Bath & North East Somerset Council

# 2018 Air Quality Annual Status Report (ASR)

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

June, 2018

| | |
|---|---|
| Local Authority Officer | Dr Nicola Courthold<br>Robin Spalding |
| Department | Environmental Monitoring |
| Address | Bath & North East Somerset Council<br>Lewis House<br>Manvers Street<br>Bath<br>BA1 1JG |
| Telephone | 01225 396622 |
| E-mail | Environmental_Monitoring@bathnes.gov.uk |
| Report Reference number | R7ASR0618 |
| Date | June 2018 |

# 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 through 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, three Air Quality Management Areas (AQMAs) have been declared for nitrogen dioxide ($NO_2$), including the major road network within Bath, Keynsham High Street and a small section of the A4 in Saltford. 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/. Two further AQMAs are being declared in Temple Cloud and Farrington Gurney following recent monitoring showing concentrations of $NO_2$ above the air quality objectives. Details of the proposed AQMAs can be found in Appendix F.

Particulate matter is also a pollutant of concern with recent research indicating that there are no safe levels of particulate matter exposure[4]; however monitored concentrations are below the air quality objectives (Appendix G).

Bath and North East Somerset Council had 107 $NO_2$ monitoring sites and 3 particulate matter monitoring sites in 2017. 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 2017 are:

- A decrease in nitrogen dioxide ($NO_2$) concentrations has been seen across the district in 2017. The average decrease across the long-term sites was 10% compared with 2016 monitoring data. (The average change across the AURN network is a decrease of 8%).

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

- Lambridge has seen a larger drop of 23% in $NO_2$ concentrations. This is due to the extension of the bus lane to the A46 roundabout in April 2017. This means that the majority of the traffic is further form the monitoring site and receptors.
- Keynsham one-way – In May 2017 a trial began for a one-way system in Keynsham. If the overall decrease across the district is taken into account, a further decrease of 15% was seen in Keynsham High Street. Only one site showed a slight increase of 3% (junction of Rock Road and Ashton Way). All sites were below the objective of 40 µg/m$^3$ at the receptors.
- Saltford – All sites were below the objective of 40 µg/m$^3$ in 2017.
- Temple Cloud – Monitoring remains above the objective of 40 µg/m$^3$ and an AQMA is being declared for the A37 in Temple Cloud. Some sites showed a slight increase but this is likely to be due to the uncertainties in the annual corrections for part year monitoring. New sites on the side roads at Temple Inn Lane and Cameley Road were well below the objective, this confirms that the AQMA is only required on the A37.
- Farrington Gurney – New monitoring in Farrington Gurney was above the objective of 40 µg/m$^3$ along the A37. Monitoring at a residential façade has confirmed the issue. An AQMA is being declared for the A37 in Farrington Gurney.
- Pensford – Monitoring in Pensford on the A37 has remained below the objective of 40 µg/m$^3$ at the residential facades.
- Whitchurch – Monitoring in Whitchurch was below the objective of 40 µg/m$^3$ at the residential facades. An AQMA is not being declared but monitoring is continuing at key locations.
- Batheaston/Bathampton – monitoring remains below 40 µg/m$^3$ at both locations.
- Radstock/Midsomer Norton/Westfield – monitoring remains below 40 µg/m$^3$ at these locations.
- High Littleton/Timsbury – New monitoring in High Littleton and Timsbury was well below the objective of 40 µg/m$^3$. No further action is required.
- 1-hour objective – All sites in Bath are below 60 µg/m$^3$ – this suggests that the 1-hour $NO_2$ objective is unlikely to be exceeded. 2 sites in Temple Cloud

show an exceedance of 60 µg/m$^3$, the proposed AQMA will include both the 1-hour and annual average $NO_2$ objectives.

The annual mean particulate matter not exceeding 10 micrometres in diameter ($PM_{10}$) concentrations in 2017 were similar to 2016. All results were within the air quality objectives.

A new particulate matter analyser was installed in July 2015 at Chelsea House (CM4), London Road, Bath, which measures particulate matter not exceeding 2.5 micrometres in diameter ($PM_{2.5}$). Monitoring at this site in 2017 showed an annual average concentration of 12 µg/m$^3$.

## Actions to improve air quality

Key completed measures in 2017 are:

- 'Options generation' engagement events and wider consultation for the Bath Air Quality Action Plan[5];
- The Council was identified in the National Air Quality Plan as an area which must achieve improvements in air quality in the shortest time possible and by 2021 at the latest. A Project Team and Project Board has been set up to deliver a Clean Air Plan under the branding of 'Bath Breathes 2021'.
- Successful consortium bid for Clean Bus Technology Fund including retrofitting of 29 buses operating within the authority area to Euro VI standard;
- Increased staff pool car provision including 4 electric and 3 hybrid vehicles;
- Commencement of experimental (12 month) one way system in Keynsham High Street (implemented in May 2017);
- Adoption of Placemaking Plan[6] including policy requiring electric vehicle infrastructure
- Development of the Next Bike cycle hire scheme include 14 stations with 670 average monthly hires;

[5] Bath & North East Somerset Council, Bath Air Quality Action Plan –Consultation Draft (2017)
[6] Bath and North East Somerset Council's Placemaking Plan, 2017

- Parking Strategy[7] developed and published in Jan 2018 including an objective (PSO 2) for electric charge point provision;
- Investigation into potential for differential parking charges based on vehicle emissions;
- Mode Shift Stars national award scheme including Council resource to assist schools in gaining accreditation.

Bath & North East Somerset Council has also been working with local stakeholder groups to develop a new Air Quality Action Plan for Bath. This has undergone public consultation, the results of which have been fed into the delivery of a Clean Air Plan for Bath.

## Conclusions and priorities

In 2017, monitoring at existing locations showed a decrease in concentrations at most locations. Monitoring at Temple Cloud and Farrington Gurney exceeded the air quality objectives and the extents of the proposed AQMAs were consulted on in early 2018. Monitoring in Whitchurch also showed concentrations close to the objective, an AQMA is not being declared but monitoring is being continued and the area will be reviewed in 2019.

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

- Declare a new AQMA for the Temple Cloud Area
- Declare a new AQMA for the Farrington Gurney Area
- Draft and consult on an Action Plan for Temple Cloud Area
- Draft and consult on an Action Plan for Farrington Gurney Area
- Further monitoring in Whitchurch and Pensford to determine the extent of any possible AQMA
- Full Business Case for the Clean Air Plan project
- Progress adoption of a new Air Quality Action Plan for Bath

[7] Bath & North East Somerset Council, Balancing Your Needs: A parking strategy for Bath & North East Somerset, 2017

- Taxi licensing policy review to enable use of electric vehicles and incentivise use of lower emission vehicles
- Submission of Ultra Low Emission Bus bid
- Implementation of last mile freight delivery scheme using electric vans
- Continued support for Bath Clean Air Champions carrying out anti-idling campaign
- Installation of a variable message sign on the southbound A46 approach to Bath
- Implementation of an electric cycle hire scheme in Bath

## 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 bikes. 'Next Bike' now has 16 bike stations across Bath and the national cycle network provides good 'off-road' connections with Radstock, Frome, Bristol, Bradford-on-Avon and Trowbridge among other places.

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 2017. 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.

Bath & North East Somerset Council propose to declare two new AQMAs in the Temple Cloud area and Farrington Gurney area (see Appendix F).

## 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 2017 – 45 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 - 2017 – 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 2017 – 37 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 2017 - 37 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 |

☒ **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 maintained an extended monitoring programme revealing additional areas of exceedance, and carried out additional monitoring studies in other areas of concern. The Council expects to consult on and adopt a new Air Quality Action Plan for Bath during 2017.*

1. *The extended monitoring programme has highlighted new and previously undiscovered areas of exceedance in Whitchurch and Temple Cloud. We agree that monitoring should continue for a further year before deciding an outcome for Whitchurch.*

   Monitoring continues at 4 sites in Whitchurch. The annual average concentrations of nitrogen dioxide in 2017 remain below the objective level.

2. *It will be helpful if tables of monitoring results can be ordered by AQMA, and linked to the AQMA maps to assist in the appraisal process.*

   The tables and maps are ordered by area.

3. *The results for Temple Cloud are sufficient to progress towards declaring a new AQMA in this area. Section 3.41 of Defra's latest Technical Guidance LAQM TG(16) outlines the process for declaration of AQMAs based on ASR findings. The Council should consider the alternatives, particularly whether it may be appropriate to proceed with a fast track application for declaration.*

   A consultation on the AQMA boundary was completed in March 2018 and declaration is in progress with the development of the Air Quality Action Plan and consultation scheduled for autumn of this year.

4. *As detailed in last year's appraisal, we continue to recommend that the Council should re-appraise further options for achieving the air quality objectives for nitrogen dioxide within the planned update to the Bath AQAP.*

   Since the submission of the 2017 Annual Status Report[8], development of the Bath Air Quality Action Plan continued with a consultation in September 2017. Furthermore in July 2017, the Council was served a

[8] Bath & North East Somerset Council, 2017 Air Quality Annual Status Report

letter of Direction to produce a Clean Air Plan to achieve compliance with Limit Values in the shortest possible time, or by 2021 at the latest. Once the Clean Air Plan Preferred Option has been identified, the Bath Air Quality Action Plan (that includes longer term measures) will be finalised (2019).

5. *Air quality levels throughout the city do not appear to be improving at a rate seen elsewhere in the country. This suggests that the particular problems that are described in the report, including high level of HGVs serving local businesses, diesel buses in congested streets, and tourist coaches are all significant issues within Bath.*

   The development of the Clean Air Plan and Air Quality Action Plan include detailed analysis of the impacts of these vehicle types and the Strategic Outline Case[9] has identified that the preferred option will include one of the following Clean Air Zone types as part of a wider package, which includes other non-charging measures:

   - Type B Clean Air Zone (buses, coaches, taxis and HGVs)
   - Type C Clean Air Zone (buses, coaches, taxis, HGVs and LGVs)
   - Type D Clean Air Zone (buses, coaches, taxis, HGVs, LGVs and cars)

6. *On the basis that expected reductions in air quality are not evident, we suggest that the Council may wish to consider further detailed assessments within the development of the next stage of the Action Plan, that should include measures to address the main sources of pollution in the AQMAs.*

   The technical work from the development of the Clean Air Plan will inform the Bath Air Quality Action Plan.

7. *We suggest that the process for developing a new Action Plan as described in the latest Technical Guidance LAQM TG(16) should be consulted. We consider that the approach taken to developing the new Action Plan is particularly important.*

8. *Section 2.09 of LAQM TG(16) suggests:*
   *There are some key common requirements for the development of an effective AQAP:*
   *1) Develop the AQAP in stages;*

[9] Bath and North East Somerset Council Clean Air Plan: Strategic Outline Case, 2018

*2) Undertake appropriate local monitoring and assessment (source apportionment);*
*3) Decide what level of actions are required;*
*4) Establish links to other key policy areas / strategies;*
*5) Establish a Steering Group with key stakeholder groups at an early stage;*
*6) Undertake measures selection and impact assessment;*
*7) Agree monitoring and evaluation of success; and*
*8) Undertake consultation.*

*The following comments made in last year's report are still relevant and repeated below.*

9. *A strategic approach to managing transport emissions across the city is required, if the required levels of emissions reductions are to be achieved. If the AQAP can be re-integrated with the Local Transport Plan, this may provide an incentive to continue to co-ordinate action on air quality measures.*
10. *It is recommended that further measures are considered within the revised action plan, that have the potential to achieve the required level of emissions reductions at hotspot locations, and to achieve the air quality objectives within agreed timescales. The Council may find it helpful to review the source apportionment and required levels of emissions from road traffic in pollution hotspots. It is likely that there will be a significant relationship between traffic congestion and hotspot locations, further measures need to be based on a clear understanding of current and future transport management within the city.*
11. *Reference should be made to the procedures highlighted within the new Technical Guidance LAQM TG16, for further development of action plan measures, taking note of the correct use of EU categories, reduction targets and performance indicators.*
12. *Updates to action plans for inclusion in future ASR reports should use the format of Table 2.2 in the ASR Template, so that the progress on developing and implementing AQAP measures within specified timescales can be clearly recorded. It will be helpful in further updates to the ASR measures table, if details on sub-measures can be listed, as the aim within the AQAP tables is to provide a clear picture of how AQAP measures are being progressed.*

Bath and North East Somerset Council has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air

quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- The Council continued its 'options generation' community engagement events for the Bath Air Quality Action Plan in the first half of 2017. Once a long list of options had been generated in collaboration with public stakeholder groups, the wider public consultation took place over a 6 week period in late summer.
- In July 2017, the Council received a letter of Direction from the Joint Air Quality Unit (Dr Therese Coffey MP and Jesse Norman MP) that imposed a legal duty on the authority to reduce nitrogen dioxide levels to meet EU limit values of 40 micrograms per cubic metre in the shortest time possible or by 2021. In response to the Direction and following confirmation of funds, a Project Team and Project Board were set up, together with the appointment of a Project Manager and Consultants. At the time of writing Bath and North East Somerset Council are on schedule and have completed and agreed the Strategic Outline Case with the Joint Air Quality Unit and the technical work for the Outline Business Case is in progress.
- Bath and North East Somerset Council were part of a successful consortium bid submitted late 2017 for the Clean Bus Technology Fund. This includes 29 buses in B&NES being upgraded to Euro VI standard on a number of Bath and inter-urban services:
    - service 3 on Bathford - London Road – City – Wellsway – Foxhill) (10 buses)
    - service X39 on Bristol – Saltford –Bath (12 buses)
    - service 17 in Keynsham (7 buses)
- The Council have increased the number of electric and low emission hybrid pool cars for staff in Bath and Keynsham (4 electric and 3 hybrid cars) that are available to staff between 7am and 8pm on weekdays. They are also available for public hire outside of these hours in the evenings and weekends.
- In 2017 the Council also increased its electric van fleet to 4 vehicles with a further 4 on order at the time of writing.

- The Council's Placemaking plan was formerly adopted in July 2017 which includes: *'POLICY ST7: Transport Requirements for Managing Development…2 In the case of new development proposals, facilities for charging plug-in and other ultra-low emission vehicles will be sought where practicable.'*
- The inaugural 'Keynsham Cycling Campaign' was held in December 2017 in partnership with Transition Keynsham, to encourage more cycling in Keynsham and the surrounding area.
- The Keynsham High Street one way 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 of 25%. Nitrogen dioxide 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% (slight increase at Rock Road).
- From the 14 cycle hire stations in Bath, there were an average of 670 hires per month, up to the end of December 2017.
- A new parking strategy was developed in 2017 and included the following objective:

  *'Objective PSO 2 Developments within Bath and North East Somerset should provide electric vehicle charging points in accordance with the following standards;*

  *Residential developments with shared car parks:*

  *-passive provision for 10% spaces*

  *Residential developments with individual parking*

  *–passive provision within each property*

  *Commercial developments – active provision in 5% car parking spaces (*http://www.bathnes.gov.uk/sites/default/files/parking_strategy_summary.pdf)
- The idea of differential parking charges for vehicles with lower emissions was explored in a report commissioned by the Council in 2017 to inform the

Parking Strategy. Although no policy on differential parking charges has yet been adopted, the parking strategy states:

*'Differential charging could be considered as a tool to further discourage un necessary car trips to the city centre and improve air quality.'*

- The Council has achieved Mode Shift Stars accreditation (national awards scheme), which is a tool for schools to *'recognise schools that have demonstrated excellence in supporting cycling, walking and other forms of sustainable travel.'* Free support is available from the Council's full-time School Travel Plan Officer who can deliver 1to1 training sessions, offer advice on how to mitigate School travel and transport issues through soft measures (behaviour change) and support schools through the Modeshift STARS accreditation application process.
- A Clean Air Day was held at St Andrews C of E Primary School in Bath that took a whole school approach to improving air quality, reducing exposure to air pollution, and encouraging active travel. Activities included extra air pollution monitoring with 10 diffusion tubes and an AQMesh monitor. Data was presented to the school to show the effects of the initiatives on pollution. Council officers attended the school on this day and delivered lessons to each year group on air quality. The pupils took part in a poster competition that helped raise awareness and get the message to parents in order to encourage them to leave the car at home whenever possible. A walking bus pilot took place with 30 children and parents in attendance. The mascot 'Percy the pollution parrot' attended the walking pilot and lessons. The pupils also took part in a musical rap about air pollution and how to reduce it and partake in active travel. The Council intend to use this pilot to produce a Clean Air Schools pack to roll out to other schools in the area.

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

- As part of the National Clean Air Plan work:
    - Public engagement events
    - Coach operator engagement
    - Bus operator engagement
    - Taxi operator and driver engagement

    - Technical assessments for Outline Business Case
    - Completion of the Outline Business Case
    - Outline Business Case public consultation
    - Identification of the Final Preferred Option for the Clean Air Plan by end of December 2018
    - Completion of the Full Business Case
- Taxi licensing policy review to enable use of electric vehicles and lower emission vehicles
- Submission of Ultra Low Emission Bus bid
- Implementation of last mile freight delivery scheme using electric vans
- Continued support for Bath Clean Air Champions carrying out anti-idling campaign
- Installation of a variable message sign on the southbound A46 approach to Bath in order to minimise circulatory traffic, encourage use of park and rides and reduce emissions
- Implementation of an electric cycle hire scheme in Bath

The Strategic Outline Business Case technical work indicates that the implementation of a Clean Air Zone as part of a package of measures will enable ambient nitrogen dioxide emissions to fall below the 40 microgram per cubic metre annual average objective level by 2021.

Bath and North East Somerset's priorities for the coming year are for the completion of the Full Business Case for the Clean Air Plan. The principal challenges and barriers to implementation that Bath and North East Somerset anticipates facing include: establishing consensus and agreement for the preferred option for the Clean Air Plan both from the Council's political administration and the Joint Air Quality Unit within the allotted time.

Progress on the following Bath Air Quality Action Plan has been slower than expected due to the postponement necessitated by the Clean Air Plan work. The Clean Air Plan work and funding from the Joint Air Quality Unit has enabled extensive technical work that would not have been possible with the resources

allocated for the Bath Air Quality Action Plan alone. It is important for the validity of the Bath Air Quality Action Plan that it takes into account the findings of the Clean Air Plan technical work before a final plan is adopted. 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.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance by 2021, Bath and North East Somerset Council anticipates that further additional measures (not yet prescribed) will be required in subsequent years to achieve compliance and enable the revocation of the Bath Air Quality Management Area.

## 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. | 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. |
| 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 eg May 2013 - 115 deliveries to consolidation centre and 23 EV deliveries from centre. 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. | Ongoing. | 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 |
| 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. |

| 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 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. | 2018 | Over 15,000 hires between June 2014 and June 2016. 877 users per month. Electric bikes to be included in 2017/18. |
| 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. | 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. Potential hurdles include a shifting emphasis towards home-charging and on-street charging solutions as vehicle ranges increase and uptake becomes more mainstream. |
| 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 | | |
| 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 | | |

| 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 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. 4 ULEVs already purchased and operating in B&NES. | 2021 | No progress has been made re emergency fleet. |
| 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. Fleet monitored as part of Low Emission Zone Feasibility Study. Clean Bus Technology Fund paid for retrofitting of 35 buses across the West of England to Euro 5 or 6. At least 10 Euro 6 buses are in operation in Bath and a detailed review of the fleet will be undertaken as part of the Clean Air Zone proposals. | 2026 | Full audit of fleet planned as part of Clean Air Zone proposals. |

| 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 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 | No progress since previous ASR 2016. No progress on HGVs, but 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) to increase the exhaust back pressure on the engine, increasing temperatures and allowing the existing SCR system to operate more effectively, reducing nitrogen oxides. | 2017 | |

| 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 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 | Work currently underway to add further live data from AQMesh monitors to air quality dials on the website. | 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 office 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 is imminent. | 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. | | |

| 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 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 subject to emerging GUL programme. | 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. Awaiting outcome of one-way trial. | | |

| 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 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 | No progress | 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 | 2023 | |

| 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 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 | Recently submitted a consultation response (June 2017) to the DEFRA consultation: 'Improving air quality: national plan for tackling nitrogen dioxide in our towns and cities' . | | |
| 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. | 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 | | |

| 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 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. |
| 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. | | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| 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 | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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. |
| 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 | |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| 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 | Recently 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. |
| 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[10] (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[11] (particulates under 2.5 micrometers in diameter as opposed to nitrogen dioxide)' for Bath and North East Somerset Council in 2016 (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 4.5% and 5.3% 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 9 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)[12].

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 workers. 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.

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

**Bath & North East Somerset Council**

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.

### 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 2017.

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.

### Non-Automatic Monitoring Sites

Bath & North East Somerset Council undertook non-automatic (passive) monitoring of $NO_2$ at 107 sites during 2017. Table A.2 in Appendix A shows the details of the sites.

32 new sites were introduced in 2017, there were 6 specific study areas and a further 13 monitors to respond to public requests and to check other key locations. These were:

- Whitchurch
  - DT120 - Whitchurch 6 – School facade
- Temple Cloud
  - DT131 - Temple Cloud 6 – on Cameley Road
  - DT132 - Temple Cloud 7 – on Meadway
  - DT133 - Temple Cloud 8 – close to new development
- Farrington Gurney
  - DT126 - Farrington Gurney 1 – A37
  - DT134 - Farrington Gurney 2 – A37 façade
  - DT136 - Farrington Gurney 3 – by Farrington Inn
  - DT137 - Farrington Gurney 4 – Rush Hill
  - DT138 - Farrington Gurney 5 – A362
- Pensford
  - DT119 - Pensford 1 – School
  - DT125 - Pensford 2 – Pensford Hill
- Keynsham
  - DT117 - Keynsham – Rubens Close
  - DT118 - Keynsham – Wellsway
  - DT141 - Keynsham – A4
- Bath Centre
  - DT121 - Lower Borough
  - DT122 - Stall Street
  - DT123 - Beau Street
  - DT124 - Bath Street
- Other sites
  - DT127 - Camden – Gays Hill (moved from Lower Camden Place)
  - DT128 - Westfield - Wells Road 1 – close to St Peter's View (moved from Longfellow Road)
  - DT129 - Westfield – Wells Road 2 – close to Welton Road
  - DT130 - Batheaston – London Road West C
  - DT135 - Rosewell Court
  - DT139 - High Littleton 1 – School façade
  - DT140 - High Littleton 2 – close to the Post Office
  - DT142 - Prior Park Road
  - DT143 - Rackfield Place
  - DT144 - Midsomer Norton – Radstock Road
  - DT145 - Lansdown Road (moved from Lansdown Crescent)
  - DT146 - Timsbury
  - DT147 - Terrace Walk

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 2017 Bath & North East Somerset also carried out monitoring at four locations using AQ Mesh samplers. They monitor $NO_2$, $PM_{10}$ and $PM_{2.5}$ using electrochemical sensors giving real-time results every 15 minutes. In 2017 one site was co-located with a continuous analyser at Chelsea House (CM4) for a period during 2017 following installation of a new sensor. 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.

### 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 2017 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. The London Road (CM1) monitoring site exceeded the annual average

objective but is already within the AQMA. All sites measured values less than 200 µg/m$^3$, therefore the hourly objective was met.

The trend data shows that 2017 was not a peak year for $NO_2$, with monitoring results being lower than or the same as 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 monitor has moved 2m further from the kerb. 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[13]. In 2017, 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. The raw monthly diffusion tube monitoring data is shown in Appendix B.

#### *Existing Sites*

The results from existing sites corrected using the local bias factor and annual corrections for sites with low data capture show that in 2017 the annual average objective was exceeded at the following locations:

- DT88 - Angel Place
- DT90 - Anglo Terrace
- DT62 - Argyle Terrace
- DT14 - Bathwick Street
- DT03 - Broad Street
- DT51 - Cleveland Place West
- DT42 - Dorchester Street
- DT66 - Keynsham – High Street A
- DT55 - Lambridge
- DT43 - St James' Parade
- DT09 - Upper Bristol Road
- DT60 - Victoria Buildings
- DT52-54 - Walcot Terrace
- DT20 - Wells Road
- DT21 - Wells Road/Upper Oldfield Park

All the existing monitoring sites which exceed the $NO_2$ annual average objective are within an AQMA.

[13] 'Local Air Quality Management – Technical Guidance (TG.16) April 2016' (https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf)

In addition to the above sites, there are also 16 other sites (identified below) having levels which are between 36-40 µg/m$^3$. All the monitoring sites except Keynsham – Bath Hill South and Newbridge Hill are within an AQMA. Newbridge Hill is below 36 µg/m$^3$ at the residential façade. Bath & North East Somerset Council will continue to monitor at Bath Hill South and take action if the concentrations increase.

- DT37 - Charlotte Street
- DT05 - Gay Street - top
- DT04 - George Street
- DT01 - High Street/Guildhall
- DT45 - James Street West
- DT67 - Keynsham – Somerfield
- DT107 - Keynsham – Bath Hill South
- DT46 - Little Stanhope Street
- DT11 - London Road
- DT39 - Manvers Street
- DT61 - Morley Terrace
- DT34 - Newbridge Road
- DT35 - Newbridge Hill
- DT48 - Paragon
- DT75 - Salford – The Crown
- DT16 - Warminster Road

The trends in diffusion tube monitoring since 2006 are shown in Figures A.2-A.9 in Appendix A. Overall, monitoring results of $NO_2$ in 2017 were lower than in 2016 by an average of 10% across the network. Results are showing a general downward trend at most locations.

Monitoring of $NO_2$ at Widcombe High Street (DT18) has shown 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.

***Whitchurch Study***

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. Figure E.8 in Appendix E is a map showing the locations of the monitoring sites. The

results from 2017 show that levels are just above the objective at 1 location, but all locations were below 40 µg/m$^3$ at the façade of properties.

A decision has been taken not to declare an AQMA at this time. Monitoring will continue at 3 sites in Whitchurch with concentrations at or above 34 µg/m$^3$.

***Temple Cloud Study***

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.9 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.

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 and 2 sites were also likely to exceed the 1-hour objective as they were above 60 µg/m$^3$. At the property facades, 3 sites were above the annual average objective and one site was above 60 µg/m$^3$. The results from the monitoring sites located on Temple Inn Lane and Cameley Road were below the objective.

Based on the results of the survey, an AQMA will be declared for both the annual average and 1-hour $NO_2$ objectives for the A37 in Temple Cloud. The Council consulted on the extent of the area in Spring 2018, the proposed AQMA will be declared at the earliest opportunity. The proposed boundary of the AQMA is shown in Figure F.2.

***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 (Figure E.10 in Appendix E).

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 3 locations, this reduced to 2 locations at the property facades.

Based on the results of the survey, an AQMA will be declared for the annual average $NO_2$ objective for the A37 in Farrington Gurney. The Council consulted on the extent of the area in Spring 2018, the proposed AQMA will be declared at the earliest opportunity. The proposed boundary of the AQMA is shown in Figure F.4.

***Pensford***

Following high concentrations of $NO_2$ being identified in Temple Cloud in 2016, other potential areas along the A37 were investigated including Pensford. 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 (Figure E.11 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.

***Keynsham One-way Trial***

As part of the Getting around Keynsham Transport Strategy, the Council is trialling a one-way system in the centre of Keynsham. 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.5 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 initial 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. The trial is currently still in place and final results will be known in 2018.

***Bath Centre***

Monitoring was put in 4 locations (DT121-124) in the centre of Bath following a restriction on the vehicular access to the area (Figure E.2 in Appendix E). An area of the main shopping street was pedestrianised between 10am-6pm. The results shown in Table A.2 show that all the monitoring locations after bias and annual corrections are below 40 µg/m$^3$. No pre-scheme monitoring was available for comparison.

***Other new sites***

In 2017 a further 16 diffusion tubes were installed around the authority. The results shown in Table A.2 show that all the monitoring locations after bias and annual corrections are below 40 µg/m$^3$ at the building façade. Prior Park Road is close to the objective, monitoring is continuing to obtain a full years data before a decision on extending the AQMA is made.

Monitoring at 5 sites was < 25 µg/m$^3$ at the façade and the short-term study has ended:

- DT117 - Keynsham – Rubens Close
- DT135 - Rosewell Court
- DT139 - High Littleton 1
- DT140 - High Littleton 2
- DT146 - Timsbury

Monitoring at 3 sites was < 25 µg/m$^3$ at the façade, monitoring has moved to consider an alternative hotspot:

- DT127 - Camden – Gays Hill (moved from Lower Camden Place)
- DT128 - Westfield – Wells Road 1 – (moved from Longfellow Road)
- DT129 - Westfield – Wells Road 2

Monitoring at 8 sites is continuing to obtain further information:

- DT118 - Keynsham – Wellsway
- DT130 - Batheaston – London Road West C
- DT141 - Keynsham – A4
- DT142 - Prior Park Road
- DT143 - Rackfield Place
- DT144 - Midsomer Norton – Radstock Road
- DT145 - Lansdown Road (moved from Lansdown Crescent)
- DT147 - Terrace Walk

***AQMesh Results***

In 2017 the AQMesh analysers were located at Sydney Place, Chelsea House, Whitchurch and Keynsham High Street. The results from these locations are shown in Table D.3. The AQMesh sensors and firmware were updated in May 2017.

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

At Sydney Place (old sensor), the $NO_2$ concentration exceeds the air quality objective at the roadside, however using the $NO_2$ fall off calculator it is below the objective at the façade of the residential property. The $PM_{10}$ 24 hour mean is close to the objective and only calculated for 4 months so possible indicates and exceedance at the roadside. At Sydney Place (new sensor), the $NO_2$ and $PM_{10}$ objectives are not exceeded.

In Whitchurch, the $NO_2$ concentration exceeds the air quality objective at the roadside, however using the $NO_2$ fall off calculator it is below the objective at the façade of the residential property. The $PM_{10}$ objectives are not exceeded.

In Keynsham (High Street), the $NO_2$ and $PM_{10}$ objectives are not exceeded.

## Particulate Matter ($PM_{10}$)

Monitoring for $PM_{10}$ has been carried out at 2 sites during 2017 using BAM1020 analysers. The data has been corrected to Gravimetric equivalent by dividing by 1.2. QA/QC procedures are described in Appendix D.

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 2017 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.

The peaks above the 24 hour objective in January and February 2017 were due to weather conditions, wood burning and continental air. These were also seen in other areas of the UK. A peak was also seen on Bonfire night when the pollution from local bonfires and fireworks coincided with calm conditions (Figure 3.1).

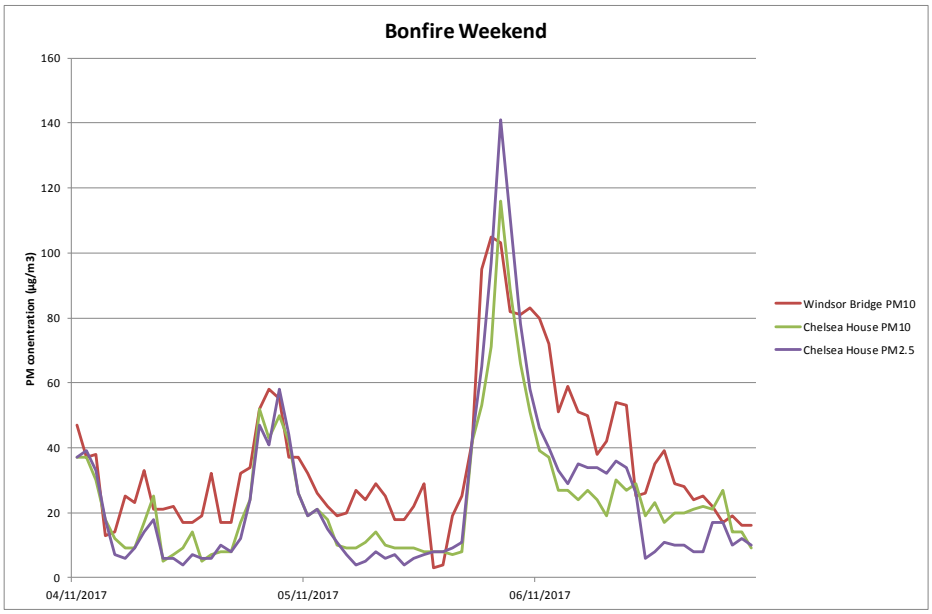



**Figure 3.1 – Hourly Particulate Matter monitoring on Bonfire weekend**

## 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 PM2.5 annual mean concentrations for the past 3 years.

The results show that concentrations of $PM_{2.5}$ remain at similar levels over the last 2½ 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 | 9 | 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** | | | | | | | | | |
| DT01 | High Street/ Guildhall | Roadside | 375108 | 164866 | $NO_2$ | YES | 2 | 1 | NO | 2.8 |
| DT03 | Broad Street (new) | Roadside | 374992 | 165173 | $NO_2$ | YES | 1.7 | 1.3 | NO | 2.6 |
| DT03 | Broad Street | Kerbside | 375008 | 165145 | $NO_2$ | YES | 2 | 0.5 | NO | 2.5 |
| DT04 | George Street | Kerbside | 374899 | 165159 | $NO_2$ | YES | 3 | 1 | NO | 2.3 |
| DT05 | Gay Street – Top | Roadside | 374797 | 165161 | $NO_2$ | YES | 3 | 1 | NO | 2.6 |
| DT08 | Windsor Bridge | Roadside | 373518 | 165124 | $NO_2$ | YES | 0 | 3.5 | NO | 2.25 |
| DT09 | Upper Bristol Rd | Roadside | 373993 | 165174 | $NO_2$ | YES | 5 | 1 | NO | 2.6 |
| DT11 | London Road | Roadside | 375533 | 165897 | $NO_2$ | YES | 3 | 1 | NO | 2.7 |
| DT13 | Daniel Street | Urban Centre | 375544 | 165331 | $NO_2$ | YES | 3 | N/A | NO | 2.7 |
| DT14 | Bathwick Street | Roadside | 375602 | 165365 | $NO_2$ | YES | 1 | 1 | NO | 2.5 |
| DT15 | Beckford Road | Roadside | 375733 | 165414 | $NO_2$ | YES | 7 | 1 | NO | 2.7 |
| DT16 | Warminster Road | Roadside | 376063 | 165492 | $NO_2$ | YES | 18 | 4 | NO | 2.4 |
| DT17 | Widcombe School | Roadside | 375634 | 164406 | $NO_2$ | YES | 5 | 1 | NO | 2.6 |
| DT18 | Widcombe High Street | Roadside | 375414 | 164216 | $NO_2$ | YES | 0 | 5 | NO | 2.5 |
| DT20 | Wells Road | Roadside | 374760 | 164310 | $NO_2$ | YES | 0 | 1.5 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT21 | Wells Road/Upper Oldfield Park | Roadside | 374454 | 164202 | $NO_2$ | YES | 3 | 1 | NO | 2.7 |
| DT23 | Alexandra Park | Urban Background | 375105 | 163991 | $NO_2$ | NO | N/A | N/A | NO | 3.3 |
| DT26 | Upper Wellsway | Roadside | 373576 | 161908 | $NO_2$ | NO | 0 | 3 | NO | 2 |
| DT34 | Newbridge Road | Roadside | 373092 | 165106 | $NO_2$ | YES | 5 | 1 | NO | 2.3 |
| DT35 | Newbridge Hill | Roadside | 373090 | 165219 | $NO_2$ | NO | 7 | 2 | NO | 2.4 |
| DT37 | Charlotte Street | Roadside | 374622 | 164994 | $NO_2$ | YES | 3 | 1 | NO | 2.7 |
| DT39 | Manvers Street | Roadside | 375247 | 164591 | $NO_2$ | YES | 3 | 2 | NO | 2.3 |
| DT42 | Dorchester Street | Kerbside | 375230 | 164383 | $NO_2$ | YES | 2 | 0.5 | NO | 2.7 |
| DT43 | St James' Parade (new) | Kerbside | 375053 | 164426 | $NO_2$ | YES | 2.6 | 0.9 | NO | 2.87 |
| DT43 | St James' Parade | Roadside | 375053 | 164418 | $NO_2$ | YES | 2 | 1 | NO | 2.8 |
| DT45 | James Street West | Roadside | 374697 | 164763 | $NO_2$ | YES | 0 | 5 | NO | 2.7 |
| DT46 | Little Stanhope Street | Roadside | 374490 | 164971 | $NO_2$ | YES | 0 | 2 | NO | 2.6 |
| DT47 | Lansdown Crescent | Roadside | 374800 | 165708 | $NO_2$ | YES | 1 | 2 | NO | 2.5 |
| DT48 | Paragon | Roadside | 375044 | 165527 | $NO_2$ | YES | 1 | 1 | NO | 2.6 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT50 | Thomas Street | Urban Centre | 375318 | 165812 | $NO_2$ | YES | 0 | N/A | NO | 2.9 |
| DT51 | Cleveland Place West | Roadside | 375255 | 165718 | $NO_2$ | YES | 2.9 | 3 | NO | 2.65 |
| DT52 | Walcot Terrace | Roadside | 375462 | 165843 | $NO_2$ | YES | 0 | 3 | YES | 2.5 |
| DT53 | Walcot Terrace | Roadside | 375462 | 165843 | $NO_2$ | YES | 0 | 3 | YES | 2.5 |
| DT54 | Walcot Terrace | Roadside | 375462 | 165843 | $NO_2$ | YES | 0 | 3 | YES | 2.5 |
| DT55 | Lambridge | Roadside | 376451 | 166502 | $NO_2$ | YES | 0 | 4 | NO | 2.6 |
| DT60 | Victoria Buildings | Roadside | 374039 | 164760 | $NO_2$ | YES | 2 | 2 | NO | 2.9 |
| DT61 | Morley Terrace | Roadside | 373484 | 164846 | $NO_2$ | YES | 0 | 3 | NO | 2.5 |
| DT62 | Argyle Terrace | Roadside | 373211 | 164743 | $NO_2$ | YES | 4 | 3 | NO | 2.8 |
| DT84 | Bear Flat | Roadside | 374604 | 163806 | $NO_2$ | NO | 5.7 | 1.85 | NO | 2.25 |
| DT85 | RUH – North | Roadside | 373073 | 165983 | $NO_2$ | NO | 7 | 1.5 | NO | 2.25 |
| DT87 | Oak Street | Roadside | 374702 | 164414 | $NO_2$ | YES | 0 | 2.65 | NO | 2.25 |
| DT88 | Angel Place | Roadside | 374884 | 164348 | $NO_2$ | YES | 0 | 2.65 | NO | 2.25 |
| DT90 | Anglo Terrace | Roadside | 375288 | 165758 | $NO_2$ | YES | 2.5 | 1.6 | NO | 2.25 |
| DT93 | Lower Camden Place | Kerbside | 375070 | 165900 | $NO_2$ | NO | 3.3 | 0.23 | NO | 2.3 |
| DT121 | Lower Borough Walls | Roadside | 375007 | 164587 | $NO_2$ | NO | 5 | 4.5 | NO | 2.5 |
| DT122 | Stall Street | Roadside | 375033 | 164687 | $NO_2$ | NO | 4 | 2.5 | NO | 2.5 |
| DT123 | Beau Street | Kerbside | 374967 | 164695 | $NO_2$ | NO | 0.5 | 0.5 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT124 | Bath Street | Roadside | 374993 | 164648 | $NO_2$ | NO | 4 | 1 | NO | 2.2 |
| DT127 | Camden - Gays Hill | Kerbside | 375120 | 165973 | $NO_2$ | NO | 4.5 | 0.5 | NO | 2.25 |
| DT135 | Rosewell Court | Kerbside | 374754 | 164794 | $NO_2$ | NO | 5.4 | 0.6 | NO | 2.6 |
| 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 |
| | **Bathampton** | | | | | | | | | |
| DT91 | Bathampton High Street | Roadside | 377683 | 166408 | $NO_2$ | NO | 0 | 1.1 | NO | 2.3 |
| | **Batheaston** | | | | | | | | | |
| DT58 | Batheaston – London Road West A | Roadside | 377643 | 167365 | $NO_2$ | NO | 0 | 1 | NO | 2.5 |
| DT94 | 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 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| | **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 |
| 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 |
| | **High Littleton** | | | | | | | | | |
| DT139 | High Littleton 1 | Roadside | 364519 | 158007 | $NO_2$ | NO | 0 | 8.5 | NO | 2.3 |
| DT140 | High Littleton 2 | Roadside | 364537 | 158396 | $NO_2$ | NO | 3.8 | 1.3 | NO | 2.6 |
| | **Keynsham** | | | | | | | | | |
| DT33 | Keynsham - (Kelston Road) | Urban Centre | 364803 | 168237 | $NO_2$ | NO | 8 | 1 | NO | 2.6 |
| DT63 | Keynsham – Station Road | Roadside | 365409 | 168846 | $NO_2$ | YES | 3 | 1 | NO | 2.7 |
| DT64 | Keynsham – Charlton Rd B | Roadside | 365305 | 168657 | $NO_2$ | YES | 4 | 1 | NO | 2.8 |
| DT65 | Keynsham - Charlton Rd A | Roadside | 365399 | 168701 | $NO_2$ | YES | 3 | 1 | NO | 2.7 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT66 | Keynsham – High Street A | Roadside | 365360 | 168815 | $NO_2$ | YES | 1 | 1 | NO | 2.5 |
| DT67 | Keynsham - Somerfield | Roadside | 365457 | 168496 | $NO_2$ | YES | 2 | 1 | NO | 2.8 |
| DT68 | Keynsham - Temple St | Roadside | 365489 | 168363 | $NO_2$ | NO | 0 | 3 | NO | 2.8 |
| DT69 | Keynsham – Rock Road | Roadside | 365428 | 168435 | $NO_2$ | NO | 0 | 2 | NO | 3 |
| DT70 | Keynsham – Bath Hill | Roadside | 365496 | 168521 | $NO_2$ | YES | 1 | 4 | NO | 2.3 |
| 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 |
| DT117 | Keynsham - Rubens Close | Urban Centre | 366126 | 168411 | $NO_2$ | NO | 8 | 2 | NO | |
| DT118 | Keynsham - Wellsway | Roadside | 365771 | 168174 | $NO_2$ | NO | 1.3 | 1.3 | NO | 2.55 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT141 | Keynsham - A4 | Roadside | 366921 | 168096 | $NO_2$ | NO | 13 | 1.4 | NO | 2.4 |
| | **Midsomer Norton** | | | | | | | | | |
| DT29 | MSN High Street | Kerbside | 366466 | 154190 | $NO_2$ | NO | 3 | 1 | NO | 3 |
| DT144 | MSN - Radstock Road | Roadside | 366987 | 154632 | $NO_2$ | NO | 3.1 | 1.1 | NO | 2.5 |
| | **Pensford** | | | | | | | | | |
| DT119 | Pensford 1 | Roadside | 361805 | 163797 | $NO_2$ | NO | 11 | 2.2 | NO | |
| DT125 | Pensford 2 | Roadside | 361780 | 163909 | $NO_2$ | NO | 1.4 | 1.1 | NO | 2.4 |
| | **Radstock** | | | | | | | | | |
| DT27 | Radstock - Fortescue Rd | Roadside | 368876 | 154908 | $NO_2$ | NO | 16 | 2 | NO | 2.7 |
| | **Saltford** | | | | | | | | | |
| DT71 | Saltford Library | Roadside | 368187 | 167117 | $NO_2$ | NO | 11 | 3 | NO | 2.6 |
| DT75 | Saltford - The Crown | Roadside | 368375 | 166988 | $NO_2$ | YES | 0 | 3 | NO | 2.6 |
| DT77 | Saltford - Bath Road | Roadside | 368778 | 166687 | $NO_2$ | YES | 0 | 2 | NO | 2.2 |
| | **Temple Cloud** | | | | | | | | | |
| DT96 | 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 |
| DT110 | Temple Cloud 4 | Roadside | 362262 | 157799 | $NO_2$ | NO | 4 | 1 | NO | 2.05 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| DT111 | Temple Cloud 5 | Roadside | 362234 | 157880 | $NO_2$ | NO | 0 | 1 | NO | 2.4 |
| DT131 | Temple Cloud 6 | Roadside | 362262 | 157709 | $NO_2$ | NO | 8 | 1 | NO | 2.2 |
| DT132 | Temple Cloud 7 | Roadside | 362307 | 158144 | $NO_2$ | NO | 5.4 | 1.6 | NO | 2.5 |
| DT133 | Temple Cloud 8 | Roadside | 362210 | 158069 | $NO_2$ | NO | 5.8 | 1.1 | NO | 2.3 |
| | **Timsbury** | | | | | | | | | |
| DT146 | Timsbury | Roadside | 367086 | 158852 | $NO_2$ | NO | 0.2 | 1 | NO | 1.8 |
| | **Westfield** | | | | | | | | | |
| DT30 | MSN Westfield Primary Sch | Urban Background | 367280 | 153840 | $NO_2$ | NO | 0 | N/A | NO | 2.6 |
| DT128 | Westfield 1 | Roadside | 367359 | 153890 | $NO_2$ | NO | 2.1 | 1.8 | NO | 2.45 |
| DT129 | Westfield 2 | Roadside | 368455 | 154727 | $NO_2$ | NO | 3.6 | 1.8 | NO | 2.5 |
| | **Whitchurch** | | | | | | | | | |
| DT32 | Whitchurch | Roadside | 361242 | 167652 | $NO_2$ | NO | 2.7 | 2.1 | NO | 2.25 |
| DT97 | Whitchurch 1 | Roadside | 361335 | 167431 | $NO_2$ | NO | 5.2 | 1.2 | NO | 2.5 |
| DT98 | Whitchurch 2 | Roadside | 361276 | 167555 | $NO_2$ | NO | 0 | 1.3 | NO | 2.3 |
| DT99 | Whitchurch 3 | Kerbside | 361235 | 167630 | $NO_2$ | NO | 1.75 | 0.9 | NO | 2.4 |
| 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 |
| DT120 | Whitchurch 6 | Urban Centre | 361265 | 167832 | $NO_2$ | NO | 0 | 3 | 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 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| | **Continuous** | | | | | | | | | |
| CM1 | London Road | Roadside | Automatic | 99 | 99 | **57** | **57** | **54** | **48** | **45** |
| CM2 | Guildhall | Roadside | Automatic | 80 | 80 | 37 | 34 | 34 | 34 | 30 |
| CM3 | Windsor Bridge | Roadside | Automatic | 94 | 94 | **46** | 35 | 33 | 33 | 33 |
| CM4 | Chelsea House | Roadside | Automatic | 99 | 99 | 33* | 27 | 31 | 29 | 29 |
| | **Bath** | | | | | | | | | |
| DT01 | High Street/ Guildhall | Roadside | Diffusion Tube | 100 | 58 | **45** | **46** | **40.3** | **40.4** | 36 |
| DT03 | Broad Street | Kerbside | Diffusion Tube | 92 | 92 | **59** | **62** | **57** | **48** | **48** |
| DT04 | George Street | Roadside | Diffusion Tube | 100 | 100 | **44** | **47** | **42** | 39 | 36 |
| DT05 | Gay Street – Top | Roadside | Diffusion Tube | 100 | 100 | **42** | **48** | **40.4** | **41** | 36 |
| DT08 | Windsor Bridge (new) | Roadside | Diffusion Tube | 100 | 100 | - | - | 38 | 37 | 34 |
| DT09 | Upper Bristol Rd | Roadside | Diffusion Tube | 100 | 100 | **47** | **49** | **46** | **47** | **40** |
| DT11 | London Road | Roadside | Diffusion Tube | 86 | 50 | **48** | **51** | **44** | **41** | 38 |
| DT13 | Daniel Street | Urban Centre | Diffusion Tube | 86 | 50 | 30 | 29 | 28 | 27 | 25 |
| DT14 | Bathwick Street | Roadside | Diffusion Tube | 100 | 100 | **50** | **54** | **51** | **45** | **44** |
| DT15 | Beckford Road | Roadside | Diffusion Tube | 100 | 100 | **43** | **43** | 35 | 37 | 34 |
| DT16 | Warminster Road | Roadside | Diffusion Tube | 100 | 100 | **40** | **43** | 37 | 39.6 | 36 |
| DT17 | Widcombe School | Roadside | Diffusion Tube | 100 | 100 | 35 | 38 | 39 | 38 | 35 |
| DT18 | Widcombe High Street | Roadside | Diffusion Tube | 100 | 100 | - | - | 31 | 28 | 28 |

| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| DT20 | Wells Road | Roadside | Diffusion Tube | 100 | 100 | - | - | **62** | **55** | **52** |
| DT21 | Wells Road/Upper Oldfield Park | Roadside | Diffusion Tube | 100 | 100 | **48** | **50** | **44** | **47** | **43** |
| DT23 | Alexandra Park | Urban Background | Diffusion Tube | 100 | 100 | 17 | 14 | 15 | 14 | 13 |
| DT26 | Upper Wellsway | Roadside | Diffusion Tube | 100 | 100 | 30* | 39.6 | 39 | 39 | 32 |
| DT34 | Newbridge Road | Roadside | Diffusion Tube | 100 | 100 | **44** | **49** | **42** | **40.2** | 38 |
| DT35 | Newbridge Hill | Roadside | Diffusion Tube | 100 | 58 | **46** | **45** | **43** | **41** | 38 |
| DT37 | Charlotte Street | Roadside | Diffusion Tube | 92 | 92 | **43** | **44** | **44** | **46** | 38 |
| DT39 | Manvers Street | Roadside | Diffusion Tube | 92 | 92 | **49** | **54** | **50** | **44** | 38 |
| DT42 | Dorchester Street | Kerbside | Diffusion Tube | 100 | 100 | **67** | **71** | **73** | **67** | **58** |
| DT43 | St James' Parade | Roadside | Diffusion Tube | 100 | 42 | **57** | **58** | **58** | **57** | **44** |
| DT43 | St James' Parade (new) | Kerbside | Diffusion Tube | 100 | 50 | - | - | - | - | **46** |
| DT45 | James Street West | Roadside | Diffusion Tube | 100 | 100 | **45** | **43** | **43** | **44** | 40 |
| DT46 | Little Stanhope Street | Roadside | Diffusion Tube | 100 | 58 | **43** | **41** | **41** | 39.7 | 37 |
| DT47 | Lansdown Crescent | Roadside | Diffusion Tube | 100 | 58 | **41** | **42** | 38 | 38 | 31 |
| DT48 | Paragon | Roadside | Diffusion Tube | 100 | 58 | **48** | **48** | **44** | **42** | 38 |
| DT50 | Thomas Street | Urban Centre | Diffusion Tube | 100 | 58 | 37 | 38 | 38 | 34 | 30 |
| DT51 | Cleveland Place West | Roadside | Diffusion Tube | 100 | 58 | **55** | **58** | **55** | **50** | **45** |

| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| DT52 | Walcot Terrace | Roadside | Diffusion Tube | 100 | 100 | **56** | **58** | **54** | **47** | **44** |
| DT53 | Walcot Terrace | Roadside | Diffusion Tube | 100 | 100 | **57** | **58** | **54** | **48** | **45** |
| DT54 | Walcot Terrace | Roadside | Diffusion Tube | 100 | 100 | **57** | **56** | **53** | **49** | **45** |
| DT55 | Lambridge | Roadside | Diffusion Tube | 100 | 100 | **60** | **64** | **65** | **60** | **46** |
| DT60 | Victoria Buildings | Roadside | Diffusion Tube | 100 | 100 | **57** | **55** | **50** | **52** | **46** |
| DT61 | Morley Terrace | Roadside | Diffusion Tube | 100 | 58 | **46** | **45** | **43** | **40.4** | 38 |
| DT62 | Argyle Terrace | Roadside | Diffusion Tube | 100 | 100 | **45** | **48** | **49** | **48** | **45** |
| DT84 | Bear Flat | Roadside | Diffusion Tube | 92 | 92 | - | - | **43** | **45** | 33 |
| DT85 | RUH – North | Roadside | Diffusion Tube | 100 | 100 | - | - | 36 | 36 | 32 |
| DT87 | Oak Street | Roadside | Diffusion Tube | 100 | 100 | - | - | **43** | 38 | 33 |
| DT88 | Angel Place | Roadside | Diffusion Tube | 100 | 58 | - | - | **55** | **47** | **42** |
| DT90 | Anglo Terrace | Roadside | Diffusion Tube | 83 | 83 | - | - | **73** | **69** | **57** |
| DT93 | Lower Camden Place | Kerbside | Diffusion Tube | 100 | 33 | - | - | - | 36 | 29 |
| DT121 | Lower Borough Walls | Roadside | Diffusion Tube | 92 | 92 | - | - | - | - | 27 |
| DT122 | Stall Street | Roadside | Diffusion Tube | 92 | 92 | - | - | - | - | 36 |
| DT123 | Beau Street | Kerbside | Diffusion Tube | 92 | 92 | - | - | - | - | 29 |
| DT124 | Bath Street | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 28 |
| DT127 | Camden - Gays Hill | Kerbside | Diffusion Tube | 100 | 67 | - | - | - | - | 31 |
| DT135 | Rosewell Court | Kerbside | Diffusion Tube | 100 | 42 | - | - | - | - | 29 |
| DT142 | Prior Park Road | Kerbside | Diffusion Tube | 100 | 42 | - | - | - | - | **41** |
| DT143 | Rackfield Place | Roadside | Diffusion Tube | 80 | 33 | - | - | - | - | 32 |

| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| DT145 | Lansdown Road | Kerbside | Diffusion Tube | 100 | 42 | - | - | - | - | 33 |
| DT147 | Terrace Walk | Roadside | Diffusion Tube | 100 | 25 | - | - | - | - | 34 |
| | **Bathampton** | | | | | | | | | |
| DT91 | Bathampton High Street | Roadside | Diffusion Tube | 83 | 83 | - | - | - | 31 | 29 |
| | **Batheaston** | | | | | | | | | |
| DT58 | Batheaston – London Road West A | Roadside | Diffusion Tube | 100 | 100 | 34 | 38 | 35 | 32 | 29 |
| DT94 | Batheaston – London Road West B | Roadside | Diffusion Tube | 92 | 92 | - | - | - | 34 | 31 |
| DT130 | Batheaston – London Road West C | Roadside | Diffusion Tube | 100 | 67 | - | - | - | - | 32 |
| | **Farrington Gurney** | | | | | | | | | |
| DT126 | Farrington Gurney 1 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | **54** |
| DT134 | Farrington Gurney 2 | Roadside | Diffusion Tube | 100 | 67 | - | - | - | - | **52** |
| DT136 | Farrington Gurney 3 | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | **42** |
| DT137 | Farrington Gurney 4 | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | 28 |
| DT138 | Farrington Gurney 5 | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | 39 |

| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| | **High Littleton** | | | | | | | | | |
| DT139 | High Littleton - school | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | 17 |
| DT140 | High Littleton - Post Office | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | 26 |
| | **Keynsham** | | | | | | | | | |
| DT33 | Keynsham - Kelston Road | Urban Background | Diffusion Tube | 100 | 100 | 18 | 17 | 16 | 16 | 16 |
| DT63 | Keynsham – Station Road | Roadside | Diffusion Tube | 92 | 92 | 33 | 36 | 34 | 34 | 30 |
| DT64 | Keynsham – Charlton Road B | Roadside | Diffusion Tube | 92 | 92 | 39 | 39 | 37 | 38 | 31 |
| DT65 | Keynsham - Charlton Rd A | Roadside | Diffusion Tube | 92 | 92 | 37 | 39 | 35 | 35 | 32 |
| DT66 | Keynsham – High Street A | Roadside | Diffusion Tube | 100 | 100 | **44** | **50** | **47** | **46** | **40** |
| DT67 | Keynsham - Somerfield | Roadside | Diffusion Tube | 92 | 92 | **44** | **46** | **42** | **40** | 37 |
| DT68 | Keynsham - Temple St | Roadside | Diffusion Tube | 100 | 100 | 28 | 28 | 26 | 24 | 22 |
| DT69 | Keynsham – Rock Road | Roadside | Diffusion Tube | 100 | 100 | 29 | 28 | 25 | 26 | 26 |
| DT70 | Keynsham – Bath Hill | Roadside | Diffusion Tube | 100 | 100 | 31 | 36 | 33 | 31 | 29 |
| DT107 | Keynsham - Bath Hill South | Roadside | Diffusion Tube | 67 | 67 | - | - | - | 39.8 | 37 |

| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| DT112 | Keynsham - Ashton Way | Roadside | Diffusion Tube | 92 | 92 | - | - | - | 26 | 26 |
| DT113 | Keynsham - West View Road | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 21 | 18 |
| DT114 | Keynsham - Victoria Church | Kerbside | Diffusion Tube | 100 | 100 | - | - | - | 35 | 30 |
| DT115 | Keynsham - High Street B | Roadside | Diffusion Tube | 75 | 75 | - | - | - | 33 | 31 |
| DT116 | Keynsham - Fish Bar | Roadside | Diffusion Tube | 92 | 92 | - | - | - | 28 | 28 |
| DT117 | Keynsham - Rubens Close | Urban Centre | Diffusion Tube | 100 | 25 | - | - | - | - | 17 |
| DT118 | Keynsham - Wellsway | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 28 |
| DT141 | Keynsham A4 | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | 36 |
| | **Midsomer Norton** | | | | | | | | | |
| DT29 | MSN High Street | Roadside | Diffusion Tube | 100 | 58 | 24 | 22 | 21 | 20 | 19 |
| DT144 | MSN - Radstock Road | Roadside | Diffusion Tube | 100 | 42 | - | - | - | - | 33 |
| | **Pensford** | | | | | | | | | |
| DT119 | Pensford 1 | Roadside | Diffusion Tube | 100 | 58 | - | - | - | - | 16 |
| DT125 | Pensford 2 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | - | 33 |
| | **Radstock** | | | | | | | | | |
| DT27 | Radstock - Fortescue Rd | Roadside | Diffusion Tube | 100 | 58 | 33 | 34 | 34 | 31 | 30 |

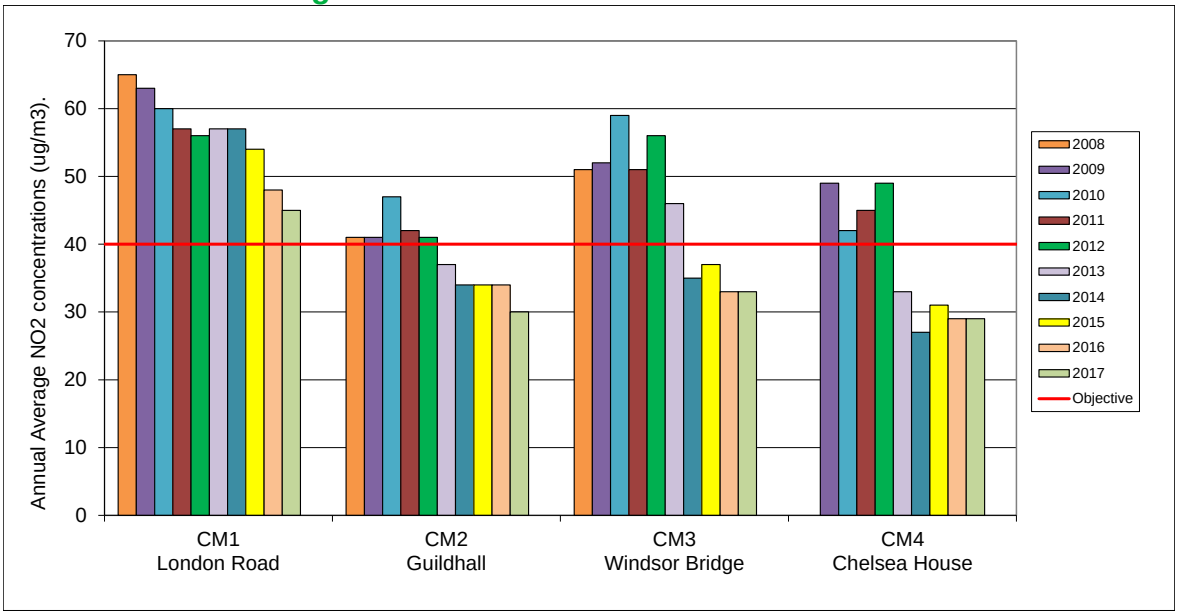
| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2017 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| | **Saltford** | | | | | | | | | |
| DT71 | Saltford Library | Roadside | Diffusion Tube | 100 | 58 | 27 | 37 | 34 | 35 | 31 |
| DT75 | Saltford - The Crown | Roadside | Diffusion Tube | 100 | 100 | **44** | **50** | **43** | **40.5** | 37 |
| DT77 | Saltford - Bath Road | Roadside | Diffusion Tube | 100 | 100 | 37 | **42** | 39 | 36 | 33 |
| | **Temple Cloud** | | | | | | | | | |
| DT96 | Temple Cloud 1 | Roadside | Diffusion Tube | 92 | 92 | - | - | - | **90** | **67** |
| DT108 | Temple Cloud 2 | Roadside | Diffusion Tube | 92 | 92 | - | - | - | **48** | **50** |
| DT109 | Temple Cloud 3 | Roadside | Diffusion Tube | 92 | 92 | - | - | - | **46** | **45** |
| DT110 | Temple Cloud 4 | Roadside | Diffusion Tube | 100 | 58 | - | - | - | **53** | **69** |
| DT111 | Temple Cloud 5 | Roadside | Diffusion Tube | 100 | 58 | - | - | - | **51** | **52** |
| DT131 | Temple Cloud 6 | Roadside | Diffusion Tube | 100 | 67 | - | - | - | - | 11 |
| DT132 | Temple Cloud 7 | Roadside | Diffusion Tube | 100 | 50 | - | - | - | - | 14 |
| DT133 | Temple Cloud 8 | Roadside | Diffusion Tube | 87 | 58 | - | - | - | - | 21 |
| | **Timsbury** | | | | | | | | | |
| DT146 | Timsbury | | Diffusion Tube | 100 | 25 | - | - | - | - | 17 |
| | **Westfield** | | | | | | | | | |
| DT30 | MSN Westfield Primary Sch | Urban Background | Diffusion Tube | 100 | 33 | 17 | 17 | 14 | 15 | 14 |
| DT128 | Westfield 1 | Roadside | Diffusion Tube | 100 | 67 | - | - | - | - | 26 |
| DT129 | Westfield 2 | Roadside | Diffusion Tube | 100 | 67 | - | - | - | - | 30 |
| | **Whitchurch** | | | | | | | | | |
| DT32 | Whitchurch | Roadside | Diffusion Tube | 75 | 75 | - | - | **52** | **47** | 39 |

| Site ID | Site Name | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| DT97 | Whitchurch 1 | Roadside | Diffusion Tube | 100 | 58 | - | - | - | **46** | 38 |
| DT98 | Whitchurch 2 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | **43** | 35 |
| DT99 | Whitchurch 3 | Kerbside | Diffusion Tube | 100 | 58 | - | - | - | 30 | 22 |
| DT100 | Whitchurch 4 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | 37 | 29 |
| DT101 | Whitchurch 5 | Roadside | Diffusion Tube | 100 | 100 | - | - | - | **50** | **46** |
| DT120 | Whitchurch 6 | Urban Centre | Diffusion Tube | 86 | 50 | - | - | - | - | 19 |

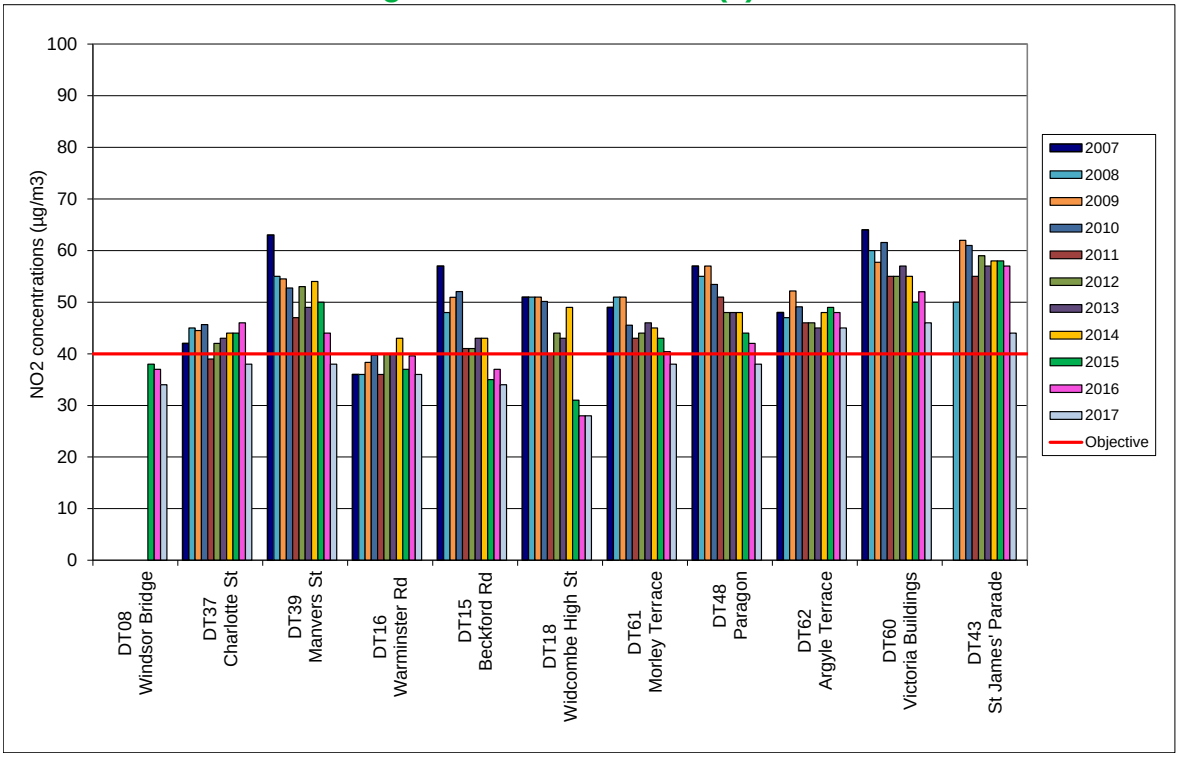
☒ **Diffusion tube data has been bias corrected** ☒ **Annualisation has been conducted where data capture is <75%**

**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.

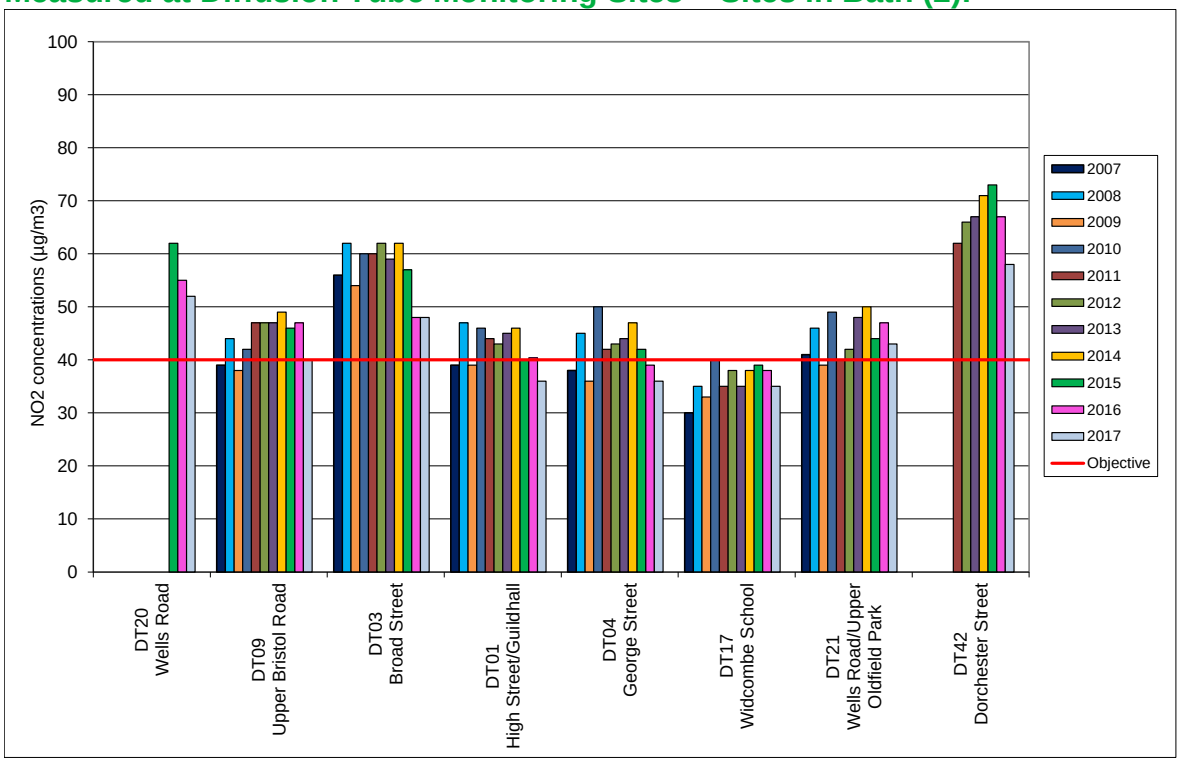
## Figure A.1 – Trends in Annual Mean $NO_2$ Concentrations at measured at automatic monitoring sites



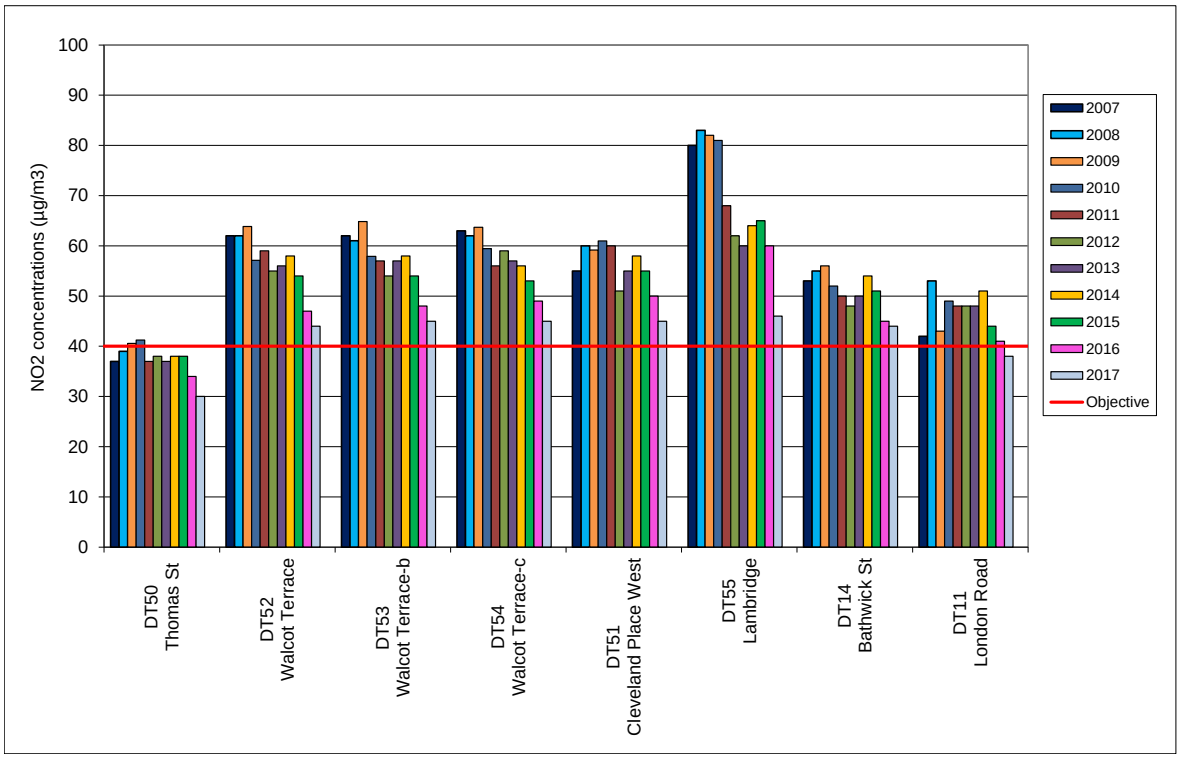

## Figure A.2 – Trends in Annual Mean $NO_2$ Concentration Measured at Diffusion Tube Monitoring Sites –Sites in Bath (1)



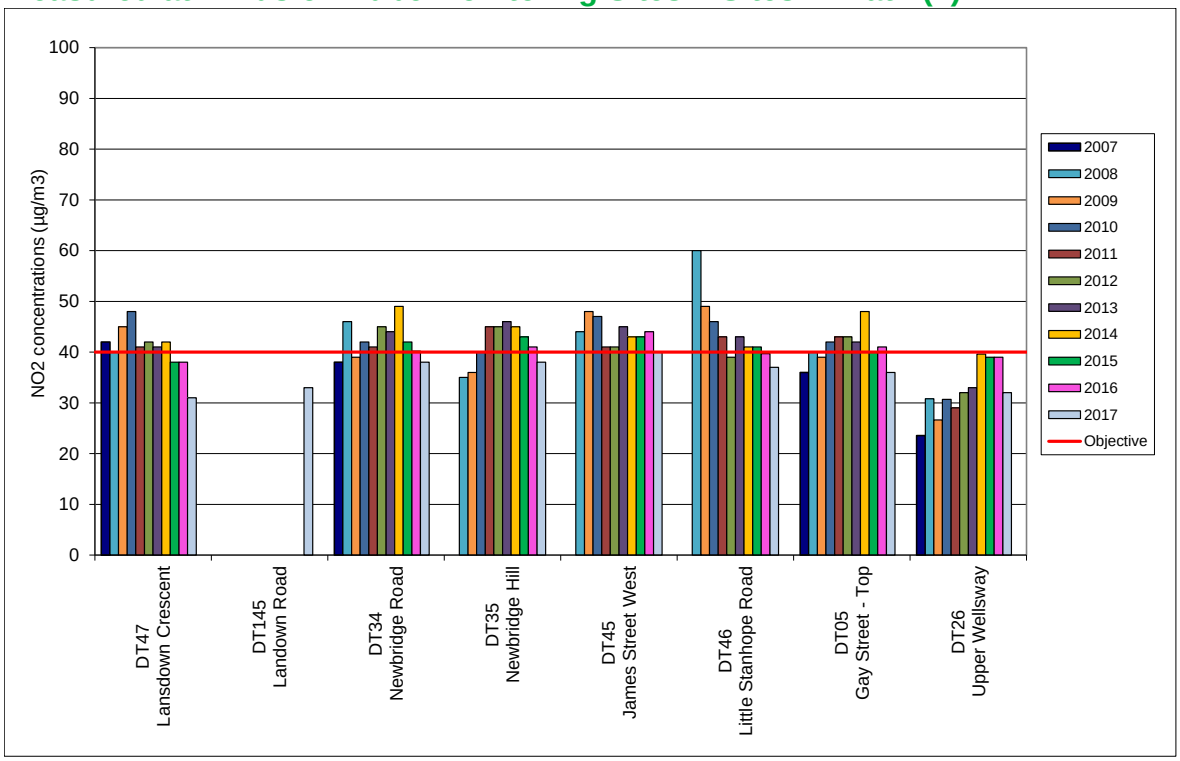
## Figure A.3 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath (2).



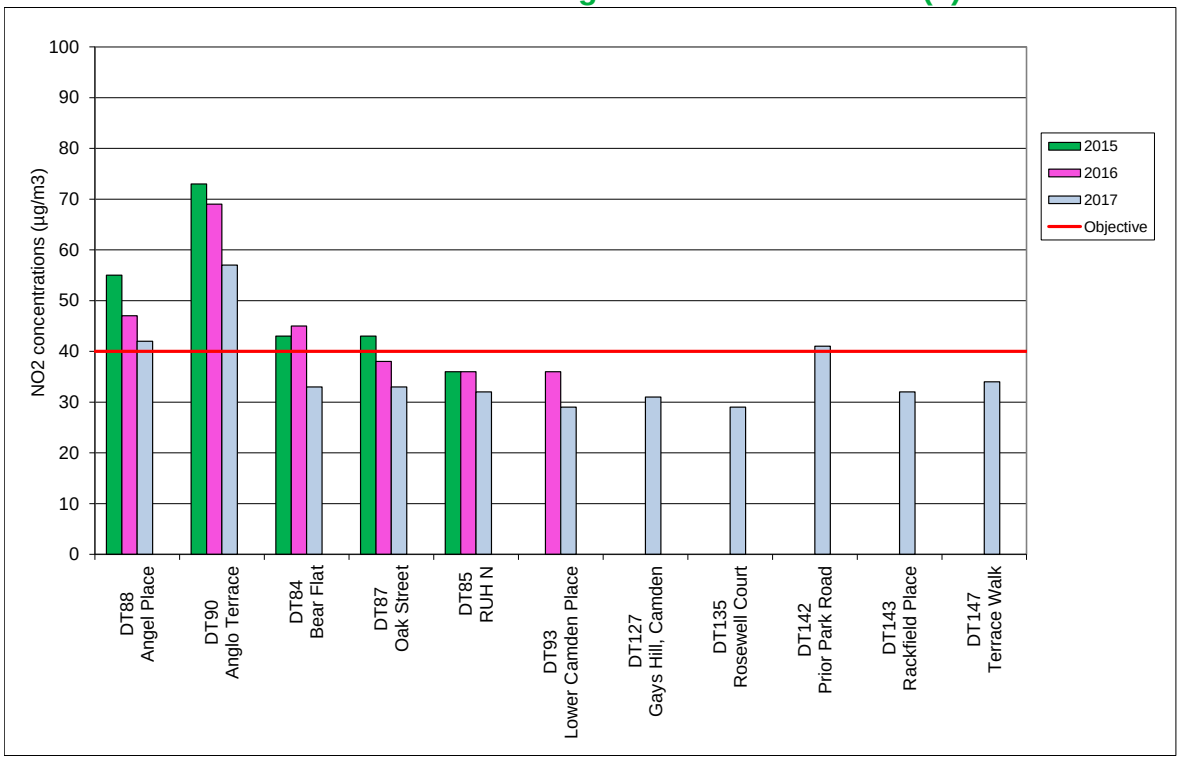

## Figure A.4 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath (3)



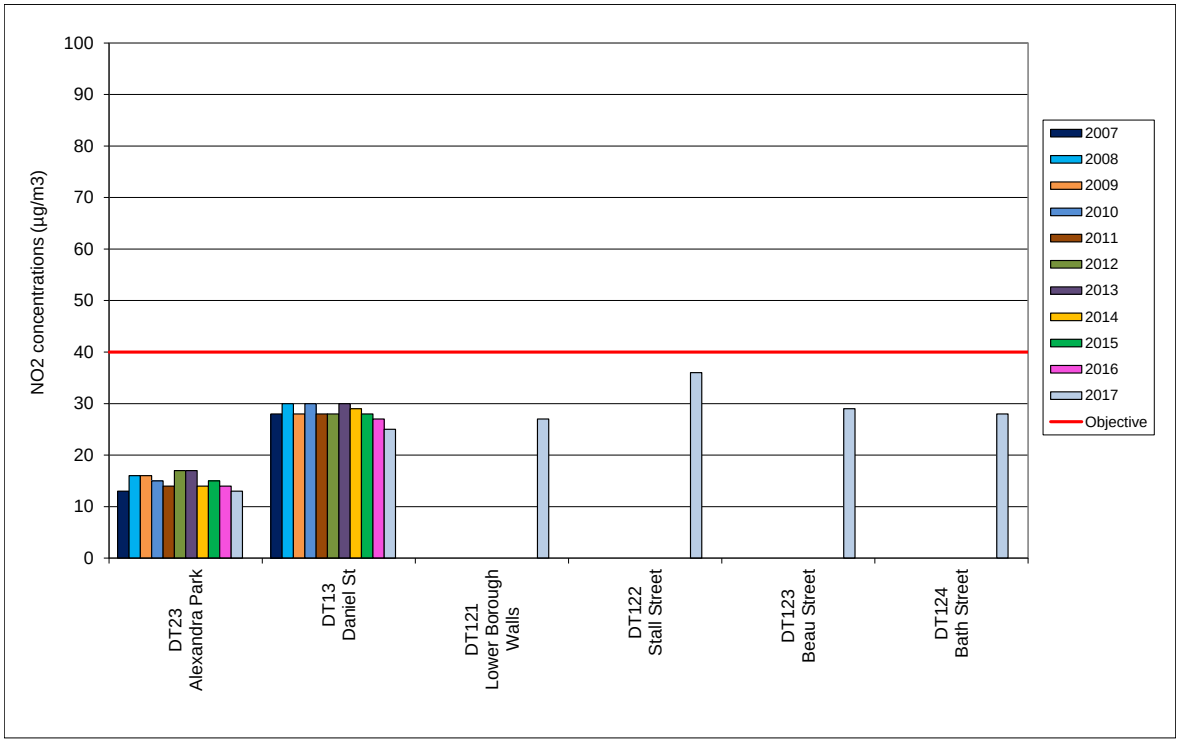
## Figure A.5 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath (4)



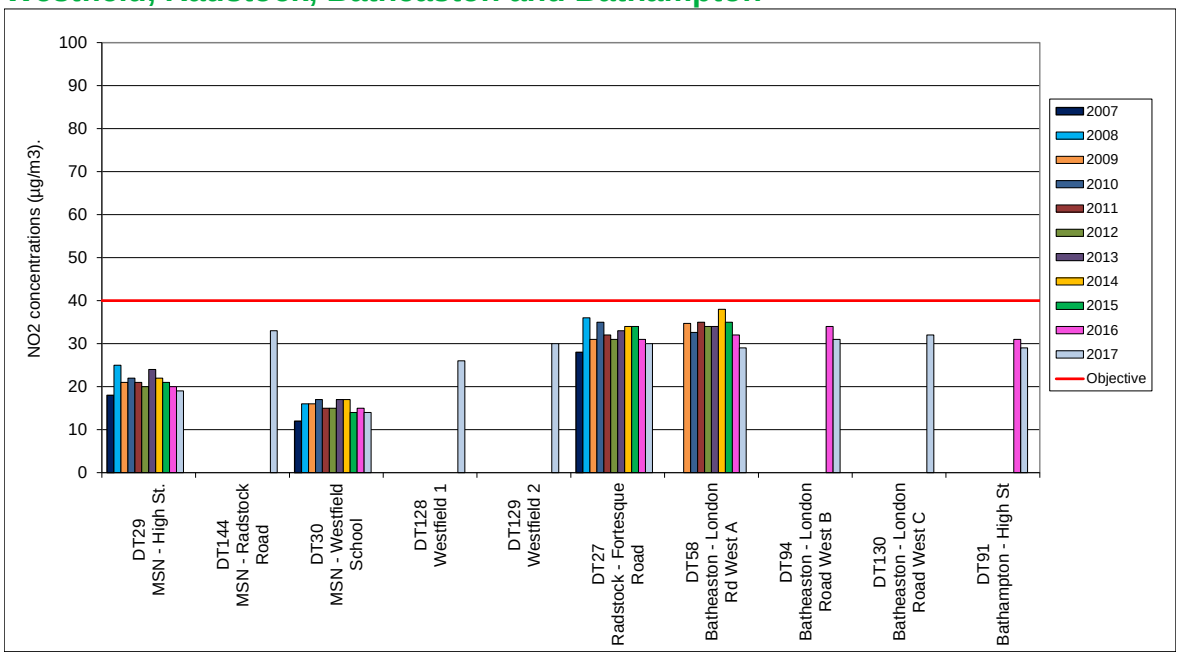

## Figure A.6 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath (5)



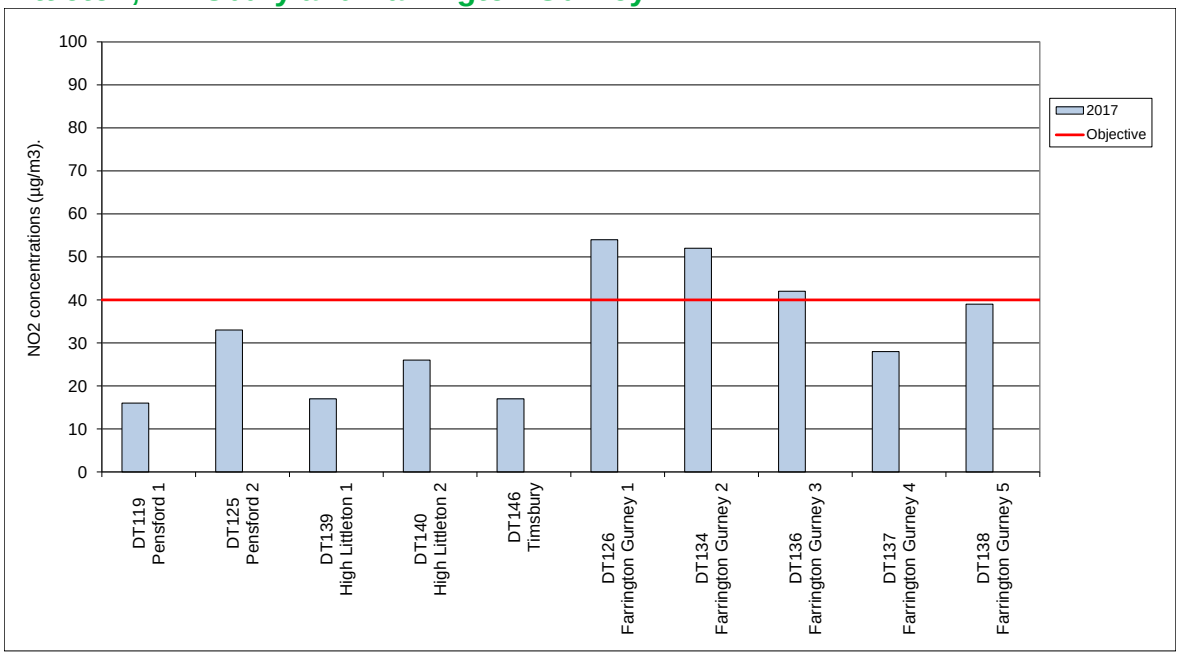
## Figure A.7 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Bath (6)



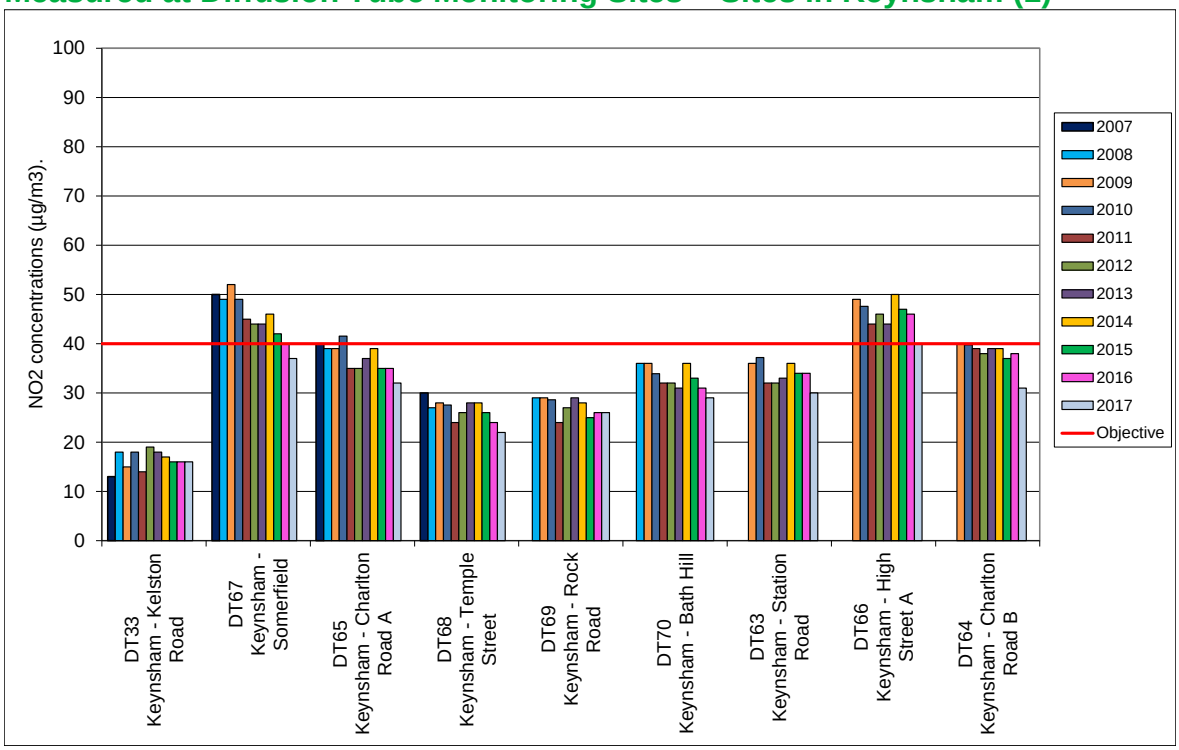

## Figure A.8 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites Midsomer Norton, Westfield, Radstock, Batheaston and Bathampton



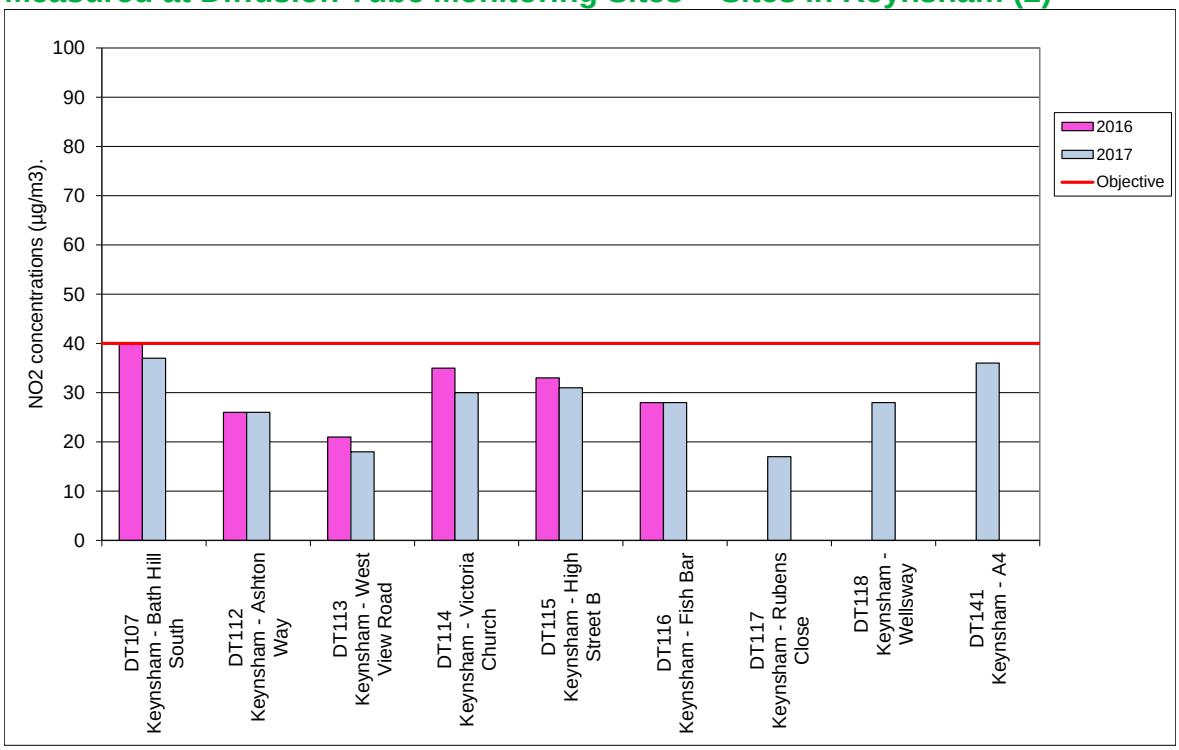
## Figure A.9 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Pensford, High Littleton, Timsbury and Farrington Gurney



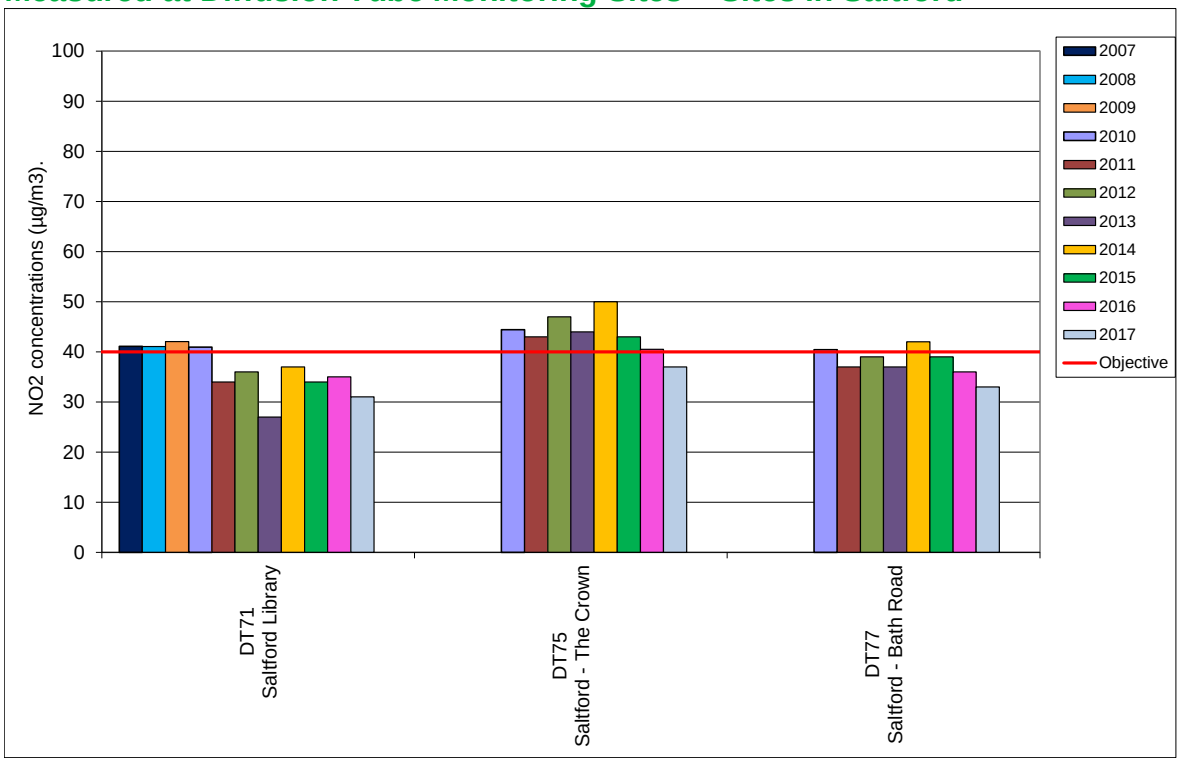

## Figure A.10 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Keynsham (1)



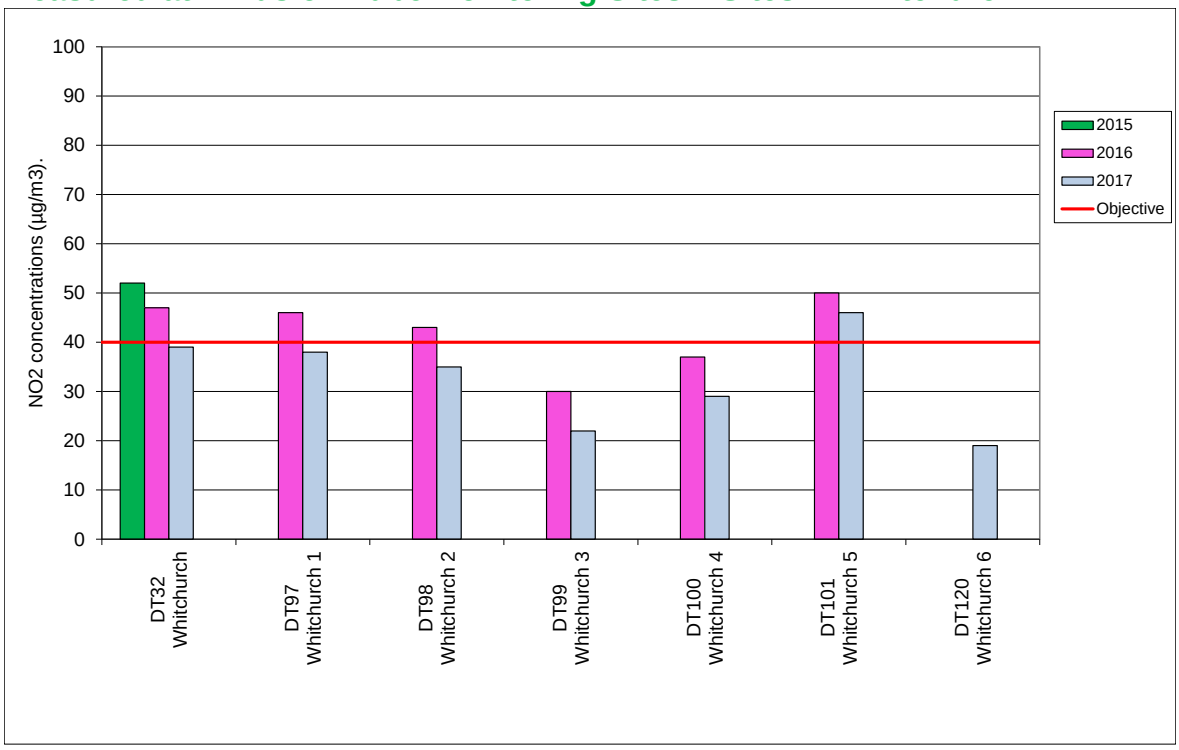
## Figure A.11 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Keynsham (2)



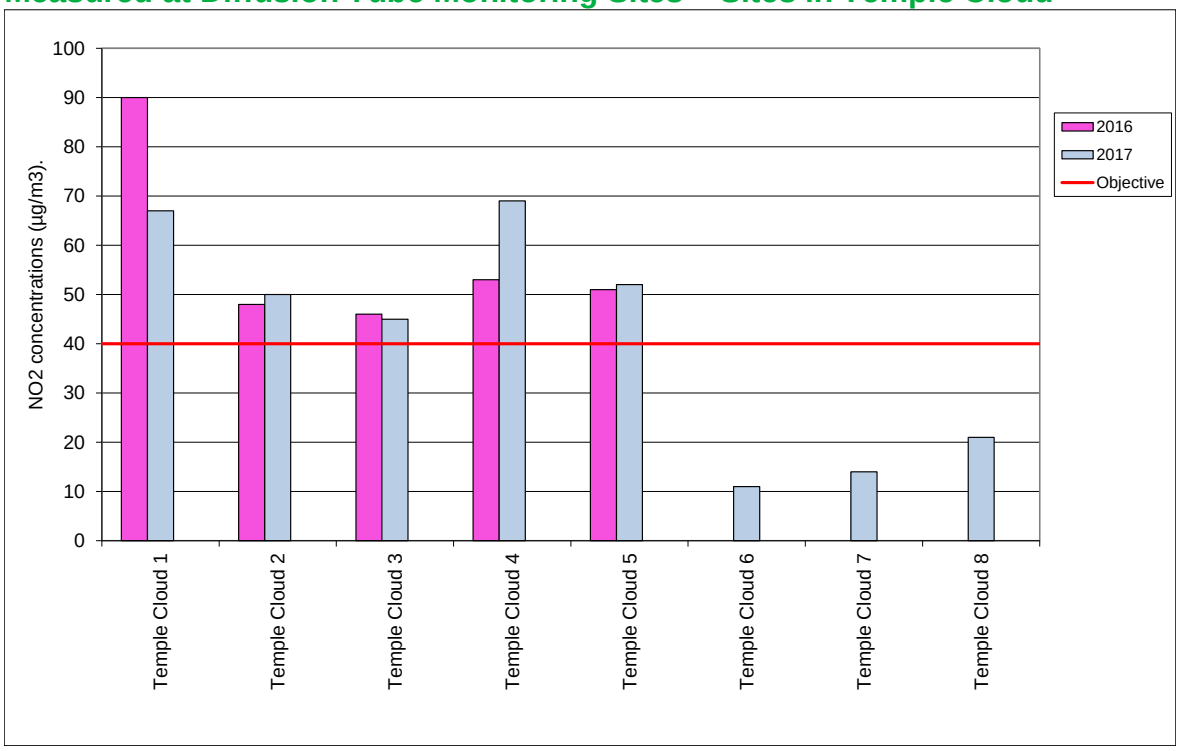

## Figure A.12 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Saltford



## Figure A.13 – Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites – Sites in Whitchurch




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



## 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 2017 (%) (2) | $NO_2$ 1 Hour Means > 200µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM1 | London Road | Roadside | Automatic | 99 | 99 | 4 | 10 | 1 | 0 | 0 |
| CM2 | Guildhall | Roadside | Automatic | 80 | 80 | 1 | 0 | 0 | 0 | 0 (96) |
| CM3 | Windsor Bridge | Roadside | Automatic | 94 | 94 | 0 (160) | 0 | 0 (105) | 0 | 0 |
| CM4 | Chelsea House | Roadside | Automatic | 99 | 99 | 0 (86) | 0 | 1 | 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 99.8$^{th}$ 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 2017 (%) (2) | $PM_{10}$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | |
| CM3 | Windsor Bridge | Roadside | 96 | 96 | 28 | 22 | 22 | 23 | 24 |
| CM4 | Chelsea House | Roadside | 99 | 99 | 21 | 19 | 22 | 18 | 16 |

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

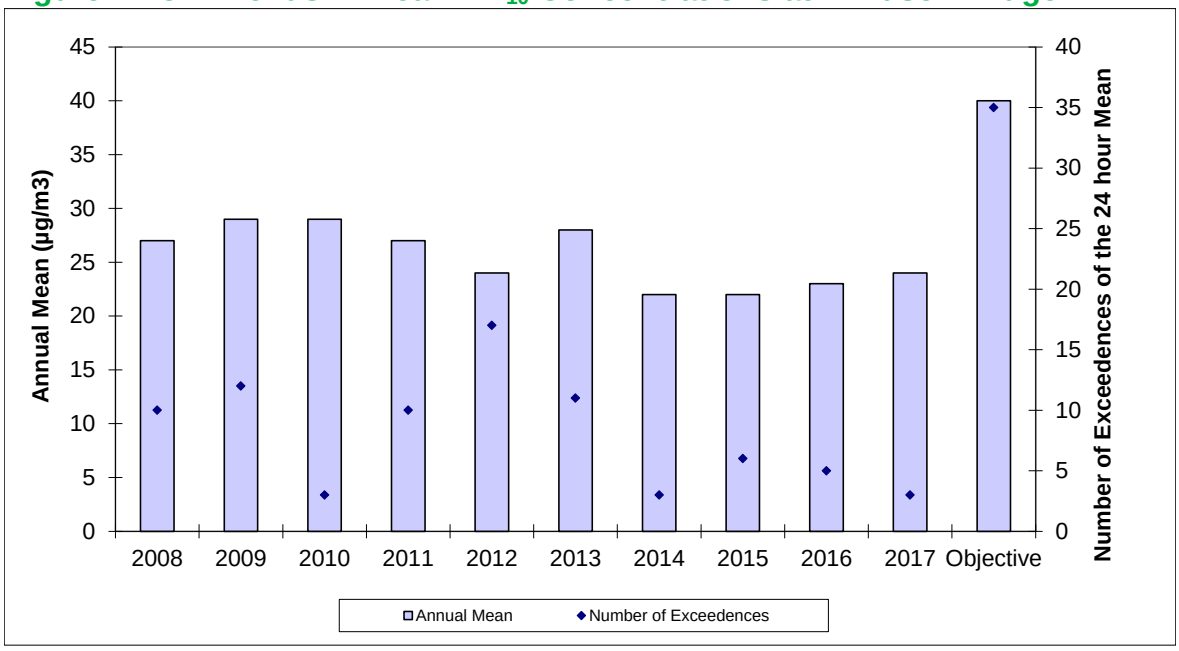
**Notes:**
Exceedances of the $PM_{10}$ annual mean objective of 40$\mu g/m^3$ are shown in **bold.**
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 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

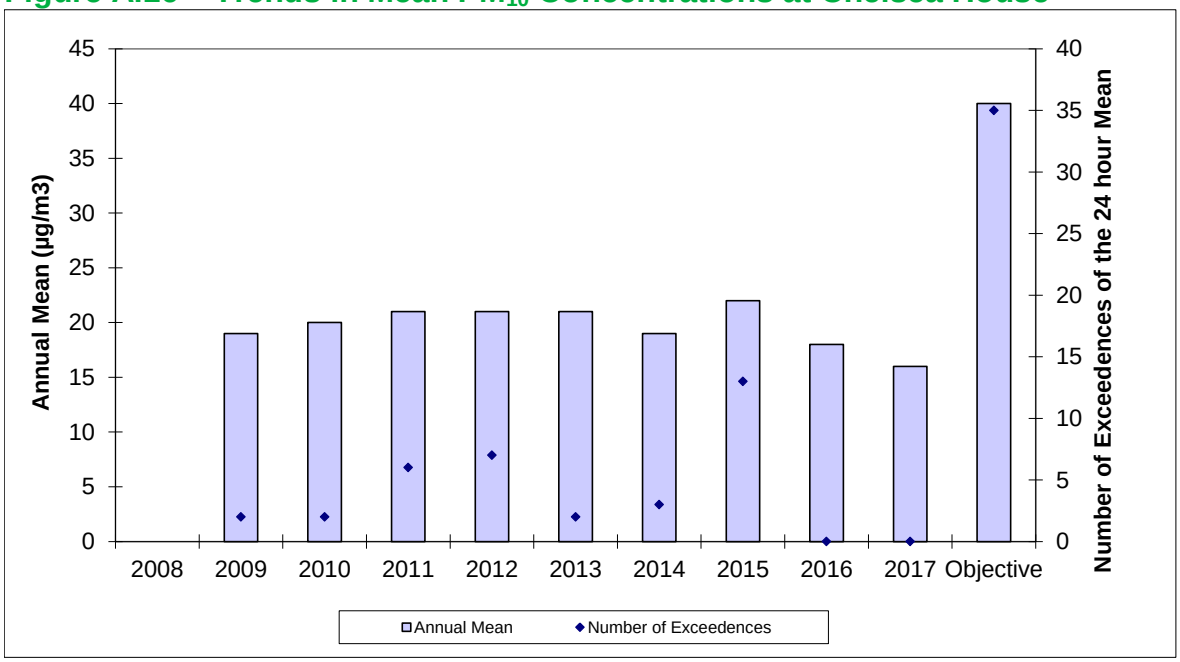
| Site ID | Site Name | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | $PM_{10}$ 24 Hour Means > 50$\mu g/m^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | |
| CM3 | Windsor Bridge | Roadside | 96 | 96 | 11 (42) | 3 | 6 | 5 | 3 |
| CM4 | Chelsea House | Roadside | 99 | 99 | 2 (31) | 3 | 13 | 0 | 0 |

**Notes:**
Exceedances of the $PM_{10}$ 24-hour mean objective (50$\mu g/m^3$ 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 90.4$^{th}$ percentile of 24-hour means is provided in brackets.

## Figure A.15 – Trends in Mean $PM_{10}$ Concentrations at Windsor Bridge




## Figure A.16 – Trends in Mean $PM_{10}$ Concentrations at Chelsea House



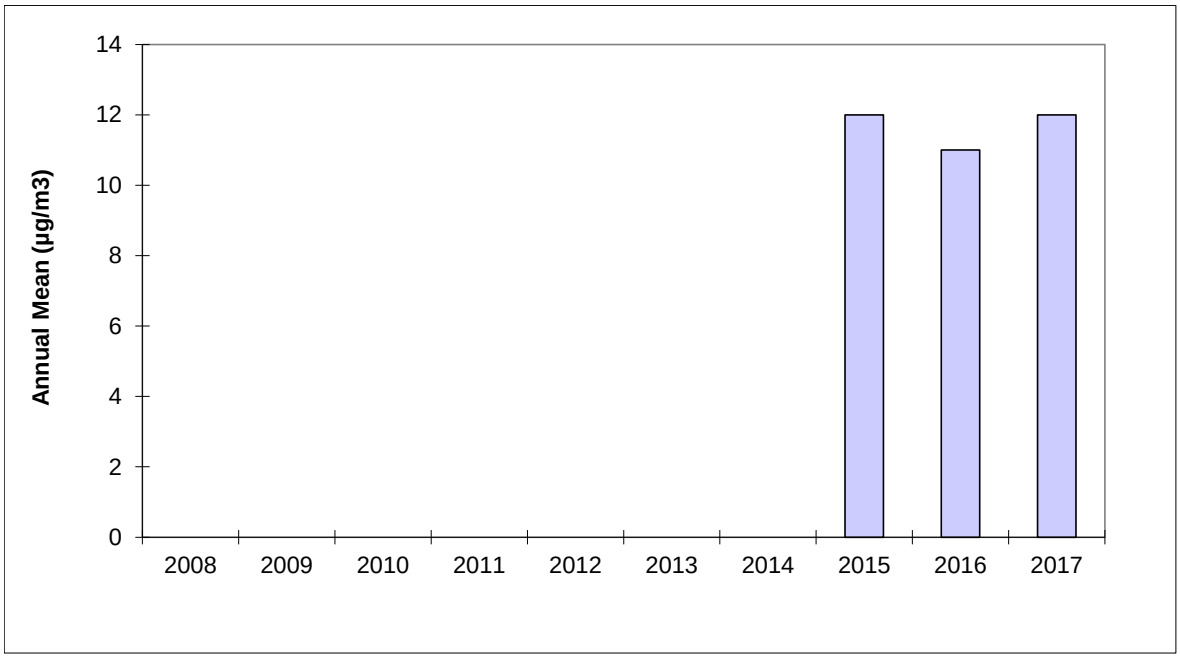
## Table A.7 – $PM_{2.5}$ Monitoring Results

| 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) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM4 | Chelsea House | Roadside | 98 | 98 | - | - | 12 | 11 | 12 |

☒ **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.17 – Trends in Annual Mean PM2.5 Concentrations at Chelsea House**



# Appendix B: Full Monthly Diffusion Tube Results for 2017

## Table B.1 – $NO_2$ Monthly Diffusion Tube Results – 2017

| 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 (1.00)[1] | Annual adjusted [1] | Distance Corrected to Nearest Exposure ([2]) |
| | **Bath** | | | | | | | | | | | | | | | | |
| DT01 | High Street/ Guildhall | 48 | 40 | 35 | 34 | 37 | 27 | 28 | | | | | | 36 | 36 | 36 | 31 |
| DT03 | Broad Street | 62 | 49 | 44 | 38 | 42 | 46 | 42 | 48 | 41 | | 57 | 54 | **48** | **48** | **48** | **41** |
| DT04 | George Street | 46 | 39 | 36 | 38 | 28 | 32 | 29 | 33 | 33 | 34 | 42 | 38 | 36 | 36 | 36 | 29 |
| DT05 | Gay Street – Top | 54 | 42 | 41 | 35 | 35 | 33 | 26 | 26 | 30 | 32 | 41 | 40 | 36 | 36 | 36 | 30 |
| DT08 | Windsor Bridge | 50 | 41 | 35 | 32 | 27 | 26 | 28 | 27 | 31 | 32 | 42 | 43 | 34 | 34 | 34 | - |
| DT09 | Upper Bristol Road | 58 | 44 | 43 | 34 | 35 | 37 | 37 | 36 | 36 | 35 | 41 | 47 | **40** | **40** | **40** | 30 |
| DT11 | London Rd | 39 | 45 | 36 | | 41 | 34 | 32 | | | | | | 38 | 38 | 38 | 31 |
| DT13 | Daniel Street | 42 | 28 | 24 | 22 | | 16 | 15 | | | | | | 24 | 24 | 25 | - |
| DT14 | Bathwick St | 50 | 46 | 47 | 41 | 38 | 42 | 38 | 40 | 39 | 42 | 51 | 48 | **44** | **44** | **44** | 39 |
| DT15 | Beckford Rd | 47 | 37 | 33 | 33 | 29 | 28 | 29 | 27 | 27 | 33 | 43 | 35 | 34 | 34 | 34 | 25 |
| DT16 | Warminster Road | 47 | 42 | 36 | 32 | 34 | 33 | 31 | 30 | 31 | 31 | 44 | 41 | 36 | 36 | 36 | 25 |
| DT17 | Widcombe School | 48 | 38 | 35 | 39 | 26 | 31 | 30 | 30 | 28 | 34 | 43 | 42 | 35 | 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 (1.00)(1) | Annual adjusted (1) | Distance Corrected to Nearest Exposure (2) |
| DT18 | Widcombe High Street | 40 | 31 | 29 | 26 | 20 | 23 | 22 | 24 | 26 | 25 | 38 | 34 | 28 | 28 | 28 | - |
| DT20 | Wells Road | 66 | 53 | 50 | 54 | 44 | 35 | 45 | 53 | 49 | 49 | 68 | 55 | **52** | **52** | **52** | - |
| DT21 | Wells Road/Upper Oldfield Park | 58 | 45 | 40 | 47 | 43 | 52 | 38 | 36 | 38 | 34 | 51 | 41 | **43** | **43** | **43** | 35 |
| DT23 | Alexandra Park | 28 | 16 | 13 | 12 | 9 | 6 | 7 | 8 | 9 | 10 | 21 | 17 | 13 | 13 | 13 | - |
| DT26 | Upper Wellsway | 50 | 37 | 35 | 28 | 34 | 28 | 27 | 24 | 27 | 29 | 37 | 30 | 32 | 32 | 32 | 32 |
| DT34 | Newbridge Road | 49 | 43 | 40 | 35 | 34 | 37 | 29 | 30 | 35 | 36 | 44 | 41 | 38 | 38 | 38 | 29 |
| DT35 | Newbridge Hill | 50 | 39 | 36 | 37 | 34 | 30 | 34 | | | | | | 37 | 37 | 38 | 29 |
| DT37 | Charlotte St | 48 | 43 | 28 | 43 | 31 | 32 | | 36 | 36 | 27 | 46 | 47 | 38 | 38 | 38 | 31 |
| DT39 | Manvers St | 50 | 41 | 42 | 35 | 32 | 35 | | 31 | 35 | 35 | 45 | 42 | 38 | 38 | 38 | 33 |
| DT42 | Dorchester Street | 55 | 57 | 68 | 74 | 47 | 57 | 45 | 58 | 51 | 56 | 68 | 62 | **58** | **58** | **58** | **45** |
| DT43 | St James' Parade | 56 | 50 | 56 | 45 | 48 | | | | | | | | **51** | **51** | **44** | 37 |
| DT43 | St James' Parade(new) | | | | | | | 37 | 39 | 37 | 48 | 51 | 44 | **43** | **43** | **46** | 37 |
| DT45 | James Street West | 60 | 47 | 46 | 37 | 37 | 37 | 29 | 30 | 35 | 34 | 46 | 41 | 40 | 40 | 40 | - |

| 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 (1.00)(1) | Annual adjusted (1) | Distance Corrected to Nearest Exposure (2) |
| DT46 | Little Stanhope Street | 54 | 40 | 39 | 33 | 30 | 30 | 28 | | | | | | 36 | 36 | 37 | - |
| DT47 | Lansdown Crescent | 43 | 36 | 30 | 25 | 27 | 25 | 27 | | | | | | 30 | 30 | 31 | 29 |
| DT48 | Paragon | 49 | 45 | 37 | 38 | 29 | 35 | 34 | | | | | | 38 | 38 | 38 | 35 |
| DT50 | Thomas St | 43 | 35 | 32 | 30 | 27 | 17 | 23 | | | | | | 29 | 29 | 30 | - |
| DT51 | Cleveland Place West | 57 | 50 | 49 | 33 | 39 | 44 | 38 | | | | | | **44** | **44** | **45** | 39 |
| DT52 | Walcot Terrace | 56 | 50 | 50 | 43 | 35 | 44 | 38 | 40 | 38 | 45 | 51 | 45 | **44** | **44** | **44** | - |
| DT53 | Walcot Terrace | 50 | 51 | 46 | 41 | 41 | 42 | 41 | 42 | 39 | 47 | 46 | 49 | **45** | **45** | **45** | - |
| DT54 | Walcot Terrace | 52 | 53 | 47 | 44 | 43 | 42 | 41 | 38 | 41 | 43 | 46 | 50 | **45** | **45** | **45** | - |
| DT55 | Lambridge | 58 | 52 | 44 | 48 | 44 | 48 | 43 | 39 | 43 | 44 | 48 | 44 | **46** | **46** | **46** | **53** |
| DT60 | Victoria Buildings | 58 | 49 | 46 | 48 | 38 | 42 | 41 | 38 | 45 | 40 | 59 | 50 | **46** | **46** | **46** | **41** |
| DT61 | Morley Terrace | 47 | 44 | 36 | 29 | 38 | 41 | 32 | | | | | | 38 | 38 | 38 | - |
| DT62 | Argyle Terrace | 62 | 58 | 50 | 42 | 43 | 33 | 37 | 33 | 40 | 40 | 54 | 45 | **45** | **45** | **45** | 38 |
| DT84 | Bear Flat | 34 | 44 | 35 | 39 | | 27 | 18 | 27 | 29 | 31 | 43 | 35 | 33 | 33 | 33 | 27 |
| DT85 | RUH – North | 40 | 39 | 33 | 32 | 28 | 29 | 28 | 26 | 28 | 30 | 37 | 36 | 32 | 32 | 32 | 25 |
| DT87 | Oak Street | 41 | 43 | 27 | 34 | 28 | 30 | 29 | 29 | 29 | 30 | 41 | 40 | 33 | 33 | 33 | 33 |

| 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 (1.00)(1) | Annual adjusted (1) | Distance Corrected to Nearest Exposure (2) |
| DT88 | Angel Place | 50 | 55 | 46 | 39 | 34 | 43 | 23 | | | | | | **42** | **42** | **42** | - |
| DT90 | Anglo Terrace | 44 | 68 | 39 | | | 78 | 51 | 48 | 57 | 58 | 69 | 54 | **57** | **57** | **57** | **48** |
| DT93 | Lower Camden Place | 52 | 39 | 33 | 27 | | | | | | | | | 38 | 38 | 29 | 22 |
| DT121 | Lower Borough Walls | 41 | 32 | 25 | 29 | 18 | 17 | | 23 | 25 | 23 | 39 | 28 | 27 | 27 | 27 | 24 |
| DT122 | Stall Street | 40 | 42 | 47 | 36 | 22 | 29 | 27 | | 33 | 33 | 42 | 47 | 36 | 36 | 36 | 31 |
| DT123 | Beau Street | 38 | 33 | 25 | 30 | 21 | 18 | | 25 | 26 | 27 | 38 | 33 | 29 | 29 | 29 | - |
| DT124 | Bath Street | 44 | 35 | 34 | 23 | 32 | 19 | 19 | 20 | 25 | 25 | 33 | 32 | 28 | 28 | 28 | 23 |
| DT127 | Camden, Gays Hill | | | | | 15 | 25 | 21 | 21 | 26 | 27 | 39 | 39 | 27 | 27 | 31 | 23 |
| DT135 | Rosewell Court | | | | | | | | 24 | 26 | 26 | 36 | 33 | 29 | 29 | 29 | 22 |
| DT142 | Prior Park Road | | | | | | | | 29 | 34 | 33 | 64 | 43 | **41** | **41** | **41** | 39 |
| DT143 | Rackfield Place | | | | | | | | | 28 | 29 | 37 | 35 | 32 | 32 | 32 | - |
| DT145 | Lansdown Road | | | | | | | | 26 | 34 | 28 | 40 | 39 | 33 | 33 | 33 | 28 |
| DT147 | Terrace Walk | | | | | | | | | | 32 | 42 | 48 | **41** | **41** | 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 (1.00)[1] | Annual adjusted [1] | Distance Corrected to Nearest Exposure ([2]) |
| | **Bathampton** | | | | | | | | | | | | | | | | |
| DT91 | Bathampton High Street | 46 | 31 | 28 | 27 | 25 | 20 | 24 | 24 | 29 | | | 32 | 29 | 29 | 29 | - |
| | **Batheaston** | | | | | | | | | | | | | | | | |
| DT58 | Batheaston – London Road West A | 41 | 35 | 30 | 23 | 27 | 25 | 22 | 21 | 26 | 28 | 35 | 29 | 29 | 29 | 29 | - |
| DT94 | Batheaston - London Road West B | 44 | 36 | 33 | 27 | 29 | 28 | 28 | 24 | 29 | 27 | 36 | | 31 | 31 | 31 | - |
| DT130 | Batheaston - London Road West C | | | | | 26 | 27 | 24 | 22 | 25 | 29 | 34 | 32 | 27 | 27 | 32 | - |
| | **Farrington Gurney** | | | | | | | | | | | | | | | | |
| DT126 | Farrington Gurney 1 | 65 | 56 | 51 | 65 | 49 | 49 | 48 | 55 | 44 | 50 | 64 | 52 | **54** | **54** | **54** | 39.8 |
| DT134 | Farrington Gurney 2 | | | | | 41 | 48 | 41 | 50 | 33 | 45 | 58 | 47 | **45** | **45** | **52** | - |
| DT136 | Farrington Gurney 3 | | | | | | | | 40 | 44 | 37 | 55 | 36 | **42** | **42** | **42** | - |
| DT137 | Farrington Gurney 4 | | | | | | | | 36 | 26 | 25 | 31 | 23 | 28 | 28 | 28 | 22 |

| 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 (1.00)(1) | Annual adjusted (1) | Distance Corrected to Nearest Exposure (2) |
| DT138 | Farrington Gurney 5 | | | | | | | | 26 | 40 | 39 | 52 | 36 | 39 | 39 | 39 | 32 |
| | **High Littleton** | | | | | | | | | | | | | | | | |
| DT139 | High Littleton 1 | | | | | | | | 14 | 14 | 16 | 24 | 18 | 17 | 17 | 17 | - |
| DT140 | High Littleton 2 | | | | | | | | 22 | 24 | 26 | 32 | 27 | 26 | 26 | 26 | 20 |
| | **Keynsham** | | | | | | | | | | | | | | | | |
| DT33 | Keynsham (Kelston Road) | 27 | 19 | 15 | 11 | 10 | 25 | 9 | 10 | 11 | 12 | 22 | 17 | 16 | 16 | 16 | 13 |
| DT63 | Keynsham – Station Road | 50 | 32 | 30 | 25 | | 25 | 25 | 25 | 24 | 28 | 40 | 32 | 30 | 30 | 30 | 26 |
| DT64 | Keynsham – Charlton Road B | 41 | 35 | 35 | 32 | 28 | 25 | 26 | 28 | 30 | 30 | | 34 | 31 | 31 | 31 | 26 |
| DT65 | Keynsham - Charlton Rd A | 44 | 36 | 33 | 31 | 34 | 27 | 27 | 26 | 30 | 29 | | 36 | 32 | 32 | 32 | 27 |
| DT66 | Keynsham – High Street A | 49 | 45 | 49 | 40 | 35 | 38 | 33 | 33 | 36 | 38 | 45 | 43 | **40** | **40** | **40** | 37 |
| DT67 | Keynsham - Somerfield | 66 | 41 | | 19 | 31 | 33 | 29 | 28 | 32 | 34 | 47 | 44 | 37 | 37 | 37 | 32 |
| DT68 | Keynsham - Temple St | 46 | 25 | 20 | 17 | 16 | 15 | 16 | 18 | 20 | 19 | 31 | 24 | 22 | 22 | 22 | - |
| DT69 | Keynsham – Rock Road | 44 | 27 | 22 | 19 | 24 | 18 | 22 | 22 | 22 | 26 | 36 | 29 | 26 | 26 | 26 | - |

| 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 (1.00)[1] | Annual adjusted [1] | Distance Corrected to Nearest Exposure ([2]) |
| DT70 | Keynsham – Bath Hill | 43 | 38 | 29 | 27 | 27 | 24 | 23 | 23 | 25 | 26 | 35 | 29 | 29 | 29 | 29 | 28 |
| DT107 | Keynsham - Bath Hill South | 54 | 42 | 39 | 42 | | | 33 | | 37 | | 51 | 43 | **43** | **43** | 37 | - |
| DT112 | Keynsham - Ashton Way | 40 | 24 | 24 | 21 | 21 | 22 | 21 | | 23 | 25 | 38 | 29 | 26 | 26 | 26 | 17 |
| DT113 | Keynsham - West View Road | 28 | 23 | 18 | 15 | 15 | 11 | 12 | 11 | 15 | 16 | 26 | 22 | 18 | 18 | 18 | 17 |
| DT114 | Keynsham - Victoria Church | 47 | 40 | 34 | 31 | 22 | 21 | 22 | 23 | 26 | 24 | 38 | 32 | 30 | 30 | 30 | 21 |
| DT115 | Keynsham - High Street B | 49 | 36 | 35 | 33 | | 17 | 21 | | 23 | | 33 | 28 | 31 | 31 | 31 | 27 |
| DT116 | Keynsham - Fish Bar | 41 | 34 | 30 | 28 | 22 | 22 | | 22 | 24 | 25 | 35 | 28 | 28 | 28 | 28 | 23 |
| DT117 | Keynsham - Rubens Close | 30 | 24 | 19 | | | | | | | | | | 24 | 24 | 17 | - |
| DT118 | Keynsham - Wellsway | 43 | 36 | 28 | 27 | 28 | 9 | 22 | 24 | 27 | 29 | 37 | 30 | 28 | 28 | 28 | 26 |
| DT141 | Keynsham A4 | | | | | | | | 22 | 36 | 32 | 51 | 40 | 36 | 36 | 36 | 25 |
| | **Midsomer Norton** | | | | | | | | | | | | | | | | |
| DT29 | MSN High Street | 31 | 22 | 19 | 20 | 15 | 14 | 14 | | | | | | 19 | 19 | 19 | 17 |

| 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 (1.00)[1] | Annual adjusted [1] | Distance Corrected to Nearest Exposure ([2]) |
| DT144 | MSN - Radstock Road | | | | | | | | 27 | 33 | 24 | 40 | 41 | 33 | 33 | 33 | 27 |
| | **Pensford** | | | | | | | | | | | | | | | | |
| DT119 | Pensford 1 | 26 | 22 | 16 | 14 | 12 | 11 | 11 | | | | | | 16 | 16 | 16 | 12 |
| DT125 | Pensford 2 | 44 | 38 | 34 | 33 | 30 | 28 | 26 | 30 | 32 | 33 | 42 | 32 | 33 | 33 | 33 | 29 |
| | **Radstock** | | | | | | | | | | | | | | | | |
| DT27 | Radstock - Fortescue Rd | 38 | 33 | 31 | 28 | 25 | 26 | 27 | | | | | | 30 | 30 | 30 | 19 |
| | **Saltford** | | | | | | | | | | | | | | | | |
| DT71 | Saltford Library | 57 | 32 | 25 | 29 | 24 | 22 | 24 | | | | | | 30 | 30 | 31 | 22 |
| DT75 | Saltford - The Crown | 50 | 41 | 33 | 31 | 35 | 32 | 30 | 33 | 30 | 40 | 46 | 38 | 37 | 37 | 37 | - |
| DT77 | Saltford - Bath Road | 33 | 37 | 35 | 33 | 29 | 32 | 28 | 32 | 31 | 34 | 41 | 34 | 33 | 33 | 33 | - |
| | **Temple Cloud** | | | | | | | | | | | | | | | | |
| DT96 | Temple Cloud 1 | 92 | 73 | 62 | 81 | 39 | 69 | 67 | | 29 | 68 | 87 | 72 | **67** | **67** | **67** | - |
| DT108 | Temple Cloud 2 | 71 | 49 | 48 | 41 | 41 | 49 | 42 | | 44 | 56 | 62 | 49 | **50** | **50** | **50** | 34 |
| DT109 | Temple Cloud 3 | 56 | 42 | 43 | 41 | 65 | | 39 | 39 | 38 | 40 | 52 | 44 | **45** | **45** | **45** | 39 |

| 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 (1.00)(1) | Annual adjusted (1) | Distance Corrected to Nearest Exposure (2) |
| DT110 | Temple Cloud 4 | 80 | 58 | 51 | 78 | 63 | 52 | 99 | | | | | | **69** | **69** | **69** | **49** |
| DT111 | Temple Cloud 5 | 72 | 48 | 45 | 50 | 51 | 48 | 49 | | | | | | **52** | **52** | **52** | - |
| DT131 | Temple Cloud 6 | | | | | 10 | 8 | 7 | 7 | 10 | 9 | 14 | 11 | 9 | 9 | 11 | 9 |
| DT132 | Temple Cloud 7 | | | | | 11 | 8 | 9 | 9 | 11 | 11 | | | 10 | 10 | 14 | 12 |
| DT133 | Temple Cloud 8 | | | | | 16 | 16 | 18 | 17 | 16 | 20 | 26 | | 18 | 18 | 21 | 16 |
| | **Timsbury** | | | | | | | | | | | | | | | | |
| DT146 | Timsbury | | | | | | | | | | 17 | 23 | 21 | 20 | 20 | 17 | - |
| | **Westfield** | | | | | | | | | | | | | | | | |
| DT30 | MSN Westfield Primary Sch | 26 | 16 | 17 | 12 | | | | | | | | | 18 | 18 | 14 | - |
| DT128 | Westfield 1 | | | | | 14 | 21 | 21 | 20 | 24 | 23 | 33 | 28 | 23 | 23 | 26 | 24 |
| DT129 | Westfield 2 | | | | | 24 | 24 | 17 | 22 | 20 | 27 | 39 | 32 | 26 | 26 | 30 | 25 |
| | **Whitchurch** | | | | | | | | | | | | | | | | |
| DT32 | Whitchurch | 51 | | 45 | 37 | 39 | | 32 | 35 | 34 | | 41 | 39 | 39 | 39 | 39 | 34 |
| DT97 | Whitchurch 1 | 56 | 39 | 40 | 34 | 34 | 30 | 29 | | | | | | 37 | 37 | 38 | 28 |

| 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 (1.00)(1) | Annual adjusted (1) | Distance Corrected to Nearest Exposure (2) |
| DT98 | Whitchurch 2 | 48 | 37 | 31 | 38 | 32 | 32 | 25 | 34 | 33 | 31 | 45 | 30 | 35 | 35 | 35 | - |
| DT99 | Whitchurch 3 | 39 | 26 | 21 | 18 | 18 | 14 | 15 | | | | | | 22 | 22 | 22 | 19 |
| DT100 | Whitchurch 4 | 42 | 30 | 28 | 28 | 23 | 26 | 24 | 25 | 27 | 25 | 38 | 29 | 29 | 29 | 29 | 22 |
| DT101 | Whitchurch 5 | 58 | 44 | 50 | 52 | 35 | 42 | 37 | 42 | 43 | 44 | 61 | 49 | **46** | **46** | **46** | 36 |
| DT120 | Whitchurch 6 | 29 | 22 | 21 | 14 | | 12 | 14 | | | | | | 19 | 19 | 19 | - |

☒ **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, 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 [14].

| | | |
|---|---|---|
| Monthly National Bias | 2013 | 0.90 (Somerset, 3 studies)(26 v03/14) |
| | 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) |

## Diffusion Tube Bias - Local Co-location Factors

A local bias factor has been calculated following the FAQ guidance on R&A website[15] (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 | 2013 | 1.01 (Somerset) |
| | 2014 | 1.09 (Somerset) |
| | 2015 | 1.06 (Somerset) |
| | 2016 | 0.99 (Somerset) |
| | 2017 | 1.00 (Gradko) |

[14] https://laqm.defra.gov.uk/assets/AIR-PT-Rounds-13-to-24-Apr-2016-Feb-2018.pdf
[15] 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 µgm$^{-3}$ | Tube 2 µgm$^{-3}$ | Tube 3 µgm$^{-3}$ | Triplicate Mean | Standard Deviation | Coefficient of Variation (CV) | 95% CI of mean | Automatic Method: Period Mean | Automatic Method: Data Capture (% DC) | Data Quality Check: Tubes Precision Check | Data Quality Check: Automatic Monitor Data |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 05/01/2017 | 01/02/2017 | 56.2 | 50.0 | 51.6 | 53 | 3.2 | 6 | 8.0 | 56.1 | 95.3 | Good | Good |
| 2 | 01/02/2017 | 01/03/2017 | 49.5 | 50.8 | 53.4 | 51 | 2.0 | 4 | 5.0 | 49.9 | 99.9 | Good | Good |
| 3 | 01/03/2017 | 27/03/2017 | 50.1 | 45.7 | 47.0 | 48 | 2.3 | 5 | 5.7 | 47.9 | 99.5 | Good | Good |
| 4 | 27/03/2017 | 26/04/2017 | 42.8 | 41.3 | 43.8 | 43 | 1.2 | 3 | 3.0 | 41.6 | 99.7 | Good | Good |
| 5 | 26/04/2017 | 31/05/2017 | 34.8 | 41.2 | 42.6 | 40 | 4.2 | 11 | 10.4 | 41.1 | 97.3 | Good | Good |
| 6 | 31/05/2017 | 27/06/2017 | 43.8 | 41.9 | 41.7 | 42 | 1.1 | 3 | 2.8 | 41.6 | 99.8 | Good | Good |
| 7 | 27/06/2017 | 01/08/2017 | 37.7 | 41.1 | 41.0 | 40 | 2.0 | 5 | 4.9 | 37.6 | 95.8 | Good | Good |
| 8 | 01/08/2017 | 29/08/2017 | 40.1 | 41.7 | 38.2 | 40 | 1.8 | 4 | 4.4 | 36.2 | 99.9 | Good | Good |
| 9 | 29/08/2017 | 28/09/2017 | 38.4 | 39.2 | 41.1 | 40 | 1.4 | 4 | 3.5 | 40.4 | 100.0 | Good | Good |
| 10 | 28/09/2017 | 30/10/2017 | 44.9 | 47.1 | 43.1 | 45 | 2.0 | 4 | 4.9 | 43.5 | 99.7 | Good | Good |
| 11 | 30/10/2017 | 06/12/2017 | 50.8 | 46.4 | 46.2 | 48 | 2.6 | 5 | 6.5 | 53.4 | 99.7 | Good | Good |
| 12 | 06/12/2017 | 03/01/2018 | 44.8 | 48.7 | 49.9 | 48 | 2.7 | 6 | 6.6 | 47.7 | 99.7 | Good | Good |
| 13 | | | | | | | | | | | | | |

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

Overall survey --> Good precision | Good Overall

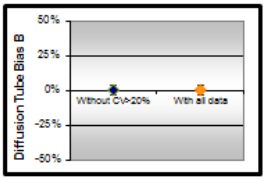
(Check average CV & DC from Accuracy calculations)

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 | 1 (0.97 - 1.04) |
| Bias B | 0% (-4% - 3%) |
| Diffusion Tubes Mean: | 45 µgm$^{-3}$ |
| Mean CV (Precision): | 5 |
| Automatic Mean: | 45 µgm$^{-3}$ |
| Data Capture for periods used: | 99% |
| Adjusted Tubes Mean: | 45 (43 - 46) µgm$^{-3}$ |

| Accuracy (with 95% confidence interval) WITH ALL DATA | |
|---|---|
| Bias calculated using 12 periods of data | |
| Bias factor A | 1 (0.97 - 1.04) |
| Bias B | 0% (-4% - 3%) |
| Diffusion Tubes Mean: | 45 µgm$^{-3}$ |
| Mean CV (Precision): | 5 |
| Automatic Mean: | 45 µgm$^{-3}$ |
| Data Capture for periods used: | 99% |
| Adjusted Tubes Mean: | 45 (43 - 46) 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 2017 the national factor for Gradko (current supplier of diffusion tube analysis for the Council) is made up from 34 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 [16]. Using the local bias factor is likely to result in concentrations at approximately 56 sites being overestimated.

In 2011-16 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 11 % lower if the national bias factor had been used in 2017. The choice of factor will be reviewed annually.

[16] 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 - 2017 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, 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[14] for nitrogen dioxide for the laboratory indicates a performance classification as satisfactory for all periods.

## Short-term to Long-term Data adjustment

During 2017 44 diffusion tubes 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; Cardiff Centre, Bristol St Paul's, Cwmbran and Charlton Mackrell. 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** | | | | **1.01** |
|---|---|---|---|---|
| **Period – January-July** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Angel Place<br>Guildhall<br>London Road<br>Daniel Street<br>Newbridge Hill<br>Little Stanhope St<br>Paragon<br>Thomas Street<br>Cleveland Place West<br>Lansdown Crescent<br>Moreley Terrace<br>Radstock – Fortesque Rd<br>MSN – High Street<br>Temple Cloud 4<br>Temple Cloud 5<br>Whitchurch 1<br>Whitchurch 3 | Bristol St Paul's | 23.4 | 22.4 | 1.04 |
| | Cardiff Centre | 20.2 | 19.9 | 1.02 |
| | Cwmbran | 12.0 | 11.6 | 1.04 |
| | Charlton Mackrell | 5.7 | 6.2 | 0.92 |

| Ratio 2 | | | | 0.77 |
|---|---|---|---|---|
| **Period – January-April** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| MSN – Westfield Primary School<br>Lower Camden Place | Bristol St Paul's | 23.4 | 29.1 | 0.80 |
| | Cardiff Centre | 20.2 | 24.5 | 0.83 |
| | Cwmbran | 12.0 | 15.6 | 0.77 |
| | Charlton Mackrell | 5.7 | 8.0 | 0.72 |
| **Ratio 3** | | | | **0.86** |
| **Period – January-May** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| St James Parade (old) | Bristol St Paul's | 23.4 | 26.0 | 0.90 |
| | Cardiff Centre | 20.2 | 23.1 | 0.88 |
| | Cwmbran | 12.0 | 13.9 | 0.87 |
| | Charlton Mackrell | 5.7 | 7.2 | 0.80 |
| **Ratio 4** | | | | **1.08** |
| **Period – July-December** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| St James Parade (new) | Bristol St Paul's | 23.4 | 23.0 | 1.02 |
| | Cardiff Centre | 20.2 | 19.2 | 1.06 |
| | Cwmbran | 12.0 | 11.4 | 1.05 |
| | Charlton Mackrell | 5.7 | 4.8 | 1.19 |

| Ratio 5 | | | | 1.15 |
|---|---|---|---|---|
| **Period – May-December** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Westfield 1<br>Westfield 2<br>Camden – Gay's Hill<br>Temple Cloud 6<br>Temple Cloud 8<br>Batheaston – London Road West C<br>Farrington Gurney 2 | Bristol St Paul's | 23.4 | 20.9 | 1.12 |
| | Cardiff Centre | 20.2 | 18.4 | 1.10 |
| | Cwmbran | 12.0 | 10.4 | 1.16 |
| | Charlton Mackrell | 5.7 | 4.7 | 1.22 |
| **Ratio 6** | | | | **1.00** |
| **Period – August-December** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Landsdown Road<br>Rosewell Court<br>Prior Park Road<br>Rackfield Place<br>Farrington Gurney 3<br>Farrington Gurney 4<br>Farrington Gurney 5<br>Keynsham – A4<br>MSN – Radstock Rd<br>High Littleton 1<br>High Littleton 2 | Bristol St Paul's | 23.4 | 24.7 | 0.95 |
| | Cardiff Centre | 20.2 | 20.7 | 0.98 |
| | Cwmbran | 12.0 | 12.7 | 0.95 |
| | Charlton Mackrell | 5.7 | 5.1 | 1.12 |
| **Ratio 7** | | | | **0.86** |
| **Period – October-December** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Timsbury | Bristol St Paul's | 23.4 | 28.1 | 0.83 |
| | Cardiff Centre | 20.2 | 24.3 | 0.83 |
| | Cwmbran | 12.0 | 14.7 | 0.82 |
| | Charlton Mackrell | 5.7 | 5.9 | 0.97 |

| **Ratio 8** | | | | **0.83** |
|---|---|---|---|---|
| **Period October-December 2** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Terrace Walk | Bristol St Paul's | 23.4 | 29.0 | 0.81 |
| | Cardiff Centre | 20.2 | 25.0 | 0.81 |
| | Cwmbran | 12.0 | 15.4 | 0.78 |
| | Charlton Mackrell | 5.7 | 6.1 | 0.94 |
| **Ratio 9** | | | | **1.43** |
| **Period – May-October** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Temple Cloud 7 | Bristol St Paul's | 23.4 | 17.0 | 1.37 |
| | Cardiff Centre | 20.2 | 15.0 | 1.35 |
| | Cwmbran | 12.0 | 7.8 | 1.54 |
| | Charlton Mackrell | 5.7 | 4.0 | 1.44 |
| **Ratio 10** | | | | **0.82** |
| **Period – Poor Data Capture** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Bath Hill South | Bristol St Paul's | 23.4 | 26.8 | 0.87 |
| | Cardiff Centre | 20.2 | 22.7 | 0.89 |
| | Cwmbran | 12.0 | 14.2 | 0.85 |
| | Charlton Mackrell | 5.7 | 6.5 | 0.88 |
| **Ratio 11** | | | | **0.70** |
| **Period – January-March** | | | | |
| **Applied to** | **Long-term site** | **Annual Mean 2017** | **Period Mean 2017** | **Ratio (Am/Pm)** |
| Keynsham – Rubens Close | Bristol St Paul's | 23.4 | 32.7 | 0.72 |
| | Cardiff Centre | 20.2 | 25.6 | 0.79 |
| | Cwmbran | 12.0 | 17.5 | 0.69 |
| | Charlton Mackrell | 5.7 | 9.3 | 0.61 |

## 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 13.0 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** | | | | | | |
| DT01 | High Street/ Guildhall | Roadside | 3 | 1 | 13.0 | 36 | 31 |
| DT03 | Broad Street | Kerbside | 3 | 1.3 | 13.0 | **48** | **41** |
| DT04 | George Street | Kerbside | 4 | 1 | 13.0 | 36 | 29 |
| DT05 | Gay Street – Top | Roadside | 4 | 1 | 13.0 | 36 | 30 |
| DT08 | Windsor Bridge | Roadside | 3.5 | 3.5 | - | 34 | At façade |
| DT09 | Upper Bristol Rd | Roadside | 6 | 1 | 13.0 | **40** | 30 |
| DT11 | London Road | Roadside | 4 | 1 | 13.0 | 38 | 31 |
| DT13 | Daniel Street | Urban Centre | - | N/A | - | 25 | Urban Centre |
| DT14 | Bathwick Street | Roadside | 2 | 1 | 13.0 | **44** | 39 |
| DT15 | Beckford Road | Roadside | 8 | 1 | 13.0 | 34 | 25 |
| DT16 | Warminster Road | Roadside | 22 | 4 | 13.0 | 36 | 25 |
| DT17 | Widcombe School | Roadside | 6 | 1 | 13.0 | 35 | 27 |
| DT18 | Widcombe High Street | Roadside | 5 | 5 | - | 28 | At façade |
| DT20 | Wells Road | Roadside | 1.5 | 1.5 | - | **52** | At façade |
| DT21 | Wells Road/Upper Oldfield Park | Roadside | 4 | 1 | 13.0 | **43** | 35 |

| 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$^3$) |
|---|---|---|---|---|---|---|---|
| DT23 | Alexandra Park | Urban Background | N/A | N/A | - | 13 | Urban Background |
| DT26 | Upper Wellsway | Roadside | 3 | 3 | - | 32 | At façade |
| DT34 | Newbridge Road | Roadside | 6 | 1 | 13.0 | 38 | 29 |
| DT35 | Newbridge Hill | Roadside | 9 | 2 | 13.0 | 38 | 29 |
| DT37 | Charlotte Street | Roadside | 4 | 1 | 13.0 | 38 | 31 |
| DT39 | Manvers Street | Roadside | 5 | 2 | 13.0 | 38 | 33 |
| DT42 | Dorchester Street | Kerbside | 2.5 | 0.5 | 13.0 | **58** | **45** |
| DT43 | St James' Parade | Roadside | 3 | 1 | 13.0 | **44** | 37 |
| DT43 | St James' Parade (new) | Kerbside | 3.5 | 0.9 | 13.0 | **46** | 37 |
| DT45 | James Street West | Roadside | 5 | 5 | - | 40 | At façade |
| DT46 | Little Stanhope Street | Roadside | 2 | 2 | - | 37 | At façade |
| DT47 | Lansdown Crescent | Roadside | 3 | 2 | 13.0 | 31 | 29 |
| DT48 | Paragon | Roadside | 2 | 1 | 13.0 | 38 | 35 |
| DT50 | Thomas Street | Urban Centre | - | N/A | - | 30 | Urban Centre |
| DT51 | Cleveland Place West | Roadside | 5.9 | 3 | 13.0 | **45** | 39 |
| DT52 | Walcot Terrace | Roadside | 3 | 3 | - | **44** | At façade |
| DT53 | Walcot Terrace | Roadside | 3 | 3 | - | **45** | 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$^3$) |
|---|---|---|---|---|---|---|---|
| DT54 | Walcot Terrace | Roadside | 3 | 3 | - | **45** | At façade |
| DT55 | Lambridge | Roadside | 1.1 | 2.6 | 13.0 | **46** | **53** |
| DT60 | Victoria Buildings | Roadside | 4 | 2 | 13.0 | **46** | **41** |
| DT61 | Morley Terrace | Roadside | 3 | 3 | - | 38 | At façade |
| DT62 | Argyle Terrace | Roadside | 7 | 3 | 13.0 | **45** | 38 |
| DT84 | Bear Flat | Roadside | 7.6 | 1.85 | 13.0 | 33 | 27 |
| DT85 | RUH – North | Roadside | 8.5 | 1.5 | 13.0 | 32 | 25 |
| DT87 | Oak Street | Roadside | 2.65 | 2.65 | - | 33 | At façade |
| DT88 | Angel Place | Roadside | 2.65 | 2.65 | - | **42** | At façade |
| DT90 | Anglo Terrace | Roadside | 4.1 | 1.6 | 13.0 | **57** | **48** |
| DT93 | Lower Camden Place | Kerbside | 3.5 | 0.2 | 13.0 | 29 | 22 |
| DT121 | Lower Borough Walls | Roadside | 9.5 | 4.5 | 13.0 | 27 | 24 |
| DT122 | Stall Street | Roadside | 6.5 | 2.5 | 13.0 | 36 | 31 |
| DT123 | Beau Street | Kerbside | 0.5 | 0.5 | - | 29 | At façade |
| DT124 | Bath Street | Roadside | 5 | 1 | 13.0 | 28 | 23 |
| DT127 | Camden - Gays Hill | Kerbside | 5 | 0.5 | 13.0 | 31 | 23 |
| DT135 | Rosewell Court | Kerbside | 6 | 0.6 | 13.0 | 29 | 22 |
| DT142 | Prior Park Road | Kerbside | 1.1 | 0.8 | 13.0 | **41** | 39 |
| DT143 | Rackfield Place | Roadside | 3.7 | 3.7 | - | 32 | 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$^3$) |
|---|---|---|---|---|---|---|---|
| DT145 | Lansdown Road | Kerbside | 3.2 | 0.7 | 13.0 | 33 | 28 |
| DT147 | Terrace Walk | Roadside | 1.7 | 1.7 | - | 34 | At façade |
| | **Bathampton** | | | | | | |
| DT91 | Bathampton High Street | Roadside | 1.1 | 1.1 | - | 29 | At façade |
| | **Batheaston** | | | | | | |
| DT58 | Batheaston – London Road West A | Roadside | 1 | 1 | - | 29 | At façade |
| DT94 | Batheaston London Road West B | Roadside | 1.25 | 1.25 | - | 31 | At façade |
| DT130 | Batheaston - London Road West C | Roadside | 1.4 | 1.4 | - | 32 | At façade |
| | **Farrington Gurney** | | | | | | |
| DT126 | Farrington Gurney 1 | Roadside | 5.35 | 1.35 | 6.07 | **54** | 39.8 |
| DT134 | Farrington Gurney 2 | Roadside | 4.5 | 4.5 | - | **52** | At façade |
| DT136 | Farrington Gurney 3 | Roadside | 1.2 | 1.2 | - | **42** | At façade |
| DT137 | Farrington Gurney 4 | Roadside | 4.8 | 1.3 | 6.07 | 28 | 22 |

| 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$^3$) |
|---|---|---|---|---|---|---|---|
| DT138 | Farrington Gurney 5 | Roadside | 4.9 | 1.9 | 6.07 | 39 | 32 |
| | **High Littleton** | | | | | | |
| DT139 | High Littleton 1 | Roadside | 8.5 | 8.5 | - | 17 | At façade |
| DT140 | High Littleton 2 | Roadside | 5.1 | 1.3 | 6.41 | 26 | 20 |
| | **Keynsham** | | | | | | |
| DT33 | Keynsham - (Kelston Road) | Urban Centre | 9 | 1 | - | 16 | Urban Centre |
| DT63 | Keynsham – Station Road | Roadside | 4 | 1 | 13.7 | 30 | 26 |
| DT64 | Keynsham – Charlton Rd B | Roadside | 5 | 1 | 13.7 | 31 | 26 |
| DT65 | Keynsham - Charlton Rd A | Roadside | 4 | 1 | 13.7 | 32 | 27 |
| DT66 | Keynsham – High Street A | Roadside | 2 | 1 | 13.7 | **40** | 37 |
| DT67 | Keynsham - Somerfield | Roadside | 3 | 1 | 13.7 | 37 | 32 |
| DT68 | Keynsham - Temple St | Roadside | 3 | 3 | - | 22 | At façade |
| DT69 | Keynsham – Rock Road | Roadside | 2 | 2 | - | 26 | At façade |
| DT70 | Keynsham – Bath Hill | Roadside | 5 | 4 | 13.7 | 29 | 28 |
| DT107 | Keynsham - Bath Hill South | Roadside | 1.3 | 1.3 | - | 37 | 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$^3$) |
|---|---|---|---|---|---|---|---|
| DT112 | Keynsham - Ashton Way | Roadside | 36.5 | 1.5 | 13.7 | 26 | 17 |
| DT113 | Keynsham - West View Road | Roadside | 6 | 1.5 | 13.7 | 18 | 17 |
| DT114 | Keynsham - Victoria Church | Kerbside | 12 | 0.5 | 13.7 | 30 | 21 |
| DT115 | Keynsham - High Street B | Roadside | 2.9 | 1.1 | 13.7 | 31 | 27 |
| DT116 | Keynsham - Fish Bar | Kerbside | 6.1 | 0.8 | 13.7 | 28 | 23 |
| DT117 | Keynsham - Rubens Close | Urban Centre | 10 | 2 | - | 17 | Urban Centre |
| DT118 | Keynsham - Wellsway | Roadside | 2.6 | 1.3 | 13.7 | 28 | 26 |
| DT141 | Keynsham - A4 | Roadside | 14.4 | 1.4 | 13.7 | 36 | 25 |
| | **Midsomer Norton** | | | | | | |
| DT29 | MSN High Street | Kerbside | 4 | 1 | 11.39 | 19 | 17 |
| DT144 | MSN - Radstock Road | Roadside | 4.2 | 1.1 | 11.39 | 33 | 27 |
| | **Pensford** | | | | | | |
| DT119 | Pensford 1 | Roadside | 13.2 | 2.2 | 6.88 | 16 | 12 |
| DT125 | Pensford 2 | Roadside | 2.5 | 1.1 | 6.88 | 33 | 29 |
| | **Radstock** | | | | | | |
| DT27 | Radstock - Fortescue Rd | Roadside | 18 | 2 | 9.25 | 30 | 19 |

| 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$^3$) |
|---|---|---|---|---|---|---|---|
| | **Saltford** | | | | | | |
| DT71 | Saltford Library | Roadside | 14 | 3 | 9.37 | 31 | 22 |
| DT75 | Saltford - The Crown | Roadside | 3 | 3 | - | 37 | At façade |
| DT77 | Saltford - Bath Road | Roadside | 2 | 2 | - | 33 | At façade |
| | **Temple Cloud** | | | | | | |
| DT96 | Temple Cloud 1 | Roadside | 1.5 | 1.5 | - | **67** | At façade |
| DT108 | Temple Cloud 2 | Roadside | 7.5 | 1.25 | 6.43 | **50** | 34 |
| DT109 | Temple Cloud 3 | Roadside | 3.7 | 1.67 | 6.43 | **45** | 39 |
| DT110 | Temple Cloud 4 | Roadside | 5 | 1 | 6.43 | **69** | **49** |
| DT111 | Temple Cloud 5 | Roadside | 1 | 1 | - | **52** | At façade |
| DT131 | Temple Cloud 6 | Roadside | 9 | 1 | 6.43 | 11 | 9 |
| DT132 | Temple Cloud 7 | Roadside | 7 | 1.6 | 6.43 | 14 | 12 |
| DT133 | Temple Cloud 8 | Roadside | 6.9 | 1.1 | 6.43 | 21 | 16 |
| | **Timsbury** | | | | | | |
| DT146 | Timsbury | Roadside | 1 | 1 | - | 17 | At façade |
| | **Westfield** | | | | | | |
| DT30 | MSN Westfield Primary Sch | Urban Background | - | N/A | - | 14 | Urban Background |
| DT128 | Westfield 1 | Roadside | 3.9 | 1.8 | 9.68 | 26 | 24 |
| DT129 | Westfield 2 | Roadside | 5.4 | 1.8 | 9.68 | 30 | 25 |

| 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$^3$) |
|---|---|---|---|---|---|---|---|
| | **Whitchurch** | | | | | | |
| DT32 | Whitchurch | Roadside | 4.8 | 2.1 | 9.85 | 39 | 34 |
| DT97 | Whitchurch 1 | Roadside | 6.4 | 1.2 | 9.85 | 38 | 28 |
| DT98 | Whitchurch 2 | Roadside | 1.3 | 1.3 | - | 35 | At façade |
| DT99 | Whitchurch 3 | Kerbside | 2.7 | 0.9 | 9.85 | 22 | 19 |
| DT100 | Whitchurch 4 | Roadside | 7.6 | 1.6 | 9.85 | 29 | 22 |
| DT101 | Whitchurch 5 | Roadside | 5.6 | 1.6 | 9.85 | **46** | 36 |
| DT120 | Whitchurch 6 | Urban Centre | 3 | 3 | - | 19 | At façade |

# Appendix D: Other monitoring

## Benzene

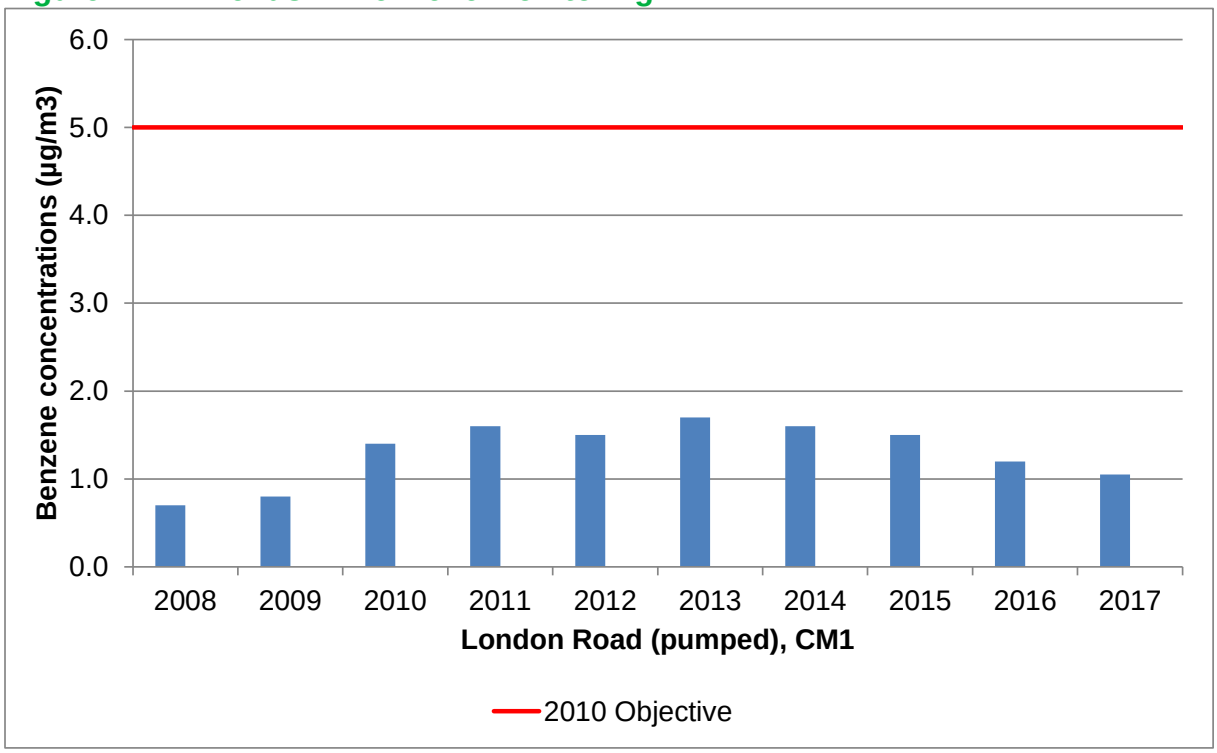
Monitoring results for benzene are shown in Table D.1 and Figure D.1. The results show that there are no exceedances of the benzene objectives during 2017.

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 2017 (%) | Annual Mean (µg/m$^3$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM1 | London Road (Pumped) | 100 | 1.7 | 1.6 | 1.5 | 1.2 | 1.1 |
| | Annual Mean Objective: 5 µg/m$^3$ | | | | | | |

### Figure D.1 – Trends in Benzene Monitoring



## AQMesh comparison

### Table D.2 – Comparison of AQMesh analysers when co-located with the continuous analyser at Chelsea House

| Analyser | Annual Mean $NO_2$ ($\mu g/m^3$) | $NO_2$ 1-Hour Means > 200$\mu g/m^3$ (1) | Annual Mean $PM_{10}$ ($\mu g/m^3$) | $PM_{10}$ 24-hour Means >50 $\mu g/m^3$ (2) | Annual Mean $PM_{2.5}$ |
|---|---|---|---|---|---|
| July-October | | | | | |
| AQMesh – Luther | 30 | 0 (64) | 11 | 2 (15) | 6 |
| Chelsea House | 25 | 0 (61) | 13 | 0 | 10 |

(1) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.
(2) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets

### Table D.3 – Results from AQMesh analysers

| Analyser | 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 $\mu g/m^3$ | Annual Mean $PM_{2.5}$ |
|---|---|---|---|---|---|
| January-Apr– at Sydney Place | | | | | |
| AQMesh – Luther | 56 | 1 (154) | 35 | 2 (76) | 20 |
| | | | | | |
| June-July– at Sydney Place (new sensors) | | | | | |
| AQMesh – Luther | 23 | 0 (72) | 14 | 0 (20) | 8 |
| | | | | | |
| October-December – at Whitchurch | | | | | |
| AQMesh – Luther | 44 | 0 (112) | 20 | 2 (36) | 12 |
| | | | | | |
| January-April – at Keynsham High Street | | | | | |
| AQMesh – Wallander | - | - | 30 | 18 (64) | 16 |
| | | | | | |
| June-December – at Keynsham High Street (new sensor and one-way trial) | | | | | |
| AQMesh – Wallander | 35 | 0 (82) | 12 | 2(21) | 7 |
| | | | | | |

# Appendix E: Maps of Monitoring Locations and AQMAs

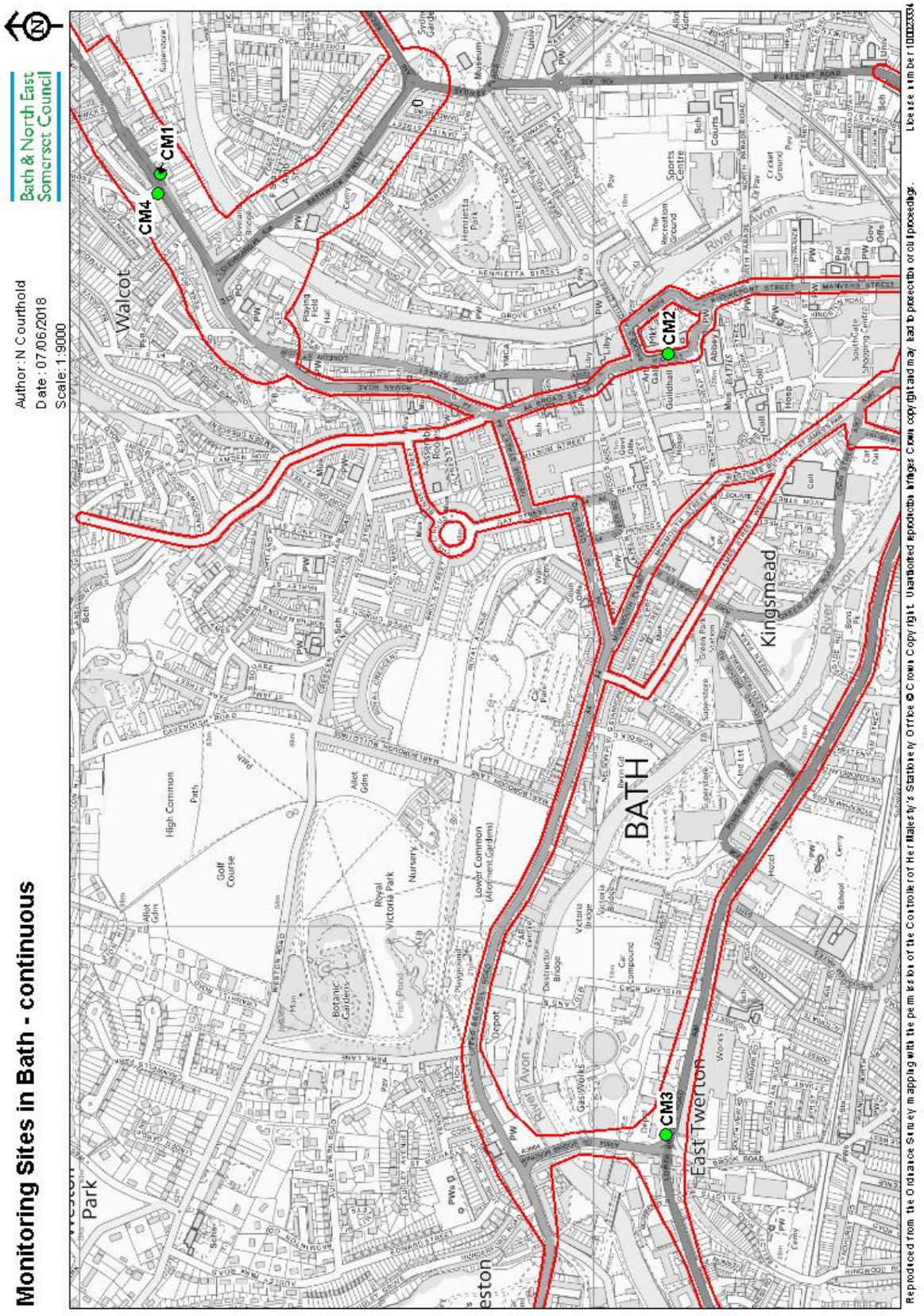



**Figure E.1 – Map showing automatic monitoring sites in Bath**

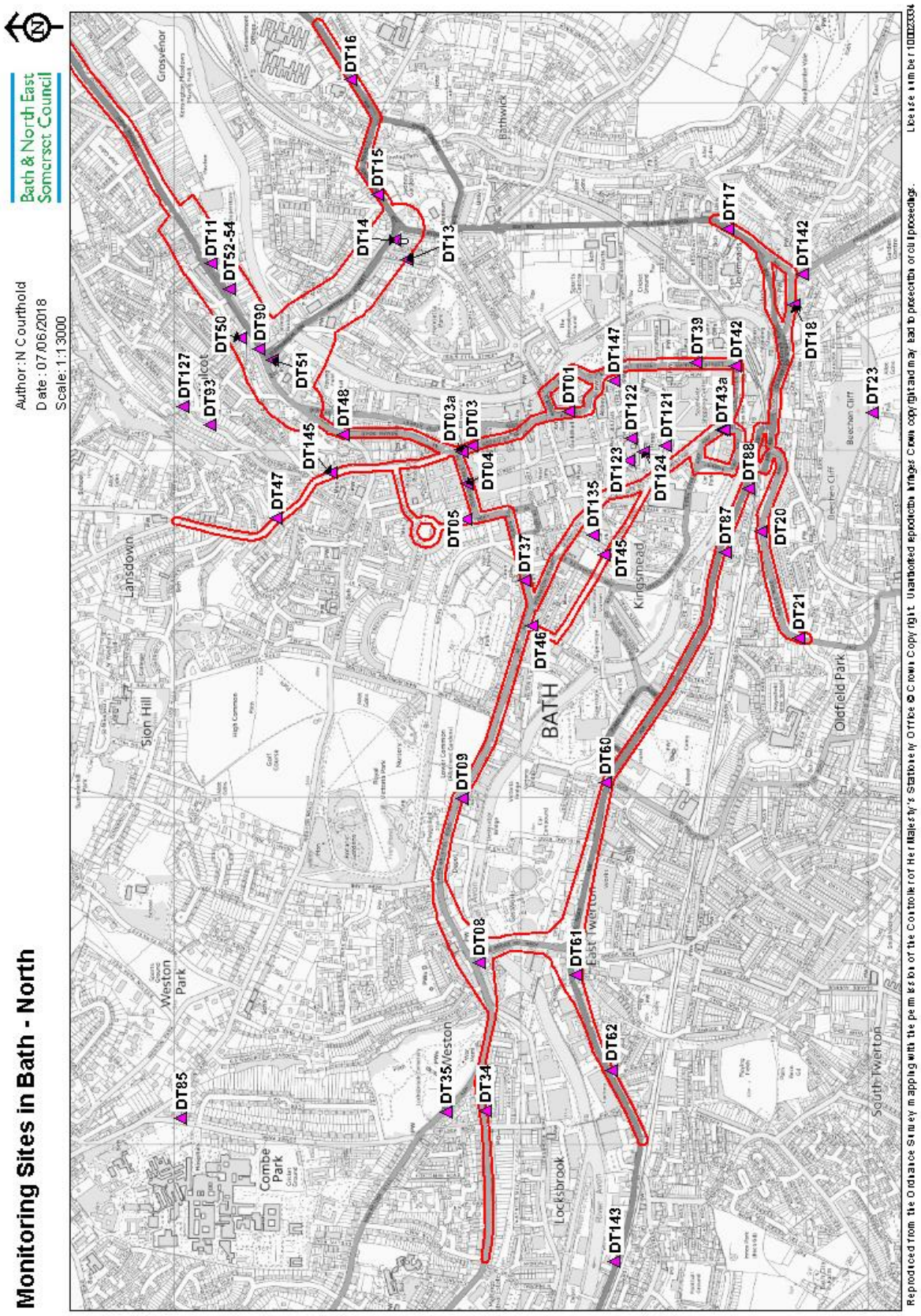



**Figure E.2 – Map showing monitoring sites and AQMA in Bath – North**

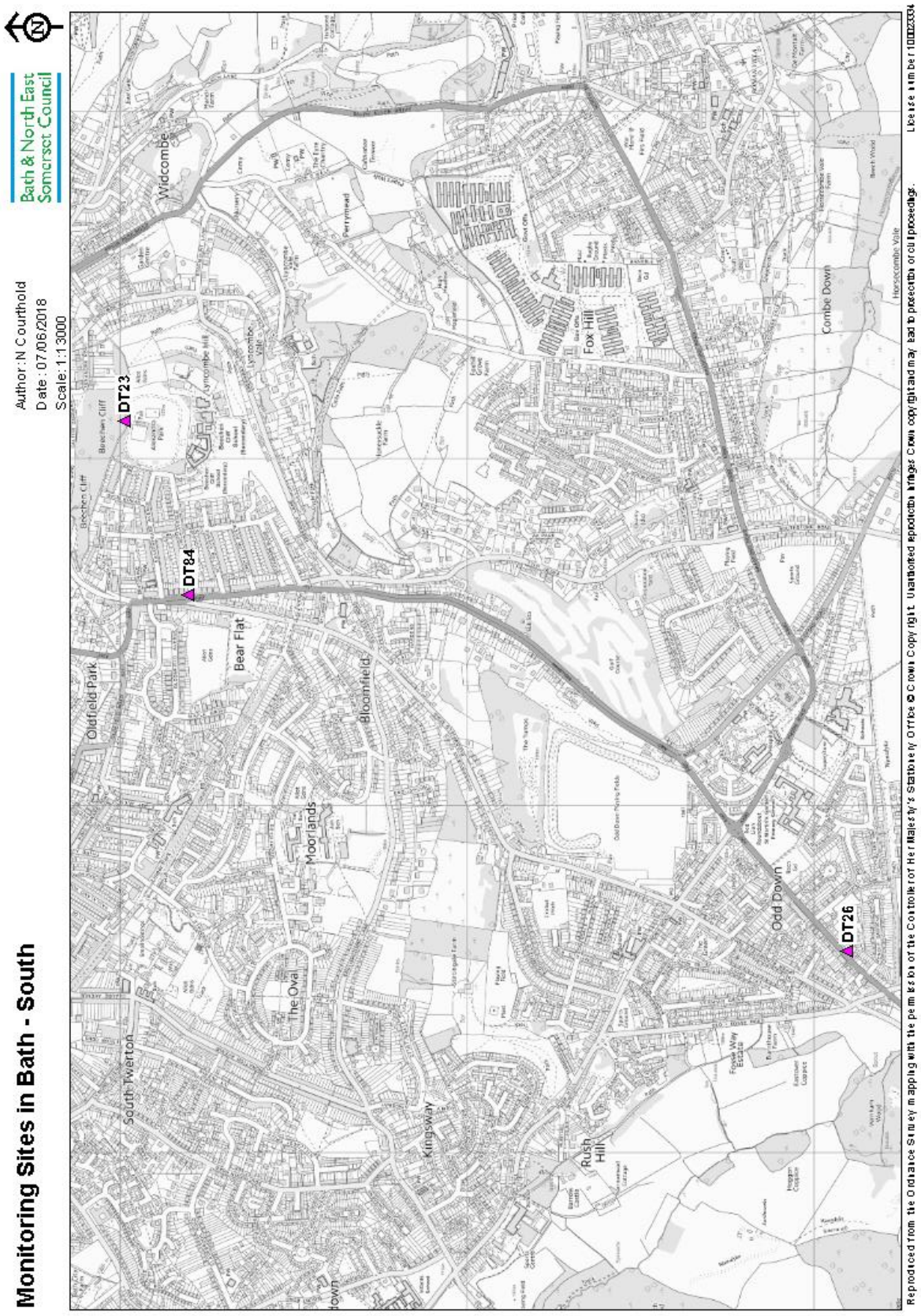



**Figure E.3 – Map showing monitoring sites in Bath – South**

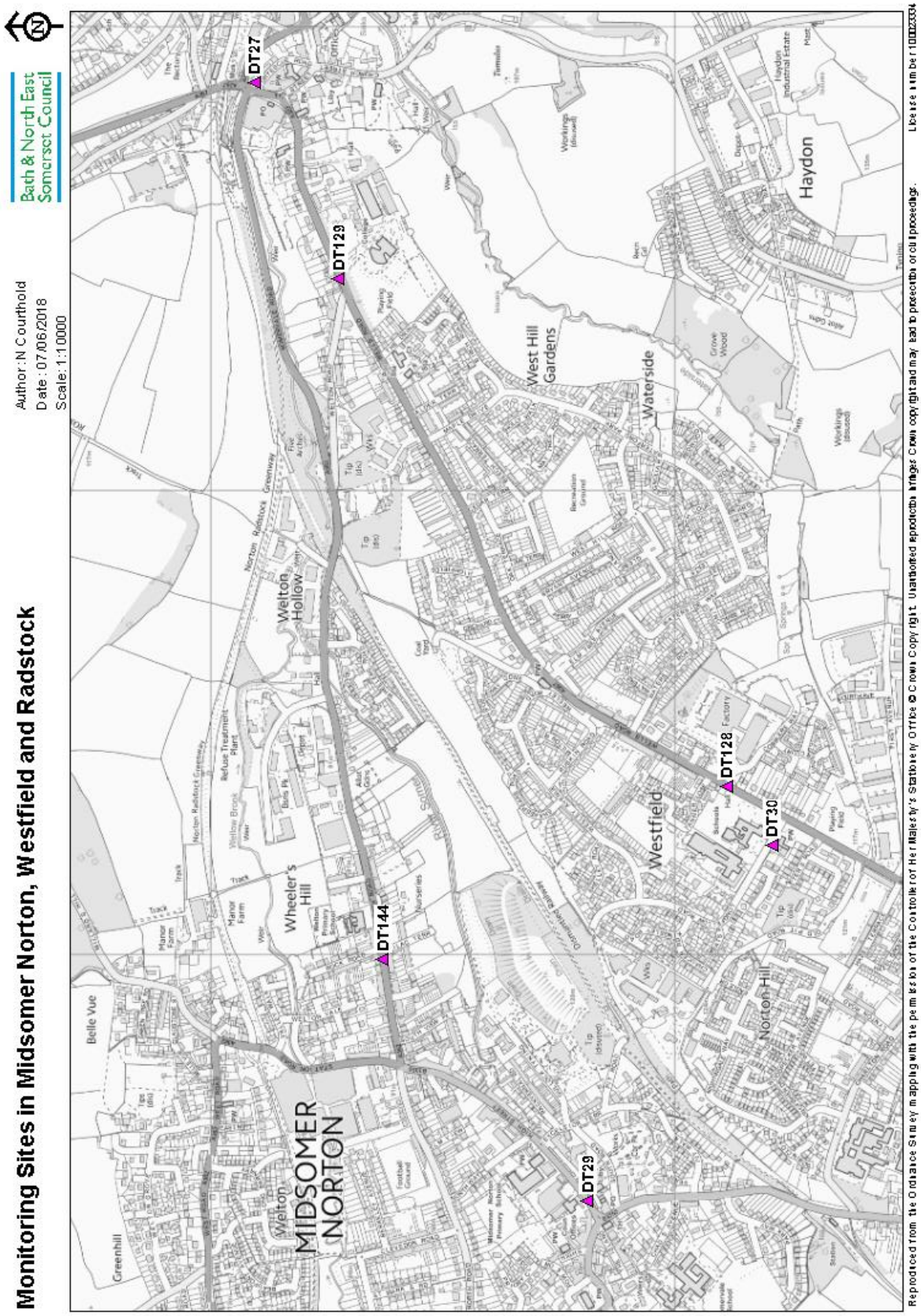



**Figure E.4 – Map showing monitoring sites in Midsomer Norton, Westfield and Radstock**

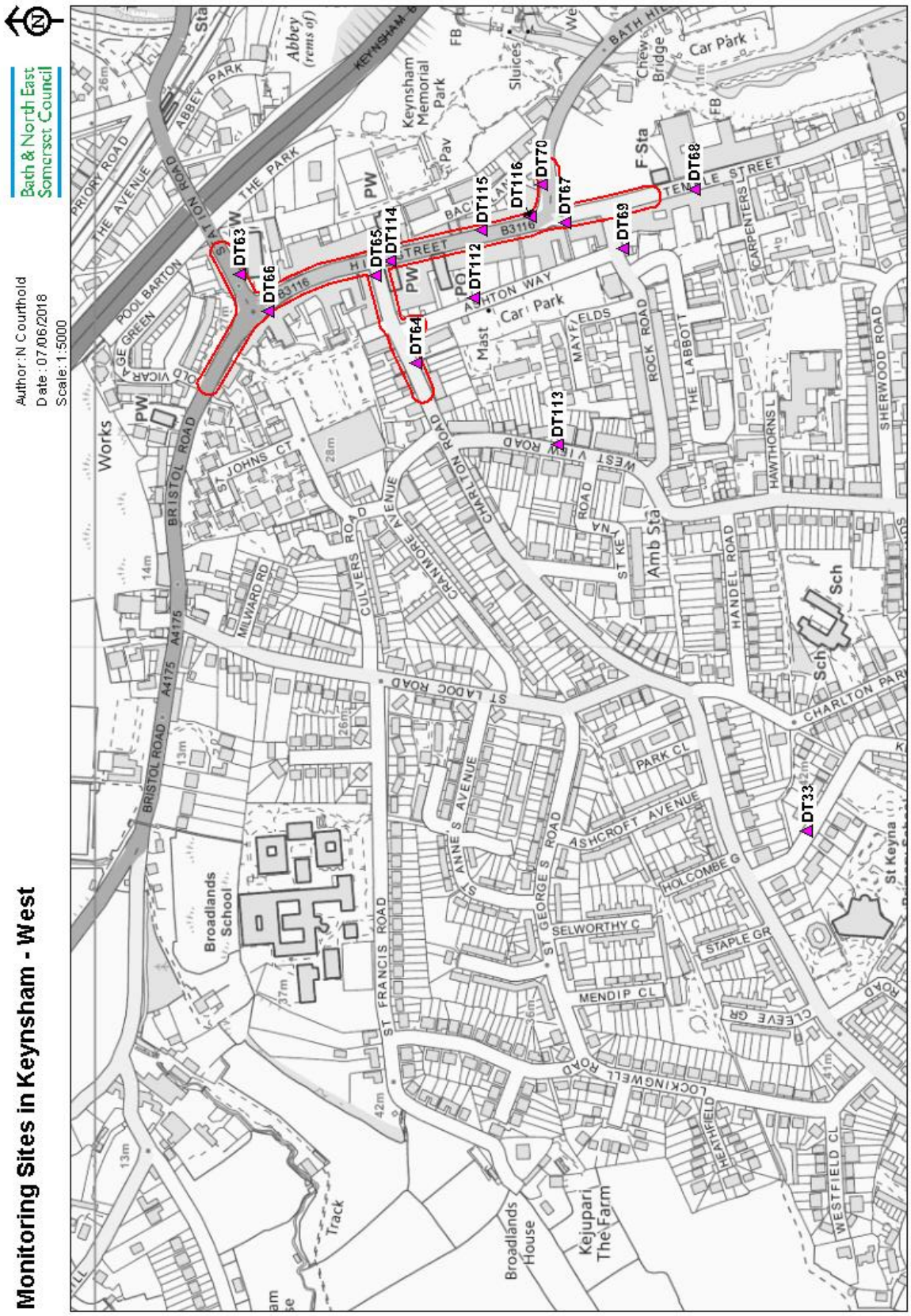



**Figure E.5 – Map showing monitoring sites and AQMA in Keynsham – West**

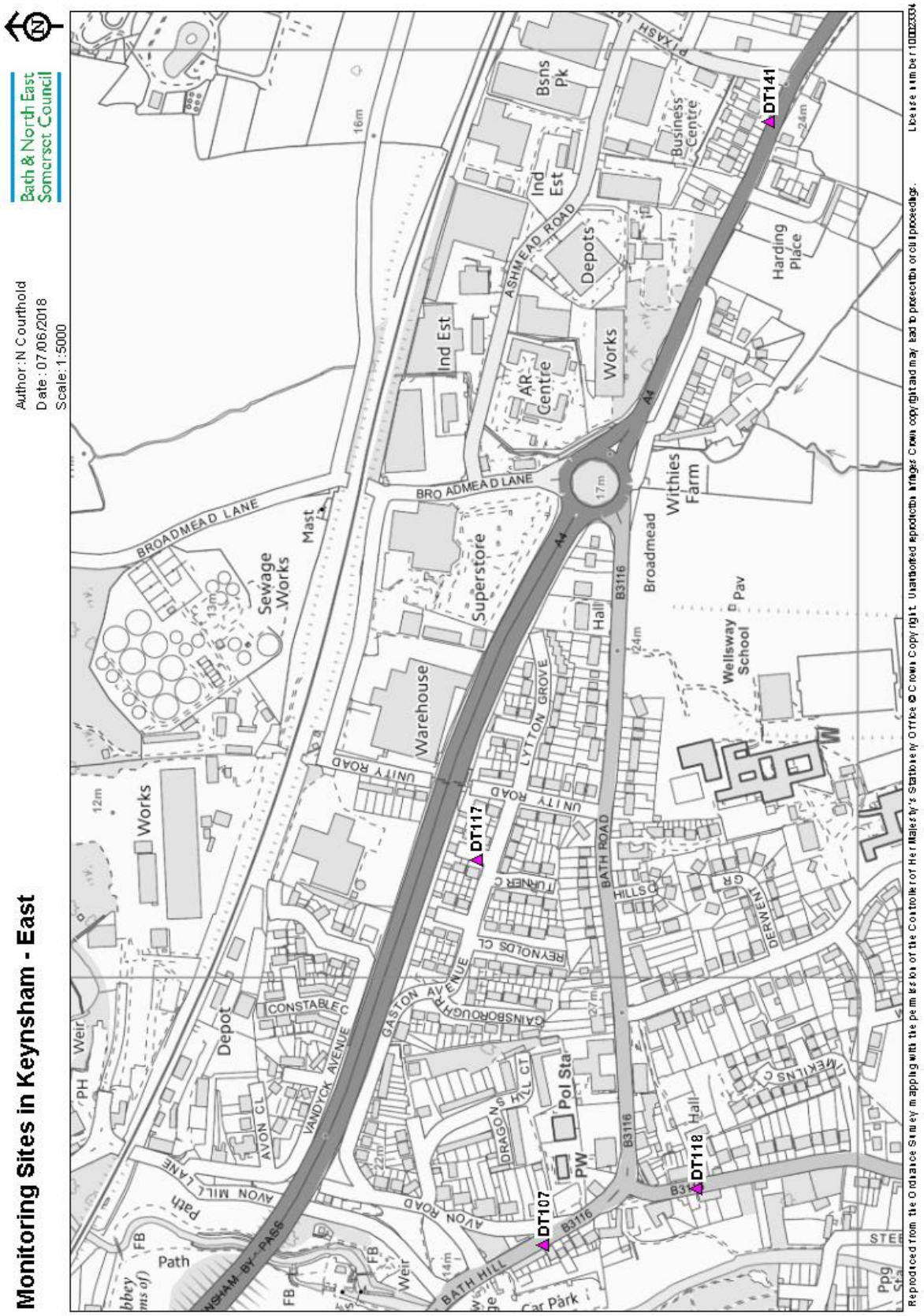



**Figure E.6 – Map showing monitoring sites and AQMA in Keynsham – East**

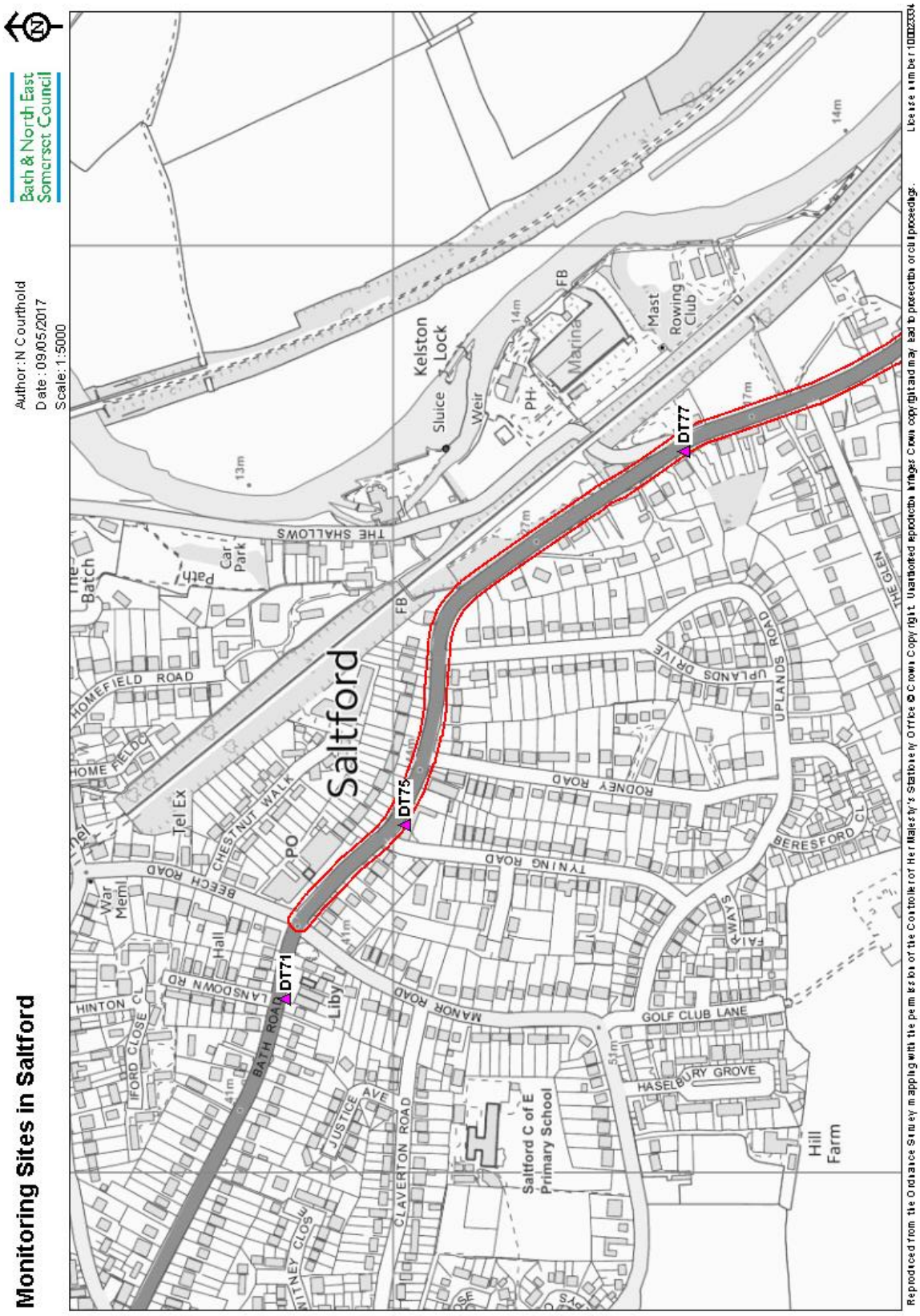



**Figure E.7 – Map showing monitoring sites and AQMA in Saltford**

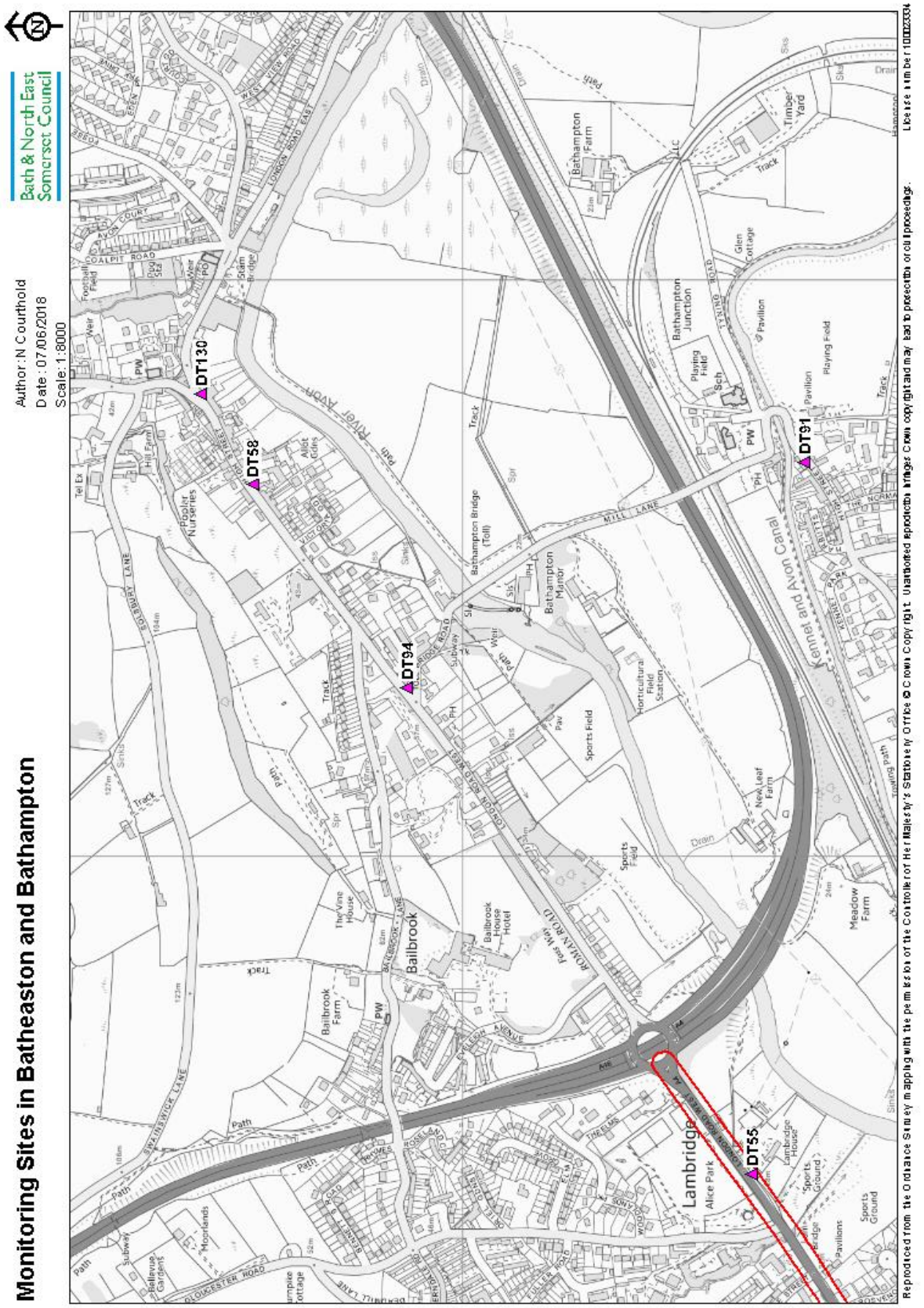



**Figure E.8 – Map showing monitoring sites in Batheaston and Bathampton**

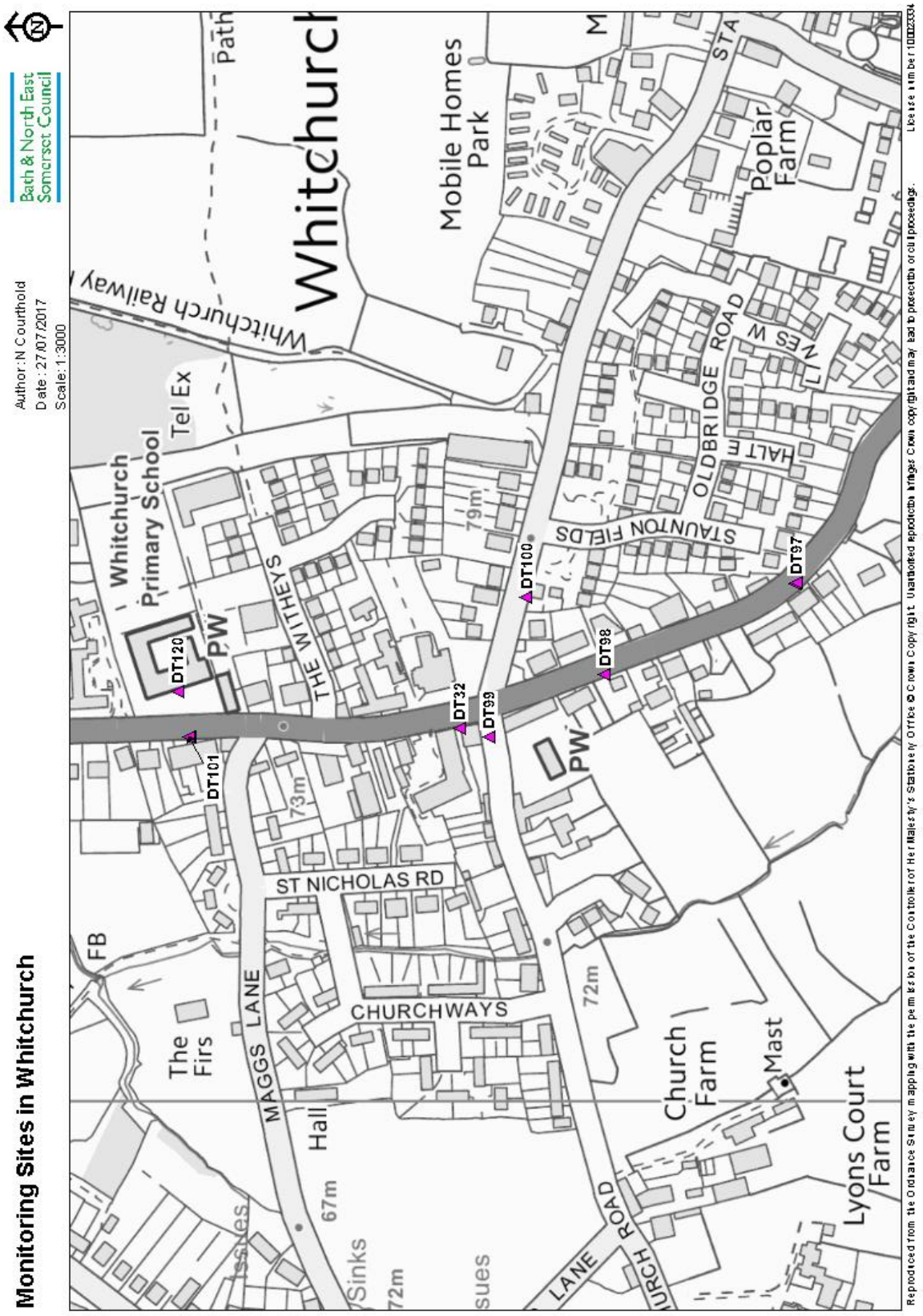



**Figure E.9 – Map showing monitoring sites in Whitchurch**


**Figure E.10 – Map showing monitoring sites in Temple Cloud**


**Figure E.11 – Map showing monitoring sites in Farrington Gurney**

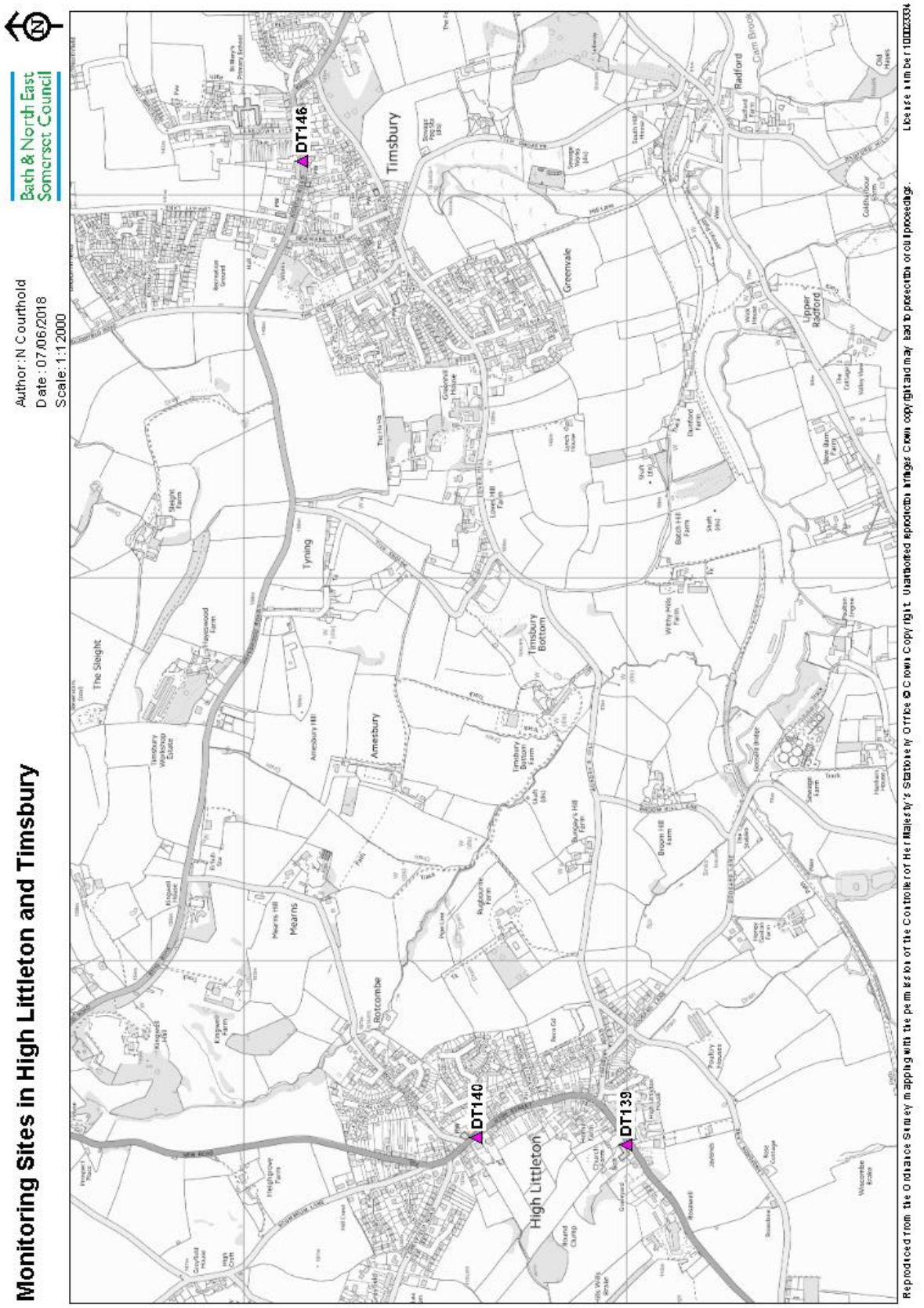



**Figure E.12 – Map showing monitoring sites in High Littleton and Timsbury**

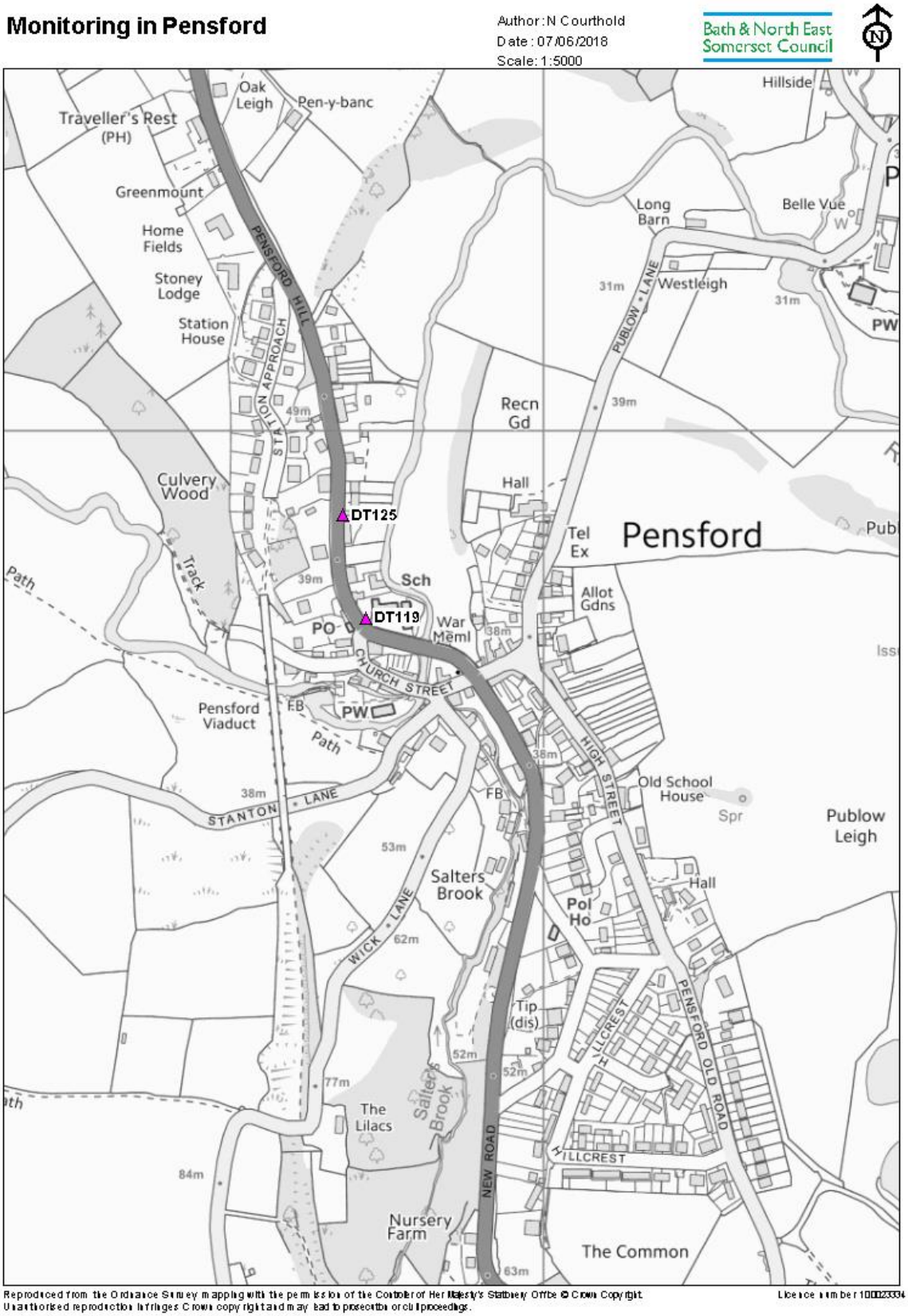



**Figure E.13 – Map showing monitoring sites in Pensford**

# 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.

## F.2 Detailed Assessment for Temple Cloud

### Background

The A37 road through Temple Cloud is very narrow in places and has several pinch points where larger vehicles, including Heavy Goods Vehicles (HGVs), are unable to pass one another. Consequently, they are forced to stop and give way. The additional engine power used to start again, negatively contributes to the vehicular emissions especially when travelling in an uphill direction.

Retaining walls and overhanging vegetation in Temple Cloud exacerbate the issue, and also act as physical barriers that can decrease air flow, resulting in higher pollutant concentrations. This is known as a street canyon effect.

### Monitoring

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.9 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.

Table A.2 in Appendix A shows the details of the sites and Appendix C gives details of bias and annual corrections used for sites with less than 75 % data capture. The annual $NO_2$ data for 2016 and 2017 is displayed in Table F.1 below.

The results shown in Table F.1 show that the monitoring locations on the A37 exceeded the annual average objective after bias and annual corrections were applied and 2 sites were also likely to exceed the 1-hour objective as they were above 60 µg/m$^3$. At the property facades, 3 sites were above the annual average objective and one site was above 60 µg/m$^3$. The results from the monitoring sites located on Temple Inn Lane and Cameley Road were below the objective. The AQMA will therefore be declared for both the annual and 1-hour average $_{NO2}$ objectives.

## Table F.1 – Temple Cloud 2016 and 2017 annual average $NO_2$ monitoring data

| Site ID | Site Name | $NO_2$ Annual Mean Concentration (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | 2016 | at Façade 2016 | 2017 | at Façade 2017 |
| DT96 | Temple Cloud 1 | **90** | **90** | **67** | **67** |
| DT108 | Temple Cloud 2 | **48** | 35 | **50** | 34 |
| DT109 | Temple Cloud 3 | **46** | **41** | **45** | 39 |
| DT110 | Temple Cloud 4 | **53** | **40** | **69** | **49** |
| DT111 | Temple Cloud 5 | **51** | **51** | **52** | **52** |
| DT131 | Temple Cloud 6 | | | 11 | 9 |
| DT132 | Temple Cloud 7 | | | 14 | 12 |
| DT133 | Temple Cloud 8 | | | 21 | 16 |

Note: Exceedances of the $NO_2$ annual mean objective of 40 µg/m$^3$ are shown in **bold**. $NO_2$ annual means exceeding 60 µg/m$^3$ indicating potential exceedances of the $NO_2$ 1-hour mean objective are shown in **bold and underlined**. Results for sites with less than 75 % data capture have been annualised.

## Proposed Air Quality Management Area (AQMA)

Setting the boundary of an AQMA involves an element of judgement as to the extent of the exceedance based on monitoring data, sources, receptors and other local factors. The dispersive nature of $NO_2$ results in concentrations quickly decreasing only a few metres from the source. The proposed boundary for the AQMA was derived from the monitoring data for Temple Cloud. Sites not exceeding were not included with the proposed area. The width of the area was determined using the distance adjustment tool work out the distance from the kerb where the objective would be met.

The proposed AQMA in Temple Cloud runs along the A37, starting just to the north of the A37/Temple Inn Lane junction and running just to the south of the A37/Eastcourt Road junction. The area will measure approximately 13 metres from the centre of the road, as displayed below in Figure F.1. Any relevant building façades and gardens touched by or within this boundary are included in the AQMA.

## Consultation

A public consultation on the proposed Air Quality Management Area boundary ran from Wednesday 14th February to Friday 23rd March 2018. The statutory consultees listed in the Policy Guidance (LAQM.PG16), relevant Council departments and local residents were consulted on the proposed AQMA boundary.

The primary aims of the consultation were to:

- Gain opinion on the proposed Air Quality Management Area boundary

- Raise public awareness of the air quality issue within the village
- Encourage public engagement with the process; throughout the declaration of the Air Quality Management Area and then onto the Action Planning.

Full details of the consultation and the responses are available in the consultation report[17].

The consultation showed that 68 % of respondents agreed with the proposed boundary. The respondents who disagreed with the proposed boundary were encouraged to provide the reasoning behind their answer. A common suggestion was to extend the AQMA further to the north and south than suggested; to cover the whole stretch of A37 that runs through the village. Further comments requested that Temple Inn Lane also be included in the AQMA, and Meadway and Oaklands were also mentioned.

Elongating the AQMA boundary to further extend through the village is not supported by the monitoring data. However, to residents this seems logical as the same vehicle traffic is experienced by all the residences along the A37 in Temple Cloud. This has been reviewed and the decision taken to elongate the AQMA, so that all residences along the A37 are treated in an equal manner.

The comments which requested the inclusion of Temple Inn Lane, Meadway and Oaklands were considered. The diffusion tube monitoring sites DT132 and DT133 measured $NO_2$ concentrations well below the annual average objective of 40 µg/$m^3$ and therefore provide evidence that the air quality issue does not extend beyond the A37. The concerns regarding Temple Inn Lane focused on its unsuitability for HGVs and the difficulty to turn in and out of its junction with the A37, rather than issues with air quality.

### Conclusions and recommendations

The amended map of the proposed AQMA boundary post consultation is shown in Figure F.2. The proposed AQMA starts approximately 245 metres north of the A37/Temple Inn Lane junction and runs along the A37 to approximately 150 south of

[17] Bath & North East Somerset Council, Consultation Report: Air Quality Management Area (AQMA) in Temple Cloud, 2018

the A37/Eastcourt Road junction. The area will measure approximately 13 metres from the centre of the road.

Post consultation, the formal agreement of the Air Quality Management Area boundary in Temple Cloud will be a Cabinet Single Member Decision. The declaration of the area then follows a legal process, by which an order is created. Following the declaration of the AQMA an AQAP will be developed for Temple Cloud when potential actions and measures will be considered.

The main source of the $NO_2$ concentrations in Temple Cloud is vehicle emissions. A small fraction of $NO_2$ is directly emitted from vehicle exhausts; however the majority forms in secondary reactions within the atmosphere. The source apportionment for the area will be calculated as part of the AQAP. The draft AQAP will be consulted on in Autumn 2018.

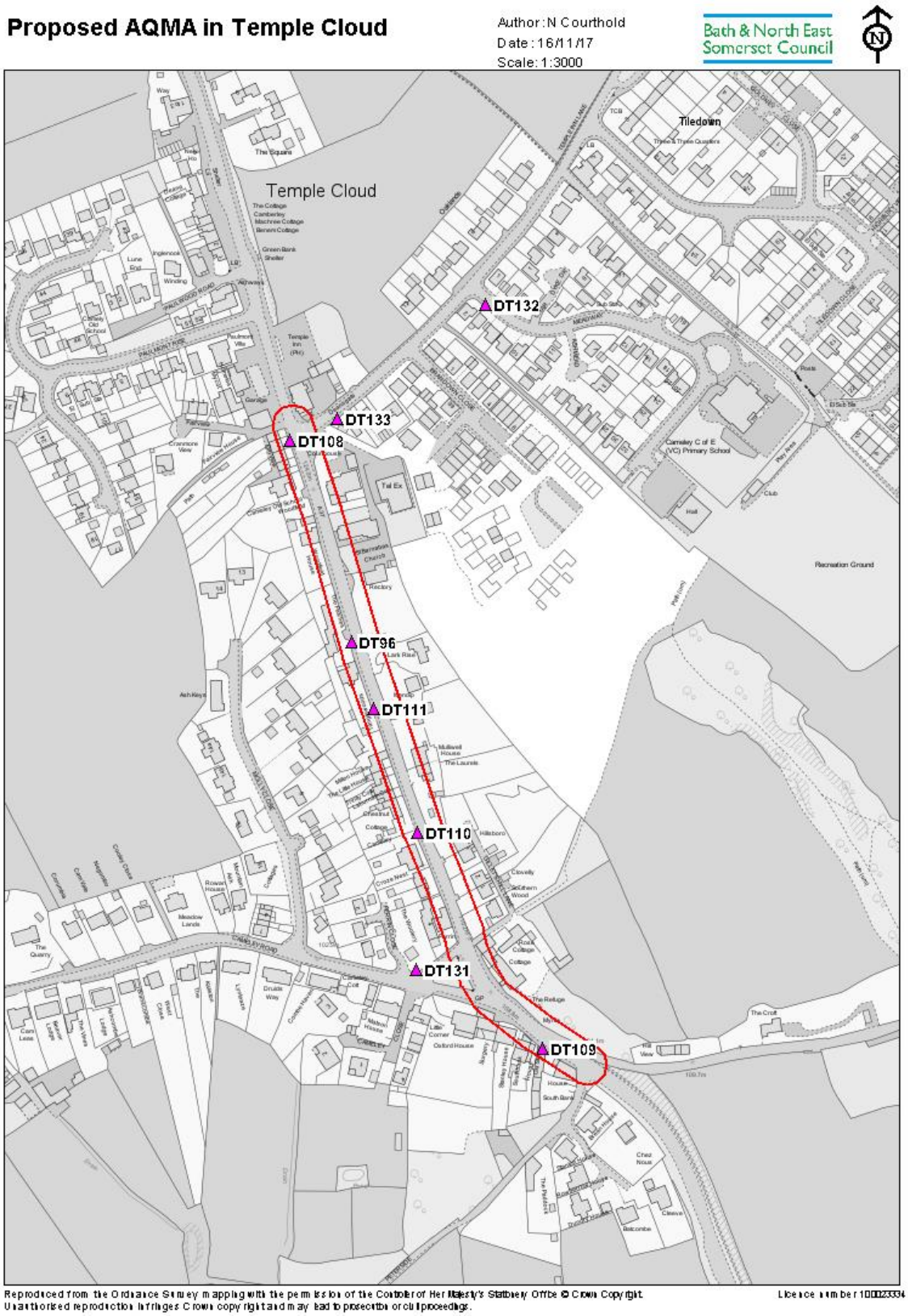



**Figure F.1 – Map of the proposed AQMA boundary in Temple Cloud**

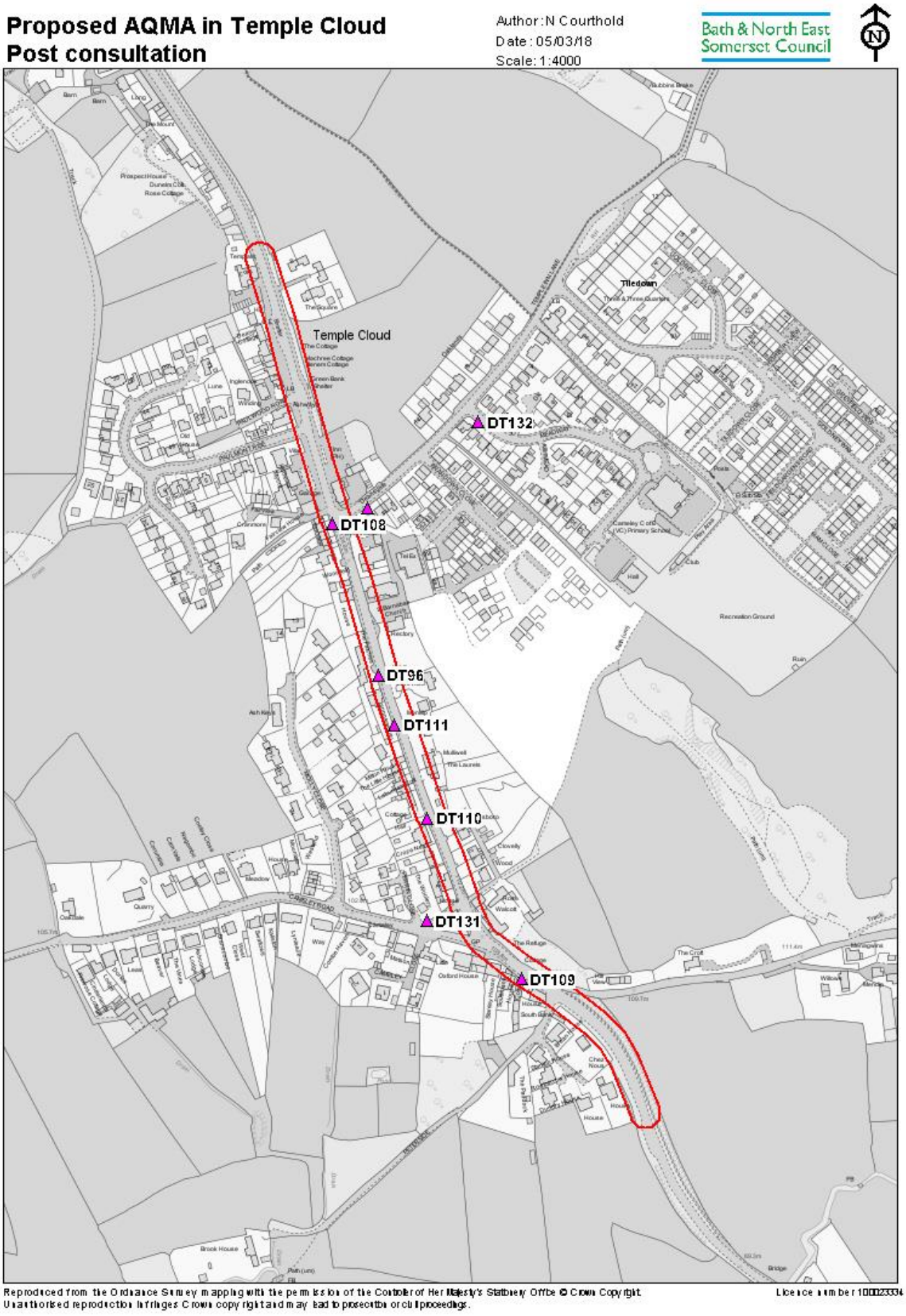



**Figure F.2 – Map of the proposed AQMA boundary in Temple Cloud, post consultation**

# F.3 Detailed Assessment for Farrington Gurney

## Background

Following high concentrations of $NO_2$ being identified in Temple Cloud in 2016, other potential areas along the A37 were investigated including Farrington Gurney.

The A37 through Farrington Gurney is relatively flat. No street canyons or avenue canyons, where high buildings trap air pollution in narrow stretches of road, are present.

The main area of concern is a traffic light controlled junction where the A37 meets the A362.

## Monitoring

Initially one monitoring 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 (Figure E.11 in Appendix E).

Table A.2 in Appendix A shows the details of the sites and Appendix C gives details of bias and annual corrections used for sites with less than 75 % data capture. The annual average $NO_2$ data for 2017 is displayed in Table F.2 below.

The results shown in Table F.2 show that the monitoring locations on the A37 exceeded the annual average objective after bias and annual corrections were applied at 3 locations, this reduced to 2 locations at the property facades.

**Table F.2 – Farrington Gurney 2017 annual average $NO_2$ monitoring data**

| Site ID | Site Name | $NO_2$ Annual Mean Concentration 2017 | $NO_2$ Annual Mean Concentration at Façade 2017 |
|---|---|---|---|
| DT126 | Farrington Gurney 1 | **54** | **40** |
| DT134 | Farrington Gurney 2 | **52** | **52** |
| DT136 | Farrington Gurney 3 | **42** | **42** |
| DT137 | Farrington Gurney 4 | 28 | 22 |
| DT138 | Farrington Gurney 5 | 39 | 32 |

Note: Exceedances of the $NO_2$ annual mean objective of 40 µg/m$^3$ are shown in **bold**. $NO_2$ annual means exceeding 60 µg/m$^3$ indicating potential exceedances of the $NO_2$ 1-hour mean objective are shown in **bold and underlined**. Results for sites with less than 75 % data capture have been annualised.

## Proposed Air Quality Management Area (AQMA)

Setting the boundary of an AQMA involves an element of judgement as to the extent of the exceedance based on monitoring data, sources, receptors and other local factors. The dispersive nature of $NO_2$ results in concentrations quickly decreasing only a few metres from the source. The proposed boundary for the AQMA was derived from the monitoring data for Farrington Gurney. Sites not exceeding on the A362 were not included with the proposed area. The width of the area was determined using the distance adjustment tool work out the distance from the kerb where the objective would be met.

The proposed AQMA boundary starts approximately 160 metres north of the A37/Church Lane junction and runs south along the A37 through Farrington Gurney to the Bath and North East Somerset Council boundary, as marked in red in Figure F.3 below. The area will measure approximately 12 metres from the centre of the road, and incorporates part of the junction where the A362 meets the A37. Any relevant building façades touched by or within this boundary are included in the AQMA.

## Consultation

A public consultation on the proposed Air Quality Management Area boundary ran from Monday 19th February to Friday 23rd March 2018. The statutory consultees listed in the Policy Guidance (LAQM.PG16), relevant Council departments and local residents were consulted on the proposed AQMA boundary.

The primary aims of the consultation were to:

- Gain opinion on the proposed Air Quality Management Area boundary
- Raise public awareness of the air quality issue within the village
- Encourage public engagement with the process; throughout the declaration of the Air Quality Management Area and then onto the Action Planning.

Full details of the consultation and the responses are available in the consultation report[18].

[18] Bath & North East Somerset Council, Consultation Report: Air Quality Management Area (AQMA) in Farrington Gurney, 2018

The consultation showed that 79 % of respondents agreed with the proposed boundary. The respondents who answered disagreed with the proposed boundary were encouraged to provide the reasoning behind their answer. A common suggestion was to extend the AQMA to include the A362, which stretches to the east of Farrington Gurney from its junction with the A37. In addition it was also suggested for the AQMA to be extended more widely across the village.

The comments which requested the inclusion of the A362 road within the AQMA were considered post consultation. The diffusion tube DT138 does not record $NO_2$ concentrations over the annual average objective of 40 µg/$m^3$. However, to fully incorporate the A37/A362 junction, and the vehicle queues which emanate east along the A362, the proposed AQMA has been amended post consultation.

Actions within the Air Quality Action Plan are not allowed to favour one area at the expense of another; and actions cannot be implemented on the A37 if they negatively affect any part of the A362. Therefore, it is expected that measures within the AQAP will positively affect both roads. The planned development of the Somer Valley Enterprise Zone at Old Mills is also expected to have an impact on the A362.

### Conclusions and recommendations

The amended map of the proposed AQMA boundary post consultation is shown in Figure F.4. The proposed AQMA post consultation extends 80 metres east of the junction to include the stretch of A362 road up to DT138. It otherwise remains unchanged.

Post consultation, the formal agreement of the Air Quality Management Area boundary in Farrington Gurney will be a Cabinet Single Member Decision. The declaration of the area then follows a legal process, by which an order is created. Following the declaration of the AQMA an AQAP will be developed for Temple Cloud when potential actions and measures will be considered.

Proposed improvements to the A37/A362 junction and the provision of a cycle route along the A362 as part of the Somer Valley Enterprise Zone project could be expected to have a positive influence on the air quality at the junction due to

improved traffic flow and uptake of active travel. The Environmental Monitoring team will liaise with the project team as part of the Farrington Gurney AQAP.

However, there were concerns raised over the potential increase in traffic volumes as a result of the development. Monitoring along the A362 will continue, and $NO_2$ concentrations will continue to be reviewed. In addition, an extra diffusion tube will be installed further east of the current DT138. The section of road near the properties known as 'Sunnyside' was highlighted during the consultation, and therefore a suitable location near here is being considered.

The main source of the $NO_2$ concentrations in Farrington Gurney is vehicle emissions. A small fraction of $NO_2$ is directly emitted from vehicle exhausts; however the majority forms in secondary reactions within the atmosphere. The source apportionment for the area will be calculated as part of the AQAP. The draft AQAP will be consulted on in Autumn 2018.

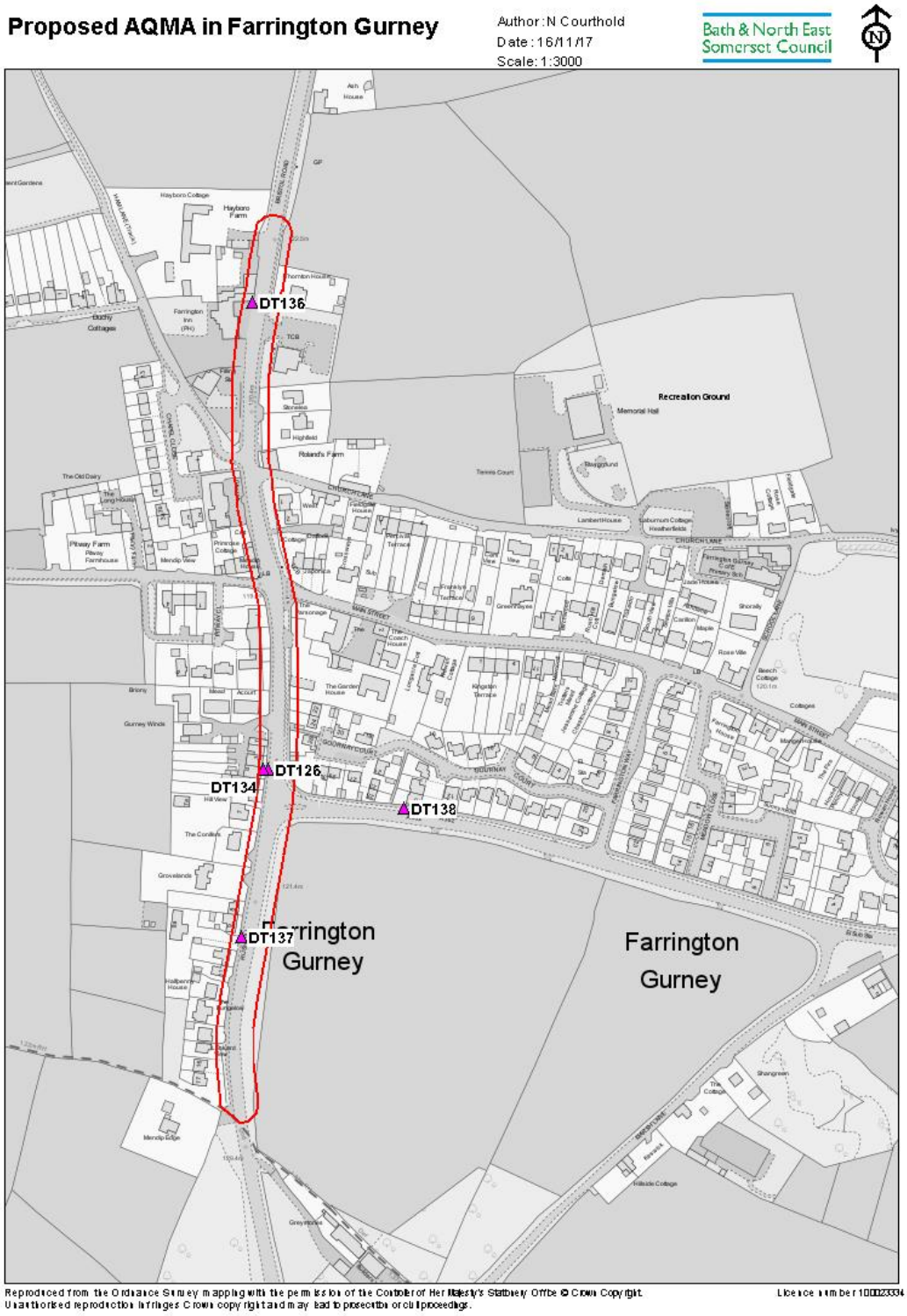



**Figure F.3 – Map of the proposed AQMA boundary in Farrington Gurney**

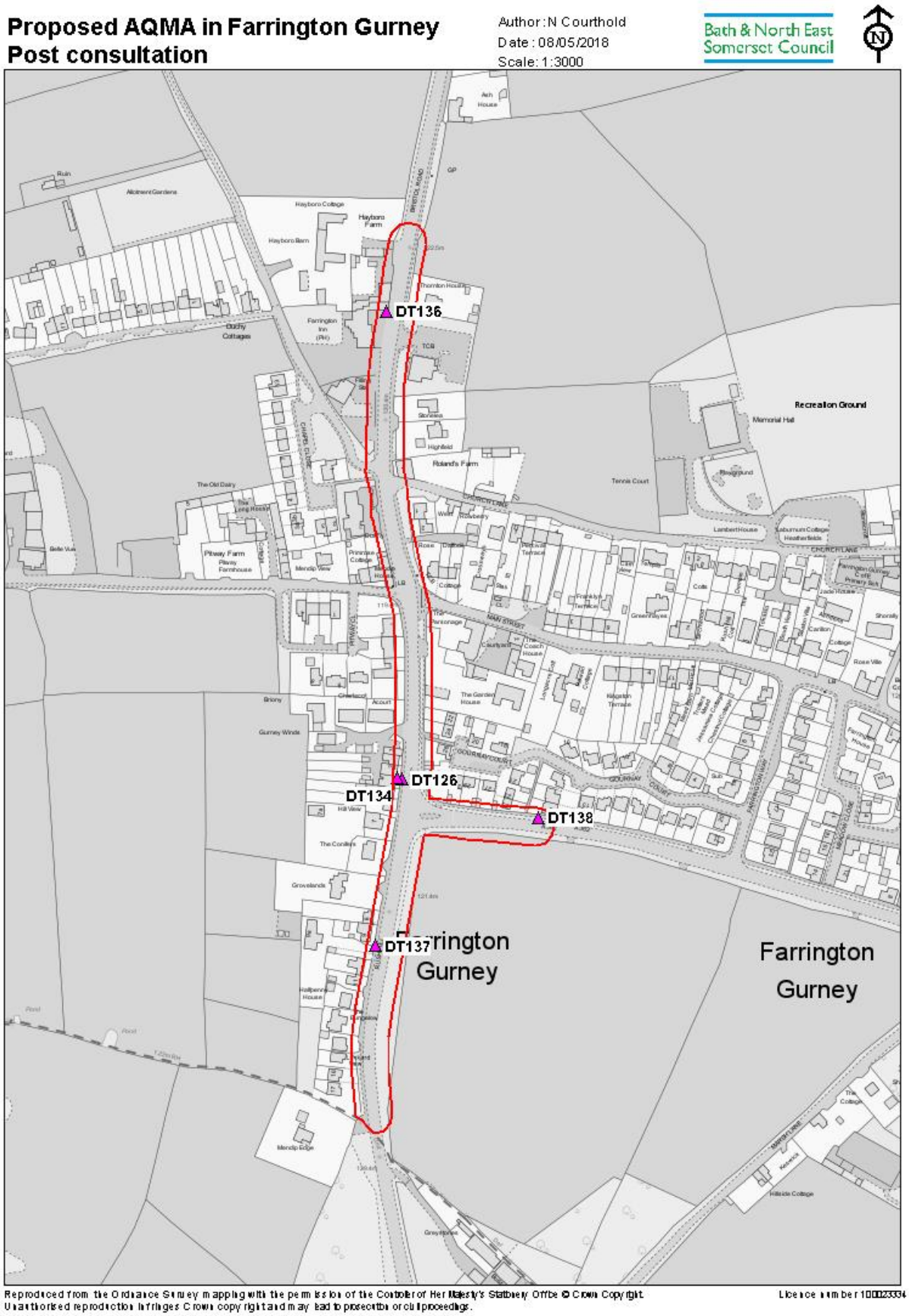



**Figure F.4 – Map of the proposed AQMA boundary in Farrington Gurney, post consultation**

# Appendix G: Summary of Air Quality Objectives in England

### Table G.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective[19] | |
|---|---|---|
| | 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 |

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

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AADT | Annual Average Daily Traffic |
| 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 |
| DC | Development Control |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| EU | European Union |
| EV | Electric Vehicle |
| GUL | Go Ultra Low |
| HGV | Heavy Goods Vehicle |
| LAQM | Local Air Quality Management |
| LEZ | Low Emission Zone |
| LSTF | Local Sustainable Transport Fund |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| NPPF | National Planning Policy Framework |
| 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 |
| $\mu g/m^3$ | micrograms per cubic metre |
| ULEV | Ultra-Low Emission Vehicles |

# References


1. Environmental equity, air quality, socioeconomic status and respiratory health, 2010.

2. Department for Environment, Food and Rural Affairs (2006) Air quality and social deprivation in the UK: an environmental inequalities analysis.

3. Department for Environment, Food and Rural Affairs (May 2013) Abatement cost guidance for valuing changes in air quality.

4. Department for Environment, Food and Rural Affairs (2017), Air Quality: A Briefing for Directors of Public Health.

5. Bath & North East Somerset Council (2017a), Bath Air Quality Action Plan – Consultation Draft

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

7. Bath & North East Somerset Council (2017c), Balancing Your Needs: A parking strategy for Bath & North East Somerset.

8. Bath & North East Somerset Council (2017d), Air Quality Annual Status Report

9. Bath & North East Somerset Council (2018), Clean Air Plan: Strategic Outline Case

10. Bath & North East Somerset Council (2011) Bath Air Quality Action Plan.

11. Bath & North East Somerset Council (2016) Keynsham and Saltford Air Quality Action Plans.

12. Bath and North East Somerset Council (2014) Getting Around Bath: Supporting Document - A Transport Strategy for Bath. Mott Macdonald. (http://www.bathnes.gov.uk/sites/default/files/sitedocuments/getting_around_bath_transport_strategy_-_final_issue_web_version.pdf)

13. Bath & North East Somerset Council (2016) Getting Around Keynsham Transport Strategy. Mott Macdonald. (http://www.bathnes.gov.uk/sites/default/files/siteimages/Parking-and-Travel/getting_around_keynsham_-_final_version.pdf)

14. Bath and North East Somerset (2017) Placemaking Plan, part 3 – Keynsham (http://www.bathnes.gov.uk/sites/default/files/sitedocuments/Planning-and-Building-Control/Planning-Policy/Placemaking-Plan/draft_pmp_vol_3_keynsham.pdf)

15. Department for Environment, Food and Rural Affairs (2016b) Part IV of the Environment Act 1995, Local Air Quality Management, Policy Guidance LAQM.PG(16). DEFRA, London.

16. Public Health Outcomes Framework (https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000009/ati/102/are/E06000022 )

17. Local Air Quality Management - Technical Guidance (TG16), April 2016 (https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf)

18. https://laqm.defra.gov.uk/assets/AIR-PT-Rounds-13-to-24-Apr-2016-Feb-2018.pdf

19. https://laqm.defra.gov.uk/laqm-faqs/

20. https://laqm.defra.gov.uk/helpdesk/laqm-helpdesk.html

21. Bath and North East Somerset Council (2018a) Consultation Report:
    Air Quality Management Area (AQMA) in Temple Cloud

22. Bath and North East Somerset Council (2018b) Consultation Report:
    Air Quality Management Area (AQMA) in Farrington Gurney