint Local Transport Plan 4 which sets out the vision for transport investment in the West of England and the policy framework within which the West of England authorities will work.

Local engagement and how to get involved

As the main source of air pollution in Bath and North East Somerset is from road sources, the Council wishes to encourage a greater amount of active travel across the district. The cycling infrastructure in Bath and North East Somerset is improving all the time and there are more opportunities to hire electric bikes being developed.

We recommend that people visit the 'Travel West' website (www.travelwest.info/), as this provides live data on public transport for journey planning as well as route information for walkers and cyclists; car clubs; traffic reports; electric vehicle charging infrastructure; and other information that simplifies travel choices. This site is administered by the West of England Local Enterprise Partnership.

Further information on what the Council is doing to improve air quality in Bath as part of the National Air Quality Plan and local engagement events can be found at http://www.bathnes.gov.uk/bath-breathes-2021. For further information on current and historic data on air quality levels visit the Council's website: www.bathnes.gov.uk/air-quality.

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

This report provides an overview of air quality in Bath & North East Somerset Council during 2018. 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 Bath & North East Somerset 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 G.1 in Appendix G.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) 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 to set out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Bath & North East Somerset Council can be found in Table 2.1. Further information relating to declared or revoked AQMAs, including maps of AQMA boundaries are available online at http://www.bathnes.gov.uk/services/environment/pollution/air-quality/. Alternatively, see Appendix E, which provides maps of the air quality monitoring locations in relation to the AQMAs.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
The Bath London Road Air Quality Management Area - 2013	Declared 1 February 2002, Amended v1 19 August 2005, Amended v2 30 July 2008, Amended v3 18 July 2013	NO_2 Annual Mean	Bath	The area covers the major road network in Bath, encompassing any buildings whose facades are within the area.	YES	London Road AURN 2001 57 µg/m^3	London Road AURN 2018 – 38 µg/m^3	Bath Air Quality Action Plan (2011) - http://www.bathnes.gov.uk/sites/default/files/20110303_final_bath_air_quality_action_plan.pdf
The Bath London Road Air Quality Management Area - 2013	Declared 18 July 2013	NO_2 1 Hour Mean	Bath	The area covers the major road network in Bath, encompassing any buildings whose facades are within the area.	YES	Lambridge - 2012 – 62 µg/m^3	Lambridge - 2018 – 46 µg/m^3	Bath Air Quality Action Plan (2011) - http://www.bathnes.gov.uk/sites/default/files/20110303_final_bath_air_quality_action_plan.pdf
The Keynsham High Street Air Quality Management Area 2010	Declared 31 July 2010	NO_2 Annual Mean	Keynsham	An area covers the town centre and extends along the High Street and Charlton Road encompassing the facades of the buildings within the area.	NO	Keynsham - High Street 2009 – 45 µg/m^3 at façade	Keynsham - High Street 2018 – 31 µg/m^3 at façade	Air Quality Action Plans for Keynsham and Saltford (2016) - http://www.bathnes.gov.uk/sites/default/files/keynsham_and_saltford_air_quality_action_plans_2016_1.pdf
The Saltford Air Quality Management Area 2013	Declared 4 July 2013	NO_2 Annual Mean	Saltford	An area which covers the Bath Road, Saltford, encompassing any buildings whose facades are within the area, extending from its junction with Beech Road until 150m south of the Glen	NO	Saltford - The Crown 2012 - 47 µg/m^3	Saltford - The Crown 2018 - 31 µg/m^3	Air Quality Action Plans for Keynsham and Saltford (2016) - http://www.bathnes.gov.uk/sites/default/files/keynsham_and_saltford_air_quality_action_plans_2016_1.pdf

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
Temple Cloud Air Quality Management Area 2018	Declared 20 August 2018	NO_2 Annual Mean NO_2 1 Hour Mean	Temple Cloud	The area starts approximately 245 metres north of the A37/Temple Inn Lane junction and runs along the A37 to approximately 150 metres south of the A37/Eastcourt Road junction.	NO	Temple Cloud 1 2017 – 67 µg/m^3	Temple Cloud 1 2018 – 60 µg/m^3	In development
Farrington Gurney Air Quality Management Area 2018	Declared 20 August 2018	NO_2 Annual Mean	Farrington Gurney	The area starts approximately 165 metres north of the A37/Church Lane junction and runs south along the A37 to the Bath and North East Somerset Council boundary, and additionally extends approximately 100 metres east along the A362 from the A37/A362 junction.	NO	Farrington Gurney 2 2017 - 52 µg/m^3	Farrington Gurney 2 2018 - 39.6 µg/m^3	In development

☒ **Bath & North East Somerset Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

2.2 Progress and Impact of Measures to address Air Quality in Bath & North East Somerset Council

Defra's appraisal of last year's ASR concluded (responses in blue):

'The report is well structured, detailed, and provides the information specified in the Guidance. The Council have responded to comments made in the previous ASR and provided some detailed examples of recent improvements in air quality that can be linked to traffic management interventions. The monitoring programme continues to be extensive, highlighting pollution levels falling below objective levels in two AQMAs.

1. The ASR has included results of detailed monitoring assessments for the Temple Cloud and Farrington Gurney.
2. For Temple Cloud, monitoring results over two consecutive years 2016-2017 show consistent exceedances of the annual mean objective for nitrogen dioxide at 3 locations.
3. The assessment includes a map of a proposed AQMA which has been subject to public consultation where majority of public opinion approved the proposed AQMA boundary but also recommended an extension to include all properties along the A37 in Temple Cloud. The proposed AQMA has been extended to include areas encompassing all properties along the A37 in Temple Cloud.
4. Farrington Gurney also sits beside the A37, and the detailed assessment provided has only considered a single year's monitoring for 2017, at 5 locations. Three locations have results either on or above objective levels for annual mean nitrogen dioxide concentrations.
5. This detailed assessment and proposed AQMA boundary has also been subject to public consultation. The proposed AQMA boundary has also been extended to include the A37/A362 junction and vehicle queues eastwards along the A362.
6. In each case above, it would be useful to provide an estimate of the number of properties included within each proposed AQMA and consequent estimate of population resident within the AQMA.

Full details of the calculation will be given in the AQAP, population within the AQMAs are; Farrington Gurney – 44, Temple Cloud – 158.

7. The Council may consider the fast track application process to Defra for declaration of the Temple Cloud AQMA. Please ensure Defra are notified of any changes to AQMAs via the report submission website (RSW).

   An AQMA was declared in August 2018. DEFRA was informed and the RSW was updated.

8. As the proposed Farrington Gurney AQMA has only been based on a single year's monitoring, it may be reasonable for the Council to consider a further year's monitoring prior to declaring this AQMA.

   An AQMA was declared in August 2018 and the comment has been noted for future reference.

9. Continued monitoring at Whitchurch provides no evidence of exceedances of statutory air quality objectives, with no further requirement to consider an AQMA.

   Monitoring is continuing in the area due to local concerns and future housing developments in the area.

10. Saltford and Keynsham AQMAs are now beneath objective levels for the first year. Monitoring should continue prior to reviewing the status of each AQMA to ensure levels remain below objectives.

    Monitoring is continuing in both areas and remains beneath the objective; the AQMAs will be reviewed at the end of 2019.

11. We note the response to the request to order the monitoring results by AQMA, this provides a significant improvement in the presentation of results.

    Results will continue to be reported by area.

12. We also note that a more detailed consideration of monitoring results has shown improvements, with some positively linked to traffic management schemes in the Local Authority area. We would encourage continued reporting on this theme, which should provide some useful evidence of the potential of local traffic schemes to influence air quality.

13. We note the significance of the requirement placed upon the Council to produce a Clean Air Plan, and welcome the completion of the strategic outline case for development of the plan.

    The Strategic Outline Case and the Outline Business Case have been completed and work is continuing on the Full Business Case.

14. The progress in developing the plan should continue to be reported within Table 2.2 of the ASR report.'

Bath and North East Somerset Council has taken forward a number of direct measures during the current reporting year of 2018 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 their respective Action Plans; Bath Air Quality Action Plan (2011) and Air Quality Action Plans for Keynsham and Saltford (2016).

Key completed measures are:

- Air quality work was dominated by the Clean Air Plan technical work and consultation. The Strategic Outline Business Case published in early 2018 identified three main options and the draft Outline Business Case identified, using technical modelling tools as required by central Government, that a category D Charging Clean Air Zone in Bath as the only option that would enable compliance in 2021. A public consultation took place in October and November with over 750 attending drop-in events and over 8,000 consultation responses. A Cabinet decision was made in March 2019 to implement a category C Charging Clean Air Zone with Traffic Management measures at Queen Square, from the options proposed in the Cabinet report[5]. This followed a review of consultation responses, development of the model (with agreement from central Government), and taking account of adjustments to emission factors on gradients. Originally, a higher emission factor was applied to both uphill and downhill traffic flows, however further refinement concluded that the factor should be applied to uphill gradients only – where heavier uphill traffic accounts for greater emissions. This

[5] https://democracy.bathnes.gov.uk/ieDecisionDetails.aspx?ID=1218

development meant the number of locations predicted to exceed the limit value was reduced to one at Gay Street. Modelling of an existing public realm and traffic management scheme close by at Queen Square identified that this scheme would reduce emissions in the area enough to meet the limit value in Gay Street. A continuous engagement approach means that regular meetings continue to be held with key stakeholders including bus and coach operators, hauliers, emergency service providers and commercial vehicle operators.

- A widespread air quality and health campaign was undertaken as a precursor to the Clean Air Zone public consultation in order to raise the issue of air quality and health with the people living and working in Bath. This included advertising the impact of clean air on the back of lower emission buses, bus stop shelters and online;
- Successful bid for the Clean Air Plan Early Measures Fund to implement lower resident's parking permit charges for ultra-low emission vehicles;
- Successful Ultra Low Emission Vehicle Taxi Infrastructure bid submission for 10 rapid charging locations. To inform the bid and promote the potential of electric vehicles as taxis, a number of telematics devices were fitted to taxis;
- Taxi licensing policy change that now requires all licensed vehicles to be compliant, enables the use of electric vehicles and incentivises the use of lower emission vehicles;
- AQMAs declared in August 2018 for Farrington Gurney and Temple Cloud on the A37;
- Site assessments and District Network Operator approval of Go Ultra Low funded rapid and fast charging locations across the authority area;
- Clean Air Schools Pack pilot which involved a primary school in Bath and included pupil air pollution monitoring, air quality lessons, awareness raising poster competition, walking bus pilot and a musical rap performed by the school
- 14 schools accredited with Modeshift STARS Bronze, Silver or Gold. 43 schools signed-up (94 educational institutions in B&NES, excluding universities); and
- Keynsham one way trial scheme commenced in May 2017. The trial remained in place throughout 2018 enabling assessment of the impacts of the scheme. Air pollution levels on Keynsham High Street reduced by more than the average

reduction across the area. A decision is scheduled to be made in 2019 as to whether the scheme will be made permanent.

Bath and North East Somerset Council expects the following measures to be completed over the course of the next reporting year:

- Development and wide distribution of the Clean Air Schools Pack following the 2018 pilot that involved a primary school in Bath and included pupil air pollution monitoring, air quality lessons, awareness raising poster competition, walking bus pilot and a musical rap performed by the school pupils;
- A37 Options and Feasibility Study for Temple Cloud and Farrington Gurney AQMAs;
- Draft and consult on an Action Plan for Temple Cloud Area;
- Draft and consult on an Action Plan for Farrington Gurney Area;
- Full Business Case and Clean Air Fund bid submission as part of the Clean Air Plan project;
- Review Air Quality Action Plan for Bath following the approval of Clean Air Plan Full Business Case and Clean Air Fund bid submission;
- Implementation of the Clean Air Plan Early Measures Funding for reduced residents' parking permit charges for ultra-low emission vehicles;
- Clean Bus Technology Fund extension spending;
- Award and implementation of last-mile freight delivery scheme contract using e-cargo bikes;
- Award and implementation of an electric cycle hire scheme contract in Bath;
- Completion of Delivery Service Plan pilot as part of the Clean Air Plan to inform the supporting measures being developed in the bid submission for the Clean Air Fund;
- Installation of a variable message sign on the southbound A46 approach to Bath;
- Clean Air Day campaign including pledges from third parties and on-street stalls promoting active travel and lower emission vehicles;
- 'Mobility as a service' trial that provides users with credit for using car hire, bus and alternative transport modes in exchange for selling their car. This is part

of a joint bid with Bristol City Council and includes mobility stations near bus stops with e-bikes, car club cars and car share parking;

- Bath Transport Study. This is a £450k study funded by the West of England Combined Authority to consider a range of options including; implementing a mass transit system in Bath as well as improvements relating to walking, cycling and existing forms of public transport;
- Public Realm Movement Strategy access restrictions are being progressed in four locations in Bath, starting with Kingsmead Square in Spring 2020, followed by Cheap Street, Westgate Street and Milsom Street;
- The Local Cycling and Walking Investment Plan is to be consulted on in summer 2019;
- Development of a shared management plan for the shared use river path to promote cycling and walking;
- Further work on MetroWest rail improvements following expected funding confirmation and confirmation of funding for Portishead Line;
- Adoption of the Joint Local Transport Plan 4 which sets out the vision for transport investment in the West of England and the policy framework within which the West of England authorities will work.

Bath and North East Somerset's priorities for the coming year are for the completion of the Full Business Case and Clean Air Fund bid submission as part of the Bath Clean Air Plan work.

The delivery of the programme is challenging and is subject to:

- Success of the funding bids to the Joint Air Quality Unit (JAQU) Clean Air Fund and Implementation Fund to resource the necessary infrastructure and supporting measures that will ensure the reductions in nitrogen dioxide concentrations as stipulated by the Ministerial Direction;
- The timescales for implementing the Clean Air Plan and having the Clean Air Zone infrastructure in place prior to planned commencement in late November 2020, are extremely tight and require a significant upscaling of resource dependent on external JAQU funds (some of which has already been secured).

Progress on the following measures has been slower than expected due to prioritisation of the Clean Air Plan:

- The Bath Air Quality Action Plan was put on hold following the Ministerial Direction to implement a Clean Air Plan in 2017. The long term nature of the Bath Air Quality Action Plan means that it includes additional infrastructure measures that cannot be carried out within the timescale of the Clean Air Plan work.

Temple Cloud and Farrington Gurney

Bath and North East Somerset Council's Environmental Monitoring team have been generating ideas for measures that could form part of the joint Farrington Gurney and Temple Cloud Air Quality Action Plan (AQAP) and result in the required air quality improvement within the areas.

Given the constraints that exist in both the AQMAs it has been deemed appropriate to carry out an Options and Feasibility Study of the available measures. This will involve a full technical assessment; measures will first be assessed for feasibility and then undergo further assessment in terms of quantified air quality benefit, cost implications and other associated impacts if proven feasible.

The study will inform measures to be listed within the Air Quality Action Plan. By taking this approach Bath and North East Somerset Council is seeking to avoid including measures within the AQAP which are then not deemed deliverable given the physical, environmental and built heritage constraints that are present within the areas; and that do not result in the required improvement in air quality.

The Options and Feasibility Study will be undertaken by the consultant Jacobs under the current B&NES Framework for Professional Services. Upon completion of the study, the draft Air Quality Action Plan will be subject to a public consultation later in 2019 to receive the public's views and comments on the acceptability of the measures.

The monitored concentrations of NO_2 decreased from 2017 to 2018 in both Farrington Gurney and Temple Cloud when the annual averages were compared. In

Farrington Gurney this decrease resulted in no exceedances of the annual average objective at façade in 2018. B&NES Council will continue to monitor this trend in Farrington Gurney to establish if it is ongoing; as it could be the case that 2018 was a ‘good’ year in terms of nitrogen dioxide concentrations.

The constraints and conditions in each AQMA vary; therefore different actions may be required in each area. The decision by B&NES Council to assess all the available measures will ensure that measures within the Air Quality Action Plan are feasible and deliver the required air quality improvement.

Also of relevance to the Farrington Gurney AQMA is the new transport infrastructure proposed in line with the Somer Valley Enterprise Zone; to help facilitate the development of the site. The Somer Valley Enterprise Zone was established in 2017 and is located to the east of Farrington Gurney at Old Mills.

The proposed new transport infrastructure includes improvements to the A37/A362 junction which is within the Farrington Gurney AQMA. The improvements aim to create additional capacity and involve widening the A362 exit arm and reviewing the traffic signal phasing to better optimise flows. The potential impact on traffic flows may affect air quality and therefore the junction improvements will be assessed as a standalone measure within the aforementioned Options and Feasibility Study.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Bath 1	Bath Transport Package	Traffic Management	Other	Bath and North East Somerset Council			Park & Ride (P&R) bus patronage; and vehicles using the P&R	n/a	890 additional P&R spaces between 2012 and 2015. Patronage at the 3 P&R sites overall grew by 16% between 2008/09-2016/17. 4 EV charging sockets installed at each P&R site. Bus infrastructure works included: Raised pavements at 375 stops to ease access on and off buses; 169 Real Time Passenger Information displays; Replacement of existing shelters and the addition of new bus shelters. There are 10 city centre live car parking availability VMS, 7 VMS on the edge of the city and 6 VMS in the City Centre for parking info and P&R promotion. There are plans for a VMS on A46 southbound. Extension of 10am to 6pm traffic restrictions in Stall Street and Lower Borough Walls. Seven Dials shared space and cycle scheme. Closure of Saw Close car park (22 spaces). Central access restrictions are currently being assessed and an initial conclusion is expected on schemes that can be taken forward in the summer.	Substantially Complete.	Planned relocation of Mineral Water Hospital needs to take place before next phase of vehicular restrictions are implemented. This is due to meeting the needs of disabled drivers & passengers.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Bath 2	Cleveland Bridge area restrictions feasibility study [& Low Emission Zone Feasibility Study]	Promoting Low Emission Transport	Low Emission Zone (LEZ)	Bath and North East Somerset Council			Modelled NO_2 levels.	n/a	LEZ Feasibility Study completed and findings available online and in full on request. Further feasibility work underway following Clean Air Zones guidance publication and including identification in Devolution Deal Consultation Document. Now superseded by Clean Air Plan work following 2017 Ministerial Direction.	Initial study complete.	Possible NO_2 emissions reduction of 7% but only marginal changes in resulting concentrations. Further progress subject to Devolution Deal consultation outcome. Originally no funds to implement, but this has changed with Ministerial Direction of 2017.
Bath 3	Low Carbon Bus Trial (CIVITAS 1.3)	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	University of the West of England, First Group and Bath and North East Somerset Council			Fuel usage / costs.	n/a	Complete. As a result, 8 hybrid electric buses now in used on the 3 park and ride services.	Complete.	39% improved fuel economy (mpg). 28% fuel saving (l/100km). Overall operating cost increase of £0.03/km (but due in part to prototype status). NO_x comparison unavailable.
Bath 4	Urban Freight Transhipment (CIVITAS 7.2)	Freight and Delivery Management	Freight Consolidation Centre	University of the West of England, Bath and North East Somerset Council and DHL			HGV traffic flows. Electric vehicle. Number of participating businesses. NO_x emissions.	1% p.a. from HGVs (provisional target)	>80% journey reduction. 55.7% reduction in energy consumption. 38 businesses with 40 retail outlets. Average monthly reduction in deliveries since January 2011 when scheme started is 77%. 91 deliveries in to centre and 22 out for Bath in May 2016. Delivery Service Plans Pilot taking place in 2019 as part of the Clean Air Plan. Also, an e-bike last-mile delivery service is out to tender at the time of writing.	Expired.	Following a review of the economic viability of the operation, the Council has cancelled its contract and ongoing subsidy for the operation, effective from 1st April 2017. DHL, the current operator of the scheme is currently reviewing their commercial viability for the service and are continuing the service until such time as they decide it is no longer a viable enterprise

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Bath 5	Improved Enforcement of TROs (CIVITAS 3.4 - Demand Management Strategies)	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	Bath and North East Somerset Council			HGV traffic flows. NO_2 levels.	n/a		Complete.	The trial indicated that identifying breaches of the 7.5 tonne weight limit and informally contacting the relevant operators led to a reduction in HGV volumes. For details see 2016 ASR.
Bath 6	Bicycle Hire including Electric Bikes (CIVITAS 6.4 and 6.5)	Transport Planning and Infrastructure	Public cycle hire scheme	Bath and North East Somerset Council			Vehicle mix (% bikes). No. of hires.	n/a	New cycle hire facility launched 2014 with PAYG at 9 stations across Bath. 5 further hire stations added to total 14 in 2016. Contract expired in 2019 and a new electric cycle hire scheme will be tendered in 2019	2018	Over 15,000 hires between June 2014 and June 2016. 877 users per month. Electric cycle hire scheme will be tendered in 2019.
Bath 7	Electric Vehicle Recharging Points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Bath and North East Somerset Council			Vehicle mix (count of electric vehicles). Number of charges p.a. Number of different users.	1% of private car emissions p.a. (provisional target)	Charging sessions increase across West of England charge point commensurate with national uptake of ULEVs. 2nd wave of OLEV funded chargers in the planning stage following consultation with DNO and commercial partner. Charge points funded by OLEV (GUL and ULEV Taxi Infrastructure).	2021	The West of England GUL City Scheme outlines an increase in charge points sub-regionally from 200 to 400 points, including 'charging hubs'; further rapid chargers; demonstrator vehicles; and 100 council fleet vehicles converted to ULEVs by 2021 across the West of England. Barriers include a lack of resource to implement prior to 2019.
Bath 8	Improve Building Emission Assessments	Policy Guidance and Development Control	Other policy	Bath and North East Somerset Council			Number of air quality assessments including spreadsheet tool.		No progress	Expired.	Lack of resource and low priority due to low %age source apportionment.
Bath 9	ECO Stars Vehicle Recognition Scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Bath and North East Somerset Council			Number of haulage operators & vehicles audited. HGV vehicle mix survey (number plate and engine standard).		No progress		

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Bath 10	Review Council and Emergency Service Vehicle Fleet	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Bath and North East Somerset Council			Euro engine standard survey.	5% p.a. (provisional target)	Review undertaken by Energy Saving Trust for successful Go Ultra Low City Scheme Bid. As a result the Council has pledged to change 25% of light duty fleet to ultra-low emission vehicles by 2021. 10 pure EVs already purchased and operating in B&NES plus 4 hired pool cars. Memorandum of agreement is in development with Emergency Service providers – already a high proportion of Euro 6 vehicles.	2021	
Bath 11	Monitoring of Bus Fleet Quality	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	First Group and Bath and North East Somerset Council			Euro engine standard survey. Number of emissions abatement retrofit / original design.	5% emissions over whole fleet p.a. (provisional target)	OLEV Low Emission Bus Scheme bid unsuccessful. Pre-CVRAS Clean Bus Technology Fund relatively ineffective with some retrofitting unable to meet certification requirements. The Clean Air Fund bid as part of the Clean Air Plan and CBTF extension means that theoretically all public bus services will be upgraded to CVRAS Euro VI by the end of 2020. See ‘Bath 13’.	2026	Full audit of fleet planned as part of Clean Air Zone proposals.

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Bath 12	Transport & Travel Information	Public Information	Via the Internet	Bath and North East Somerset Council			Number of signs. Contribute to achieving a target increase in bus passenger journeys per annum of 3% on a 2001/2 base level of 9.184m. Contribute to achieving an improvement in favourability recorded for B&NES within the West of England Bus Satisfaction Survey.	n/a	248 real time bus passenger information displays installed across B&NES. Overall bus passenger satisfaction in 2016 stood at 41% very satisfied and 47% fairly satisfied, in 2016.	Complete.	Bus checker app implemented as part of LSTF West of England project and available via www.travelwest.info
Bath 13	Alternative Exhaust Emissions Abatement	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Bristol City Council			Number of retrofitted HGVs.	n/a	Clean Bus Technology Fund used for retrofitting of 35 buses across the West of England to Euro 5/6. Also Clean Vehicle Technology Fund award (joint bid) enabled Thermal Management Technology (TMT) to 42 buses across the West of England fitted as standard with Selective Catalytic Reduction (SCR). Clean Air Plan CAF bid for 117 fully funded vehicle retrofits, 13 repowers and 26 CBTF Extension funded retrofits.	Nov 2020	Availability of CVRAS (Clean Vehicle Retrofit Accreditation Scheme) accredited retrofit solutions.

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Bath 14	Rossiter Road Traffic Management Measures	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Bath and North East Somerset Council			Traffic flows. NO_2 levels.	Moving traffic from receptors.	Completed 2015 and annual mean NO_2 levels reduced from 49 in 2014 to 28 $\mu g/m^3$ in 2016 on Widcombe Parade.	Complete.	
Bath 15	Promotional Website	Public Information	Via the Internet	Bath and North East Somerset Council			Number of visits to website.	n/a	Live AQ dials added and launch of Bath Breathes 2021 website with Clean Air Plan funding.	2017	
Bath 16	B&NES Corporate Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	Bath and North East Somerset Council			Business mileage. Modal shift (e.g. number of employees transferred from private car to bike, walking or public transport bus for commuting.	1% p.a. (provisional target)	Low emission pool cars provided at Keynsham and Bath offices in association with Europcar, including 4 Renault Zoe E.V (with charging point), Auris Hybrid and 3 Fiat 500's.	2018	Current plan covers 2015-2018

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Keynsham 1	Quantify the benefits from the one way system pilot for the High Street including monitoring and modelling of air quality impacts.	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Project Delivery.	2017	2017-2018	Reduction in nitrogen dioxide concentrations. Traffic Counts. Reduction in emissions of nitrogen oxides.	Predicted reduction of approximately 3 $\mu g/m^3$ NO_2 on High Street and approximately 1 microgram increase on some areas of alternative route. No significant improvement predicted on Charlton Road.	Trial commenced in May 2017. The reduction in monitored concentrations is between 3 to 27% when comparing similar periods before and after the introduction of the one-way system. Keynsham High Street showed an average reduction in between 25%. NO_2 concentrations across the district have reduced on average by approximately 10%, thus the percentage reduction that can be attributed to the scheme equates to approximately -7 to 17%. Final decision on whether the changes are made permanent will be in 2019.	2018	
Keynsham 2	Targeted information campaign for the most vulnerable groups (i.e. asthmatics, Chronic Obstructive Pulmonary Disease etc.).	Public Information	Other	B&NES Public Protection and Health Improvement, Public Health, Research and Intelligence Team, Clinical Commissioning Group, Sirona Care and Health.			The number of hits on website. Number of initiatives delivered.	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	In progress – designing scheme with Public Health Team.		

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Keynsham 3	This Action Plan influences planning policy to require electric vehicle charge points for each new property.	Promoting Low Emission Transport	Other	Developer and B&NES Planning Development Control.			Number of properties where a power spur for an electric vehicle charge point is installed. Number of planning applications approved with a vehicle charge point as an advisory or required condition.	% reduction in NO_x emissions compared to a diesel.	Placemaking Plan states that electric charging facilities will be sought where practical	Ongoing	
Keynsham 4	Increase public charging points through 'Ultra Low West' (Source West) EV charging infrastructure programme.	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	B&NES Public Protection and Health Improvement			Number of charge points. Number of charging sessions per year.	% reduction in NO_x emissions compared to a diesel.	2 public charge points and 2 charge points for council fleet installed. Further installations are in the planning stage following a successful consultation with the DNO.	2016-2021	
Keynsham 5	Recommend tree planting in future infrastructure programmes	Other	Other	Keynsham Connecting Communities Forum, Keynsham in Bloom (town council), Public Protection and Health Improvement, Public Health, Highways & Parks.			Number of trees planted.	Provision of a barrier to protect residents and visitors	Keynsham High St enhancement likely to be first application of this action. Subject to permanent design once the funding has been signed off and the decision as to whether the scheme is to be permanent has been made.		

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Keynsham 6	This Action Plan influences planning policy to encourage the provision of cycle parking for each new property.	Promoting Travel Alternatives	Promotion of cycling	Developer and B&NES Planning DC.			Number of new properties with cycle storage. Number of planning applications approved with cycle storage as advisory or required condition.	% reduction in NO_x emissions compared to a diesel.	Placemaking plan adopted 2017 and standards require new development to now provide minimum parking (secured and covered).	2016-2029	
Keynsham 7	Explore the promotion of an "Electric Zone".	Promoting Low Emission Transport	Other	Public Protection and Health Improvement & Highways.			Number of signs erected. Number of electric vehicles in peak hours on High Street/Ashton Way with a manual traffic count. Number of charging sessions.	N/A	Subject to outcome of charge point review as part of Go Ultra Low infrastructure demand review work by Bristol Energy on behalf of West of England authorities.		Partly dependent on emerging GUL programme and outcome of one-way trial for certainty over any on-street installations.
Keynsham 8	Influence the design of developments to improve access to public transport, cycling and walking routes.	Transport Planning and Infrastructure	Other	B&NES Placemaking Plan / Planning DC.			Number of approved planning applications with minimum 30 minute bus frequency in or adjacent to site (with 100 metre of the site).	Negligible	Placemaking Plan requires developments to facilitate walking, cycling and public transport	2016-2029	
Keynsham 9	Support the creation of a local "Air Quality Action Group".	Public Information	Other	Connecting Communities Forum			Established as part of the remit of existing of new group.	N/A	Inaugural meeting of Keynsham Cycle Campaign took place recently. An Officer attended and is building stronger links with Transition Keynsham.		

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Keynsham 10	Keynsham Greenway links to National Cycle Network 4, Wellsway School and riverside path into Bristol and S Glos with new bridge over River Avon.	Transport Planning and Infrastructure	Cycle network	Transportation, Bristol City Council, South Gloucestershire Council, Sustrans, developers.	Feasibility study in 2017	Est. 2019	Delivery of project. Number of cycle trips from annual surveys.	Funding secured	Local Cycling and Walking Investment Plan(LCWIP) in development and due for consultation in 2019.	2023	Sufficient contributions to cover final cost and delivery of housing.
Keynsham 11	Work with Community Transport to promote the use of Low emission dial-a-ride vehicles.	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Keynsham and District Dial and Ride			Low emission vehicle journeys / miles.	% reduction in NO_x emissions compared to a diesel.	No progress		Appropriate vehicle availability, plus budget and fleet renewal programme.
Keynsham 12	Identify, influence and publicise pedestrian and cycling facility improvements	Transport Planning and Infrastructure	Other	B&NES & First Group.	2017	2018-2023	Audit of infrastructure completed. Recommendation will be integrated into this plan. Walking and cycling surveys	N/A	Keynsham Transport Strategy approved in 2016. LCWIP in development and due for consultation in 2019.	2023	
Keynsham 13	Lobby government for incentivising uptake of non-diesel cars.	Other	Other	Public Protection and Health Improvement & Public Health.			Letter sent.	In itself, no improvement, however, there is a quantifiable reduction in emissions with each new Ultra Low Emission Vehicle which is introduced to replace a diesel vehicle	Submitted a consultation response (June 2017) to the DEFRA consultation: 'Improving air quality: national plan for tackling nitrogen dioxide in our towns and cities'.		

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Keynsham 14	Identify and publicise priority cycling routes to support a cycling culture for all.	Transport Planning and Infrastructure	Cycle network	B&NES Environmental Services, Sustrans & South Gloucestershire Council.			Cycling routes identified.	n/a	Network cycle maps plus a range of route maps available on the Council's website, supported by printed versions and cycling events. LCWIP in development and due for consultation in 2019.	Ongoing	
Keynsham 15	Encourage low emission bus services in Keynsham	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	B&NES Public Transportation			Number of bus routes serviced by a Low emission vehicle	% reduction in NO_x emissions compared to a diesel. (or milligrams)	No progress.		The proposed Bath Clean Air Zone will be framed such that Keynsham AQMA will also benefit low emission vehicles.
Keynsham 16	Increase public education messages which promote healthier choices for short journeys	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	B&NES Public Protection and Health Improvement			Delivery of a public education campaign	No reduction in concentration. Exposure reduction	B&NES-wide Active Lifestyle campaigns and activities undertaken. Air quality and health campaign focussed in Bath also benefits Keynsham – bus shelter and rear of lower emission bus advertising as part of the Clean Air Plan.		
Keynsham 17	Work with bus operators on improved services, ticketing and simplified fare structure.	Transport Planning and Infrastructure	Bus route improvements	B&NES Public Transportation			B&NES area bus usage figures. Annually Bus Passenger Satisfaction surveys for B&NES (Transport Focus).	n/a	First Group, the region's largest bus operator launch mobile ticketing (mTickets) in October 2016.	Ongoing	
Keynsham 18	Support the provision of improved lighting on cycle path.	Transport Planning and Infrastructure	Cycle network	B&NES Property Services			Lighting provided to key locations.	n/a	No progress in B&NES, but Bristol City Council has installed solar studs within their boundary.		Concerns about effects on bat corridor, which may be offset by 'bat hat' option.

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Keynsham 19	Advocate increased rail service via "MetroWest" - resulting in increase from hourly to half-hourly rail service.	Transport Planning and Infrastructure	Other	B&NES Environmental Services & other former Avon authorities.	2017-2019	2020-2021	Project implementation. Rail patronage per service at Keynsham (annual rail survey).	Offsets less efficient modes.	Part of MetroWest Phase 1 being developed by the West of England.	2021	
Saltford 1	Targeted information campaign advice for the most vulnerable groups (i.e. asthmatics, Chronic Obstructive Pulmonary Disorder etc.).	Public Information	Other	B&NES Public Protection and Health Improvement, Public Health, Research and Intelligence Team, Clinical Commissioning Group, Sirona Care and Health.			The number of hits on website. Number of initiatives	No reduction in concentration. Reduction in exposure to NO_2 and fine particles.	In progress – designing scheme with Public Health Team.		
Saltford 2	Recommend tree planting in future infrastructure programmes	Other	Other	Community Air Quality Group (utilising Keynsham Connecting Communities Forum).			Number of trees planted.	Provision of a barrier to protect residents and visitors	Included in Joint Spatial Plan		
Saltford 3	Advice to land owners on planting that can help to protect their properties from air pollution.	Other	Other	B&NES Public Protection and Health Improvement, Highways & Planning			Number of hits on website	No reduction in concentration. Reduction in exposure to NO_2 and fine particles.	No progress		Limited resources and lowering of nitrogen dioxide concentrations resulted in it being a low priority.

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Saltford 4	Influence planning policy to support the increase of electric vehicle charge point infrastructure for each new property.	Promoting Low Emission Transport	Other	Developer and B&NES Planning DC			Number of properties where a power spur for an electric vehicle charge point is installed. Number of planning applications approved with a vehicle charge point as an advisory or required condition.	% reduction in NO_x emissions compared to a diesel.	Placemaking Plan states that electric charging facilities will be sought where practical	2016-2029	
Saltford 5	Increase public charging points through 'Ultra-Low West' (Source West) electric vehicle charging infrastructure programme	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	B&NES Public Protection and Health Improvement,			Number of charge points. Number of charging sessions.	% reduction in NO_x emissions compared to a diesel.	No progress.		
Saltford 6	Explore the promotion of an "Electric Zone".	Promoting Low Emission Transport	Other	B&NES Public Protection and Health Improvement, & Highways.			Number of signs. Number of electric vehicles in peak hour on A4.	N/A	No progress.		Partly dependent on emerging GUL programme and outcome of one-way trial for certainty over any on-street installations.
Saltford 7	Support the creation of a local "Air Quality Action Group".	Public Information	Other	Connecting Communities Forum and B&NES Public Protection and Health Improvement,			Established as part of the remit of existing of new group.	N/A	No progress.		Build on good relationship with parish council.

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Saltford 8	Influence planning policy to encourage the provision of cycle parking for each new property.	Promoting Travel Alternatives	Promotion of cycling	Developer and B&NES Planning DC			Number of new properties with cycle storage. Number of planning applications approved with cycle storage as advisory or required condition.	% reduction in NO_x emissions compared to a diesel.	Placemaking Plan requires provision for cycling in new developments	2016-2029	
Saltford 9	Work with Community Transport to promote the use of Low emission dial-a-ride vehicles.	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	KADDAR.			Low emission vehicle journeys / miles.	% reduction in NO_x emissions compared to a diesel.	No progress		Lack of available funds and low impact on overall emissions.
Saltford 10	Encourage low emission bus services in Saltford.	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	B&NES Public Transportation			Number of bus routes serviced by a Low emission vehicle	% reduction in NO_x emissions compared to a diesel.	No progress		The proposed Bath Clean Air Zone will be framed such that Saltford AQMA will also benefit low emission vehicles.
Saltford 11	Lobby government for incentivising uptake of non-diesel cars.	Other	Other	B&NES Public Protection and Health Improvement			Government response and changes to legislation.	In itself, no improvement, however, there is a reduction with each new ULEV introduced replaced a diesel vehicle	Submitted a consultation response (June 2017) to the DEFRA consultation: 'Improving air quality: national plan for tackling nitrogen dioxide in our towns and cities' .		
Saltford 12	Increase public education messages which promote healthier choices for short journeys	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	B&NES Public Protection and Health Improvement			Delivery of a public education campaign	No reduction in concentration. Exposure reduction	B&NES-wide Active Lifestyle campaigns and activities undertaken	On going	
Saltford 13	Support the provision or improved lighting on cycle path.	Transport Planning and Infrastructure	Cycle network	B&NES Property Services			Lighting provided to key locations at least	n/a	No progress		Concerns about effects on bat corridor, which may be offset by 'bat hat' option.

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Saltford 14	Continue feasibility work on reopening Saltford Station.	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	B&NES, First Group, Network Rail & MetroWest partners			Completed feasibility study	Requires air quality assessment	GWR requested to undertake timetabling work to determine if an additional station is feasible within MetroWest phase 1 timetable.		Supported by West of England Authorities, but not part of MetroWest phases 1 and 2. Awaiting results of GWR timetabling work.

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16[6] (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Public Health England 'Public Health Outcomes Framework' indicator '3.01 Fraction of mortality attributable to particulate air pollution[7] (particulates under 2.5 micrometers in diameter as opposed to nitrogen dioxide)' for Bath and North East Somerset Council in 2017 (the most recent year available) is 4.7% (compared to 4.8% in 2013). This is similar to the values across the South West region of 4.4% and 5.1% nationally.

In 2015 Bath & North East Somerset Council started to monitor $PM_{2.5}$ at Chelsea House, London Road, Bath (CM4), this a roadside site set 15 m back from the road. Monitoring from this location shows similar levels to previous years. Due to its small size $PM_{2.5}$ can travel large distances in the air. 40-50% of $PM_{2.5}$ levels can be from sources outside the local authority boundary (LAQM.TG16)[8].

Environmental Monitoring are working with the Public Health team on mitigating the impacts of $PM_{2.5}$ within Bath & North East Somerset by developing a project as part of the Keynsham and Saltford Air Quality Action Plans that provides targeted information to vulnerable groups through health and social care workers. The potential to expand this to other parts of B&NES will be explored. Public Health are represented on the Air Quality working group which developed the Keynsham and Saltford Action Plans and have been involved in the development of the revised Bath Action Plan. Many of the actions in the action plans will reduce $PM_{2.5}$ as well as NO_2; details of the specific actions are given in Table 2.2.

[6] Local Air Quality Management – Policy Guidance (PG16), April 2016 (https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf)
[7] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000009/ati/102/are/E06000022
[8] Local Air Quality Management - Technical Guidance (TG16), April 2016 (https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf)

Within Bath & North East Somerset the area depicted by the city of Bath is a smoke control area. Details of this area can be found at http://www.bathnes.gov.uk/services/environment/pollution/smoke-control. Within this area the Council works to ensure that only authorised fuels or appliances are used.

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

3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how it compares with the air quality objectives.

3.1.1 Automatic Monitoring Sites

Bath & North East Somerset Council undertook automatic (continuous) monitoring at 4 sites during 2017. Table A.1 in Appendix A shows the details of the sites. Monitoring was carried out for NO_2 and PM_{10} and a $PM_{2.5}$ in 2018.

National monitoring results are available at https://uk-air.defra.gov.uk/ (the London Road Continuous NO_2 analyser is listed as Bath Roadside).

Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. Whilst we are fully compliant with the national air quality objective with respect to benzene, Bath & North East Somerset Council has a benzene monitor which is part of the national non-automatic hydrocarbon network located at the London Road continuous site (CM1). Results from this site are available at https://uk-air.defra.gov.uk/data/non-auto-data?uka_id=UKA00306&network=nahc&s=View+Site listed as Bath Roadside and details are also given in Appendix D.

Maps showing the location of the monitoring sites are provided in Appendix E. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Bath & North East Somerset Council undertook non-automatic (passive) monitoring of NO_2 at 121 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

51 new sites were introduced in 2018, there were 44 sites as wider monitoring for the clean air plan and a further 7 monitors to respond to public requests and to check other key locations. These were:

- Bath Clean Air Plan
  - DT150 – Brougham Hayes
  - DT151 – Widcombe Hill
  - DT152 – Bathwick Hill
  - DT153 – North Road
  - DT154 – Bradford Road
  - DT155 – Newbridge Hill
  - DT156 – Corn Street
  - DT157 – Charles Street
  - DT158 – Paragon 2
  - DT159 – Walcot Street
  - DT160 – North Parade Road
  - DT161 – Kelston Road
  - DT162 – Corston – A39
  - DT163 – Batheaston – A4, Box Road
  - DT164 – Midford Road
  - DT165 – Brassknocker Hill
  - DT166 – Bathampton – A36
  - DT167 – Weston High Street
  - DT168 – Englishcombe Lane
  - DT169 – Eastbourne Avenue
  - DT170 – St James Parade 2
  - DT171 – Frome Road/Upper Bloomfield
  - DT172 – London Road 2
  - DT173 – Upper Bristol Road 2 (near Nile Street)
  - DT179 – Upper Bristol Road 3 (near Shaftesbury Avenue)
  - DT180 – Wells Road 2 (near Holloway)
  - DT181 – Wellsway
  - DT182 – Gay Street – Lower
  - DT183 – Chapel Row
  - DT184 – Lansdown Road 2
  - DT185 – Greenway Lane
  - DT186 – Coronation Avenue
  - DT187 – Stanley Road West
  - DT188 – Moorland Road
  - DT189 – Old Newbridge Hill
  - DT190 – Church Street
  - DT191 – Batheaston – Mill Lane
  - DT192 – Fairfield Road
  - DT193 – Granville Road
  - DT194 – Brooklyn Road
  - DT195 – Lansdown Lane
  - DT196 – Oakley
  - DT197 – Rush Hill
  - DT198 – Walcot Parade
- Paulton/Radstock/Westfield
  - DT175 – Westfield 3 (Wells Road near Butchers Close)
  - DT176 – Radstock – Wells Road 2 (near The Shambles)
  - DT177 – Paulton (near The Pithay)
- Farrington Gurney
  - DT178 – Farrington Gurney 6 (near Bridge Buildings)
- Pensford
  - DT174 – Pensford 3 (Pensford Hill near Hillside Cottages)
- Other sites
  - DT148 – Julian Road (St Andrew's)
  - DT149 – Camden 3 (moved from Gays Hill to Berkeley Place)

Maps showing the locations of the monitoring sites are provided in Appendix E.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

During 2018 Bath & North East Somerset also carried out monitoring at five locations using AQ Mesh samplers.

- Bath – Northampton Street
- Bath – Terrace Walk
- Keynsham – High Street
- Keynsham – Bath Hill
- Westfield – Wells Road

These samplers are indicative and monitor NO_2 using electrochemical sensors, PM_{10} and $PM_{2.5}$ using optical particle count sensors giving real-time results every 15 minutes. Results are shown in Appendix D.

Monitoring of non-LAQM parameters including pollen and local meteorology which had previously been carried out by Bath & North East Somerset ceased in 2017 as the Council were unable to continue using the monitoring location.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40 µg/m^3.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year.

Automatic Monitoring Data

Results from automatic monitoring of NO_2 are shown in Tables A.3 and A.4 and Figure A.1. All sites measured values less than both the annual average objective (40 µg/m^3) and hourly objective (200 µg/m^3), therefore the objectives were met.

The trend data shows that 2018 was not a peak year for NO_2, with monitoring results being lower than previous years at all sites (Figure A.1, Appendix A). The results from Windsor Bridge remain significantly lower than in the previous years of 2011-2013. During 2013 the site was relocated due to junction changes and the kerb has moved 2 m further from the monitor. The site is now a similar distance from the road to the residential properties which are located opposite the monitoring point.

Diffusion Tube Monitoring Data

The results of the diffusion tube monitoring are shown in Table A.3 and Figures A.2-A.14. The results have been corrected by bias factors as described in LAQM.TG16[8]. In 2018, the choice of bias factor was reviewed and the local bias factor was chosen in preference to the national bias factor, with the clarification that using this factor will overestimate results from sites which are not directly comparable with the co-located reference site on London Road, Bath. An explanation for this is provided in Appendix C. Sites with less than 75% data capture were annualised using the method described in LAQM.TG16, details are provided in Appendix C. Results were also adjusted to the closest façade where appropriate, details are given in Appendix C and results are shown in Appendix B. The raw monthly diffusion tube monitoring data is shown in Appendix B.

Bath

The results from monitoring sites in Bath show that in 2018 the annual average objective was exceeded at the following locations:

- DT90 - Anglo Terrace
- DT165 - Brassknocker Hill
- DT42 - Dorchester Street
- DT55 - Lambridge
- DT172 - London Road 2
- DT43 - St James' Parade
- DT09 - Upper Bristol Road
- DT60 - Victoria Buildings
- DT20 - Wells Road
- DT21 - Wells Road/Upper Oldfield Park
- DT198 – Walcot Parade

Of these sites the five highlighted in red exceeded the 40 µg/m^3 when adjusted to the closest building façade. All the existing monitoring sites which exceed the NO_2 annual average objective at the façade are within an AQMA.

In addition to the above sites, there are also 5 other sites in Bath (identified below) having levels which are between 36-40 µg/m^3. All these monitoring sites are within an AQMA.

- DT62 - Argyle Terrace
- DT03 - Broad Street
- DT184 – Lansdown Road 2
- DT173 - Upper Bristol Road 2
- DT52-54 - Walcot Terrace

The trends in diffusion tube monitoring since 2008 are shown in Figures A.2-A.9 in Appendix A. Overall, monitoring results of NO_2 in 2018 were lower than in 2017 by an average of 12% across the network. Results are showing a general downward trend at most locations, however there was a slight increase at one site (DT084 - Bearflat) and only a 1% reduction at DT090 - Anglo Terrace.

Monitoring of NO_2 at Widcombe High Street (DT018) continues to show a significant drop in concentrations (around 15 µg/m^3). This is due to a new road layout being created to move through traffic out of the pedestrian centre and away from residential properties. This site is now below the objective and is expected to stay at this level. There are currently no plans to amend the AQMA to remove this small link.

No existing monitoring sites were at or above 60 µg/m^3, indicating the 1-hour objective has been met. There are currently no plans to amend the AQMA to remove the 1-hour objective from the Bath AQMA.

Bathampton/Batheaston

Monitoring continued along Bathampton High Street and London Road West in Batheaston. As part of the wider Clean Air Plan monitoring further sites were also added on the A4 in Batheaston, A36 in Bathampton and on the Toll Bridge linking the 2 villages (Figure E.9 in Appendix E). The results from 2018 show that levels at all locations were below 40 µg/m^3. Monitoring will continue in Batheaston and Bathampton as part of the Clean Air Plan.

Corston

As part of the wider Clean Air Plan monitoring a monitoring site was added on the A39 in Corston (Figure E.13 in Appendix E). The results from 2018 show that levels were below 40 µg/m^3 and no further action is required. Monitoring has ended as the results were below the objective.

Farrington Gurney

Following high concentrations of NO_2 being identified in Temple Cloud in 2016, other potential areas along the A37 were investigated including Farrington Gurney. Initially one site was located at the junction of the A37 and A362 in January 2017. Following high readings at this location a further 4 sites were added, in 2018 following the AQMA consultation a monitor was added close to Bridge Buildings as there was concern over a potential hotspot (Figure E.12 in Appendix E).

The results shown in Table A.2 show that the monitoring in Farrington Gurney reduced in 2018 and results were just below the objective of 40 µg/m^3 at the residential façade at 39.6 µg/m^3 along the A37. Monitoring is continuing to establish if this reduction is an ongoing trend.

Following high concentrations in 2017, an AQMA was declared in August 2018. Monitoring continues at 2 locations on A37 and one location on A362 which had NO_2 concentrations above 36 µg/m^3.

Keynsham

As part of the Getting around Keynsham Transport Strategy, the Council was trialling a one-way system in the centre of Keynsham, a decision will be made in 2019 on whether this will be made permanent. To monitor the effects of the scheme, 5 additional diffusion tubes have been located in the town. The diffusion tubes were installed in September 2016 to have pre-trial monitoring. The trial began in May 2017. Locations of the monitoring sites are shown in Figure E.6 and E.7 in Appendix E. The results shown in Table A.2 show that all the monitoring locations after bias and annual corrections are below 40 µg/m^3.

The results show that the trial one-way system has reduced NO_2 concentrations on the High Street by approximately 15%. A small increase of 3% was seen at one location on the alternative route.

Midsomer Norton/Radstock/Westfield

Monitoring in Midsomer Norton, Radstock and Westfield was carried out at 3 locations (Figure E.5 in Appendix E). All monitoring was below 40 µg/m^3.

Paulton

As part of the wider monitoring a monitoring site was added on the in Paulton (Figure E.14 in Appendix E). The results from 2018 show that levels were below 40 µg/m^3 and no further action is required. Monitoring has ended as the results were below the objective.

Pensford

Following high concentrations of NO_2 being identified in Temple Cloud in 2016, other potential areas along the A37 were investigated including Pensford. In 2017 two monitoring sites were included, one in the street canyon section of the hill on the A37 and the second close to the primary school. In 2018 the site in the canyon was moved to investigate further along the road (Figure E.15 in Appendix E).

The results for monitoring locations in Pensford in Table A.2 show that the levels were below the objective. Monitoring in Pensford is continuing to identify if there are any hotspots of pollution.

Saltford

In 2018 monitoring was carried out at 2 locations within Saltford. Figure E.8 in Appendix E is a map showing the locations of the monitoring sites. The results from 2018 show that levels at both locations were below 40 µg/m^3 at the façade of properties. Monitoring will continue at 2 sites in Saltford and the AQMA will be reviewed at the end of 2019.

Temple Cloud

Following a request from Cameley Parish Council a diffusion tube was installed in May 2016 on the A37 in at Temple Cloud in a narrow section of road, which also included a street canyon (Figure E.11 in Appendix E). The initial results from this monitored suggested that concentrations at this section of the A37 may be high. A further 4 monitoring sites were added in September 2016 and a further 3 monitoring sites were added in May 2017 to see the extent of the high levels. In 2018 monitoring was reduced to 3 key locations on the A37.

The results shown in Table A.2 show that the monitoring locations on the A37 exceeded the annual average objective after bias and annual corrections were applied. At the property facades, one sites were above the annual average objective. In 2018 all sites were below 60 µg/m^3, this indicates the 1-hour objective was not exceeded.

Based on the 2017 results, an AQMA was declared for both the annual average and 1-hour NO_2 objectives for the A37 in Temple Cloud in August 2018.

Whitchurch

Following a high result in 2015 at the Whitchurch site monitoring site a wider study was commissioned. A further 5 monitoring locations in Whitchurch were added to the network in May 2016 and one on the school façade was added in January 2017. In 2018 this was reduced to 4 key locations. Figure E.10 in Appendix E is a map showing the locations of the monitoring sites. The results from 2018 show that levels at all locations were below 40 µg/m^3 at the façade of properties. Monitoring will continue at 4 sites in Whitchurch.

3.2.2 Particulate Matter (PM_{10})

Monitoring for PM_{10} has been carried out at 2 sites during 2018 using BAM1020 analysers. The data has been corrected to Gravimetric equivalent by dividing by 1.2. QA/QC procedures are described in Appendix C.

Chelsea House is located on the façade of a residential property and Windsor Bridge is at a worse case location on the opposite side of the junction to the residential

properties. In 2013 the Windsor Bridge site was moved across the junction due to changes in the road layout.

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

The results show that the annual average objective was not exceeded during 2018 and the number of exceedances of the 24 hour objective was below 35 at both sites (Tables A.5 and A.5). Figures A.11-A.12 shows that the levels of PM_{10} are similar to previous years at Windsor Bridge and Chelsea House.

There was one peak above the 24 hour objective in February 2018, this was due to weather conditions, wood burning and continental air. This was also seen in other areas of the UK. A smaller peak was also seen on Bonfire night when the pollution from local bonfires and fireworks coincided with calm conditions (Figure 3.1).

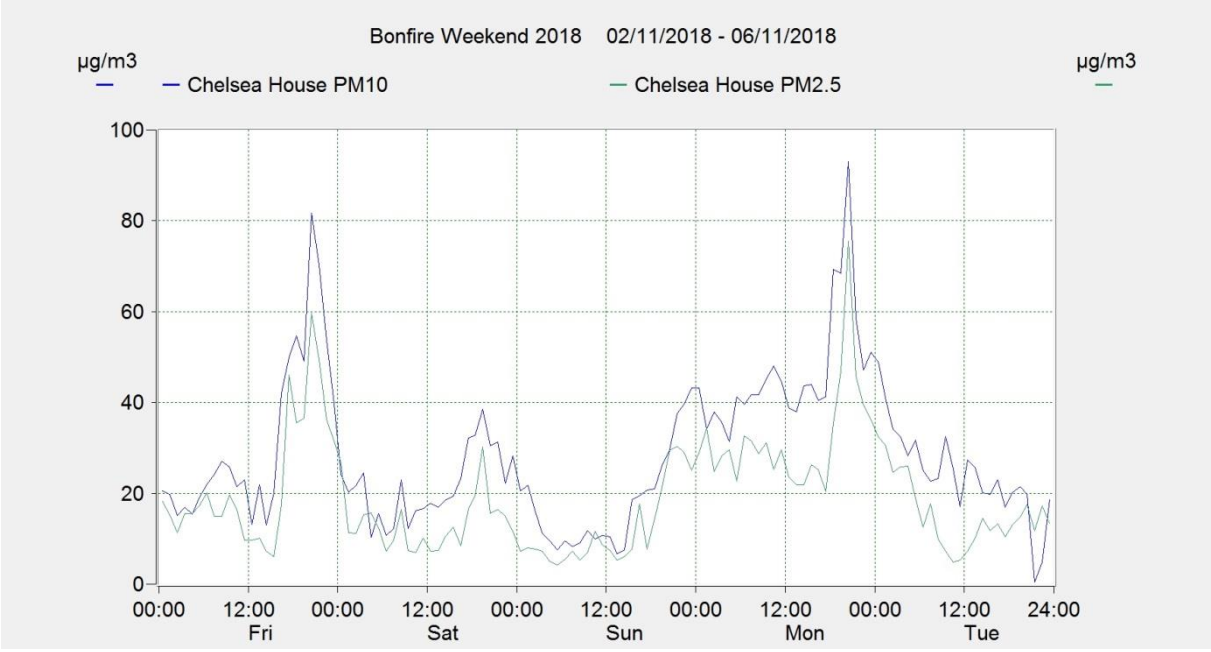


Figure 3.1 – Hourly Particulate Matter monitoring on Bonfire weekend

3.2.3 Particulate Matter ($PM_{2.5}$)

Bath & North East Somerset Council started monitoring $PM_{2.5}$ in July 2015. Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 4 years.

The results show that concentrations of $PM_{2.5}$ remain at similar levels over the last 3½ years, however there is currently not enough data to establish a long-term trend at this site.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	London Road	Roadside	375462	165844	NO_2 Benzene	Y	Chemiluminescent Pumped BTX tubes	0	3	2.6
CM2	Guildhall	Roadside	375111	164857	NO_2	Y	Chemiluminescent	1	2	1.3
CM3	Windsor Bridge	Roadside	373593	164861	NO_2 , PM_{10}	Y	Chemiluminescent BAM1020	2	4	2.0
CM4	Chelsea House	Roadside	375419	165853	NO_2 , PM_{10}, $PM_{2.5}$	Y	Chemiluminescent BAM1020 BAM1020 (smart heated)	0	15	2.0

Notes:
(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).
(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Bath									
DT003	Broad Street (new)	Roadside	374992	165173	NO_2	YES	1.7	1.3	NO	2.6
DT003	Broad Street	Kerbside	375008	165145	NO_2	YES	2	0.5	NO	2.5
DT004	George Street	Kerbside	374899	165159	NO_2	YES	3	1	NO	2.3
DT005	Gay Street – Top	Roadside	374797	165161	NO_2	YES	3	1	NO	2.6
DT008	Windsor Bridge	Roadside	373518	165124	NO_2	YES	0	3.5	NO	2.25
DT009	Upper Bristol Rd	Roadside	373993	165174	NO_2	YES	5	1	NO	2.6
DT014	Bathwick Street	Roadside	375602	165365	NO_2	YES	1	1	NO	2.5
DT015	Beckford Road	Roadside	375733	165414	NO_2	YES	7	1	NO	2.7
DT016	Warminster Road	Roadside	376063	165492	NO_2	YES	18	4	NO	2.4
DT017	Widcombe School	Roadside	375634	164406	NO_2	YES	5	1	NO	2.6
DT018	Widcombe High Street	Roadside	375414	164216	NO_2	YES	0	5	NO	2.5
DT020	Wells Road	Roadside	374760	164310	NO_2	YES	0	1.5	NO	2.25
DT021	Wells Road/Upper Oldfield Park	Roadside	374454	164202	NO_2	YES	3	1	NO	2.7
DT023	Alexandra Park	Urban Background	375105	163991	NO_2	NO	N/A	N/A	NO	3.3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT026	Upper Wellsway	Roadside	373576	161908	NO_2	NO	0	3	NO	2
DT034	Newbridge Road	Roadside	373092	165106	NO_2	YES	5	1	NO	2.3
DT037	Charlotte Street	Roadside	374622	164994	NO_2	YES	3	1	NO	2.7
DT039	Manvers Street	Roadside	375247	164591	NO_2	YES	3	2	NO	2.3
DT042	Dorchester Street	Kerbside	375230	164383	NO_2	YES	2	0.5	NO	2.7
DT043	St James' Parade (new)	Kerbside	375053	164426	NO_2	YES	2.6	0.9	NO	2.87
DT043	St James' Parade	Roadside	375053	164418	NO_2	YES	2	1	NO	2.8
DT045	James Street West	Roadside	374697	164763	NO_2	YES	0	5	NO	2.7
DT052	Walcot Terrace	Roadside	375462	165843	NO_2	YES	0	3	YES	2.5
DT053	Walcot Terrace	Roadside	375462	165843	NO_2	YES	0	3	YES	2.5
DT054	Walcot Terrace	Roadside	375462	165843	NO_2	YES	0	3	YES	2.5
DT055	Lambridge	Roadside	376451	166502	NO_2	YES	0	4	NO	2.6
DT060	Victoria Buildings	Roadside	374039	164760	NO_2	YES	2	2	NO	2.9
DT062	Argyle Terrace	Roadside	373211	164743	NO_2	YES	4	3	NO	2.8
DT084	Bear Flat	Roadside	374604	163806	NO_2	NO	5.7	1.85	NO	2.25
DT085	RUH – North	Roadside	373073	165983	NO_2	NO	7	1.5	NO	2.25
DT087	Oak Street	Roadside	374702	164414	NO_2	YES	0	2.65	NO	2.25
DT090	Anglo Terrace	Roadside	375288	165758	NO_2	YES	2.5	1.6	NO	2.25

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT142	Prior Park Road	Kerbside	375513	164194	NO_2	NO	0.3	0.8	NO	2.5
DT143	Rackfield Place	Roadside	372647	164738	NO_2	NO	0	3.7	NO	2.5
DT145	Lansdown Road	Kerbside	374930	165550	NO_2	YES	2.5	0.7	NO	2.45
DT147	Terrace Walk	Roadside	375195	164735	NO_2	NO	0.3	1.7	NO	2.7
DT148	Julian Road	Roadside	375195	164735	NO_2	NO	0.4	2.2	NO	2.5
DT149	Camden 3	Kerbside	375038	165838	NO_2	NO	2	0.4	NO	2.55
DT150	Brougham Hayes	Roadside	373955	164590	NO_2	NO	1.9	1.3	NO	2.6
DT151	Widcombe Hill	Kerbside	375598	164190	NO_2	NO	3.9	0.8	NO	2.2
DT152	Bathwick Hill	Roadside	375800	164912	NO_2	NO	2.0	1.0	NO	2.6
DT153	North Road	Roadside	376069	165356	NO_2	NO	3	1.85	NO	2.4
DT154	Bradford Road	Roadside	375529	162389	NO_2	NO	0.35	2.2	NO	2.35
DT155	Newbridge Hill 2	Roadside	372696	165488	NO_2	NO	7	1.8	NO	2.45
DT156	Corn Street	Roadside	374827	164531	NO_2	NO	2.4	2.6	NO	2.45
DT157	Charles Street	Roadside	374644	164815	NO_2	NO	1.5	3.15	NO	2.4
DT158	Paragon 2	Roadside	375051	165350	NO_2	YES	5.4	1.1	NO	3.0
DT159	Walcot Street	Roadside	375075	165287	NO_2	NO	3.0	2.5	NO	2.65
DT160	North Parade Road	Roadside	375284	164694	NO_2	NO	6.3	1.3	NO	2.6
DT161	Kelston Road	Roadside	371842	166053	NO_2	NO	16	1.1	NO	2.3
DT164	Midford Road	Kerbside	374725	161881	NO_2	NO	1.4	0.4	NO	2.4
DT165	Brassknocker Hill	Kerbside	377960	162736	NO_2	NO	7	0.8	NO	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT167	Weston High Street	Roadside	372587	166629	NO_2	NO	0.4	1.0	NO	2.5
DT168	Englishcombe Lane	Roadside	373207	163339	NO_2	NO	3.4	1.6	NO	2.45
DT169	Eastbourne Avenue	Roadside	357667	166369	NO_2	NO	5.1	2.0	NO	2.45
DT170	St James Parade 2	Kerbside	375001	164516	NO_2	YES	2.65	0.45	NO	2.5
DT171	Frome Road/Upper Bloomfield	Roadside	373706	162411	NO_2	NO	0.4	4.2	NO	2.4
DT172	London Road 2	Roadside	375374	165813	NO_2	YES	0.45	3.7	NO	2.0
DT173	Upper Bristol Road 2	Roadside	374362	165016	NO_2	YES	0.6	2.2	NO	2.35
DT179	Upper Bristol Road 3	Roadside	373299	165093	NO_2	YES	0	1.5	NO	2.0
DT180	Wells Road 2	Roadside	374537	163968	NO_2	NO	0.7	1.7	NO	2.4
DT181	Wellsway	Roadside	374618	163494	NO_2	NO	15	1.2	NO	2.5
DT182	Gay Street – Lower	Roadside	374796	165122	NO_2	YES	3.7	1.1	NO	2.3
DT183	Chapel Row	Roadside	374712	164916	NO_2	NO	0	2.1	NO	2.45
DT184	Lansdown Road 2	Kerbside	374949	165320	NO_2	YES	3.5	0.9	NO	2.4

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT185	Greenway Lane	Kerbside	374712	163417	NO_2	NO	0.5	0.7	NO	2.4
DT186	Coronation Avenue	Roadside	373170	163416	NO_2	NO	3.3	1.4	NO	2.35
DT187	Stanley Road West	Roadside	373835	164438	NO_2	NO	0.2	1.7	NO	2.3
DT188	Moorland Road	Roadside	373696	164343	NO_2	NO	0.5	3.4	NO	2.6
DT189	Old Newbridge Hill	Roadside	372251	165686	NO_2	NO	10	2.1	NO	2.5
DT190	Church Street	Kerbside	375814	164027	NO_2	NO	0	0.9	NO	2.5
DT192	Fairfield Road	Roadside	375505	166428	NO_2	NO	3.6	1.3	NO	2.5
DT193	Granville Road	Roadside	374260	167661	NO_2	NO	4.5	1.5	NO	2.5
DT194	Brooklyn Road	Roadside	376096	166878	NO_2	NO	3.5	1.0	NO	2.6
DT195	Lansdown Lane	Roadside	372537	167235	NO_2	NO	11	1.9	NO	2.5
DT196	Oakley	Kerbside	377133	164045	NO_2	NO	2	0.8	NO	2.5
DT197	Rush Hill	Roadside	372703	162983	NO_2	NO	5.5	2.0	NO	2.35
DT198	Walcot Parade	Kerbside	375240	165739	NO_2	YES	0.4	1.0	NO	3.4
	Bathampton									
DT091	Bathampton High Street	Roadside	377683	166408	NO_2	NO	0	1.1	NO	2.3
DT166	Bathampton – A36	Roadside	377543	165924	NO_2	NO	23	1.2	NO	2.4

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Batheaston									
DT058	Batheaston – London Road West A	Roadside	377643	167365	NO_2	NO	0	1	NO	2.5
DT094	Batheaston London Road West B	Roadside	377290	167097	NO_2	NO	0	1.25	NO	2.5
DT130	Batheaston - London Road West C	Roadside	377802	167456	NO_2	NO	0	1.4	NO	2.5
DT163	Batheaston – A4 Box Road	Roadside	378911	167259	NO_2	NO	2.4	1.8	NO	2.4
DT191	Batheaston – Mill Lane	Roadside	377339	167065	NO_2	NO	4	1.0	NO	2.5
	Corston									
DT162	Corston – A39 Wells Road	Roadside	369588	165301	NO_2	NO	-0.3	1.7	NO	2.5
	Farrington Gurney									
DT126	Farrington Gurney 1	Roadside	362894	155484	NO_2	NO	4	1.35	NO	2.1
DT134	Farrington Gurney 2	Roadside	362891	155485	NO_2	NO	0	4.5	NO	2.5
DT136	Farrington Gurney 3	Roadside	362884	155790	NO_2	NO	0	1.2	NO	2.08

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT137	Farrington Gurney 4	Roadside	362877	155375	NO_2	NO	3.5	1.3	NO	2.4
DT138	Farrington Gurney 5	Roadside	362983	155459	NO_2	NO	3	1.9	NO	2.5
DT178	Farrington Gurney 6	Roadside	363698	155366	NO_2	NO	0.5	2.0	NO	2.35
	Keynsham									
DT033	Keynsham - (Kelston Road)	Urban Centre	364803	168237	NO_2	NO	8	1	NO	2.6
DT063	Keynsham – Station Road	Roadside	365409	168846	NO_2	YES	3	1	NO	2.7
DT064	Keynsham – Charlton Rd B	Roadside	365305	168657	NO_2	YES	4	1	NO	2.8
DT065	Keynsham - Charlton Rd A	Roadside	365399	168701	NO_2	YES	3	1	NO	2.7
DT066	Keynsham – High Street A	Roadside	365360	168815	NO_2	YES	1	1	NO	2.5
DT067	Keynsham - Somerfield	Roadside	365457	168496	NO_2	YES	2	1	NO	2.8
DT068	Keynsham - Temple St	Roadside	365489	168363	NO_2	NO	0	3	NO	2.8
DT069	Keynsham – Rock Road	Roadside	365428	168435	NO_2	NO	0	2	NO	3
DT070	Keynsham – Bath Hill	Roadside	365496	168521	NO_2	YES	1	4	NO	2.3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT107	Keynsham - Bath Hill South	Roadside	365710	168339	NO_2	NO	0	1.3	NO	2.45
DT112	Keynsham - Ashton Way	Roadside	365375	168594	NO_2	NO	35	1.5	NO	2.55
DT113	Keynsham - West View Road	Roadside	365217	168505	NO_2	NO	4.5	1.5	NO	2.55
DT114	Keynsham - Victoria Church	Kerbside	365414	168684	NO_2	YES	11.5	0.5	NO	2.65
DT115	Keynsham - High Street B	Roadside	365447	168586	NO_2	YES	1.8	1.1	NO	2.4
DT116	Keynsham - Fish Bar	Kerbside	365462	168533	NO_2	YES	5.3	0.8	NO	2.25
DT118	Keynsham - Wellsway	Roadside	365771	168174	NO_2	NO	1.3	1.3	NO	2.55
DT141	Keynsham - A4	Roadside	366921	168096	NO_2	NO	13	1.4	NO	2.4
	Midsomer Norton									
DT144	MSN - Radstock Road	Roadside	366987	154632	NO_2	NO	3.1	1.1	NO	2.5
	Paulton									
DT177	Paulton	Roadside	365070	156531	NO_2	NO	0	1.1	NO	2.45
	Pensford									
DT174	Pensford 3	Roadside	361769	164034	NO_2	NO	2.7	1.25	NO	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Radstock									
DT176	Radstock – Wells Road 2	Roadside	368763	154818	NO_2	NO	0	2.2	NO	2.5
	Saltford									
DT075	Saltford - The Crown	Roadside	368375	166988	NO_2	YES	0	3	NO	2.6
DT077	Saltford - Bath Road	Roadside	368778	166687	NO_2	YES	0	2	NO	2.2
	Temple Cloud									
DT096	Temple Cloud 1	Roadside	362219	157923	NO_2	NO	0	1.5	NO	2.4
DT108	Temple Cloud 2	Roadside	362179	158055	NO_2	NO	6.2	1.25	NO	2.58
DT109	Temple Cloud 3	Roadside	362344	157658	NO_2	NO	2	1.67	NO	2.55
	Westfield									
DT175	Westfield 3	Roadside	367416	153974	NO_2	NO	2.7	1.25	NO	2.5
	Whitchurch									
DT032	Whitchurch	Roadside	361242	167652	NO_2	NO	2.7	2.1	NO	2.25
DT098	Whitchurch 2	Roadside	361276	167555	NO_2	NO	0	1.3	NO	2.3
DT100	Whitchurch 4	Roadside	361326	167606	NO_2	NO	6	1.6	NO	2.26
DT101	Whitchurch 5	Roadside	361235	167824	NO_2	NO	4	1.6	NO	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	AQMesh analysers									
AQM12	Bath – Northampton Street	Roadside	374558	165609	NO_2, PM_{10}, $PM_{2.5}$	NO	26	1.3	NO	2.2
AQM13	Bath – Terrace Walk	Roadside	375198	164702	NO_2, PM_{10}, $PM_{2.5}$	NO	10.6	1.5	NO	2.2
AQM14	Keynsham – Bath Hill	Roadside	365566	168512	NO_2, PM_{10}, $PM_{2.5}$	NO	1.5	1.5	NO	2.2
AQM9	Keynsham – High Street	Roadside	365439	168583	NO_2, PM_{10}, $PM_{2.5}$	YES	4.0	0.8	NO	2.2
AQM15	Westfield – Wells Road	Roadside	367416	153974	NO_2, PM_{10}, $PM_{2.5}$	NO	2.7	1.25	NO	2.5

Notes:
(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.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
						2014	2015	2016	2017	2018
	Continuous									
CM1	London Road	Roadside	Automatic	99	99	**57**	**54**	**48**	**45**	38
CM2	Guildhall	Roadside	Automatic	97	97	34	34	34	30	29
CM3	Windsor Bridge	Roadside	Automatic	96	96	35	33	33	33	30
CM4	Chelsea House	Roadside	Automatic	92	92	27	31	29	29	26
	Bath									
DT003	Broad Street (new)	Roadside	Diffusion Tube	100	100	-	-	-	-	36
DT003	Broad Street	Kerbside	Diffusion Tube	-	-	**62**	**57**	**48**	**48**	**-**
DT004	George Street	Roadside	Diffusion Tube	92	92	**47**	**42**	39	36	30
DT005	Gay Street – Top	Roadside	Diffusion Tube	100	100	**48**	**40.4**	**41**	36	32
DT008	Windsor Bridge (new)	Roadside	Diffusion Tube	92	92	-	38	37	34	31
DT009	Upper Bristol Rd	Roadside	Diffusion Tube	100	100	**49**	**46**	**47**	**40**	33
DT014	Bathwick Street	Roadside	Diffusion Tube	100	100	**54**	**51**	**45**	**44**	36
DT015	Beckford Road	Roadside	Diffusion Tube	100	100	**43**	35	37	34	30
DT016	Warminster Road	Roadside	Diffusion Tube	83	83	**43**	37	39.6	36	33
DT017	Widcombe School	Roadside	Diffusion Tube	67	67	38	39	38	35	31
DT018	Widcombe High Street	Roadside	Diffusion Tube	100	100	-	31	28	28	24
DT020	Wells Road	Roadside	Diffusion Tube	100	100	-	**62**	**55**	**52**	**49**
DT021	Wells Road/Upper Oldfield Park	Roadside	Diffusion Tube	100	100	**50**	**44**	**47**	**43**	**43**
DT023	Alexandra Park	Urban Background	Diffusion Tube	100	100	14	15	14	13	12
DT026	Upper Wellsway	Roadside	Diffusion Tube	100	100	39.6	39	39	32	31

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
						2014	2015	2016	2017	2018
DT034	Newbridge Road	Roadside	Diffusion Tube	100	100	**49**	**42**	**40.2**	38	33
DT037	Charlotte Street	Roadside	Diffusion Tube	92	92	**44**	**44**	**46**	38	33
DT039	Manvers Street	Roadside	Diffusion Tube	92	92	**54**	**50**	**44**	38	29
DT042	Dorchester Street	Kerbside	Diffusion Tube	92	92	**71**	**73**	**67**	**58**	**45**
DT043	St James' Parade	Roadside	Diffusion Tube	-	-	**58**	**58**	**57**	**44**	**-**
DT043	St James' Parade(new)	Kerbside	Diffusion Tube	100	100	-	-	-	**46**	**40**
DT045	James Street West	Roadside	Diffusion Tube	100	100	**43**	**43**	**44**	40	31
DT052	Walcot Terrace	Roadside	Diffusion Tube	100	100	**58**	**54**	**47**	**44**	37
DT053	Walcot Terrace	Roadside	Diffusion Tube	100	100	**58**	**54**	**48**	**45**	39
DT054	Walcot Terrace	Roadside	Diffusion Tube	100	100	**56**	**53**	**49**	**45**	39.5
DT055	Lambridge	Roadside	Diffusion Tube	100	100	**64**	**65**	**60**	**46**	39.7
DT060	Victoria Buildings	Roadside	Diffusion Tube	83	83	**55**	**50**	**52**	**46**	**41**
DT062	Argyle Terrace	Roadside	Diffusion Tube	92	92	**48**	**49**	**48**	**45**	39
DT084	Bear Flat	Roadside	Diffusion Tube	92	92	-	**43**	**45**	33	35
DT085	RUH – North	Roadside	Diffusion Tube	100	100	-	36	36	32	28
DT087	Oak Street	Roadside	Diffusion Tube	92	92	-	**43**	38	33	31
DT090	Anglo Terrace	Roadside	Diffusion Tube	100	100	-	**73**	**69**	**57**	**56**
DT142	Prior Park Road	Kerbside	Diffusion Tube	100	100	-	-	-	**41**	34
DT143	Rackfield Place	Roadside	Diffusion Tube	100	100	-	-	-	32	27
DT145	Lansdown Road	Kerbside	Diffusion Tube	100	100	-	-	-	33	31
DT147	Terrace Walk	Roadside	Diffusion Tube	100	100	-	-	-	34	29
DT148	Julian Road	Roadside	Diffusion Tube	92	92	-	-	-	-	27
DT149	Camden 3	Kerbside	Diffusion Tube	100	100	-	-	-	-	31
DT150	Brougham Hayes	Roadside	Diffusion Tube	92	92	-	-	-	-	27

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
						2014	2015	2016	2017	2018
DT151	Widcombe Hill	Kerbside	Diffusion Tube	92	92	-	-	-	-	32
DT152	Bathwick Hill	Roadside	Diffusion Tube	100	100	-	-	-	-	26
DT153	North Road	Roadside	Diffusion Tube	92	92	-	-	-	-	19
DT154	Bradford Road	Roadside	Diffusion Tube	92	92	-	-	-	-	30
DT155	Newbridge Hill 2	Roadside	Diffusion Tube	92	92	-	-	-	-	19
DT156	Corn Street	Roadside	Diffusion Tube	92	92	-	-	-	-	28
DT157	Charles Street	Roadside	Diffusion Tube	92	92	-	-	-	-	29
DT158	Paragon 2	Roadside	Diffusion Tube	100	100	-	-	-	-	33
DT159	Walcot Street	Roadside	Diffusion Tube	100	100	-	-	-	-	27
DT160	North Parade Road	Roadside	Diffusion Tube	100	100	-	-	-	-	31
DT161	Kelston Road	Roadside	Diffusion Tube	100	100	-	-	-	-	19
DT164	Midford Road	Kerbside	Diffusion Tube	100	100	-	-	-	-	23
DT165	Brassknocker Hill	Kerbside	Diffusion Tube	100	100	-	-	-	-	**40.2**
DT167	Weston High Street	Roadside	Diffusion Tube	100	100	-	-	-	-	24
DT168	Englishcombe Lane	Roadside	Diffusion Tube	83	83	-	-	-	-	16
DT169	Eastbourne Avenue	Roadside	Diffusion Tube	100	100	-	-	-	-	26
DT170	St James Parade 2	Kerbside	Diffusion Tube	92	92	-	-	-	-	35
DT171	Frome Road/ Upper Bloomfield	Roadside	Diffusion Tube	100	100	-	-	-	-	32
DT172	London Road 2	Roadside	Diffusion Tube	67	67	-	-	-	-	**47**
DT173	Upper Bristol Rd 2	Roadside	Diffusion Tube	100	100	-	-	-	-	37
DT179	Upper Bristol Rd 3	Roadside	Diffusion Tube	100	42	-	-	-	-	35
DT180	Wells Road 2	Roadside	Diffusion Tube	100	42	-	-	-	-	35
DT181	Wellsway	Roadside	Diffusion Tube	100	42	-	-	-	-	36

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
						2014	2015	2016	2017	2018
DT182	Gay Street – Lower	Roadside	Diffusion Tube	100	42	-	-	-	-	**42**
DT183	Chapel Row	Roadside	Diffusion Tube	100	42	-	-	-	-	30
DT184	Lansdown Road 2	Kerbside	Diffusion Tube	100	42	-	-	-	-	39
DT185	Greenway Lane	Kerbside	Diffusion Tube	40	17	-	-	-	-	19
DT186	Coronation Avenue	Roadside	Diffusion Tube	100	33	-	-	-	-	20
DT187	Stanley Road West	Roadside	Diffusion Tube	100	42	-	-	-	-	24
DT188	Moorland Road	Roadside	Diffusion Tube	60	25	-	-	-	-	25
DT189	Old Newbridge Hill	Roadside	Diffusion Tube	100	42	-	-	-	-	29
DT190	Church Street	Kerbside	Diffusion Tube	100	42	-	-	-	-	14
DT192	Fairfield Road	Roadside	Diffusion Tube	80	33	-	-	-	-	20
DT193	Granville Road	Roadside	Diffusion Tube	100	42	-	-	-	-	11
DT194	Brooklyn Road	Roadside	Diffusion Tube	100	42	-	-	-	-	18
DT195	Lansdown Lane	Roadside	Diffusion Tube	100	42	-	-	-	-	20
DT196	Oakley	Kerbside	Diffusion Tube	100	42	-	-	-	-	32
DT197	Rush Hill	Roadside	Diffusion Tube	100	33	-	-	-	-	25
DT198	Walcot Parade	Kerbside	Diffusion Tube	100	42	-	-	-	-	**56**
	Bathampton									
DT091	Bathampton High St	Roadside	Diffusion Tube	100	100	-	-	31	29	26
DT166	Bathampton – A36	Roadside	Diffusion Tube	100	100	-	-	-	-	30
	Batheaston									
DT058	Batheaston – London Road West A	Roadside	Diffusion Tube	100	100	38	35	32	29	26

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3]				
						2014	2015	2016	2017	2018
DT094	Batheaston – London Road West B	Roadside	Diffusion Tube	100	100	-	-	34	31	28
DT130	Batheaston – London Road West C	Roadside	Diffusion Tube	100	100	-	-	-	32	26
DT163	Batheaston – A4 Box Road	Roadside	Diffusion Tube	100	100	-	-	-	-	24
DT191	Batheaston – Mill Lane	Roadside	Diffusion Tube	100	42	-	-	-	-	22
	Corston									
DT162	Corston – A39 Wells Road	Roadside	Diffusion Tube	100	100	-	-	-	-	24
	Farrington Gurney									
DT126	Farrington Gurney 1	Roadside	Diffusion Tube	100	100	-	-	-	**54**	**43**
DT134	Farrington Gurney 2	Roadside	Diffusion Tube	100	100	-	-	-	**52**	39
DT136	Farrington Gurney 3	Roadside	Diffusion Tube	100	100	-	-	-	**42**	39.6
DT137	Farrington Gurney 4	Roadside	Diffusion Tube	80	33	-	-	-	28	25
DT138	Farrington Gurney 5	Roadside	Diffusion Tube	100	100	-	-	-	39	38
DT178	Farrington Gurney 6	Roadside	Diffusion Tube	100	58	-	-	-	-	31
	Keynsham									
DT033	Keynsham - Kelston Road	Urban Background	Diffusion Tube	100	100	17	16	16	16	13
DT063	Keynsham – Station Road	Roadside	Diffusion Tube	100	100	36	34	34	30	27
DT064	Keynsham – Charlton Road B	Roadside	Diffusion Tube	100	100	39	37	38	31	28

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
						2014	2015	2016	2017	2018
DT065	Keynsham - Charlton Rd A	Roadside	Diffusion Tube	92	92	39	35	35	32	29
DT066	Keynsham – High Street A	Roadside	Diffusion Tube	83	83	**50**	**47**	**46**	**40**	33
DT067	Keynsham - Somerfield	Roadside	Diffusion Tube	92	92	**46**	**42**	**40**	37	32
DT068	Keynsham - Temple St	Roadside	Diffusion Tube	100	100	28	26	24	22	21
DT069	Keynsham – Rock Rd	Roadside	Diffusion Tube	100	100	28	25	26	26	25
DT070	Keynsham – Bath Hill	Roadside	Diffusion Tube	100	100	36	33	31	29	25
DT107	Keynsham - Bath Hill South	Roadside	Diffusion Tube	83	83	-	-	39.8	37	35
DT112	Keynsham - Ashton Way	Roadside	Diffusion Tube	100	100	-	-	26	26	23
DT113	Keynsham - West View Road	Roadside	Diffusion Tube	100	100	-	-	21	18	17
DT114	Keynsham - Victoria Church	Kerbside	Diffusion Tube	100	100	-	-	35	30	23
DT115	Keynsham - High Street B	Roadside	Diffusion Tube	83	83	-	-	33	31	22
DT116	Keynsham - Fish Bar	Roadside	Diffusion Tube	92	92	-	-	28	28	25
DT118	Keynsham - Wellsway	Roadside	Diffusion Tube	100	100	-	-	-	28	28
DT141	Keynsham A4	Roadside	Diffusion Tube	92	92	-	-	-	36	33
	Midsomer Norton									
DT144	MSN - Radstock Road	Roadside	Diffusion Tube	100	100	-	-	-	33	30
	Paulton									
DT177	Paulton	Roadside	Diffusion Tube	100	100	-	-	-	-	28

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2014	2015	2016	2017	2018
	Pensford									
DT174	Pensford 3	Roadside	Diffusion Tube	100	100	-	-	-	-	37
	Radstock									
DT176	Radstock – Wells Rd 2	Roadside	Diffusion Tube	92	92	-	-	-	-	29
	Saltford									
DT075	Saltford - The Crown	Roadside	Diffusion Tube	100	100	**50**	**43**	**40.5**	37	31
DT077	Saltford - Bath Road	Roadside	Diffusion Tube	100	100	**42**	39	36	33	28
	Temple Cloud									
DT096	Temple Cloud 1	Roadside	Diffusion Tube	100	100	-	-	**90**	**67**	**59.5**
DT108	Temple Cloud 2	Roadside	Diffusion Tube	100	100	-	-	**48**	**50**	**40.1**
DT109	Temple Cloud 3	Roadside	Diffusion Tube	100	100	-	-	**46**	**45**	**40.0**
	Westfield									
DT175	Westfield 3	Roadside	Diffusion Tube	100	100	-	-	-	-	26
	Whitchurch									
DT032	Whitchurch	Roadside	Diffusion Tube	100	100	-	**52**	**47**	39	33
DT098	Whitchurch 2	Roadside	Diffusion Tube	100	100	-	-	**43**	35	33
DT100	Whitchurch 4	Roadside	Diffusion Tube	100	100	-	-	37	29	27
DT101	Whitchurch 5	Roadside	Diffusion Tube	100	100	-	-	**50**	**46**	37

☒ **Diffusion tube data has been bias corrected** ☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(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 Boxes 7.9 and 7.10 in 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_2 Concentrations at measured at automatic monitoring sites

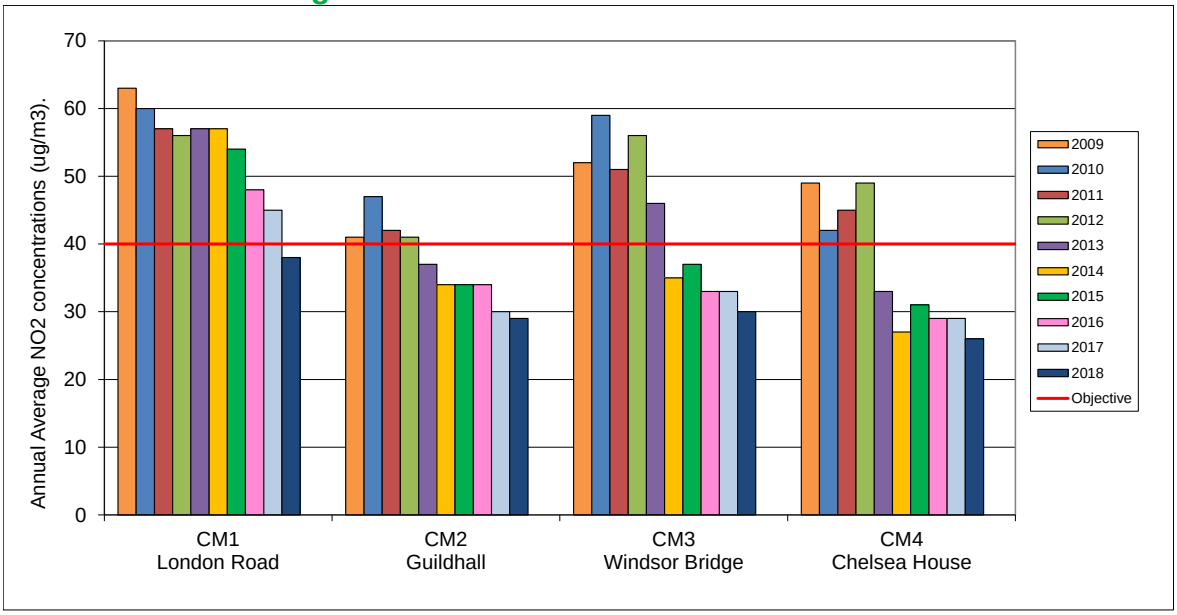


Figure A.2 – Trends in Annual Mean NO_2 Concentration Measured at Diffusion Tube Monitoring Sites –Sites in Bath – South

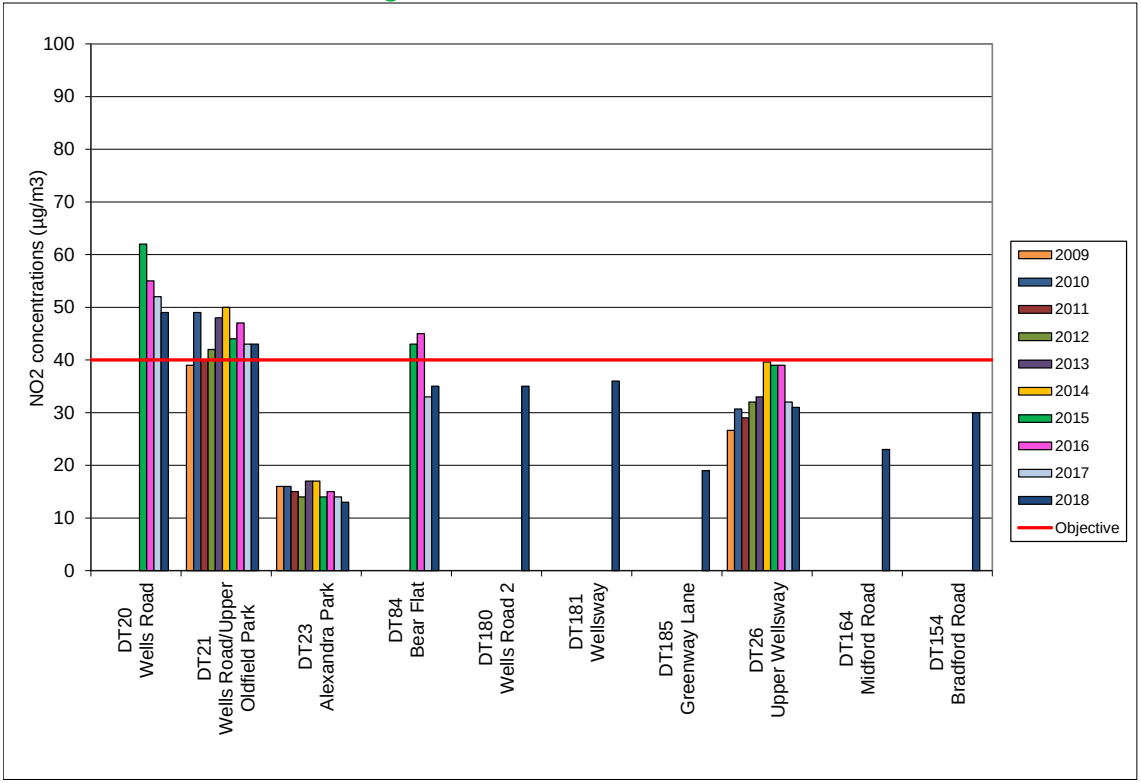


Figure A.3 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath – South East

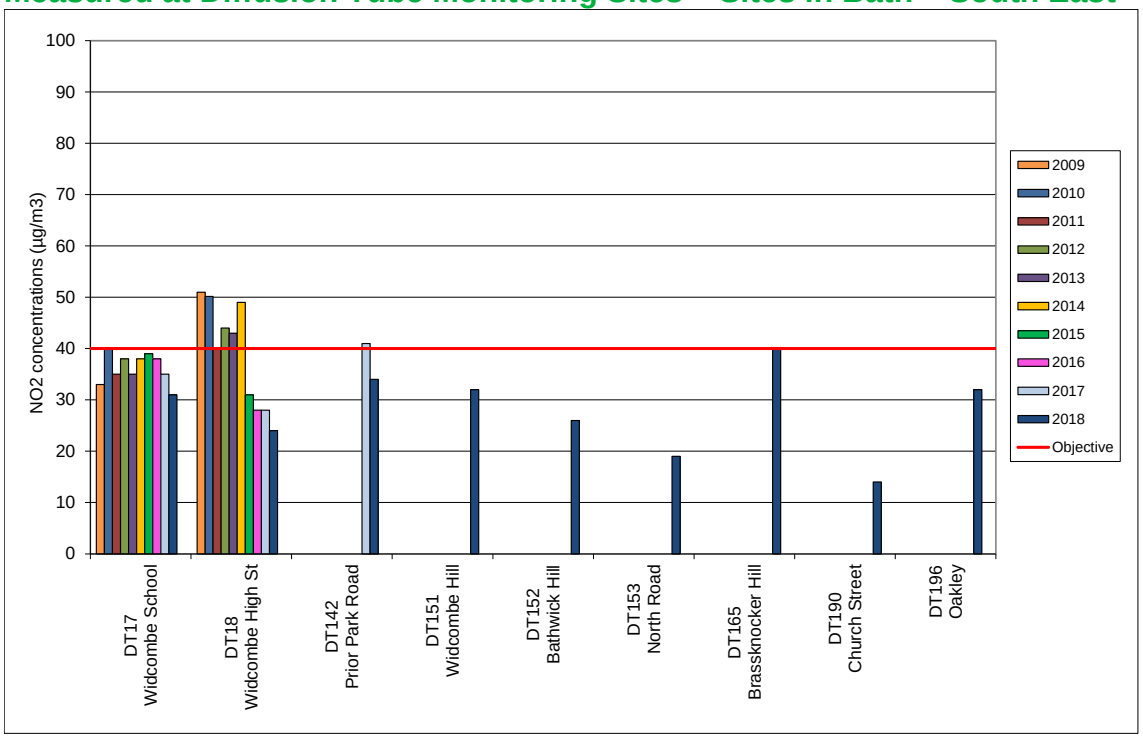


Figure A.4 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath – South West

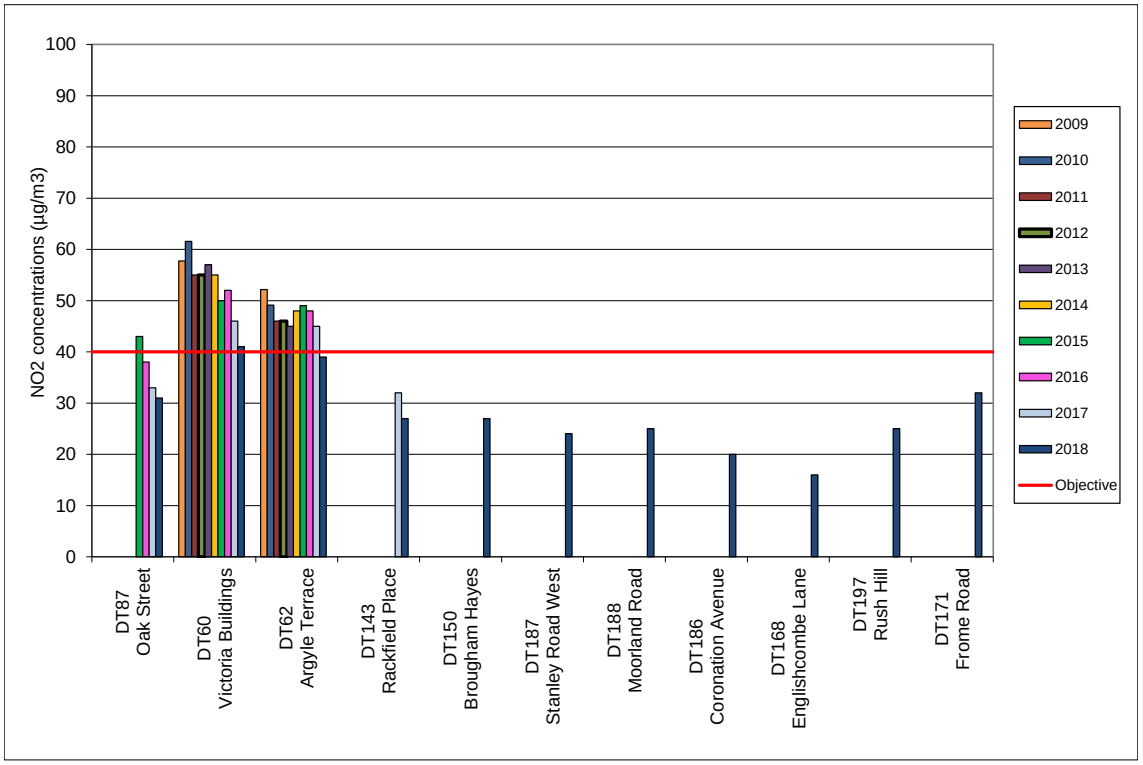


Figure A.5 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath - West

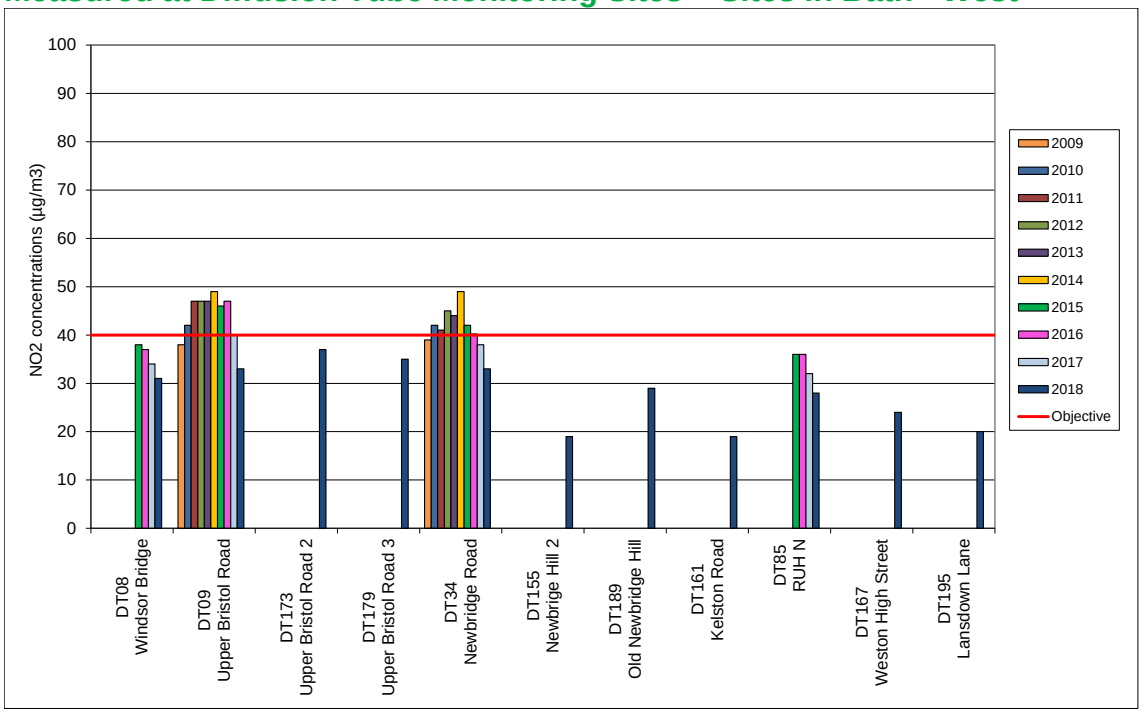


Figure A.6 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath - East

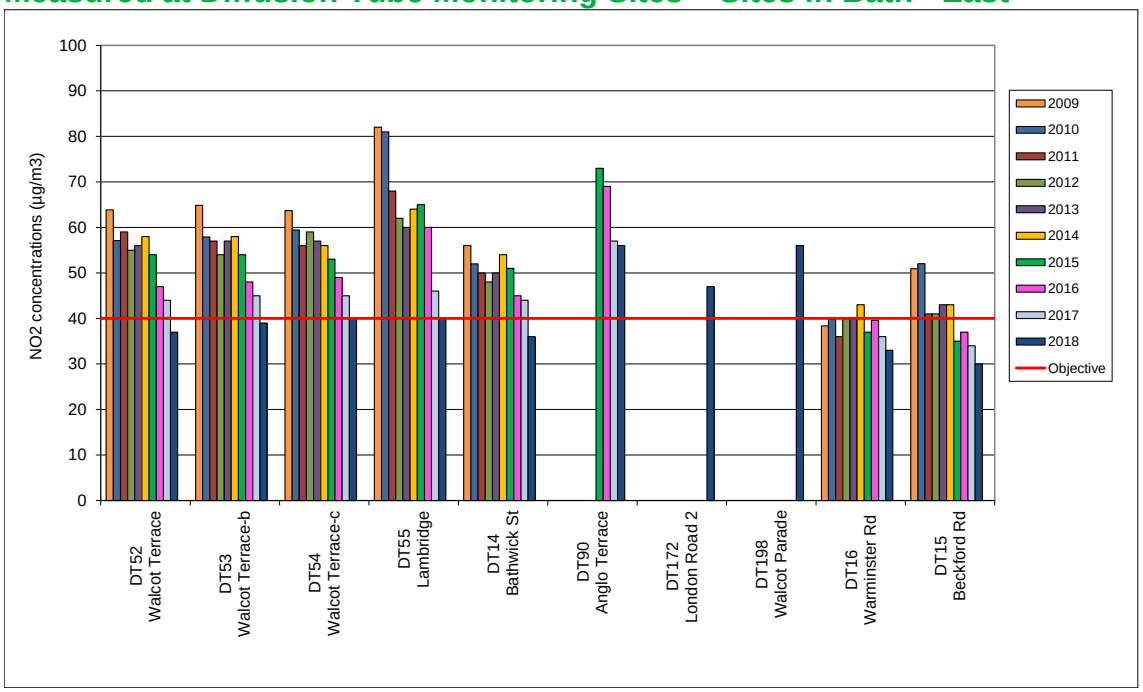


Figure A.7 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath – North East

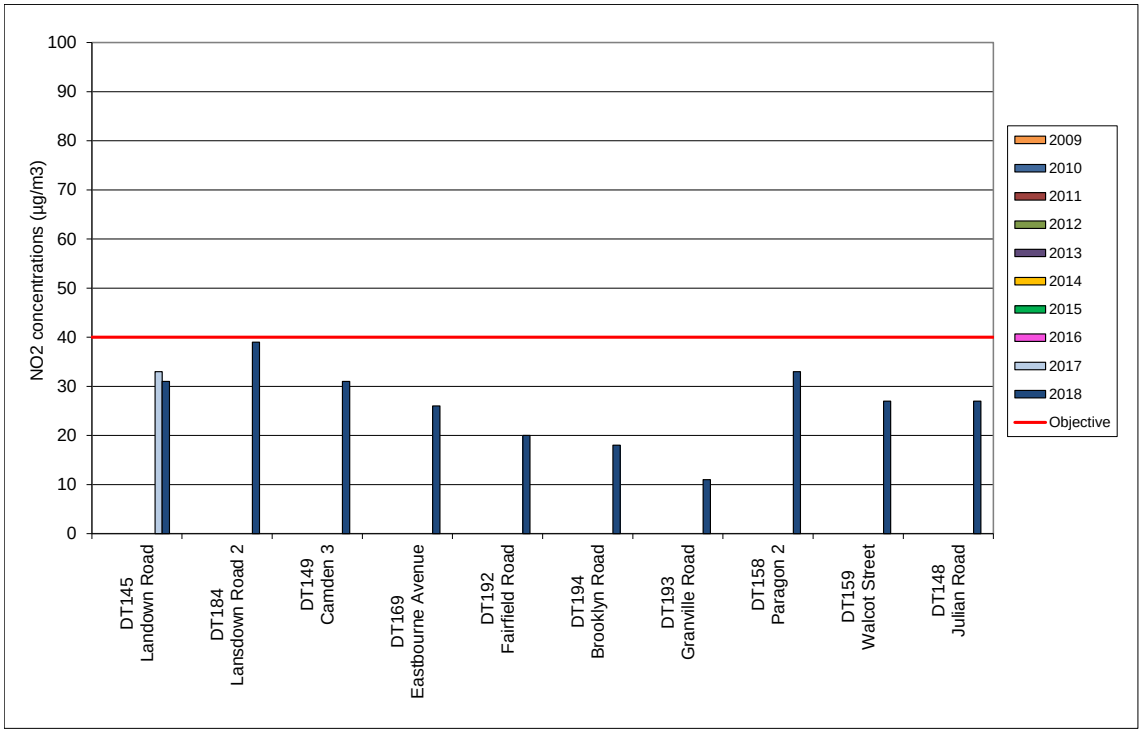


Figure A.8 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath – Centre South

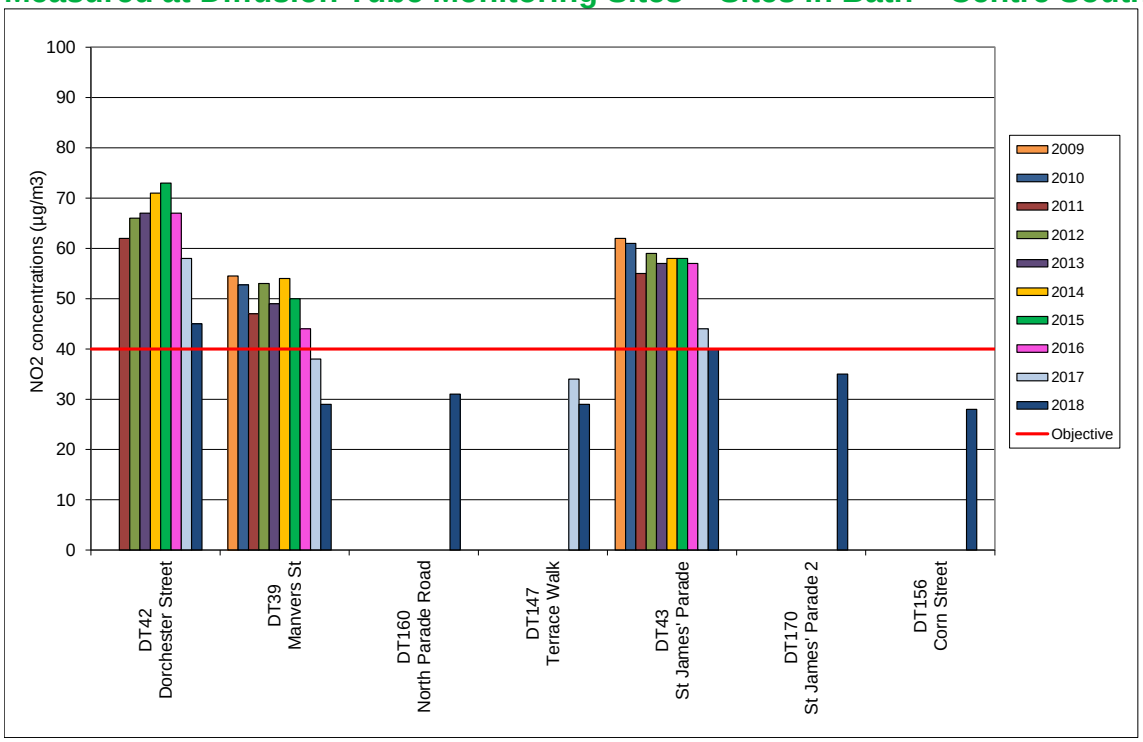


Figure A.9 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath – Centre North

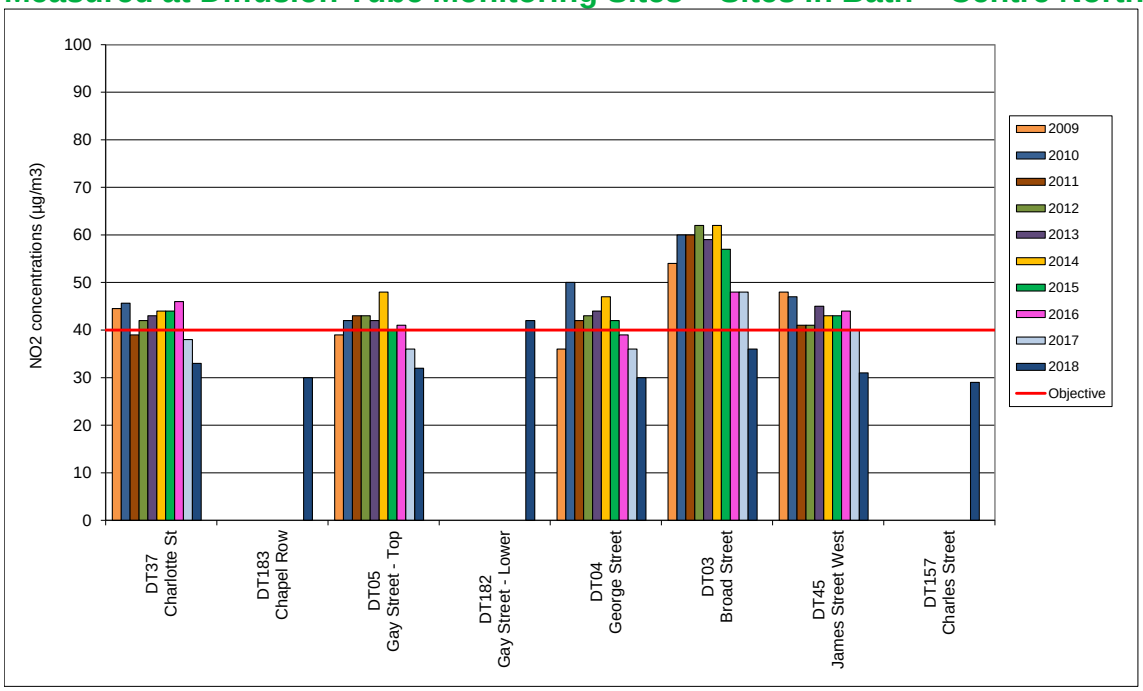


Figure A.10 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites Midsomer Norton, Westfield, Radstock, Pensford, Paulton and Corston

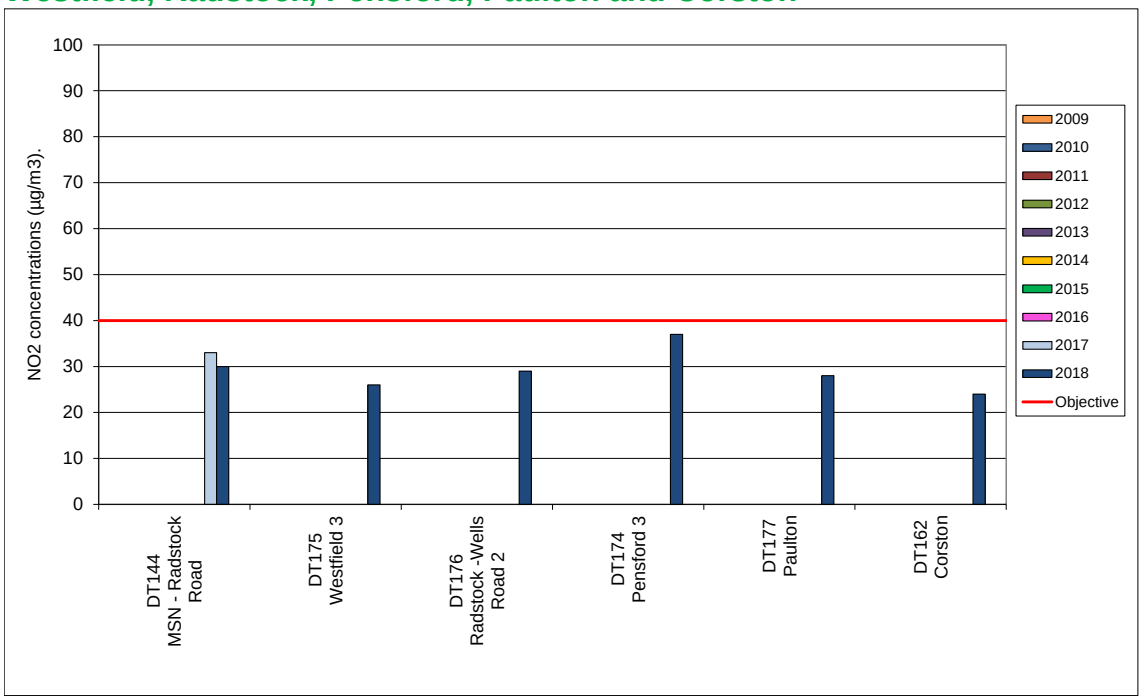


Figure A.11 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Farrington Gurney

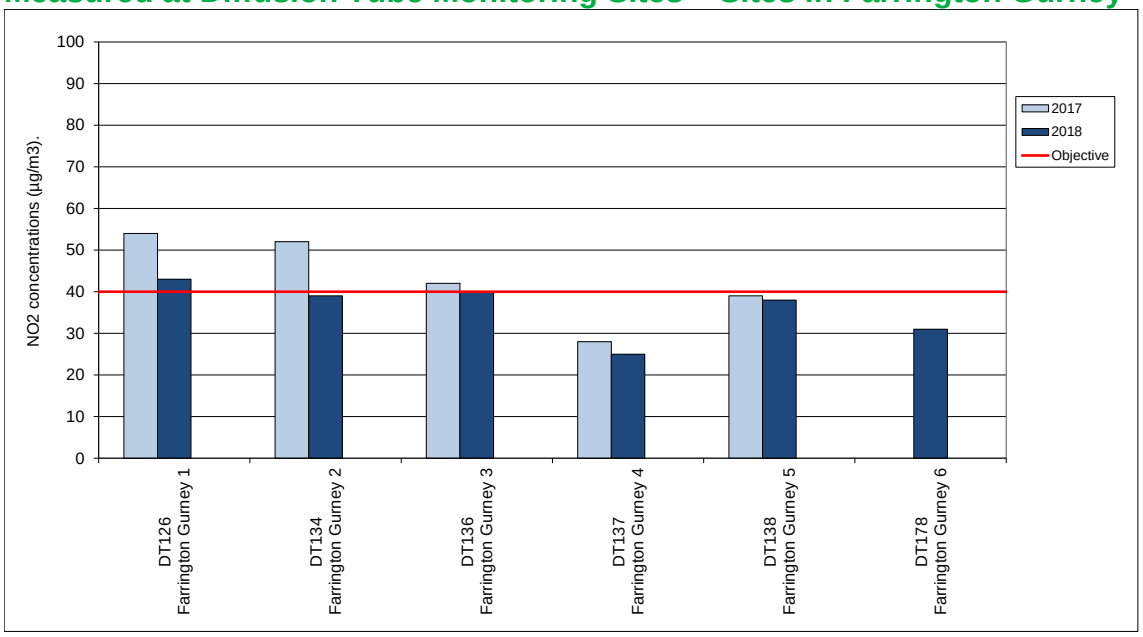


Figure A.12 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Keynsham (1)

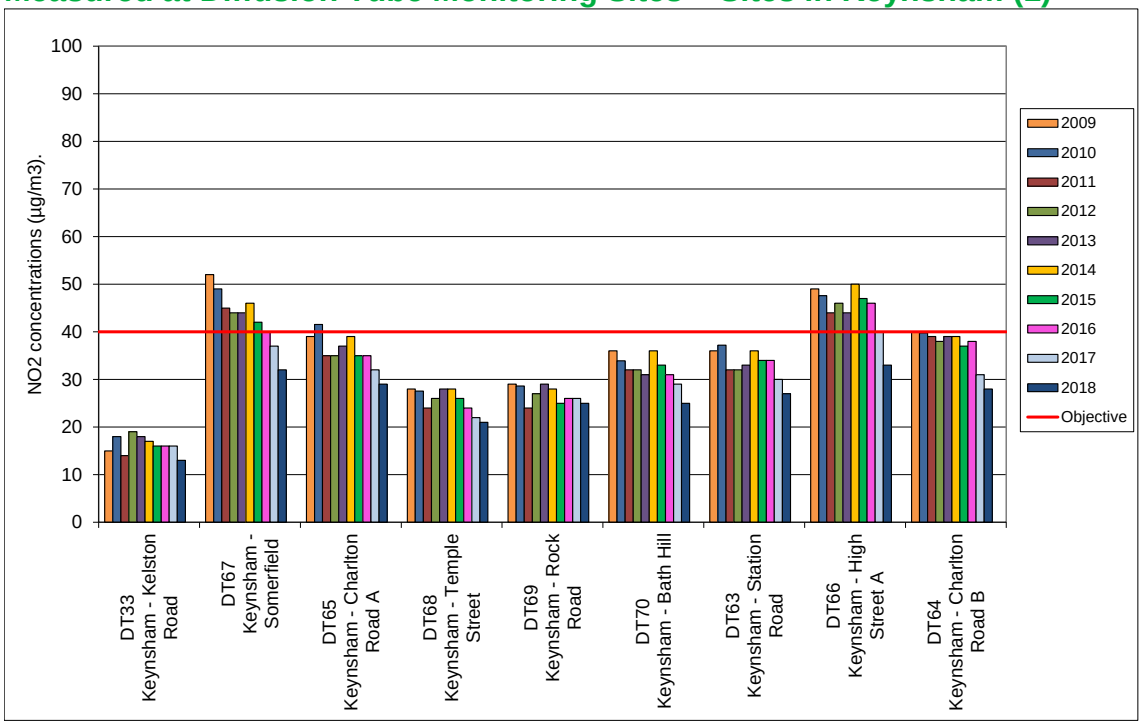


Figure A.13 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Keynsham (2)

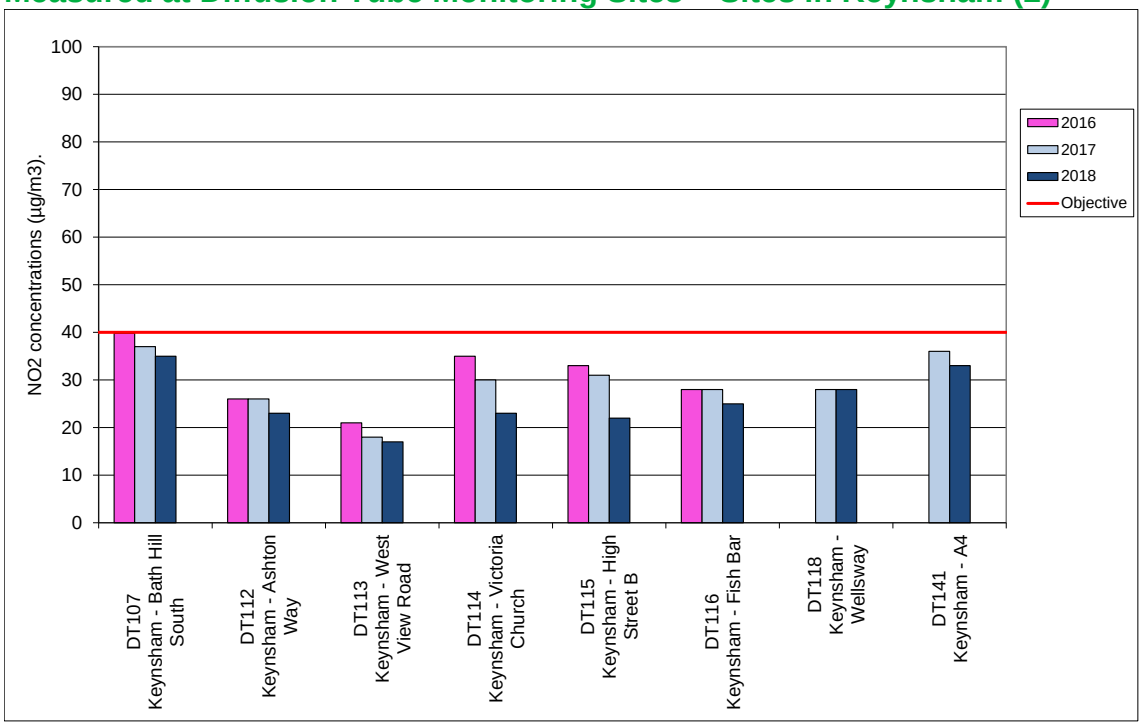


Figure A.14 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Saltford, Temple Cloud and Whitchurch

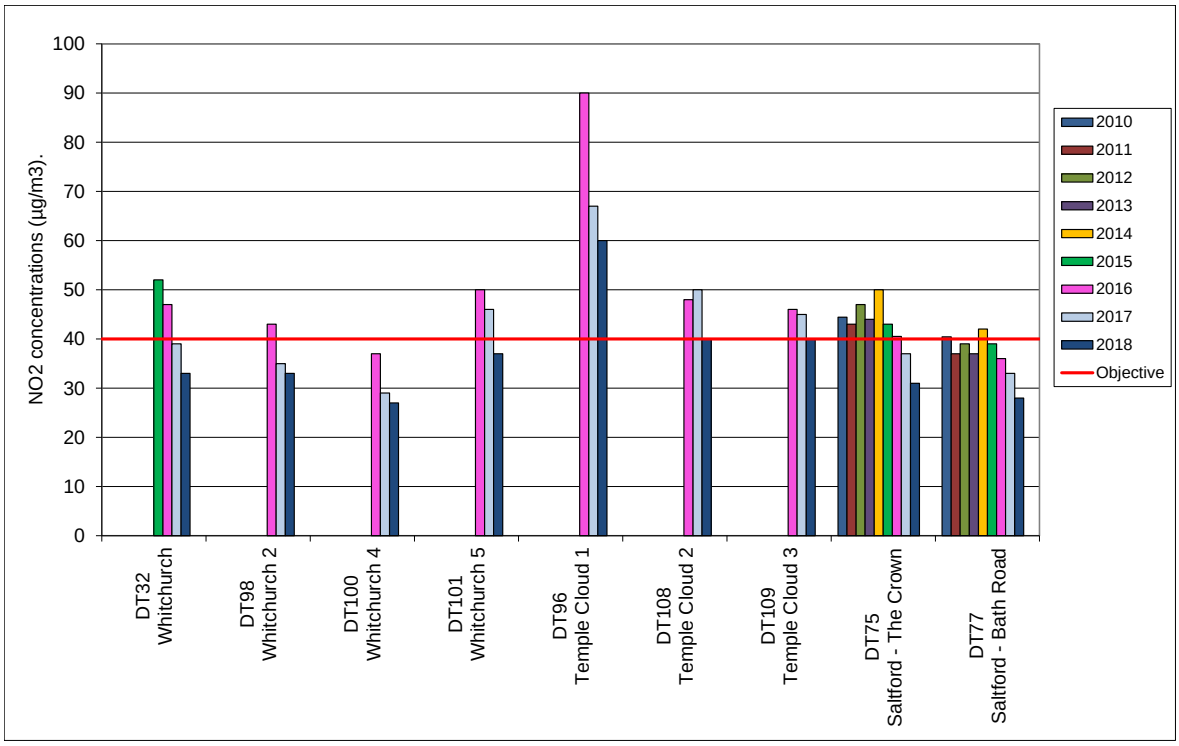


Figure A.15 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Batheaston and Bathampton

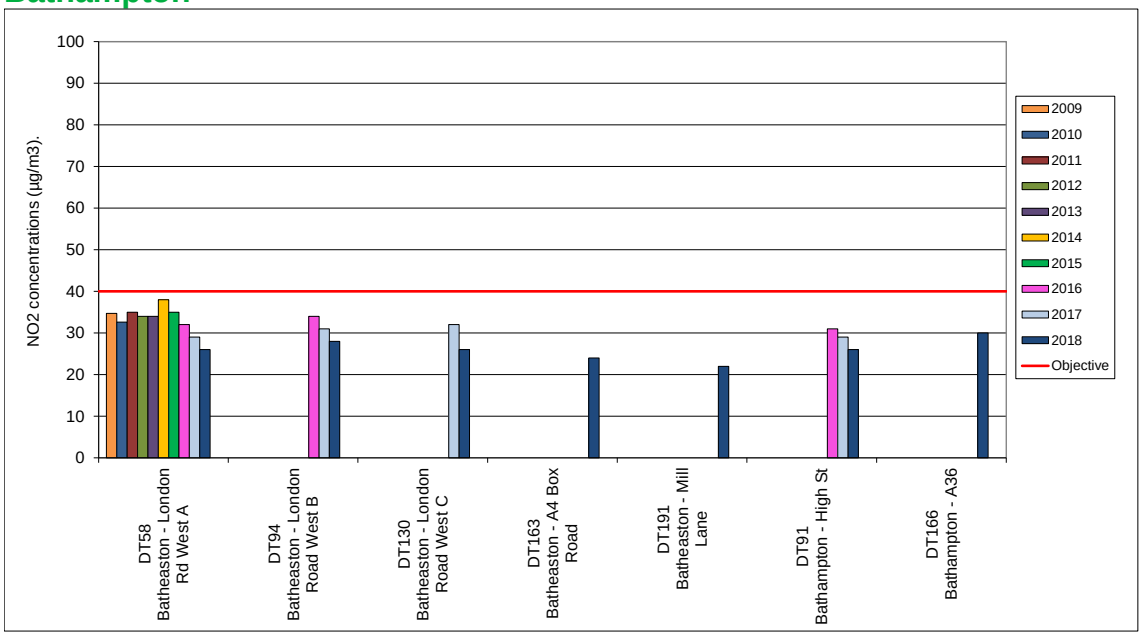


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
						2014	2015	2016	2017	2018
CM1	London Road	Roadside	Automatic	99	99	10	1	0	0	0
CM2	Guildhall	Roadside	Automatic	97.2	97.2	0	0	0	0 (96)	0
CM3	Windsor Bridge	Roadside	Automatic	96.3	96.3	0	0 (105)	0	0	0
CM4	Chelsea House	Roadside	Automatic	91.5	91.5	0	1	0	0	0

Notes:
Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) 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) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
					2014	2015	2016	2017	2018
CM3	Windsor Bridge	Roadside	96.9	96.9	22	22	23	24	24
CM4	Chelsea House	Roadside	87.7	87.7	19	22	18	16	16

☒ **Annualisation has been conducted where data capture is <75%**

Notes:
Exceedances of the PM_{10} annual mean objective of 40µg/m^3 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) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
					2014	2015	2016	2017	2018
CM3	Windsor Bridge	Roadside	96.9	96.9	3	6	5	3	1
CM4	Chelsea House	Roadside	87.7	87.7	3	13	0	0	0

Notes:
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) 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) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure A.16 – Trends in Mean PM_{10} Concentrations at Windsor Bridge

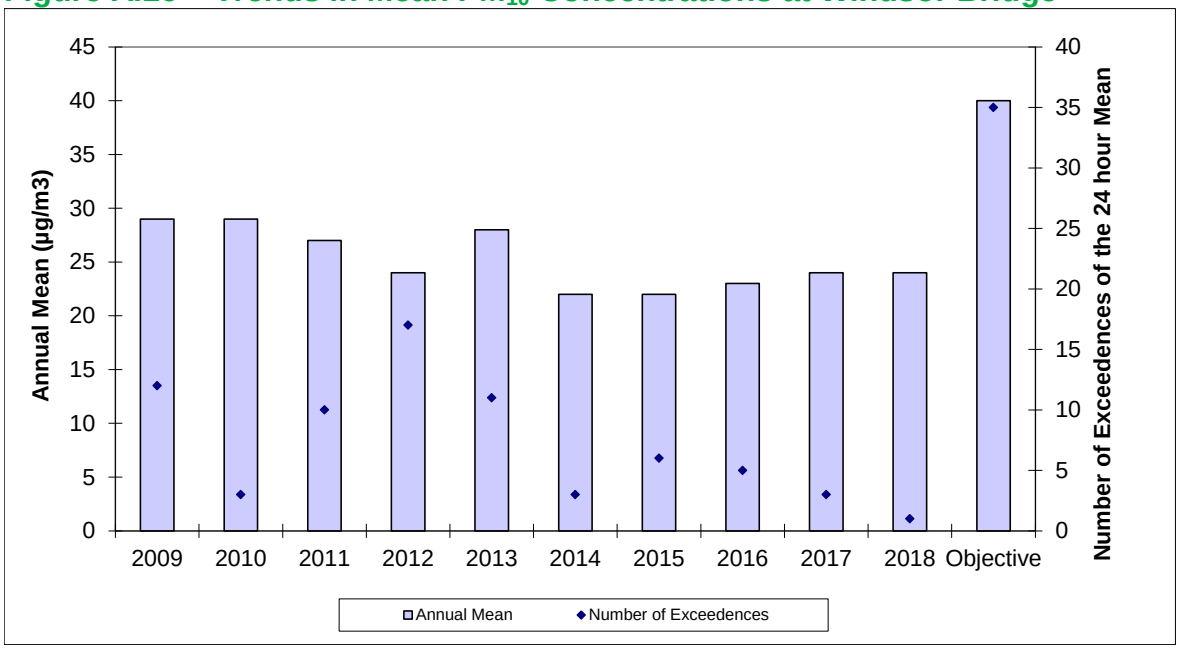


Figure A.17 – Trends in Mean PM_{10} Concentrations at Chelsea House

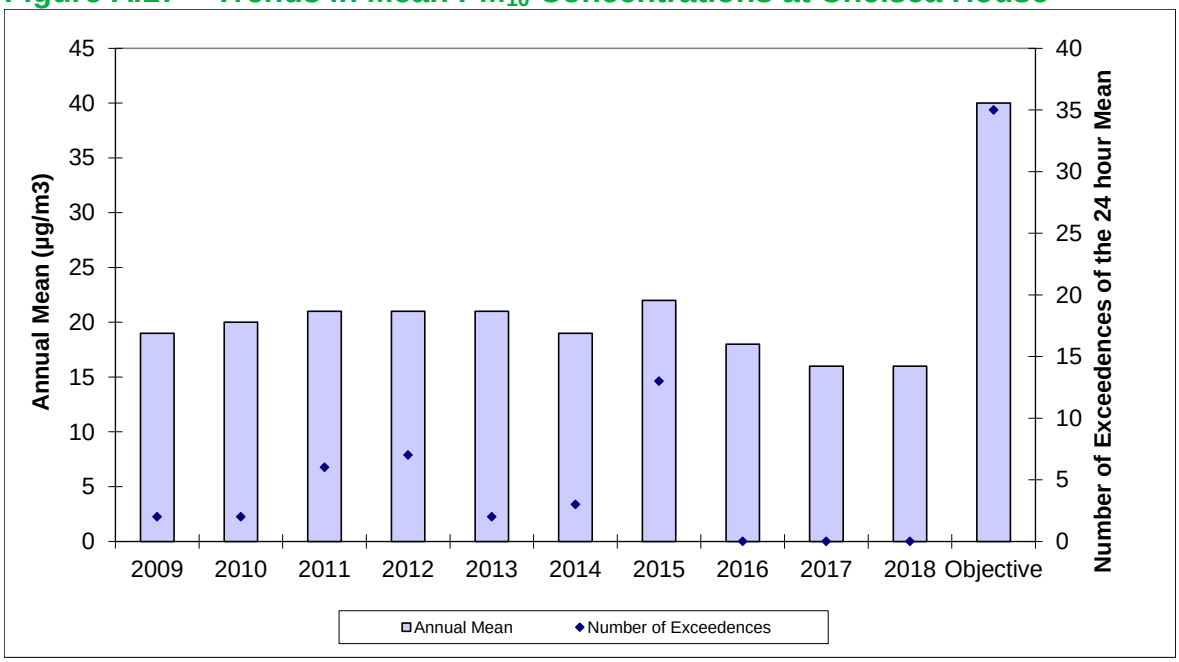


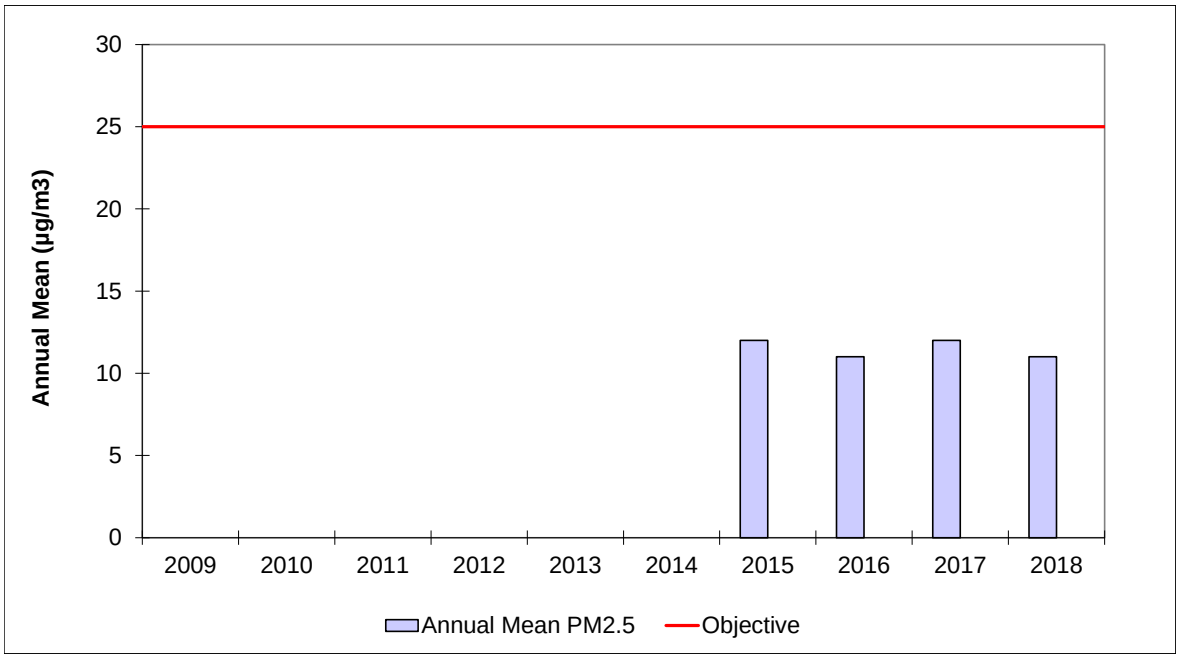
Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
					2014	2015	2016	2017	2018
CM4	Chelsea House	Roadside	89.5	89.5	-	12	11	12	11

☒ **Annualisation has been conducted where data capture is <75%**

Notes:
(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) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.-

Figure A.18 – Trends in Annual Mean PM2.5 Concentrations at Chelsea House



Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2018

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)(1)	Annual adjusted (1)	Distance Corrected to Nearest Exposure (2)
	Bath																
DT003	Broad St	33	**41**	38	30	35	30	**43**	40	38	**44**	**44**	40	38	36	36	32
DT004	George St	30	35		29	35	31	31	27	28	37	37	27	32	30	30	25
DT005	Gay St - Top	37	37	36	33	35	30	30	27	28	32	37	39	33	32	32	26
DT008	Windsor Bridge	31	37	35	30	28	27	26	27		33	36	39	32	30	30	31
DT009	Upper Bristol Rd	35	36	37	35	33	28	36	31	27	29	38	**44**	34	33	33	25
DT014	Bathwick St	36	38	**41**	37	33	27	**43**	37	39	37	**41**	37	37	36	36	32
DT015	Beckford Rd	29	39	36	29	31	31	30	25	29	27	34	36	31	30	30	23
DT016	Warminster Rd		**41**	39	28	37	37	37	31	29	30	35		34	33	33	23
DT017	Widcombe School	30		34			27	31	31	35		33	31	32	30	31	24
DT018	Widcombe High St	29	32	28	24	21	19	24	22	24	26	19	28	25	24	24	24
DT020	Wells Rd	**49**	**54**	**56**	**43**	**53**	**49**	**58**	**46**	**53**	**47**	**50**	**51**	**51**	**49**	**49**	**49**
DT021	Wells Rd /Upper Oldfield Park	30	**50**	**50**	**42**	**54**	**49**	**46**	37	39	**49**	**50**	39	**45**	**43**	**43**	34

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)(1)	Annual adjusted (1)	Distance Corrected to Nearest Exposure (2)
DT023	Alexandra Park	15	20	15	10	10	8	9	8	9	16	15	12	12	12	12	12
DT026	Upper Wellsway	32	32	**40**	33	34	37	30	21	27	31	34	31	32	31	31	31
DT034	Newbridge Rd	34	36	37	32	32	25	32	27	32	39	**42**	**40**	34	33	33	25
DT037	Charlotte St	35	**40**	34	33	36	30	31	32	32	39		**42**	35	33	33	27
DT039	Manvers St	32	**40**	33	24	30	30		16	34	32	33	28	30	29	29	25
DT042	Dorchester St		**47**	**45**	**46**	**46**	**45**	**56**	**52**	**45**	**50**	**40**	**45**	**47**	**45**	**45**	36
DT043	St. James Parade (new)	36	**46**	**45**	37	**41**	**41**	40	35	37	**45**	**55**	**44**	**42**	**40**	**40**	33
DT045	James St West	37	35	33	27	30	22	28	28	30	36	37	40	32	31	31	31
DT052	Walcot Terrace	38	**43**	**46**	39	36	32	**40**	**40**	37	35	**44**	35	39	37	37	37
DT053	Walcot Terrace	40	**43**	**45**	**41**	37	35	**42**	40	39	39	**42**	**43**	**40**	39	39	39
DT054	Walcot Terrace	**42**	**42**	**43**	**45**	38	34	**42**	39	39	**42**	**47**	**40**	**41**	39	39	40
DT055	Lambridge	**42**	**43**	**44**	33	**48**	**44**	**46**	39	34	39	**42**	**42**	**41**	40	40	46
DT060	Victoria Terrace	36	**46**	**41**	**41**	39	**40**	**46**	38			**54**	**49**	**43**	**41**	**41**	37
DT062	Argyle Terrace	**44**	**45**		39	**41**	36	**41**	34	37	**42**	**44**	**43**	**41**	39	39	33
DT084	Bearflat	33	**47**	**42**	34	40	34		25	30	39	38	33	36	35	35	27

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
														Annual Mean			
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.96)(1)	Annual adjusted (1)	Distance Corrected to Nearest Exposure (2)
DT085	RUH North	27	34	34	28	28	23	29	24	30	26	32	30	29	28	28	22
DT087	Oak Street	36	37	34	26	30	25	29		35	35	39	34	33	31	31	31
DT090	Anglo Terrace	**52**	**60**	**65**	**56**	**69**	**59**	**63**	**50**	**55**	**60**	**60**	**51**	**58**	**56**	**56**	**47**
DT142	Prior Park Road	36	**40**	**43**	34	34	33	36	31	31	36	28	**42**	35	34	34	34
DT143	Rackfield Place	29	35	33	25	25	24	24	21	26	31	35	34	28	27	27	27
DT145	Lansdown Road	34	37	34	30	33	29	29	25	30	35	38	28	32	31	31	25
DT147	Terrace Walk	25	34	25	25	29	23	34	28	28	30	33	**44**	30	29	29	29
DT148	Julian Rd (St Andrew's)	25	32	26	25	24	25	28		30	33	30	30	28	27	27	27
DT149	Camden 3	39	34	34	31	26	26	31	26	33	32	39	35	32	31	31	25
DT150	Brougham Hayes	34	34		24	30	24	29	24	21	26	31	31	28	27	27	24
DT151	Widcombe Hill	24	**43**	32	32	38	34	35	28		38	29	28	33	32	32	25
DT152	Bathwick Hill	27	29	30	23	25	20	28	24	24	31	33	29	27	26	26	23
DT153	North Road	25	24	23		17	12	18	16	20	20	23	21	20	19	19	18
DT154	Bradford Road	28	36	36	31	28	25	27		27	34	40	29	31	30	30	30
DT155	Newbridge Hill 2	23	25		17	16	14	16	15	18	25	23	23	20	19	19	16

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)(1)	Annual adjusted (1)	Distance Corrected to Nearest Exposure (2)
DT156	Corn Street	33	33	33	26		24	26	23	28	30	36	27	29	28	28	25
DT157	Charles Street	32	34	34	24	30		24	22	27	31	39	35	30	29	29	27
DT158	Paragon 2	37	38	36	32	32	31	29	26	31	38	**41**	**42**	35	33	33	25
DT159	Walcot Street	32	31	30	22	25	22	21	24	26	32	33	37	28	27	27	24
DT160	North Parade Road	36	37	29	30	32	26	36	28	31	31	33	36	32	31	31	24
DT161	Kelston Road	25	22	23	19	17	14	19	17	20	23	21	23	20	19	19	15
DT164	Midford Road	26	27	27	20	25	20	21	20	21	27	28	26	24	23	23	20
DT165	Brassknocker Hill	39	**49**	**42**	23	**44**	**43**	**46**	**44**	**48**	**41**	**42**	**41**	**42**	**40**	**40**	28
DT167	Weston High St	28	29	30	25	25	23	25	18	17	25	34	26	25	24	24	24
DT168	Englishcombe Lane	20	22	22	15	16	14	12	12	14	20			17	16	16	15
DT169	Eastbourne Ave	31	31	30	23	23	24	25	20	25	30	29	29	27	26	26	22
DT170	St James Parade 2		36	35	30	**41**	35	36	30	33	**43**	**44**	39	36	35	35	27
DT171	Frome Road/Upper Bloomfield	30	**40**	39	31	39	37	32	27	27	**40**	36	19	33	32	32	32
DT172	London Road 2	**44**					**46**	**55**	37	**46**	**48**	**48**	**52**	**47**	**45**	**47**	**46**
DT173	Upper Bristol Rd 2	**49**	**44**	**42**	34	33	30	35	34	39	38	**45**	**43**	39	37	37	36

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)[1]	Annual adjusted [1]	Distance Corrected to Nearest Exposure ([2])
DT179	Upper Bristol Rd 3								28	30	**41**	**46**	**44**	38	36	35	35
DT180	Wells Road 2								31	36	**43**	**43**	36	38	36	35	33
DT181	Wellsway								30	39	**41**	**41**	**42**	39	37	36	23
DT182	Gay Street - Lower								**48**	**43**	**45**	**60**	33	**46**	**44**	**42**	33
DT183	Chapel Row								25	28	36	37	38	33	31	30	30
DT184	Lansdown Road 2								36	40	**43**	**47**	**48**	**43**	**41**	39	31
DT185	Greenway Lane									20			20	20	20	19	18
DT186	Coronation Ave									18	26	31	21	24	23	20	18
DT187	Stanley Road West								18	23	28	33	30	26	25	24	24
DT188	Moorland Road								17	22		33		24	23	24	24
DT189	Old Newbridge Hill								25	32	**42**	35	23	31	30	29	22
DT190	Church Street								11	13	19	18	13	15	14	14	14
DT192	Fairfield Road								14	18	22	25		20	19	20	17
DT193	Granville Road								9	10	13	17	13	12	12	11	11
DT194	Brooklyn Road								13	18	21	24	22	19	19	18	16

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)[1]	Annual adjusted [1]	Distance Corrected to Nearest Exposure ([2])
DT195	Lansdown Lane								15	16	27	25	26	22	21	20	17
DT196	Oakley								26	35	**44**	**42**	29	35	34	32	23
DT197	Rush Hill									26	33	34	25	30	28	25	21
DT198	Walcot Parade								**53**	**61**	**66**	**68**	**58**	**61**	**59**	**56**	**56**
	Bathampton																
DT091	Bathampton - High Street	28	33	28	24	27	25	25	23	26	31	27	25	27	26	26	26
DT166	Bathampton - A36	34	33	37	31	30	26	30	25	29	35	35	29	31	30	30	17
	Batheaston																
DT058	Batheaston - London Rd West A	30	30	31	27	22	22	26	19	24	29	33	28	27	26	26	26
DT094	Batheaston - London Rd West B	28	32	30	21	32	30	26	27	28	31	33	33	29	28	28	28
DT130	Batheaston - London Rd West C	32	31	29	26	25	23	28	22	25	29	30	28	27	26	26	26
DT163	Batheaston - A4 Box Road	32	30	28	22	20	19	20	24	26	25	29	28	25	24	24	21
DT191	Batheaston - Mill Lane								22	23	26	27	24	24	23	22	18
	Corston																
DT162	Corston - A39 Wells Road	25	30	29	24	22	20	21	25	23	27	25	28	25	24	24	25

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)[1]	Annual adjusted [1]	Distance Corrected to Nearest Exposure ([2])
	Farrington Gurney																
DT126	Farrington Gurney 1	**47**	**41**	**40**	40	**53**	**51**	**60**	**48**	40	**43**	**47**	31	**45**	**43**	**43**	32
DT134	Farrington Gurney 2	39	37	34	**42**	**49**	**45**	**57**	40	**41**	**40**	**41**	21	**41**	39	39	39
DT136	Farrington Gurney 3	**42**	39	26	40	**48**	**50**	**57**	**44**	**40**	**47**	32	30	**41**	40	40	40
DT137	Farrington Gurney 4	23	29	34	29									29	28	24	19
DT138	Farrington Gurney 5	30	36	39	38	**46**	**41**	**52**	37	**40**	**41**	35	36	39	38	38	31
DT178	Farrington Gurney 6						23	33	30	25	34	36	35	31	29	31	30
	Keynsham																
DT033	Keynsham (Kelston Road)	18	19	16	9	12	9	11	10	12	16	18	18	14	13	13	13
DT063	Keynsham - Station Rd	34	30	30	26	28	24	23	22	26	30	30	35	28	27	27	23
DT064	Keynsham - Charlton Rd B	22	33	30	30	27	27	27	24	28	33	33	34	29	28	28	23
DT065	Keynsham - Charlton Rd A	34	34	30		29	26	28	24	30	34	30	37	30	29	29	25
DT066	Keynsham - High St A	35	**41**	34	34			31	32	31	36	36	37	35	33	33	31
DT067	Keynsham - Somerfield		40	34	35	33	29	29	27	29	36	37	39	33	32	32	28
DT068	Keynsham - Temple St	26	29	23	22	21	16	18	19	18	24	28	24	22	21	21	21

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)[1]	Annual adjusted [1]	Distance Corrected to Nearest Exposure ([2])
DT069	Keynsham - Rock Road	30	29	25	26	26	26	22	20	21	27	28	29	26	25	25	25
DT070	Keynsham - Bath Hill	29	29	30	25	25	25	23	22	24	29	29	25	26	25	25	25
DT107	Keynsham - Bath Hill (South)	31	**42**	37	39	38			35	35	38	35	34	36	35	35	35
DT112	Keynsham - Ashton Way	24	31	26	24	22	17	19	19	21	28	30	29	24	23	23	16
DT113	Keynsham - West View Rd	20	22	20	19	16	13	14	12	15	19	22	21	18	17	17	16
DT114	Keynsham - Victoria Church	24	31	28	26	22	19	20	22	23	28	27	16	24	23	23	18
DT115	Keynsham - High Street B	30	29	28			22	21	19	20	26	24	15	23	22	22	21
DT116	Keynsham - Fish Bar	28	33	29	26		20	21	21	22	26	29	27	26	25	25	20
DT118	Keynsham - Wells Road	29	38	31	32	27	25	25	18	23	32	36	30	29	28	28	26
DT141	Keynsham A4		**40**	35	36	33	30	31	32	34	37	37	39	35	33	33	23
	Midsomer Norton																
DT144	Midsomer Norton - Radstock Road	31	34	37	29	32	28	33	29	26	33	29	38	31	30	30	25
	Paulton																
DT177	Paulton	32	27	**45**	27	28	23	27	24	26	30	28	34	29	28	28	29

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)(1)	Annual adjusted (1)	Distance Corrected to Nearest Exposure (2)
	Pensford																
DT174	Pensford 3	39	38	34	**40**	**43**	30	**41**	40	34	**41**	39	37	38	37	37	29
	Radstock																
DT176	Radstock, Wells Road 2	35	28	27	28	34	34	29	25	31	29	33		30	29	29	29
	Saltford																
DT075	Saltford - The Crown	29	35	35	29	31	26	31	25	33	37	**41**	35	32	31	31	31
DT077	Saltford - Bath Rd	29	36	33	31	28	25	24	30	31	32	28	27	29	28	28	28
	Temple Cloud																
DT096	Temple Cloud 1	**60**	**58**	38	**60**	**82**	**78**	**83**	**53**	**44**	**67**	**58**	**63**	**62**	**60**	**60**	**60**
DT108	Temple Cloud 2	**49**	**45**	32	**42**	**47**	39	**50**	23	**44**	**41**	**46**	**42**	**42**	**40**	**40**	27
DT109	Temple Cloud 3	**41**	**40**	**55**	40	**44**	**45**	**44**	34	37	**41**	**43**	37	**42**	40	40	34
	Westfield																
DT175	Westfield 3	31	25	27	24	29	28	26	18	23	29	30	29	27	25	25	22
	Whitchurch																
DT032	Whitchurch	38	34	29	31	35	32	37	32	25	36	40	**41**	34	33	33	28

Site ID	Site Name	NO_2 Mean Concentrations (µg/m^3)															
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
														Raw Data	Bias Adjusted (0.96)(1)	Annual adjusted (1)	Distance Corrected to Nearest Exposure (2)
DT098	Whitchurch 2	30	37	36	36	**41**	29	37	29	31	38	35	35	35	33	33	33
DT100	Whitchurch 4	36	29	35	28	28	22	29	24	26	29	29	26	28	27	27	21
DT101	Whitchurch 5	39	**44**	16	**43**	**43**	36	37	38	**42**	39	**42**	40	38	37	37	29

☒ **Local bias adjustment factor used** ☐ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%** ☒ **Where applicable, data has been distance corrected for relevant exposure**

Notes:
Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**
(1) See Appendix C for details on bias adjustment and annualisation.
(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Bias - National Adjustment Factors

The diffusion tubes were analysed by Gradko in 2017-2018, by Somerset Scientific Services in 2012-2016 and prior to that by Bristol Scientific Services. The method of analysis is 20% triethanolamine (TEA) in water. They confirm that they are following the harmonised practice guidance document and have a satisfactory AIR-PT result[9].

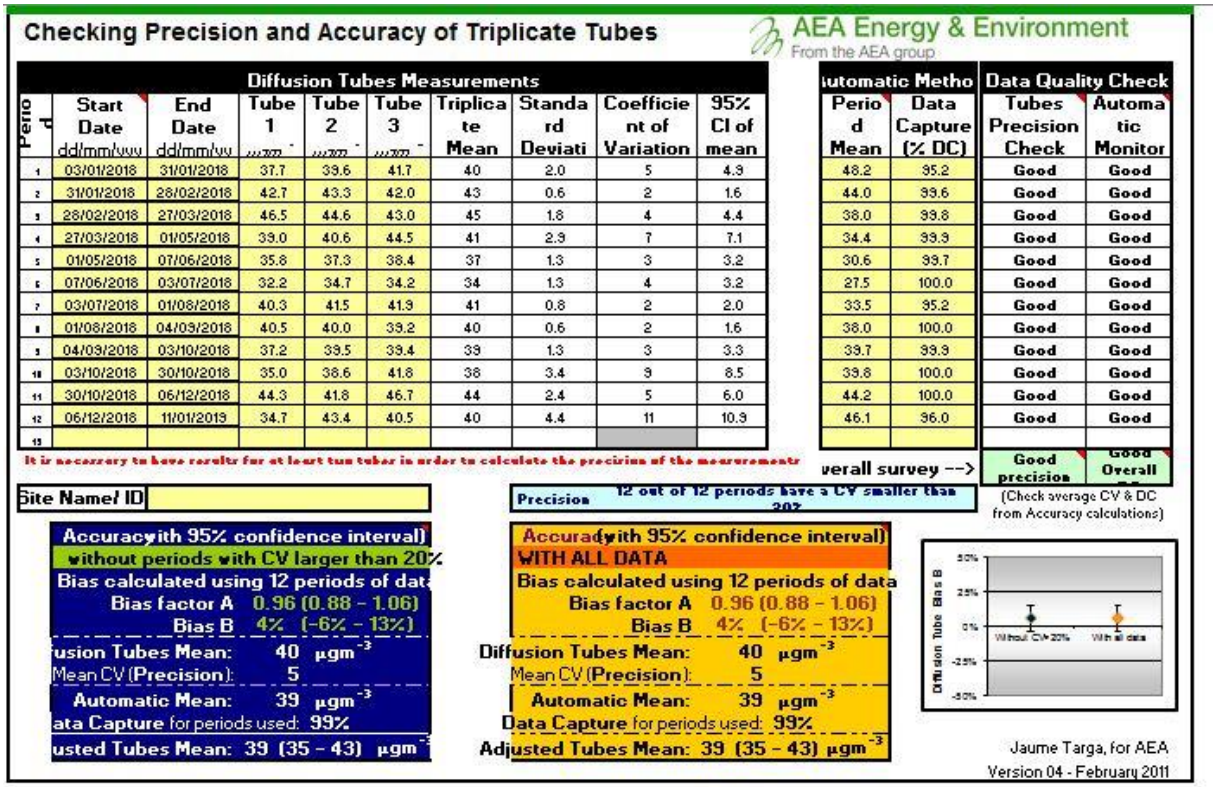
Monthly National Bias	2014	0.89 (Somerset, 8 studies)(26 v03/15)
	2015	0.90 (Somerset, 10 studies)(26 v06/16)
	2016	0.88 (Somerset, 3 studies)(26 v03/17)
	2017	0.89 (Gradko, 34 studies)(26 v03/18)
	2018	0.93 (Gradko, 30 studies)(26 v03/19)

Diffusion Tube Bias - Local Co-location Factors

A local bias factor has been calculated following the FAQ guidance on R&A website[10] (Figure C.1). This has been calculated using monitoring data from the Walcot Terrace sites (now located at Walcot Buildings) (triplicate tubes) which are co-located with the London Road continuous monitor.

Monthly Local Bias	2014	1.09 (Somerset)
	2015	1.06 (Somerset)
	2016	0.99 (Somerset)
	2017	1.00 (Gradko)
	2018	0.96 (Gradko)

[9] https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.pdf
[10] https://laqm.defra.gov.uk/laqm-faqs/



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	Tube 2	Tube 3	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	03/01/2018	31/01/2018	37.7	39.6	41.7	40	2.0	5	4.9
2	31/01/2018	28/02/2018	42.7	43.3	42.0	43	0.6	2	1.6
3	28/02/2018	27/03/2018	46.5	44.6	43.0	45	1.8	4	4.4
4	27/03/2018	01/05/2018	39.0	40.6	44.5	41	2.9	7	7.1
5	01/05/2018	07/06/2018	35.8	37.3	38.4	37	1.3	3	3.2
6	07/06/2018	03/07/2018	32.2	34.7	34.2	34	1.3	4	3.2
7	03/07/2018	01/08/2018	40.3	41.5	41.9	41	0.8	2	2.0
8	01/08/2018	04/09/2018	40.5	40.0	39.2	40	0.6	2	1.6
9	04/09/2018	03/10/2018	37.2	39.5	39.4	39	1.3	3	3.3
10	03/10/2018	30/10/2018	35.0	38.6	41.8	38	3.4	9	8.5
11	30/10/2018	06/12/2018	44.3	41.8	46.7	44	2.4	5	6.0
12	06/12/2018	11/01/2019	34.7	43.4	40.5	40	4.4	11	10.9
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
48.2	95.2	Good	Good
44.0	99.6	Good	Good
38.0	99.8	Good	Good
34.4	99.9	Good	Good
30.6	99.7	Good	Good
27.5	100.0	Good	Good
33.5	95.2	Good	Good
38.0	100.0	Good	Good
39.7	99.9	Good	Good
39.8	100.0	Good	Good
44.2	100.0	Good	Good
46.1	96.0	Good	Good
	Overall survey -->	Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

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 0.96 (0.88 - 1.06)
Bias B 4% (-6% - 13%)
Diffusion Tubes Mean: 40 µgm-3
Mean CV (Precision): 5
Automatic Mean: 39 µgm-3
Data Capture for periods used: 99%
Adjusted Tubes Mean: 39 (35 - 43) µgm-3

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.96 (0.88 - 1.06)
Bias B 4% (-6% - 13%)
Diffusion Tubes Mean: 40 µgm-3
Mean CV (Precision): 5
Automatic Mean: 39 µgm-3
Data Capture for periods used: 99%
Adjusted Tubes Mean: 39 (35 - 43) µgm-3

Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at LAQMHelpdesk@uk.bureauveritas.com

Figure C.1 – Copy of Local Bias Correction Calculation

Discussion of Choice of Which Bias Factor to Use

Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference (more accurate) chemiluminescence continuous analyser.

In Bath and North East Somerset there is a choice of using either a local bias factor (calculated at a co-located site in Bath [London Road, Continuous analyser], where three diffusion tubes were located next to the reference continuous analyser), or the national bias factor (this is a combined factor which averages a number of local bias factor studies for the analytical laboratory and diffusion tube preparation method). Bath and North East Somerset has submitted its local bias factor to be included in the national average bias factor. Guidance on the choice of bias factor is given in LAQM.TG16 (Box 7.11) and includes consideration on diffusion tube locations compared with the co-location site, exposure period and number of studies contributing to the national bias factor.

The guidance in the LAQM.TG16 tends to suggest that the choice of a single bias correction factor is required for all diffusion tubes from the local authority. However,

the bias correction factor chosen will only be appropriate for locations where a similar traffic characteristics, street geometry, and distance from kerbside are repeatable. If a bias factor from a co-located site that is closer to a background location is used, the application of its bias factor to roadside locations will be likely to provide an underestimate of true concentrations and vice-versa for using a bias factor, derived from a roadside or kerbside site, that is applied to monitoring locations, further away from the kerb, the results are likely to be overestimated.

In Bath & North East Somerset the local bias is derived from a roadside co-located site on a congested road with traffic flows in the region of 20,000 vehicles a day, with 7% Heavy Duty Vehicles (HDV's). Using this factor will represent sites within the Bath and Saltford AQMAs well but is likely to overestimate sites outside the AQMAs, particularly at urban background, urban centre locations or roadside sites with significantly different traffic flows. In 2018 the national factor for Gradko (current supplier of diffusion tube analysis for the Council) is made up from 30 studies across a range of locations so may not best represent the sites within the Bath AQMA, but would be better for the sites outside the AQMA.

Bath and North East Somerset Council used the local bias factor for diffusion tube results because individual factors which represent all locations within the authority are not available. After feedback from DEFRA, it is better to ensure that the correct bias factor is at locations where there is more exposure (within the AQMA) than to overestimate the concentrations at sites outside the AQMA which are not showing an issue. This choice is consistent with the recommendations in LAQM.TG16 (Box 7.11) and recommendations from the LAQM helpdesk [11]. Using the local bias factor is likely to result in concentrations at approximately 45 sites being overestimated.

In 2011-18 the local bias adjustment factors were used to correct the diffusion tube data as they were the same as or higher than the national bias factor leading to a worse case result. The corrected concentrations would have been 3 % lower if the national bias factor had been used in 2018. The choice of factor will be reviewed annually.

[11] https://laqm.defra.gov.uk/helpdesk/laqm-helpdesk.html

PM Monitoring Adjustment

The PM_{10} measurements are made using an unheated BAM1020 and have been corrected by dividing by 1.2 as recommended in the LAQM.TG16.

QA/QC of automatic monitoring

The Council's continuous analysers follow a QA/QC programme; the London Road Monitor is the Bath AURN affiliate site and is managed as part of that network. The Guildhall, Windsor Bridge and Chelsea House sites follow the QA/QC programme below.

- There are daily checks on the data to ensure analysers and communications are working and faults are reported as soon as possible.
- The sites are inspected and calibrated checks are made once a month by a member of the Environmental Quality Team at Bristol City Council, using certified traceable gases. The sites are also visited once a month by a trained AURN Local Site Operator (LSO) to change the filters and check the analysers. These are planned so the site is visited once a fortnight.
- The analysers are also serviced and re-calibrated at six monthly intervals by the equipment suppliers.
- The results of all service, maintenance and calibration checks are held and used for ratification and scaling of the data.

In 2015 - 2018 the continuous data for Guildhall, Windsor Bridge and Chelsea House was corrected by AQDM. Previously the data corrected in house and was scaled on a time-linear basis from the zero and span readings obtained from the calibration checks. The instrument span was calculated using the method in LAQM.TG16 and the span and offset values are applied to the data using Opsis Enviman software. The data is viewed and spurious data is identified and removed where appropriate. A copy of the original data is kept for reference.

QA/QC of diffusion tube monitoring

The diffusion tubes were analysed by Gradko in 2017-2018, by Somerset Scientific Services in 2012-2016 and prior to that by Bristol City Council Scientific Services.

Gradko is UKAS accredited for the analysis of the diffusion tubes and all the laboratories participate in the AIR-PT scheme formally the Workplace Analysis Scheme for Proficiency (WASP). The latest AIR-PT report[9] for nitrogen dioxide for the laboratory indicates a performance classification as satisfactory for all periods.

Short-term to Long-term Data adjustment

During 2018 24 diffusion tubes and 5 AQMesh sites had data capture less than 75%. To estimate the annual mean from the short-term monitoring period the method in LAQM.TG(16) was followed. Four sites were selected from the national network within 50 miles of Bath and greater that 85% data capture; Charlton Mackrell (99% data capture, 27miles from Bath), Swindon Walcot (97% data capture, 28miles from Bath), Cwmbran (99% data capture, 33 miles from Bath) and Chilbolton Observatory (99% data capture, 43 miles from Bath). The adjusted monitored concentrations are shown in Table B.1 and the sites which the specific adjustment factor is applied to are detailed below each table.

Table C.1 – Ratio for Short-term to Long-term Data Adjustment

Ratio 1				**0.89**
Period – January-April				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT137 - Farrington Gurney 4	Swindon Walcot	13.7	14.7	0.93
	Chilbolton Observatory	9.7	12.3	0.78
	Cwmbran	13.0	14.8	0.88
	Charlton Mackrell	6.1	6.4	0.96
Ratio 2				**1.06**
Period – June - December				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT 178 - Farrington Gurney 6	Swindon Walcot	13.7	13.3	1.03
	Chilbolton Observatory	9.7	8.0	1.21
	Cwmbran	13.0	12.6	1.03
	Charlton Mackrell	6.1	6.3	0.97

Ratio 3				0.96
Period – August-December				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT179 – Upper Bristol Rd 3 DT180 – Wells Road 2 DT181 – Wellsway DT182 – Gay Street–Lower DT183 – Chapel Row DT184 – Lansdown Road 2 DT187 – Stanley Rd West DT189 – Old Newbridge Hill DT190 – Church Street DT191 – Batheaston–Mill Lane DT193 – Granville Road DT194 – Brooklyn Road DT195 – Lansdown Lane DT196 – Oakley DT198 – Walcot Parade	Swindon Walcot	13.7	14.8	0.93
	Chilbolton Observatory	9.7	8.4	1.15
	Cwmbran	13.0	14.5	0.9
	Charlton Mackrell	6.1	7.0	0.87
Ratio 4				**0.88**
Period – September-December				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT186 - Coronation Avenue DT197 - Rush Hill	Swindon Walcot	13.7	16.2	0.84
	Chilbolton Observatory	9.7	9.1	1.06
	Cwmbran	13.0	15.9	0.82
	Charlton Mackrell	6.1	7.7	0.79
Ratio 5				**1.02**
Period – August-November				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT192 – Fairfield Road	Swindon Walcot	13.7	13.5	1.01
	Chilbolton Observatory	9.7	8.2	1.18
	Cwmbran	13.0	13.3	0.98
	Charlton Mackrell	6.1	6.6	0.93
Ratio 6				**1.02**
Period – low data capture				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT017 - Widcombe School	Swindon Walcot	13.7	13.3	1.02
	Chilbolton Observatory	9.7	8.7	1.11
	Cwmbran	13.0	13.1	0.99
	Charlton Mackrell	6.1	6.4	0.96

Ratio 7				1.04
Period – low data capture				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT172 - London Road 2	Swindon Walcot	13.7	13.5	1.02
	Chilbolton Observatory	9.7	8.3	1.17
	Cwmbran	13.0	12.8	1.02
	Charlton Mackrell	6.1	6.2	0.98
Ratio 8				**0.97**
Period September and December				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT185 - Greenway Lane	Swindon Walcot	13.7	15.5	0.88
	Chilbolton Observatory	9.7	7.9	1.23
	Cwmbran	13.0	14.7	0.88
	Charlton Mackrell	6.1	6.9	0.88
Ratio 9				**1.07**
Period – low data capture				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
DT188 – Moorland Road	Swindon Walcot	13.7	12.5	1.09
	Chilbolton Observatory	9.7	7.9	1.22
	Cwmbran	13.0	12.8	1.01
	Charlton Mackrell	6.1	6.4	0.95
Ratio 10				**0.91**
Period – January-May				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
AQM09	Swindon Walcot	13.3	14.4	0.92
	Chilbolton Observatory	9.5	12.1	0.79
	Cwmbran	12.7	14.0	0.90
	Charlton Mackrell	5.9	5.9	1.01
Ratio 11				**0.84**
Period – May-December				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
AQM14	Swindon Walcot	13.3	15.0	0.88
	Chilbolton Observatory	9.5	12.5	0.76
	Cwmbran	12.7	15.8	0.80
	Charlton Mackrell	5.9	6.6	0.90

Ratio 12				1.21
Period – January-March				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
AQM12	Swindon Walcot	13.3	11.4	1.17
	Chilbolton Observatory	9.5	8.5	1.13
	Cwmbran	12.7	9.9	1.28
	Charlton Mackrell	5.9	4.7	1.26
Ratio 13				**1.10**
Period – March – October				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
AQM13	Swindon Walcot	13.3	12.4	1.07
	Chilbolton Observatory	9.5	8.0	1.19
	Cwmbran	12.7	11.3	1.12
	Charlton Mackrell	5.9	5.8	1.02
Ratio 14				**0.80**
Period – October – December				
Applied to	**Long-term site**	**Annual Mean 2018**	**Period Mean 2018**	**Ratio (Am/Pm)**
AQM15	Swindon Walcot	13.3	16.5	0.81
	Chilbolton Observatory	9.5	9.7	0.98
	Cwmbran	12.7	17.4	0.73
	Charlton Mackrell	5.9	8.6	0.69

Distance adjustment to closest receptor

Concentrations of NO_2 fall off rapidly as you move away from the roadside. It is not always possible to locate diffusion tubes on building facades representing worst case exposure. For diffusion tube sites which have been located in roadside locations, the distance adjustment calculator on the LAQM helpdesk website has been applied. A local background of 11.9 µg/m^3 was used in Bath (from Alexandra Park, DT23) and a background concentration taken from the background maps was used for sites outside of Bath. Table C.2 below shows the distances used in the calculator, background concentrations and the concentration at the façade for these sites. Urban centre, urban background and sites at the building façade have not been adjusted.

Table C.2 – Façade adjustment

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) [1]	Distance from kerb to monitor (m) [2]	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
	Bath						
DT003	Broad St	Roadside	1.3	3	11.9	36.4	32
DT004	George St	Kerbside	1	4	11.9	30.3	25.2
DT005	Gay St - Top	Roadside	1	4	11.9	32.0	26.4
DT008	Windsor Bridge	Roadside	3.5	3.5	11.9	30.5	30.5
DT009	Upper Bristol Rd	Roadside	1	6	11.9	32.7	25.2
DT014	Bathwick St	Roadside	1	2	11.9	35.6	32.3
DT015	Beckford Rd	Roadside	1	8	11.9	30.1	22.5
DT016	Warminster Rd	Roadside	4	22	11.9	32.9	22.9
DT017	Widcombe School	Roadside	1	6	11.9	31.0	24.1
DT018	Widcombe High St	Roadside	5	5	11.9	23.7	At façade
DT020	Wells Rd	Roadside	1.5	1.5	11.9	**48.7**	At façade
DT021	Wells Rd /Upper Oldfield Park	Roadside	1	4	11.9	**42.8**	34.2
DT023	Alexandra Park	Urban Background			11.9	11.9	Urban Background
DT026	Upper Wellsway	Roadside	3	3	11.9	30.6	At façade
DT034	Newbridge Rd	Roadside	1	6	11.9	32.6	25.1
DT037	Charlotte St	Roadside	1	4	11.9	33.4	27.4
DT039	Manvers St	Roadside	2	5	11.9	29.1	25.4
DT042	Dorchester St	Kerbside	0.5	2.5	11.9	**45.2**	35.7
DT043	St. James Parade (new)	Kerbside	0.9	3.5	11.9	**40.3**	32.7

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) [1]	Distance from kerb to monitor (m) [2]	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
DT045	James St West	Roadside	5	5	11.9	30.6	At façade
DT052	Walcot Terrace	Roadside	3	3	11.9	37.3	At façade
DT053	Walcot Terrace	Roadside	3	3	11.9	38.8	At façade
DT054	Walcot Terrace	Roadside	3	3	11.9	39.5	At façade
DT055	Lambridge	Roadside	2.6	1.1	11.9	39.7	**45.7**
DT060	Victoria Terrace	Roadside	2	4	11.9	**41.4**	36.6
DT062	Argyle Terrace	Roadside	3	7	11.9	38.9	33
DT084	Bearflat	Roadside	1.85	7.55	11.9	34.5	27.2
DT085	RUH North	Roadside	1.5	8.5	11.9	27.7	21.7
DT087	Oak Street	Roadside	2.65	2.65	11.9	31.3	31.3
DT090	Anglo Terrace	Roadside	1.6	4.1	11.9	**56.1**	**46.8**
DT142	Prior Park Road	Kerbside	0.8	0.8	11.9	33.9	33.9
DT143	Rackfield Place	Roadside	3.7	3.7	11.9	27.3	At façade
DT145	Lansdown Road	Kerbside	0.7	3.2	11.9	30.6	25.2
DT147	Terrace Walk	Roadside	1.7	1.7	11.9	28.5	At façade
DT148	Julian Rd	Roadside	2.2	2.2	11.9	26.9	At façade
DT149	Camden 3	Kerbside	0.4	2.4	11.9	31.0	25.2
DT150	Brougham Hayes	Roadside	1.3	3.2	11.9	27.0	24.1
DT151	Widcombe Hill	Kerbside	0.8	4.7	11.9	31.5	24.8
DT152	Bathwick Hill	Roadside	1	3	11.9	25.8	22.7
DT153	North Road	Roadside	1.85	4.85	11.9	19.2	17.6
DT154	Bradford Road	Roadside	2.2	2.2	11.9	29.7	At façade

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) [1]	Distance from kerb to monitor (m) [2]	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
DT155	Newbridge Hill 2	Roadside	1.8	8.8	11.9	18.8	16.3
DT156	Corn Street	Roadside	2.6	5	11.9	27.9	25.3
DT157	Charles Street	Roadside	3.15	4.65	11.9	29.0	27.3
DT158	Paragon 2	Roadside	1.1	6.5	11.9	33.2	25.4
DT159	Walcot Street	Roadside	2.5	5.5	11.9	26.8	23.9
DT160	North Parade Road	Roadside	1.3	7.6	11.9	30.8	23.7
DT161	Kelston Road	Roadside	1.1	17.1	11.9	19.4	15.2
DT164	Midford Road	Kerbside	0.4	1.8	11.9	23.0	20.2
DT165	Brassknocker Hill	Kerbside	0.8	7.8	11.9	**40.2**	27.8
DT167	Weston High St	Roadside	1	1	11.9	24.4	At façade
DT168	Englishcombe Lane	Roadside	1.6	5	11.9	16.0	14.9
DT169	Eastbourne Ave	Roadside	2	7.1	11.9	25.7	21.6
DT170	St James Parade 2	Kerbside	0.45	3.1	11.9	35.0	27.3
DT171	Frome Road/Upper Bloomfield	Roadside	4.2	4.2	11.9	31.8	At façade
DT172	London Road 2	Roadside	3.7	4.15	11.9	**46.9**	**45.8**
DT173	Upper Bristol Road 2	Roadside	2.2	2.8	11.9	37.4	35.9
DT179	Upper Bristol Road 3	Roadside	1.5	1.5	11.9	34.9	At façade
DT180	Wells Road 2	Roadside	1.7	2.4	11.9	34.7	33
DT181	Wellsway	Roadside	1.2	14.2	11.9	35.6	23.4
DT182	Gay Street - Lower	Roadside	1.1	4.8	11.9	**42.1**	33
DT183	Chapel Row	Roadside	2.1	2.1	11.9	30.2	30.2

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) (1)	Distance from kerb to monitor (m) (2)	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
DT184	Lansdown Road 2	Kerbside	0.9	4.4	11.9	39.3	30.7
DT185	Greenway Lane	Kerbside	0.7	1.2	11.9	19.1	18.3
DT186	Coronation Ave	Roadside	1.4	4.7	11.9	20.3	18.1
DT187	Stanley Road West	Roadside	1.7	1.7	11.9	24.1	At façade
DT188	Moorland Road	Roadside	3.4	3.9	11.9	24.5	24
DT189	Old Newbridge Hill	Roadside	2.1	12.1	11.9	29.0	21.9
DT190	Church Street	Kerbside	0.9	0.9	11.9	13.6	At façade
DT192	Fairfield Road	Roadside	1.3	4.9	11.9	19.6	17.4
DT193	Granville Road	Roadside	1.5	6	11.9	11.2	11.2
DT194	Brooklyn Road	Roadside	1	4.5	11.9	17.9	16.1
DT195	Lansdown Lane	Roadside	1.9	12.9	11.9	20.3	16.6
DT196	Oakley	Kerbside	1.5	11.5	11.9	32.4	23.3
DT197	Rush Hill	Roadside	2	7.5	11.9	25.0	20.9
DT198	Walcot Parade	Kerbside	1	1	11.9	**56.3**	At façade
	Bathampton						
DT091	Bathampton - High St	Roadside	1.1	1.1	9.1	25.9	At façade
DT166	Bathampton - A36	Roadside	1.2	24.2	9.1	29.9	16.8
	Batheaston						
DT058	Batheaston - London Rd West A	Roadside	1	1	9.3	25.7	At façade
DT094	Batheaston - London Rd West B	Roadside	1.25	1.25	9.3	28.0	At façade

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) [1]	Distance from kerb to monitor (m) [2]	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
DT130	Batheaston - London Rd West C	Roadside	1.4	1.4	9.3	26.3	At façade
DT163	Batheaston - A4 Box Road	Roadside	1.8	4.2	9.3	24.3	21.4
DT191	Batheaston - Mill Lane	Roadside	1	5	9.3	22.2	18
	Corston						
DT162	Corston - A39 Wells Road	Roadside	1.7	1.4	8.6	24.0	24.7
	Farrington Gurney						
DT126	Farrington Gurney 1	Roadside	1.35	5.35	5.8	**43.3**	32.2
DT134	Farrington Gurney 2	Roadside	4.5	4.5	5.8	38.9	At façade
DT136	Farrington Gurney 3	Roadside	1.2	1.2	5.8	39.6	At façade
DT137	Farrington Gurney 4	Roadside	1.3	4.8	5.8	24.5	19.3
DT138	Farrington Gurney 5	Roadside	1.9	4.9	5.8	37.7	30.7
DT178	Farrington Gurney 6	Roadside	2	2.5	5.8	31.3	29.9
	Keynsham						
DT033	Keynsham (Kelston Road)	Urban Centre	1	9	13.2	13.3	13.3
DT063	Keynsham - Station Rd	Roadside	1	4	13.2	27.0	23.2
DT064	Keynsham - Charlton Rd B	Roadside	1	5	13.2	27.8	23
DT065	Keynsham - Charlton Rd A	Roadside	1	4	13.2	29.3	24.8
DT066	Keynsham - High St A	Roadside	1	2	13.2	33.3	30.5
DT067	Keynsham - Somerfield	Roadside	1	3	13.2	32.0	27.8
DT068	Keynsham - Temple St	Roadside	3	3	13.2	21.4	At façade

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) [1]	Distance from kerb to monitor (m) [2]	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
DT069	Keynsham - Rock Road	Roadside	2	2	13.2	24.6	At façade
DT070	Keynsham - Bath Hill	Roadside	4	5	13.2	25.3	24.5
DT107	Keynsham - Bath Hill (South)	Roadside	1.3	1.3	13.2	35.0	35
DT112	Keynsham - Ashton Way	Roadside	1.5	36.5	13.2	23.2	16.2
DT113	Keynsham - West View Rd	Roadside	1.5	6	13.2	17.1	15.9
DT114	Keynsham - Victoria Church	Kerbside	0.5	12	13.2	22.9	17.5
DT115	Keynsham - High Street B	Roadside	1.1	2.9	13.2	22.3	20.5
DT116	Keynsham - Fish Bar	Kerbside	0.8	6.1	13.2	24.8	20.2
DT118	Keynsham - Wells Road	Roadside	1.3	2.6	13.2	27.8	25.6
DT141	Keynsham A4	Roadside	1.4	14.4	13.2	33.4	23.2
	Midsomer Norton						
DT144	Midsomer Norton - Radstock Road	Roadside	1.1	4.2	11	30.2	24.9
	Paulton						
DT177	Paulton	Roadside	1.1	0.8	6.3	28.0	29.4
	Pensford						
DT174	Pensford 3	Roadside	1.25	3.95	7	36.5	29.4
	Radstock						
DT176	Radstock - Wells Road 2	Roadside	2.2	2.2	8.9	29.1	At façade
	Saltford						
DT075	Saltford - The Crown	Roadside	3	3	9	31.0	At façade

Site ID	Site Name	Site Type	Distance from kerb to Relevant Exposure (m) [1]	Distance from kerb to monitor (m) [2]	Background concentration (µg/m^3)	Concentration at monitoring site (µg/m^3)	Concentration at closest façade (µg/m^3)
DT077	Saltford - Bath Rd	Roadside	2	2	9	28.2	28.2
	Temple Cloud						
DT096	Temple Cloud 1	Roadside	1.5	1.5	6.2	**59.5**	At façade
DT108	Temple Cloud 2	Roadside	1.25	7.45	6.2	**40.1**	27.3
DT109	Temple Cloud 3	Roadside	1.67	3.67	6.2	40.0	34
	Westfield						
DT175	Westfield 3	Roadside	1.9	4.6	9.3	25.5	22.2
	Whitchurch						
DT032	Whitchurch	Roadside	2.1	4.8	9.4	32.8	28.2
DT098	Whitchurch 2	Roadside	1.3	1.3	9.4	33.1	At façade
DT100	Whitchurch 4	Roadside	1.6	7.6	9.4	27.3	21.1
DT101	Whitchurch 5	Roadside	1.6	5.6	9.4	36.6	29

Appendix D: Other monitoring

D1 Benzene

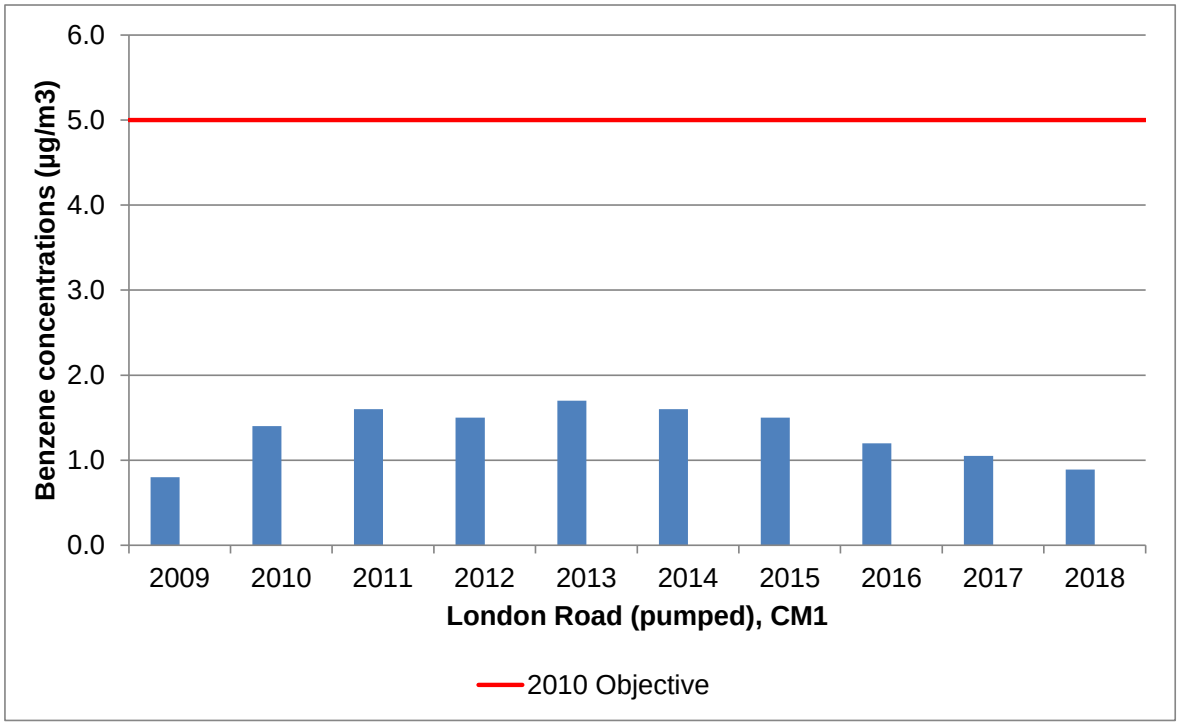
Monitoring results for benzene are shown in Table D.1 and Figure D.1. The results show that there are no exceedances of the benzene objectives during 2018.

Trends in benzene show that levels are gradually decreasing (Figure D.1).

Table D.1 – Results of Benzene Monitoring

Site ID	Site Name	Data Capture for 2018 (%)	Annual Mean (µg/m3)				
			2014	2015	2016	2017	2018
CM1	London Road (Pumped)		1.6	1.5	1.2	1.1	0.9
	Annual Mean Objective: 5 µg/m^3						

Figure D.1 – Trends in Benzene Monitoring



D2 AQMesh results

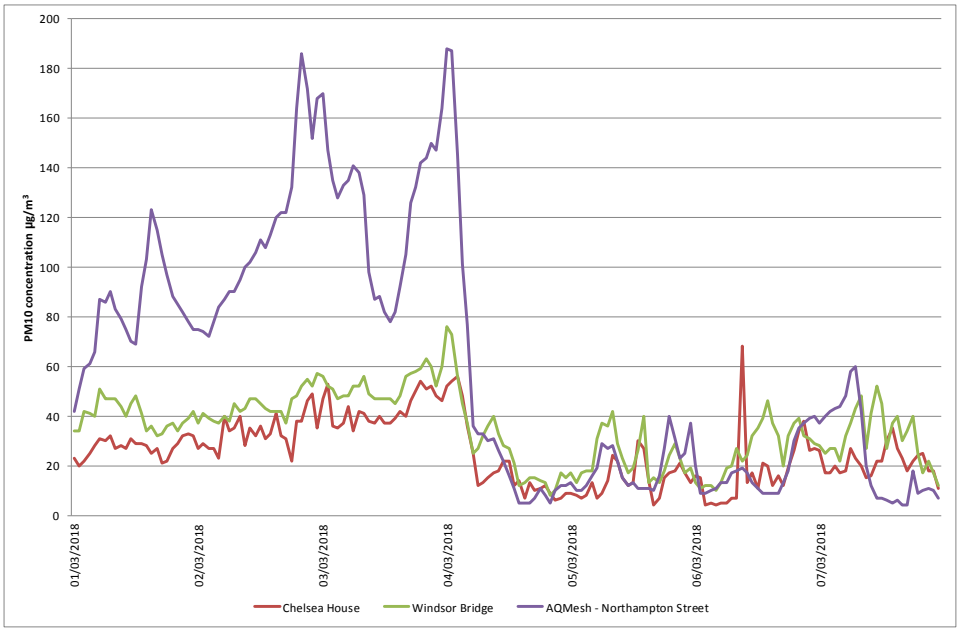
The AQMesh analyser is an indicative analyser which uses electrochemical sensors to measure NO_2 concentrations and optical sensors to monitor particulates. As an 'indicative' monitor, the monitor is used to identify the timing of peaks and troughs, changes in concentrations due to a traffic scheme being implemented and approximate values. If high concentrations are indicated further investigations will take place. It is possible that co-locating with our more accurate 'reference method' analysers (e.g. CM4 Chelsea House) will improve the accuracy (not precision) of the data by providing a local calibration factor that can be applied to the data retrospectively.

In 2018 the AQMesh analysers were located at Northampton Street, Terrace Walk, Westfield, Keynsham High Street and Keynsham Bath Hill. The results from these locations are shown in Table D.3.

The results show that when located at Chelsea House in 2017 the sensors slightly overestimated the annual mean NO_2 and underestimated the annual mean PM_{10} and $PM_{2.5.}$ The peaks in PM_{10} and $PM_{2.5}$ tend to be overestimated.

In 2018 the AQMesh was co-located with a diffusion tube in Westfield, the results from this site indicated that from the Luther AQMesh are being overestimated by approximately 20%. Results from Luther in figure D.2 show that the spike in PM_{10} and $PM_{2.5}$ was seen during the UK wide peaks in early March 2018, however the concentrations are much higher than those at the reference method analysers at Windsor Bridge and Chelsea House. An objective for 2019 is to co-locate each AQMesh with a continuous analyser to calculate a correction factor to improve the accuracy of the results.

Figure D.2 – Comparison of AQMesh and continuous analysers during PM_{10} episode March 2018



The results shown in Table D.2 show that the objectives were met at all locations.

Table D.2 – Results from AQMesh analysers

		Annual Mean NO_2 ($\mu g/m^3$)	NO_2 1-Hour Means > 200$\mu g/m^3$ (3)	Annual Mean PM_{10} ($\mu g/m^3$)	PM_{10} 24- hour Means >50 $\mu g/m^3$ (4)	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)	Data Capture 2018 (%) (1)
	January-March– at AMQ12 - Northampton Street						
AQMesh – Luther	Period	28	0 (59)	23	5 (42)	15	17
	Annualised(2)	34					
	April-October – at AQM13 - Terrace Walk						
AQMesh – Luther	Period	35	0 (78)	19	9 (37)	12	60
	Annualised(2)	39					
	November-December – at AQM15 - Westfield						
AQMesh – Luther	Period	36	0 (84)	22	6 (47)	15	19
	Annualised(2)	29					
	Diffusion tube Nov-Dec	30					
	January-April – at AQM09 - Keynsham High Street						
AQMesh – Wallander	Period	**42**	0 (90)	17	5 (36)	10	37
	Annualised(2)	38					
	June-December – at AQM15 - Keynsham Bath Hill						
AQMesh – Wallander	Period	37	0 (77)	12	2 (26)	8	58
	Annualised(2)	31					

Notes:
Exceedances of the NO_2 annual mean objective of 40$\mu g/m^3$ are shown in **bold**.
(1) 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%).
(2) NO_2 means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.
(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.
(4) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Appendix E: Maps of Monitoring Locations and AQMAs

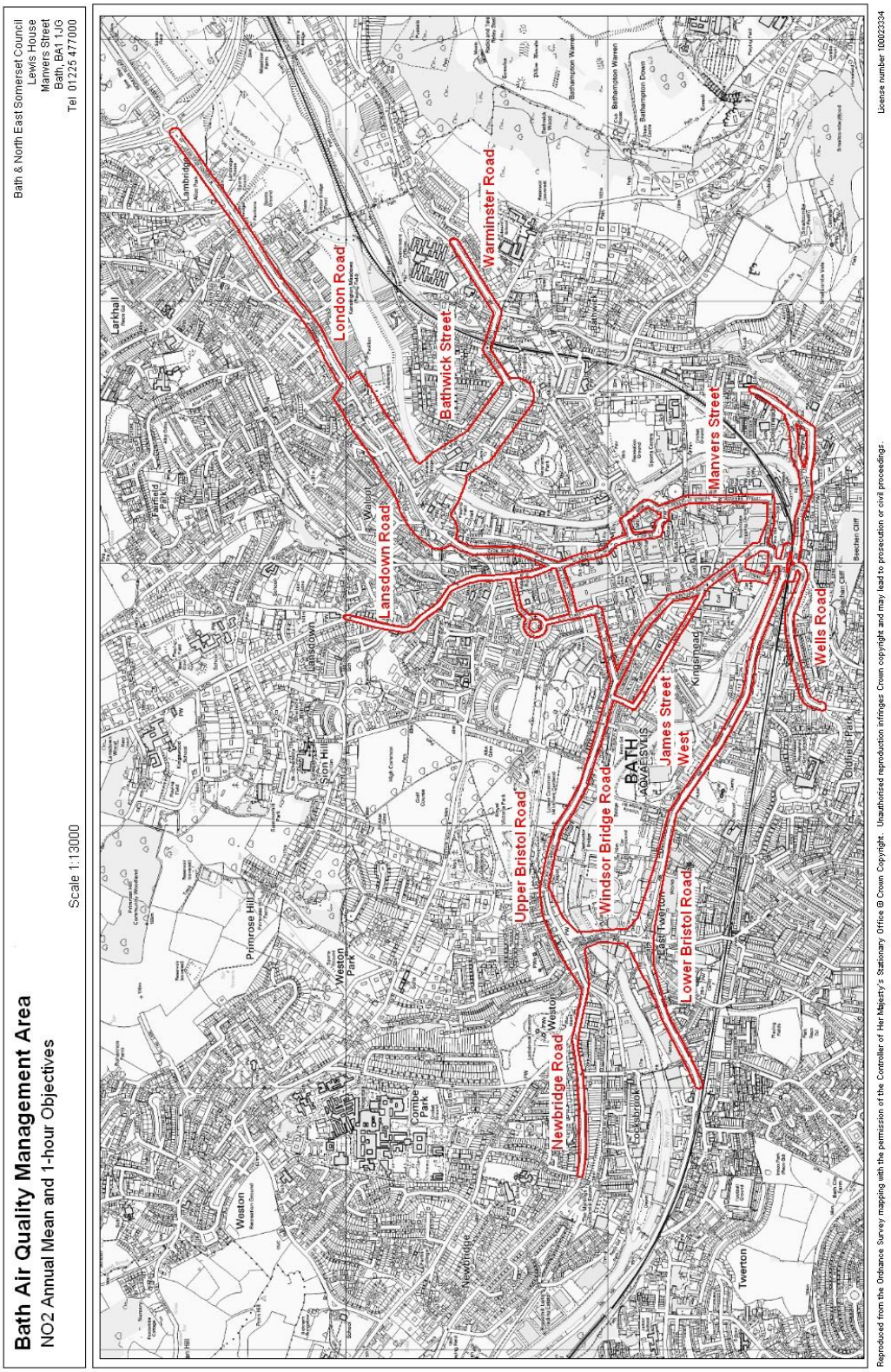


Figure E.1 – Map showing AQMA in Bath

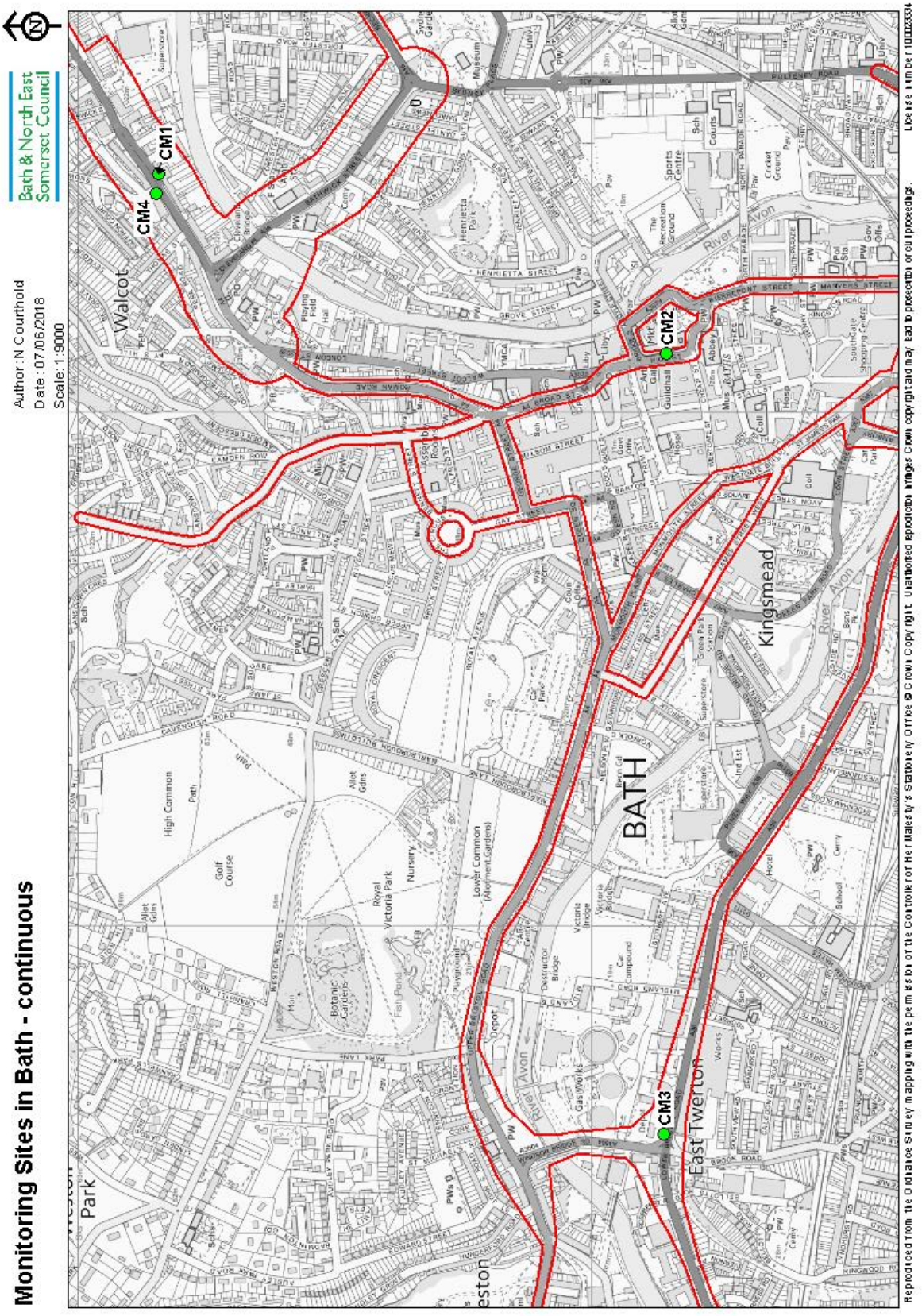


Figure E.2 – Map showing automatic monitoring sites in Bath

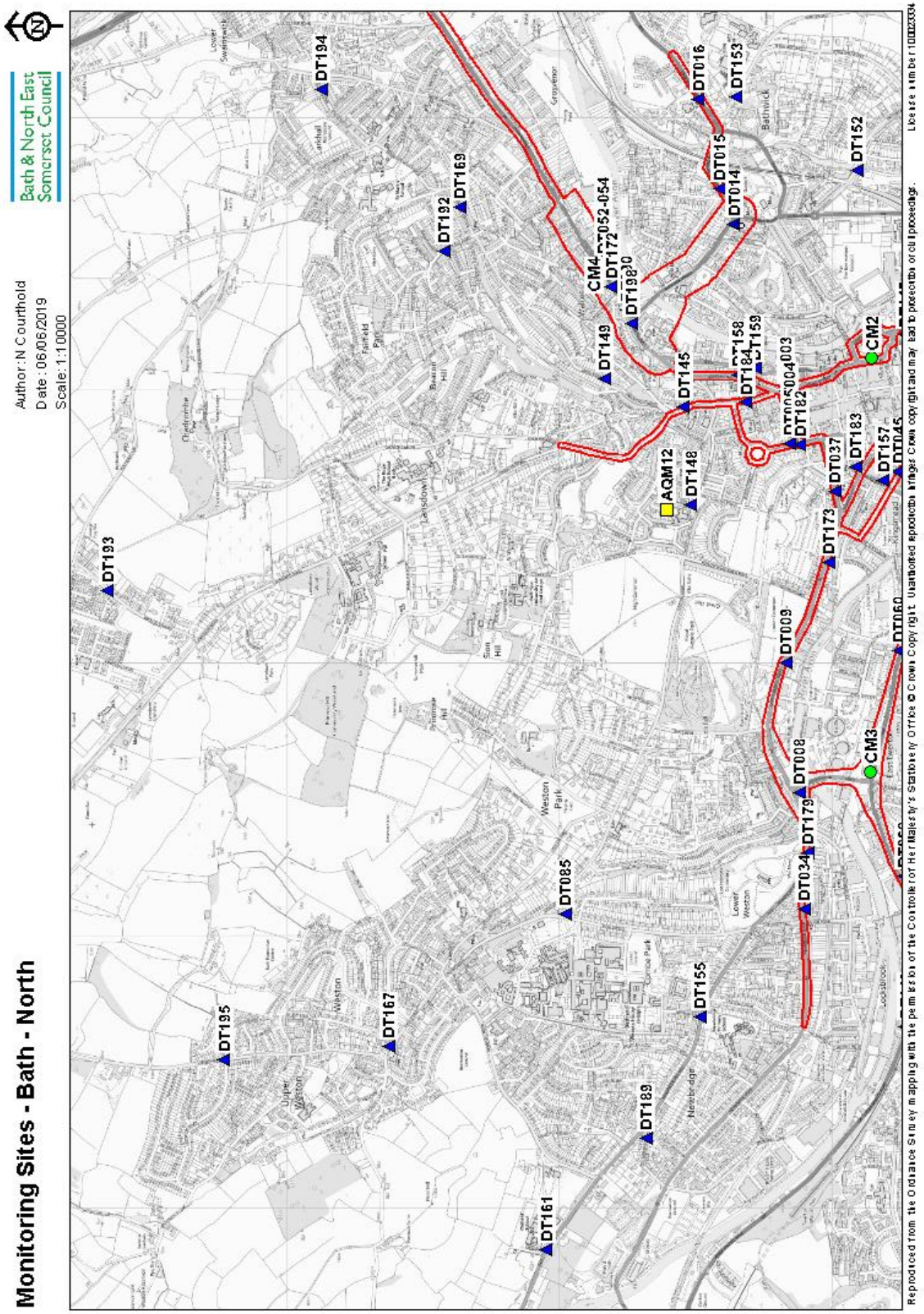


Figure E.3 – Map showing monitoring sites and AQMA in Bath – North

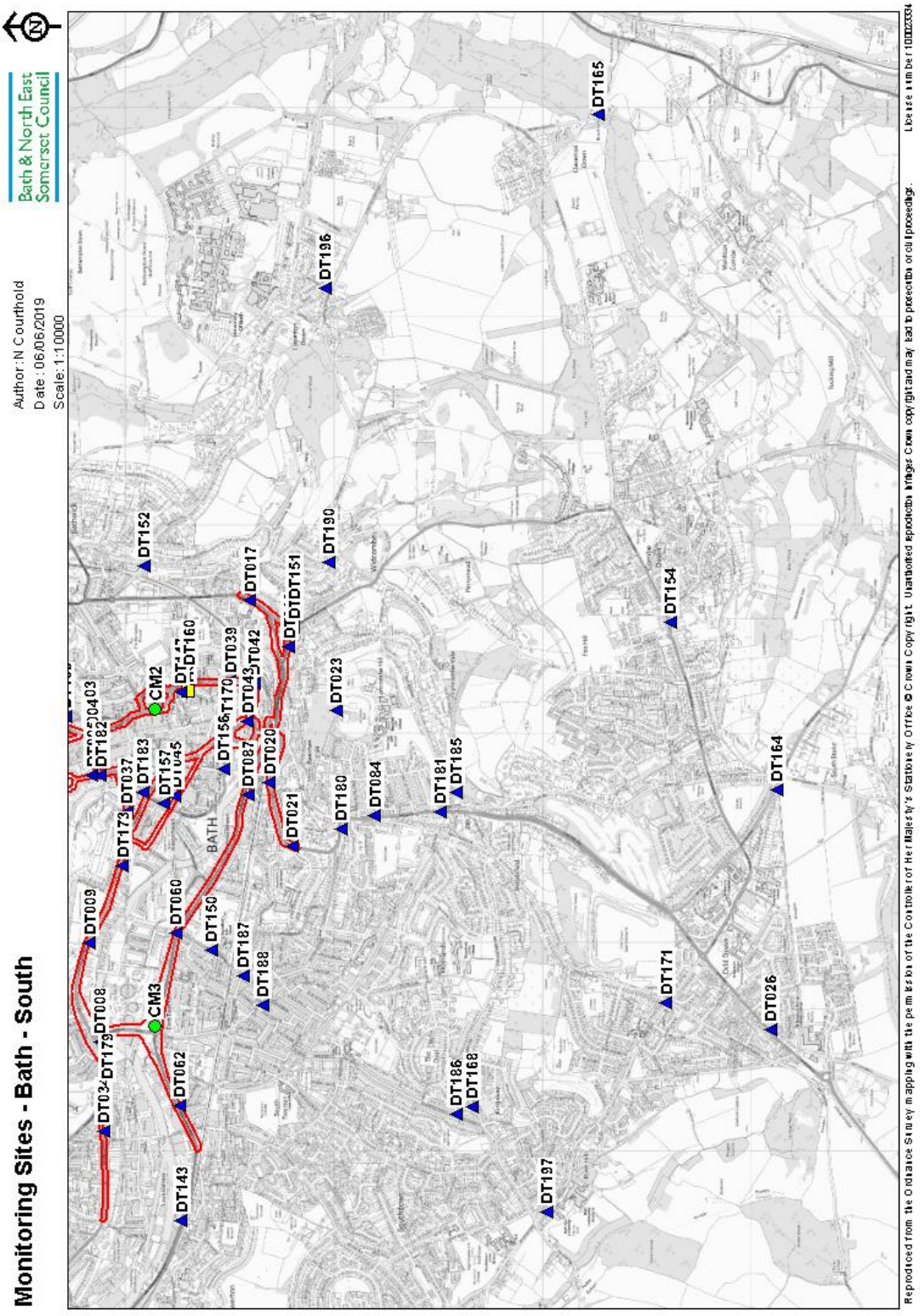


Figure E.4 – Map showing monitoring sites in Bath – South

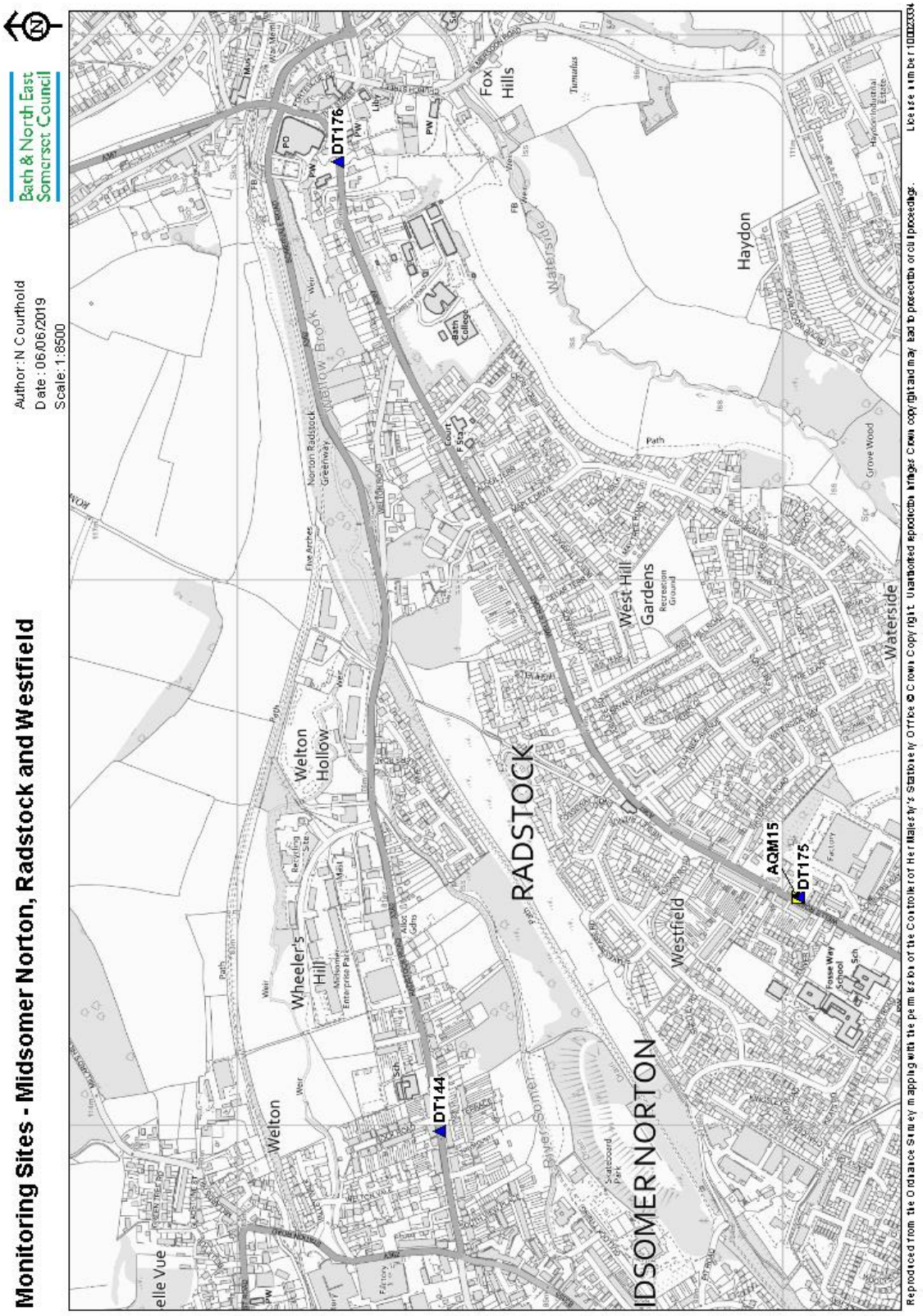


Figure E.5 – Map showing monitoring sites in Midsomer Norton, Westfield and Radstock

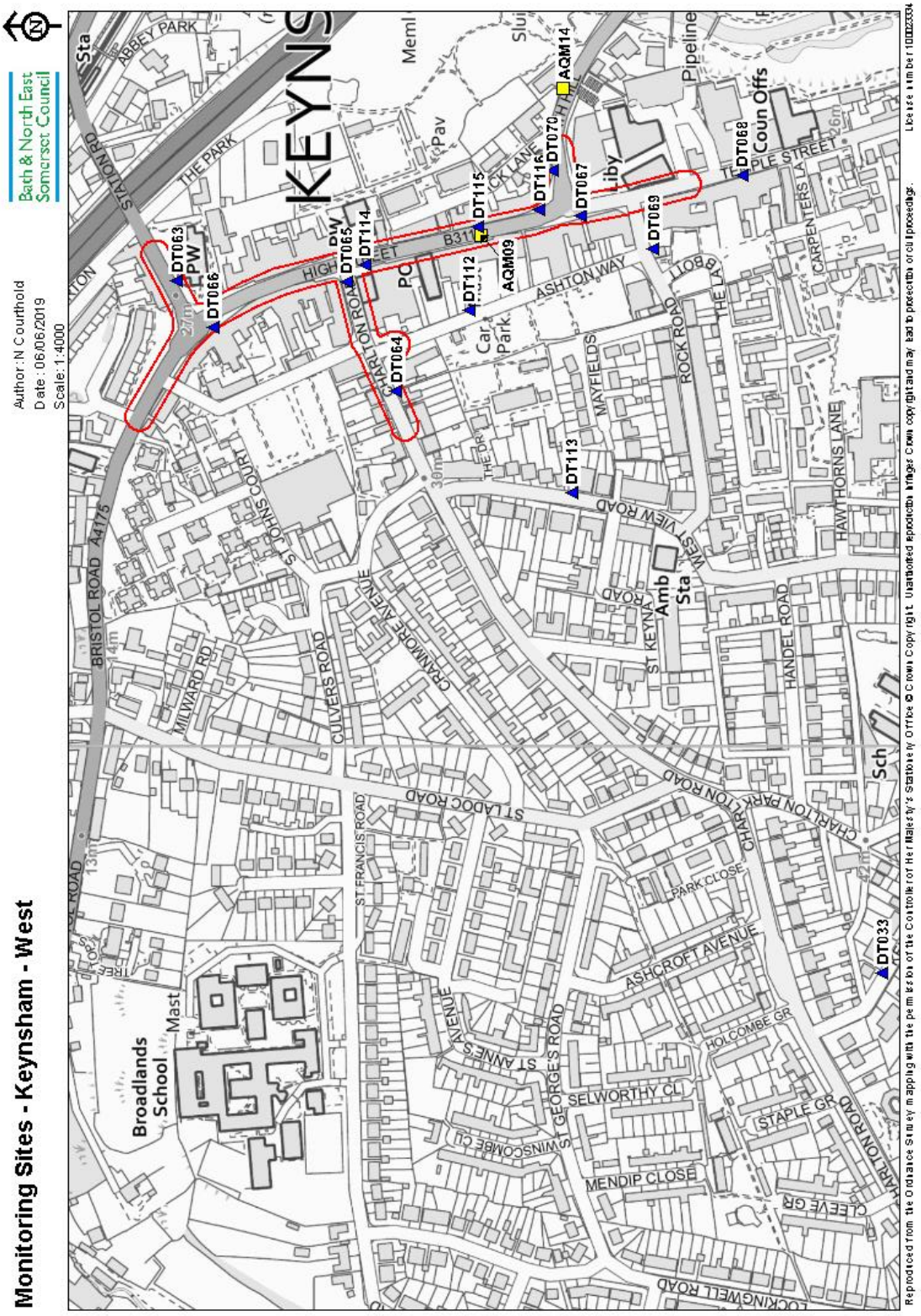


Figure E.6 – Map showing monitoring sites and AQMA in Keynsham – West

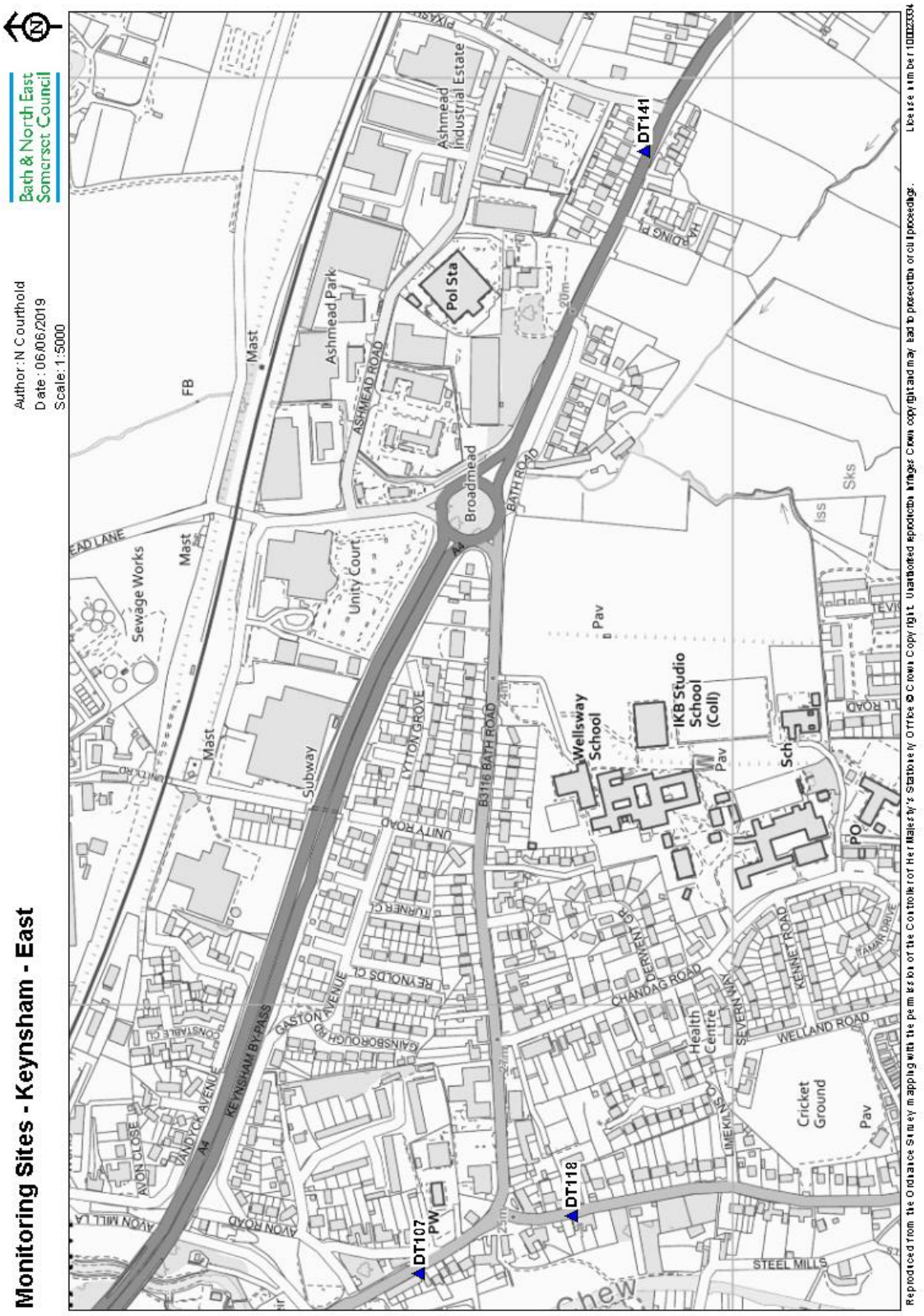


Figure E.7 – Map showing monitoring sites and AQMA in Keynsham – East

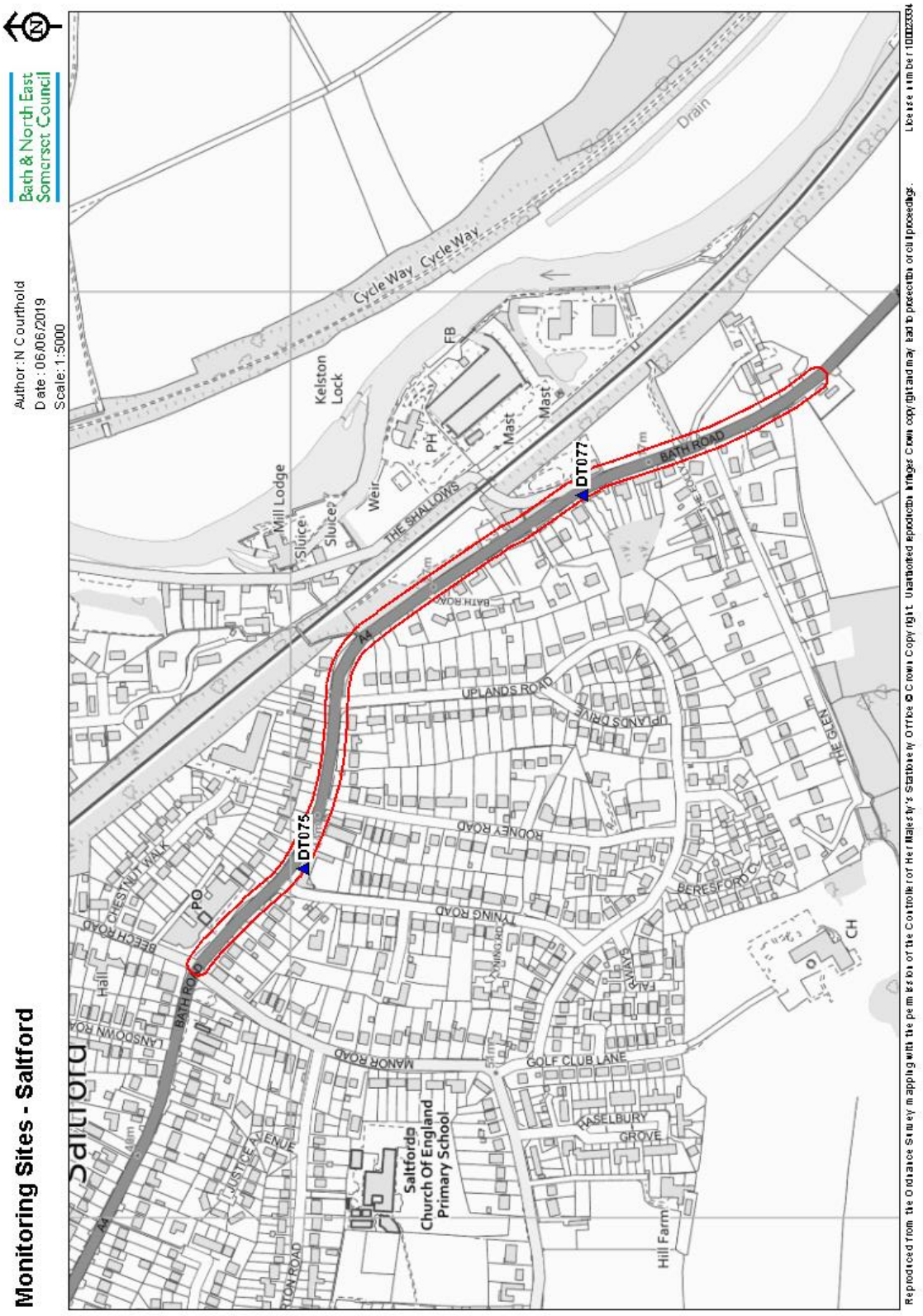


Figure E.8 – Map showing monitoring sites and AQMA in Saltford

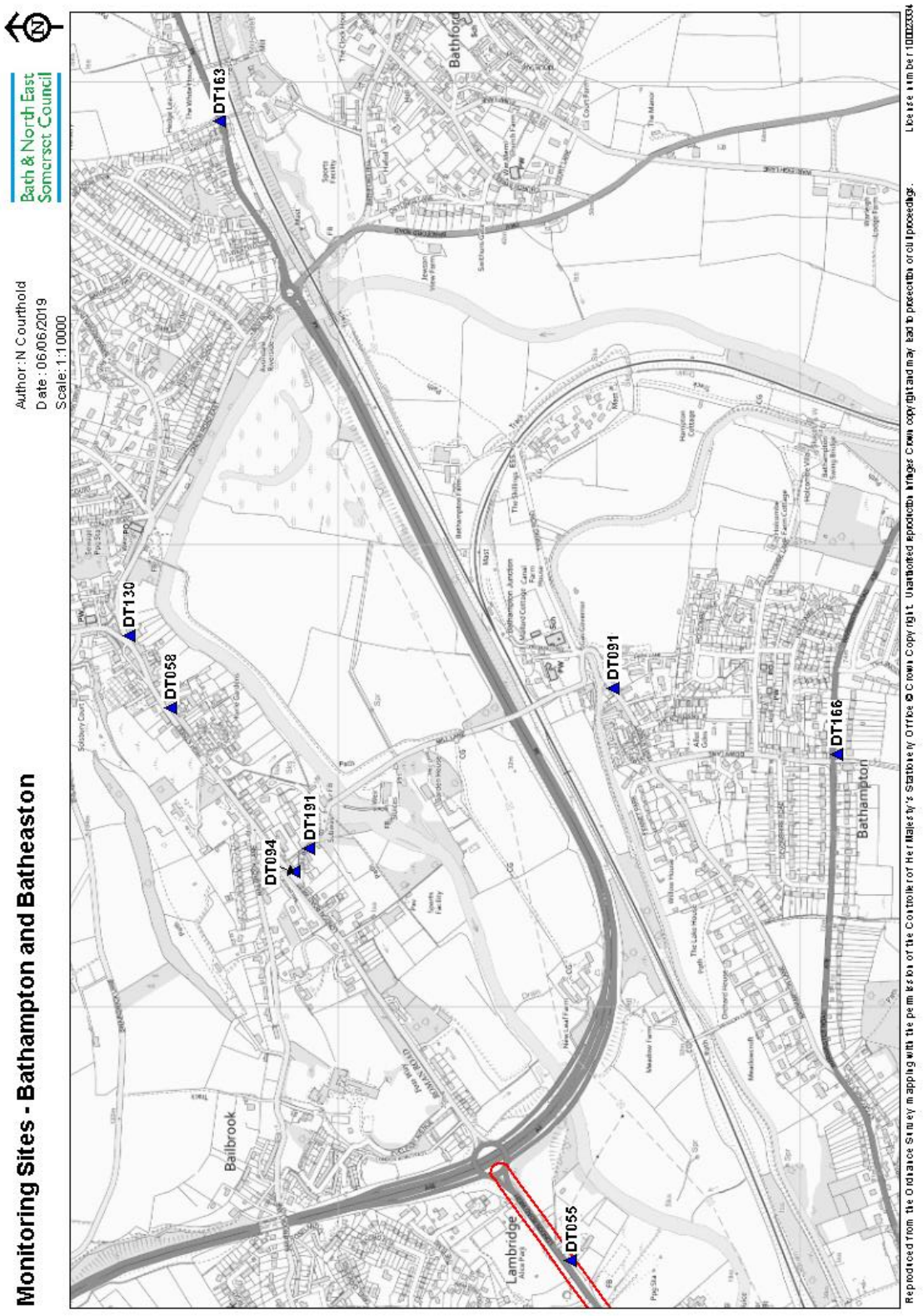


Figure E.9 – Map showing monitoring sites in Batheaston and Bathampton

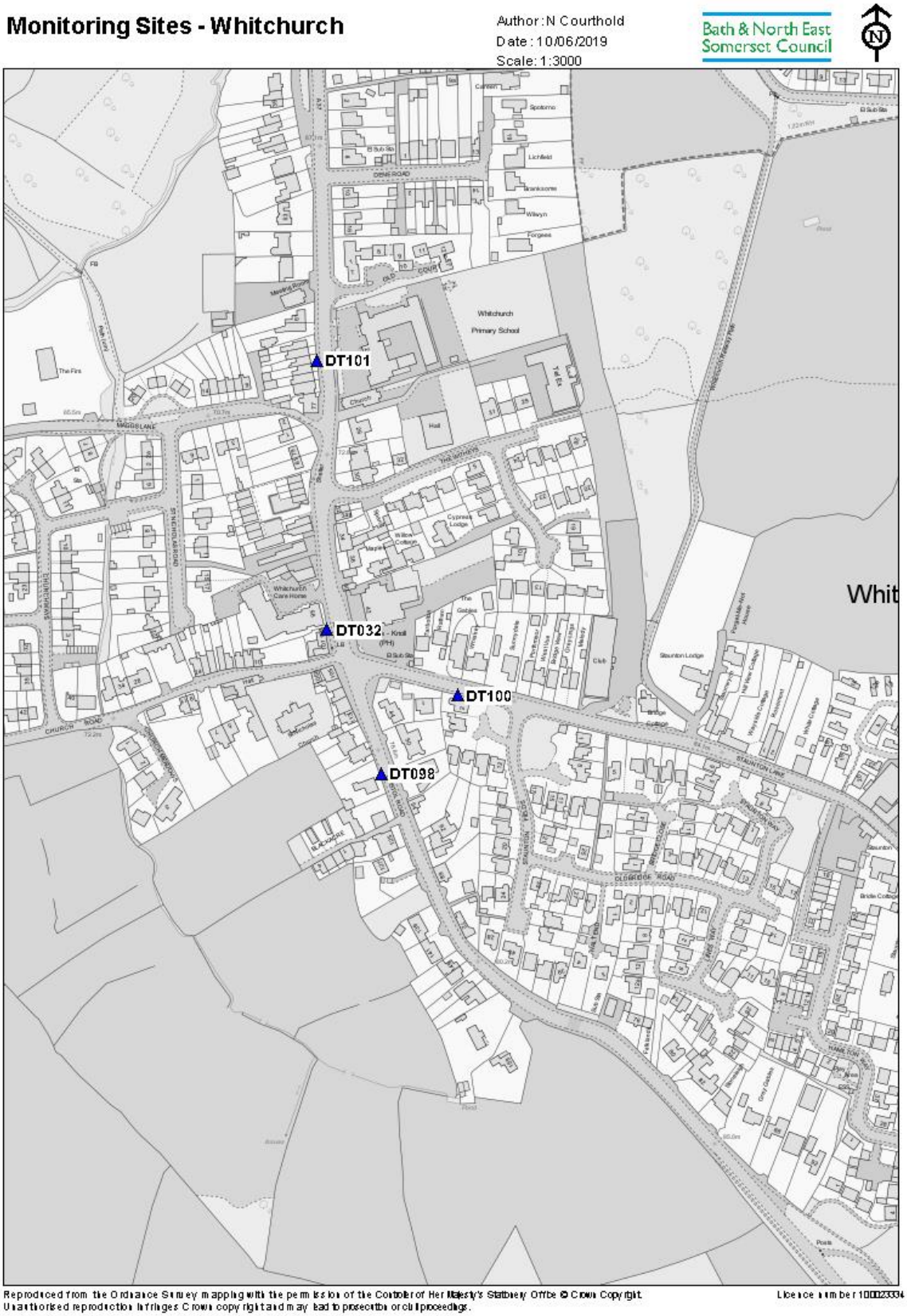


Figure E.10 – Map showing monitoring sites in Whitchurch

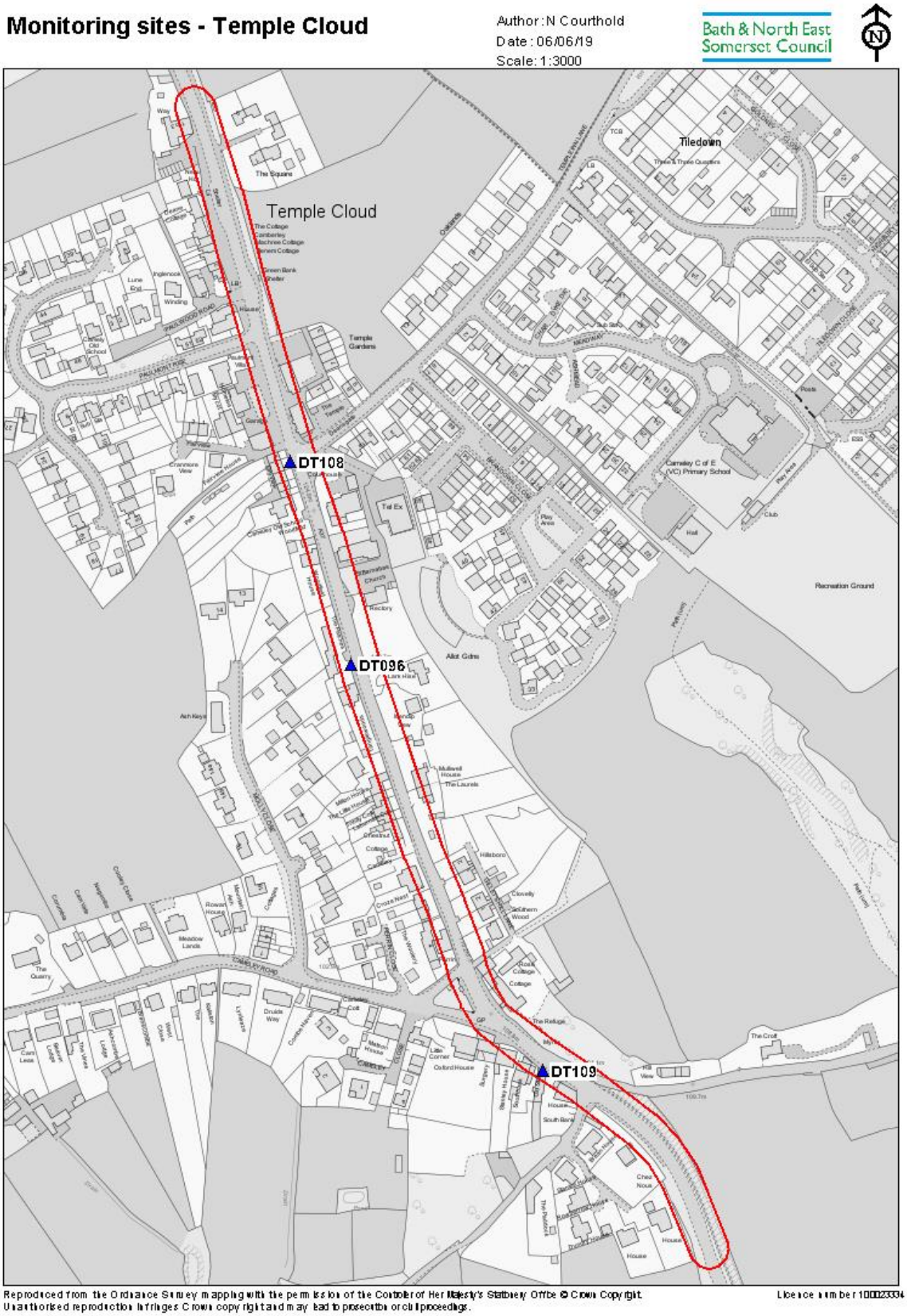


Figure E.11 – Map showing monitoring sites in Temple Cloud

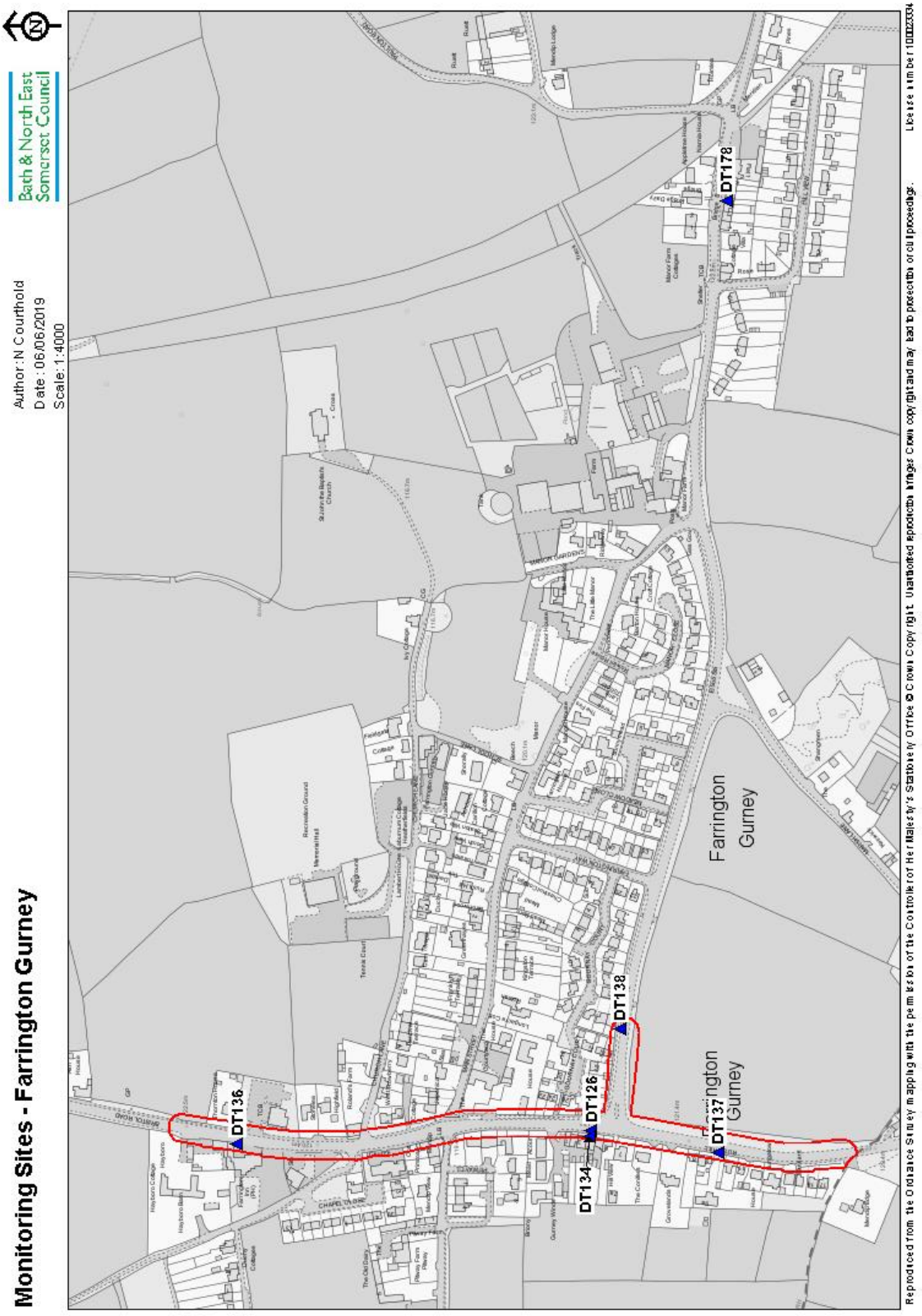


Figure E.12 – Map showing monitoring sites in Farrington Gurney

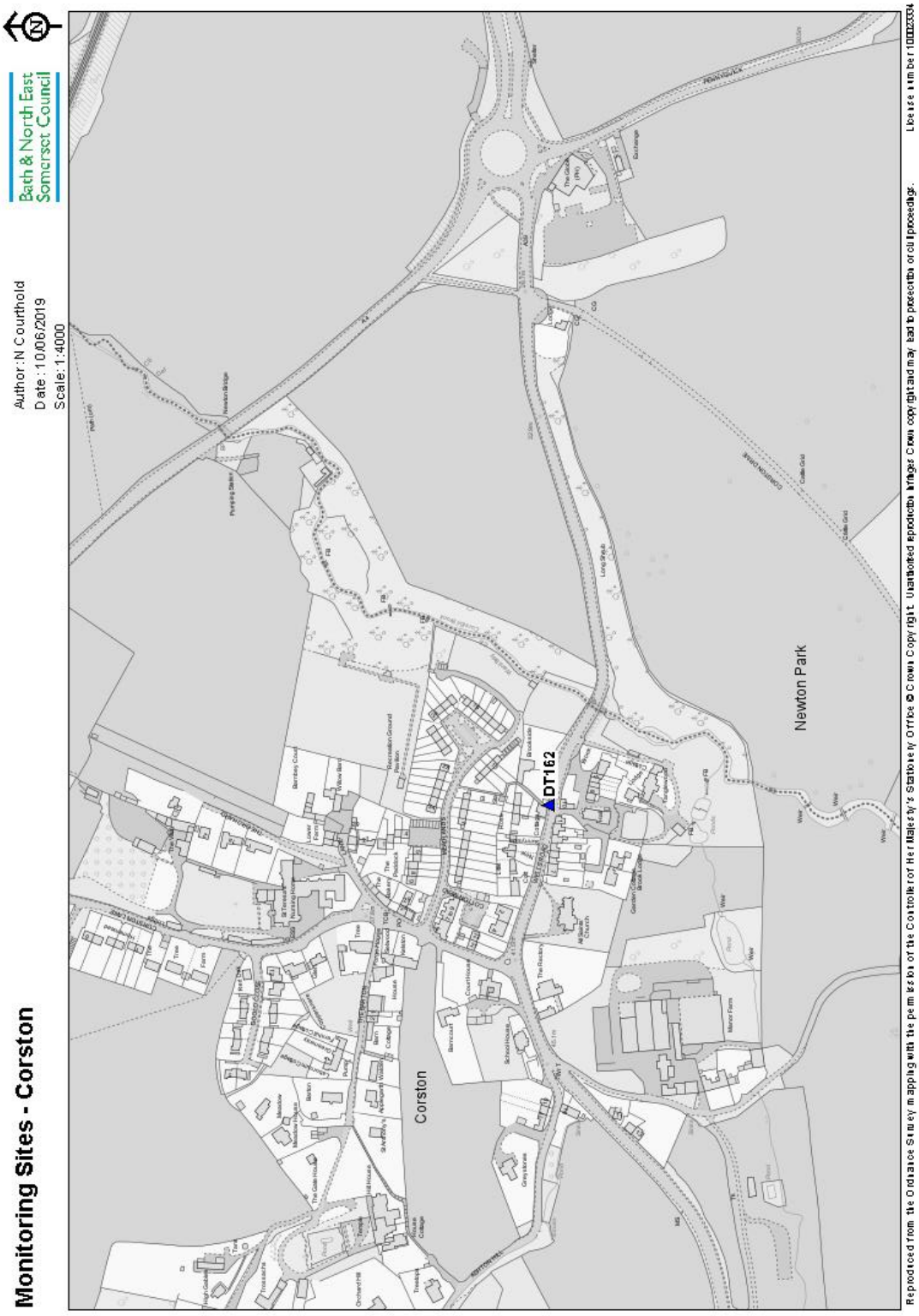


Figure E.13 – Map showing monitoring sites in Corston

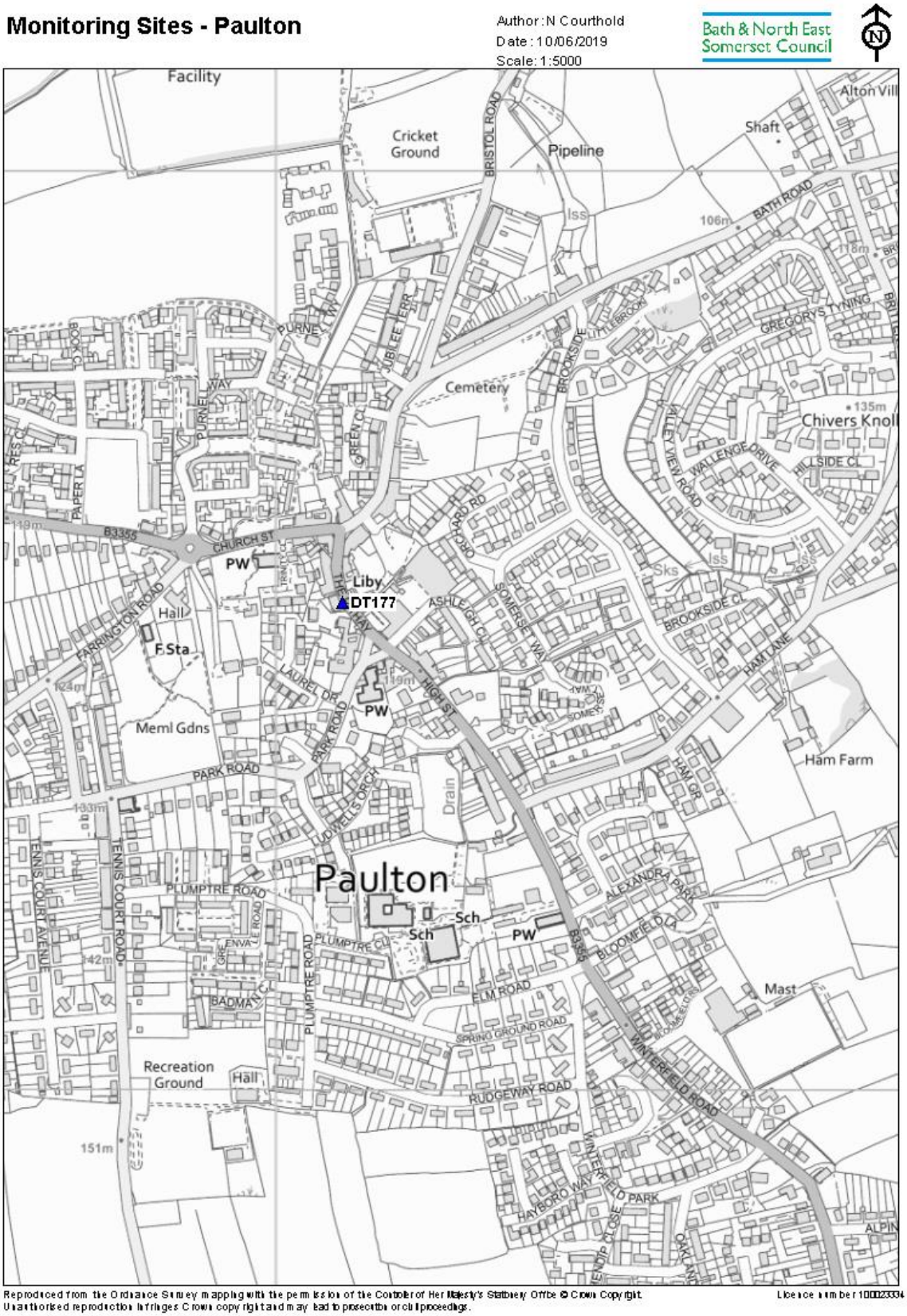


Figure E.14 – Map showing monitoring sites in Paulton

Figure E.15 – Map showing monitoring sites in Pensford

Appendix F: Supporting Technical Information – Additional Information

F.1 Screening Assessment

Road Traffic Sources

Road sources within Bath & North East Somerset have been assessed for:

- Narrow congested streets with residential properties close to the kerb
- Busy Streets where people spend 1-hour or more close to traffic
- Roads with high HGV flows
- Junctions
- New roads constructed or proposed
- Roads with significantly changed traffic flows and
- Bus and Coach Stations

Bath & North East Somerset Council confirms that there are no new/newly identified road traffic sources within Bath & North East Somerset.

Non-road Transport Sources

Bath & North East Somerset Council confirms that there are no new/newly identified non-road transport sources within Bath & North East Somerset.

Industrial Sources

Bath & North East Somerset Council confirms that there are no new/newly identified industrial sources within Bath & North East Somerset.

Commercial Sources

Bath & North East Somerset Council confirms that there are no new/newly identified commercial sources within Bath & North East Somerset.

Fugitive or Uncontrolled Sources

Bath & North East Somerset Council confirms that there are no new/newly identified fugitive sources within Bath & North East Somerset.

Appendix G: Summary of Air Quality Objectives in England

Table G.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[12]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[12] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQ	Air Quality
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
ASR	Air quality Annual Status Report
AURN	Automatic Urban and Rural Network
BAM1020	Beta Attenuation Monitor
CAZ	Clean Air Zone
CBTF	Clean Bus Technology Fund
CVRAS	Clean Vehicle Retrofit Accreditation Scheme
DC	Development Control
Defra	Department for Environment, Food and Rural Affairs
DNO	District Network Operator
EU	European Union
EV	Electric Vehicle
GUL	Go Ultra Low
HGV	Heavy Goods Vehicle
JAQU	Joint Air Quality Unit
LAQM	Local Air Quality Management
LCWIP	Local Cycling and Walking Investment Plan
LEZ	Low Emission Zone
LSO	Local Site Operator
LSTF	Local Sustainable Transport Fund
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
P&R	Park and Ride
PAYG	Pay as you go
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
SCR	Selective Catalytic Reduction
TMT	Thermal Management Technology
TRO	Traffic Regulation Order
$\mu g/m^3$	microgrammes per cubic metre
ULEV	Ultra-Low Emission Vehicles

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13. Bath and North East Somerset Council (2017b) Placemaking Plan

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