
# 2018 Air Quality Annual Status Report (ASR)

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

June 2018

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# Executive Summary: Air Quality in Our Area

## Air Quality in Stevenage

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

Air quality in Stevenage continues to remain good. There are no AQMAs and no major point sources of emissions. Emissions have remained largely constant over the years. Monitoring takes place of nitrogen dioxide (NO2) and particulate matter less than 2.5 microns (PM2.5).

Additional monitoring of NO2 using diffusion tubes is taking place in areas that have been developed for housing.

Regular meetings are held with colleagues in other authorities to share information on the gathering of air quality data, as part of the Herts and Beds Air Quality Network.

We are grateful for the funding provided by Hertfordshire County Council, which has gone toward the purchase of a new analyser for measuring PM2.5.

## Actions to Improve Air Quality

The pool bike scheme and electric cars are still in operation around the borough.

[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

## Conclusions and Priorities

Monitoring has once again provided valuable data.  Distance correction has shown the benefit of the original town plan, with wide verges separating receptors from roads, the main source of emissions.

Following discussions with Defra, the tube network is likely to be altered in the future. Sites of relevant exposure in perceived areas of higher pollution concentrations are actively being sought.

At the time of writing, the site on which the AQMS is sited is due for redevelopment. New locations are being considered.

## Local Engagement and How to get Involved

The public can

- Use the excellent network of cycle paths laid out across the borough
- Ensure cars are serviced regularly
- Reduce the use of cars for short journeys
- When changing vehicles, consider a more efficient / cleaner one.

Stevenage Borough Council was an active participant in this year's Clean Air Day, promoting the steps that people can take to look after their local environment.

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# 1 Local Air Quality Management

This report provides an overview of air quality in Stevenage 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 Stevenage Borough Council to improve air quality and any progress that has been made.

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

# 2 Actions to Improve Air Quality

## 2.1 Air Quality Management Areas

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

Stevenage currently does not have any AQMAs.

**Stevenage Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date – contacted helpdesk to advise showing no information currently available.**

## 2.2 Progress and Impact of Measures to address Air Quality in Stevenage

Defra's appraisal of last year's ASR concluded:

1. The local authority continue to monitor NO2 at several sites which have demonstrated low concentrations across the last five years.
2. It may therefore be appropriate to continue to review of the current monitoring programme, and consider relocating some of these monitors to sites where there may be relevant exposure above objective levels, and potential pollution hotspots, as well as monitoring at sites for planned developments. Some of the newer monitoring sites have evidence of higher readings, there are many locations across the borough with sites of relevant exposure close to major road sources.
3. Distance correction and annualisation have been applied to the nitrogen dioxide data, however, it is not clear exactly how these have been carried out. We recommend the local authority provide example calculations, and clearly highlight which sites have provided the background concentration figures that have been used in both.
4. The nitrogen dioxide data presented in the final results table A.3 should be bias adjusted, annualised and distance corrected (the latter is only presented in Table B.1).
5. The map presented in Appendix D does not clearly represent the monitoring site locations. We recommend further maps be included demonstrating the locations at a smaller scale, with respect to adjacent roads and buildings.

**Comments on appraisal/Further information:**
The points raised have been acknowledged.

On point one, the original siting of the tubes followed the appropriate guidance, and these tubes have largely remained to show trends.

On point two, in recent years, new tubes have been added to the network, in areas which were felt to satisfy the guidance, having regard to height and location

1) proximity to likely pollution and
2) proximity to relevant exposure sites.

I would like clarity on the line "there are many locations across the borough with sites of relevant exposure close to major road sources". Please could you advise me of the specifics of these?

Defra response
Thank you for your response, we acknowledge the information you have provided in response to points one and two, and would like to reassure the Council that we are satisfied that the original and current siting of the tubes follow the appropriate guidance.
However, we encourage Local Authorities the review their monitoring programmes on a routine basis, particularly where monitoring sites consistently demonstrate low concentrations. We acknowledge and support the changes the Council has already made to the monitoring programme, and encourage the Council to continue to check regularly for new locations of relevant exposure that may be in exceedance of air quality objectives.
Regarding the point "there are many locations across the borough with sites of relevant exposure close to major road sources", this statement was made in reference to potential locations of relevant exposure where monitoring may be suitable but has not yet taken place. Examples of areas of relevant exposure close to potentially significant road sources were noted in proximity to:

- The A1155, A602, Gunnets Wood Road, Martins Way, and Six Hills Way roads and particularly junctions

- The A602 Broadhall Way (only site 3 is located on this route, but there appear to be receptors in closer proximity to the road and junctions than where the provided co-ordinates place site 3)

Please note that these examples are more general rather than specific suggestions. We acknowledge the Council's expert knowledge of where monitoring is most likely to be required within the Borough.

Stevenage Borough 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 2.1.

Stevenage Borough Council expects the following measures to be completed over the course of the next reporting year: Identification of new sites to monitor, bearing in mind Defra's comments, and any new development proposals likely to have a detrimental effect on air quality / introduce populations to areas of poor air quality.

The principal challenges and barriers to implementation that Stevenage Borough Council anticipates facing are that the town was planned in such a way as to separate people and sources of pollution such as industry and road traffic.

## Table 2.1 – 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Local plan mobility strategy | Promoting Travel Alternatives | Promotion of cycling | SBC | Current | Ongoing | NK | Reduced vehicle emissions | Ongoing | Ongoing | |
| 2 | Local plan mobility strategy | Promoting Travel Alternatives | Promotion of walking | SBC | Current | Ongoing | NK | Reduced vehicle emissions | Ongoing | Ongoing | |
| 3 | Local plan mobility strategy | Transport Planning and Infrastructure | Cycle network | SBC | Current | Ongoing | NK | Reduced vehicle emissions | Ongoing | Ongoing | First phase successful, second phase on-going |
| 4 | Relocating diffusion tubes | Other | Other | SBC | Mid 2018 | Jan-19 | | We continue to monitor results from tubes and are looking at relocating some to see if there are areas of higher concentration while still being close to areas of relevant exposure. | Planning stage | Jan-19 | None |
| 5 | Local plan mobility strategy | Transport Planning and Infrastructure | Public cycle hire scheme | SBC | Current | Ongoing | NK | Reduced vehicle emissions | Ongoing | Ongoing | |
| 6 | Electric car club | Alternatives to private vehicle use | Car Clubs | SBC | Current | Ongoing | NK | Reduced vehicle emissions | Ongoing | Ongoing | |
| 7 | Promotion of Clean Air Day | Public Information | Via the Internet | SBC | Current | Ongoing | NK | Public information | Ongoing | Annual | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Air pollution episode alert system | Public Information | Other | SBC | Current | Autumn 2018 | NK | Public information | Ongoing | Autumn 2018 | |
| 9 | Monitoring air quality | Public Information | Via other mechanisms | HCC / SBC | Current | Ongoing | NK | Public information | Ongoing | Ongoing | |
| 10 | Engagement with Comms | Public Information | Via the Internet | SBC | Current | Ongoing | NK | Public information | Ongoing | Ongoing | |
| 11 | Consider air quality on new planning applications | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | SBC | Current | Ongoing | NK | Reduced vehicle emissions | Ongoing | Ongoing | |

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (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.

SBC is continuing to monitor $PM_{2.5}$ using a BAM 1020 roadside analyser, the purchase of which was funded by Hertfordshire County Council.

The measures taken to reduce pollution overall will also have an impact on $PM_{2.5}$ specifically.

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

## 3.1 Summary of Monitoring Undertaken

### 3.1.1 Automatic Monitoring Sites

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

Stevenage Borough Council undertook automatic (continuous) monitoring at one site during 2017. Table A.1 in Appendix A shows the details of the sites. NB. 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. National monitoring results are available at http://www.airqualityengland.co.uk/

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

### 3.1.2 Non-Automatic Monitoring Sites

Stevenage Borough Council undertook non-automatic (passive) monitoring of $NO_2$ at 32 sites during 2017. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide ($NO_2$)

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

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 200µg/$m^3$, not to be exceeded more than 18 times per year.

### 3.2.2 Particulate Matter ($PM_{2.5}$)

Table A.5 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years. The annualised reading of 11 for the second year in a row indicates PM2.5 at the Stevenage monitoring site to be low.

# 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| SE16 | Stevenage 1 | Kerbside | 523586 | 223967 | $NO_2$ | NO | Chemiluminescent | 110 | 3 | 2 |
| SE16 | Stevenage 1 | Kerbside | 523586 | 223967 | $PM_{2.5}$ | NO | BAM | 110 | 3 | 2 |

**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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Town Centre | Roadside | 523771 | 224090 | $NO_2$ | N | 102 | 4.0 | N | 2.35 |
| 2 | Ashdown Road | Roadside | 525832 | 221495 | $NO_2$ | N | 14 | 1.7 | N | 2.7 |
| 3 | Monks View | Urban background | 524857 | 222756 | $NO_2$ | N | 9.5 | 0.20 | N | 2.9 |
| 4 | Bedwell Crescent | Kerbside | 524345 | 224468 | $NO_2$ | N | 20 | 0.8 | N | 2.5 |
| 5 | Salisbury Road | Urban background | 525373 | 226985 | $NO_2$ | N | 6.6 | 19.0 | N | 2.8 |
| 6 | Letchmore Road | Roadside | 523845 | 225386 | $NO_2$ | N | 14 | 1.3 | N | 2.6 |
| 7 | High Street | Roadside | 523278 | 225479 | $NO_2$ | N | 9 | 2.4 | N | 3.0 |
| 8 | Fishers Green | Urban background | 522259 | 226001 | $NO_2$ | N | 18 | 0.95 | N | 2.75 |
| 9 | Magpie Crescent | Roadside | 526652 | 223438 | $NO_2$ | N | 12.5 | 2.0 | N | 2.9 |
| 10 | Shoreham Close | Urban background | 522075 | 225568 | $NO_2$ | N | 8 | 2.05 | N | 2.5 |
| 11 | Newlyn Close | Urban background | 522126 | 224862 | $NO_2$ | N | 3.5 | 1.7 | N | 2.65 |
| 12 | Chadwell Road | Suburban | 522955 | 223335 | $NO_2$ | N | 25 | 0.4 | N | 2.6 |
| 13 | Whitney Drive | Urban background | 523070 | 226070 | $NO_2$ | N | 8 | 1.9 | N | 2.3 |
| 14 | Lytton Way | Roadside | 523586 | 223967 | $NO_2$ | N | 110 | >5 | Y | 2.9 |
| 17 | Hitchin Road | Roadside | 522700 | 226550 | $NO_2$ | N | 14 | 2.4 | N | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Fairlands Valley Park | Urban background | 525425 | 224183 | $NO_2$ | N | 167 | 172.5 | N | 2.6 |
| 19 | 7 Tates Way | Roadside | 522700 | 226570 | $NO_2$ | N | 0 | 9 | N | 2.25 |
| 21 | 13 Hitchin Road | Roadside | 523128 | 225677 | $NO_2$ | N | 0 | 16 | N | 2.17 |
| 22 | Townsend Mews | Roadside | 523360 | 224786 | $NO_2$ | N | 0 | 7.8 | N | 2.65 |
| 23 | Hitchin Road - Longfields | Roadside | 523014 | 226029 | $NO_2$ | N | 7.4 | 2.45 | N | 2.10 |
| 24 | Martins Way | Kerbside | 525987 | 226368 | $NO_2$ | N | 8.0 | 0.8 | N | 2.15 |
| 25 | Cherwell Drive | Roadside | 525470 | 227287 | $NO_2$ | N | 8.7 | 1.3 | N | 2.8 |
| 26 | Vardon Road | Roadside | 524542 | 225654 | $NO_2$ | N | 10.2 | 7.7 | N | 2.6 |
| 27 | Mildmay Road | Kerbside | 525815 | 226061 | $NO_2$ | N | 8.0 | 0.4 | N | 2.9 |
| 28 | Chells Way | Roadside | 526078 | 224818 | $NO_2$ | N | 1.5 | 1.5 | N | 2.35 |
| 29 | Edmonds Drive | Roadside | 526964 | 223760 | $NO_2$ | N | 1.5 | 1.0 | N | 2.8 |
| 30 | Shephall Way | Roadside | 526094 | 223389 | $NO_2$ | N | 2.8 | 2.9 | N | 2.75 |
| 31 | Hydean Way | Kerbside | 522710 | 226550 | $NO_2$ | N | 0 | 6.0 | N | 2.6 |
| 32 | Hitchin Road (collocated tube 17) - base | Roadside | 522700 | 226550 | $NO_2$ | N | 14 | 2.4 | N | 0.60 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 33 | Hitchin Road – Longfields (collocated tube 23) - base | Roadside | 523014 | 226029 | $NO_2$ | N | 7.4 | 2.45 | N | 0.86 |
| 34 | A602/A1(M) Junction 7 | Kerbside | 523697 | 222590 | NO2 | NO | >50 | 2.2 | NO | 2.2 |
| 35 | A602 The Chequers | Kerbside | 527020 | 221097 | NO2 | NO | >50 | 0.5 | NO | 2.2 |

**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 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 |
| 1 | Roadside | Diffusion Tube | | 91.67 | 32.14 | 32.18 | 31.19 | 33.22 | 32.95 |
| 2 | Roadside | Diffusion Tube | | 100 | 18.54 | 17.55 | 16.25 | 17.97 | 18.18 |
| 3 | Suburban | Diffusion Tube | | 83.33 | 21.19 | 22.02 | 20.98 | 22.1 | 22.45 |
| 4 | Kerbside | Diffusion Tube | | 100 | 20.83 | 20.99 | 19.47 | 21.45 | 20.43 |
| 5 | Urban Background | Diffusion Tube | | 100 | 15.69 | 15 | 13.89 | 13.83 | 14.45 |
| 6 | Roadside | Diffusion Tube | | 100 | 19.48 | 20.58 | 17.93 | 19.2 | 18.06 |
| 7 | Roadside | Diffusion Tube | | 91.67 | 14.59 | 31.75 | 30.92 | 31.51 | 30.16 |
| 8 | Suburban | Diffusion Tube | | 100 | 21.38 | 22.53 | 19.97 | 21.43 | 19.60 |
| 9 | Kerbside | Diffusion Tube | | 66.67 | 23.96 | 25.71 | 24.45 | 26.6 | 24.99 |
| 10 | Roadside | Diffusion Tube | | 91.67 | 27.62 | 26.64 | 26.46 | 26.45 | 27.19 |
| 11 | Suburban | Diffusion Tube | | 100 | 16.44 | 21.88 | 20.23 | 20.8 | 20.33 |
| 12 | Suburban | Diffusion Tube | | 100 | 21.69 | 19.7 | 16.24 | 19.52 | 16.59 |
| 13 | Suburban | Diffusion Tube | | 100 | 22.73 | 23.88 | 21.8 | 22.44 | 22.22 |
| 14 | Kerbside | Diffusion Tube | | 100 | 30.1 | 32.88 | 30.01 | 33.03 | 31.28 |
| 17 | Roadside | Diffusion | | 100 | **47.84** | **47.59** | **46.88** | **44.43** | **48.56** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tube | | | | | | | |
| 18 | Urban Background | Diffusion Tube | | 100 | 15.25 | 16.68 | 13.7 | 16.29 | 15.29 |
| 19 | Roadside | Diffusion Tube | | 91.67 | 35.27 | 33.51 | 35.03 | 36.98 | 37.04 |
| 21 | Roadside | Diffusion Tube | | 100 | 27.66 | 27.8 | 25.03 | 26.47 | 25.37 |
| 22 | Roadside | Diffusion Tube | | 100 | 26.61 | 25.08 | 23.59 | 26.98 | 23.23 |
| 23 | Roadside | Diffusion Tube | | 100 | | | 36.75 | 36.34 | 31.53 |
| 24 | Kerbside | Diffusion Tube | | 100 | | | 27.03 | 29.78 | 32.01 |
| 25 | Roadside | Diffusion Tube | | 100 | | | 17.76 | 17.8 | 16.43 |
| 26 | Roadside | Diffusion Tube | | 100 | | | 19.9 | 20.81 | 21.08 |
| 27 | Kerbside | Diffusion Tube | | 91.67 | | | 17.16 | 19.86 | 18.14 |
| 28 | Roadside | Diffusion Tube | | 100 | | | 21.88 | 24.16 | 23.00 |
| 29 | Roadside | Diffusion Tube | | 100 | | | 16.23 | 16.72 | 17.49 |
| 30 | Roadside | Diffusion Tube | | 100 | | | 16.99 | 19.33 | 17.37 |
| 31 | Roadside | Diffusion Tube | | 100 | | | 21.11 | 23.32 | 22.16 |
| 32 | Roadside | Diffusion Tube | 16.67 | | | | **48.12** | **48.86** | **n/a** |
| 33 | Roadside | Diffusion Tube | 16.67 | | | | 39.68 | **40.51** | **n/a** |
| 34 | Kerbside | Diffusion Tube | | 83.33 | | | | | **57.33** |
| 35 | Kerbside | Diffusion Tube | | 83.33 | | | | | 24.63 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SE16 | Roadside | Automatic | | | | | | 25.87 | 26.32 |

☒ **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.

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

| Site ID | 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 |
| SE16 | Kerbside | Automatic | | 99 | 9 | 2 | 0 | 1 | 1 |

**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 – $PM_{2.5}$ Monitoring Results

| Site ID | 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 |
| SE16 | Kerbside | | 97 | | | | 11 | 11 |

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

**Notes:**

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

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

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

## Table A.6 – $SO_2$ Monitoring Results

Stevenage Borough Council do not monitor this pollutant.

# Appendix B: Full Monthly Diffusion Tube Results for 2017

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

| Site ID | $NO_2$ Mean Concentrations ($\mu g/m^3$) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.97) and Annualised (1) | Distance Corrected to Nearest Exposure (2) |
| 1 | 44.1 | 34.6 | 31.5 | 33.7 | 29.2 | 27.6 | 31.2 | 32.1 | | 34.2 | 39.2 | 36.4 | 33.97 | 32.95 | n/a3 |
| 2 | 30.2 | 18.0 | 18.8 | 16.0 | 12.6 | 12.2 | 13.6 | 13.7 | 17.2 | 21.5 | 26.2 | 24.7 | 18.74 | 18.18 | 14.8 |
| 3 | 36.59 | 26.69 | 27.42 | 18.79 | 17.29 | 17.22 | 15.77 | 18.51 | 22.76 | | 30.37 | | 23.14 | 22.45 | 17.9 |
| 4 | 32.81 | 26.24 | 20.64 | 17.27 | 15.67 | 12.98 | 14.26 | 17.92 | 20.79 | 21.8 | 26.68 | 25.7 | 21.06 | 20.43 | 17.4 |
| 5 | 31.2 | 18.58 | 15.35 | 10.4 | 10.15 | 7.95 | 9.25 | 11.51 | 13.33 | 16.52 | 16.14 | 18.36 | 14.90 | 14.45 | n/a4 |
| 6 | 30.36 | 18.21 | 18.85 | 14.28 | 15.34 | 12.41 | 12.38 | 13.6 | 18.22 | 20.75 | 24.95 | 24.09 | 18.62 | 18.06 | 17.3 |
| 7 | 45.81 | | 31.38 | 25.66 | 29.08 | 24.31 | 28.06 | 26.95 | 30.68 | 31.11 | 36.78 | 32.19 | 31.09 | 30.16 | 25.0 |
| 8 | 35.02 | 23.8 | 24.26 | 5.17 | 15.7 | 14.66 | 15.45 | 16.56 | 20.12 | 21.43 | 25.39 | 24.86 | 20.20 | 19.60 | 18.3 |
| 9 | 35.04 | 26.01 | 26.03 | 24.71 | | | 22.03 | 22.02 | | 24.56 | | 25.74 | 25.77 | 24.99 | 18.8 |
| 10 | 40.62 | 26.12 | | 30.23 | 19.76 | 20.72 | 21.38 | 26.22 | 26.05 | 25.76 | 36.01 | 35.44 | 28.03 | 27.19 | 22.7 |
| 11 | 37.31 | 25.18 | 23.13 | 19.23 | 14.46 | 15.45 | 15.05 | 16.8 | 19.08 | 17.29 | 24.18 | 24.36 | 20.96 | 20.33 | 19.6 |
| 12 | 31.35 | 21.15 | 18.34 | 13.35 | 17.57 | 12.56 | 12.48 | 12.94 | 16.62 | 14.52 | 17.86 | 16.51 | 17.10 | 16.59 | 14.6 |
| 13 | 34.2 | 26.38 | 24.91 | 20.01 | 14.5 | 16.06 | 18.18 | 18.3 | 23.09 | 26.27 | 24.87 | 28.08 | 22.90 | 22.22 | 19.1 |
| 14 | 48.55 | 36.89 | 32.55 | 29.29 | 29.34 | 20.75 | 28.28 | 26.77 | 32.73 | 32.95 | 35.66 | 33.22 | 32.25 | 31.28 | n/a3 |
| 17 | 52.18 | 49.96 | 50.83 | 56.24 | 41.65 | 47.17 | 45.48 | 48.52 | 50.91 | 48.74 | 54.11 | 54.97 | 50.06 | **48.56** | 33.9 |
| 18 | 27.35 | 15.43 | 15.84 | 11.25 | 9.78 | 11.09 | 9.39 | 11.78 | 14.46 | 16.68 | 24.79 | 21.31 | 15.76 | 15.29 | n/a3 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 44.59 | 40.24 | 39.71 | 43.17 | | 32.63 | 32.56 | 33.91 | 31.47 | 34.29 | 46.09 | 41.36 | 38.18 | 37.04 | 37.0 |
| 21 | 38.5 | 29.01 | 25.77 | 24.36 | 23.09 | 23.93 | 22.34 | 22.03 | 27.34 | 24.85 | 25.85 | 26.82 | 26.16 | 25.37 | 25.4 |
| 22 | 34.2 | 27.01 | 26.92 | 21.09 | 24.39 | 17.84 | 19.42 | 19.93 | 22.76 | 24.25 | 26.49 | 23.05 | 23.95 | 23.23 | 23.2 |
| 23 | 53.45 | 36.25 | 32.28 | 27.38 | 36.79 | 27.75 | 26.44 | 26.43 | 34.01 | 30.5 | 30.1 | 28.69 | 32.51 | 31.53 | 25.6 |
| 24 | 45.55 | 32.93 | 32.63 | 33.17 | 30.38 | 29.73 | 26.24 | 29.7 | 30.39 | 31.93 | 37.83 | 35.55 | 33.00 | 32.01 | 23.2 |
| 25 | 29.95 | 19.81 | 17.79 | 14.53 | 12.88 | 10.41 | 11.05 | 11.66 | 15.42 | 17.2 | 21.55 | 21.02 | 16.94 | 16.43 | 14.9 |
| 26 | 35.22 | 25.39 | 21.18 | 16.76 | 15.55 | 15.69 | 14.26 | 17.39 | 19.7 | 25.51 | 27.74 | 26.43 | 21.74 | 21.08 | 18.9 |
| 27 | 33.17 | 21.38 | 20.56 | 14.57 | 13 | 12.81 | 12.11 | 12.42 | 17.4 | | 25.91 | 22.37 | 18.70 | 18.14 | 15.5 |
| 28 | 38.41 | 26.64 | 21.69 | 21.47 | 19.98 | 17.51 | 17.26 | 19 | 22.7 | 22.98 | 29.55 | 27.39 | 23.72 | 23.00 | 21.2 |
| 29 | 30.9 | 19.94 | 20.23 | 16.09 | 11.63 | 11.48 | 11.59 | 12.37 | 15.18 | 18.88 | 23.94 | 24.13 | 18.03 | 17.49 | 16.4 |
| 30 | 30.52 | 19.91 | 19.69 | 14.92 | 13.07 | 11.38 | 12.08 | 13.61 | 16.42 | 18.33 | 24.33 | 20.61 | 17.91 | 17.37 | 16.4 |
| 31 | 35.55 | 24.32 | 22.38 | 22.64 | 19.33 | 16.85 | 17.11 | 19.31 | 21.1 | 19.44 | 26.64 | 29.48 | 22.85 | 22.16 | 23.1 |
| 32 | 68.25 | 60.16 | x | x | x | x | x | x | x | x | x | x | 64.21 | n/a | n/a |
| 33 | 57.95 | 34.81 | x | x | x | x | x | x | x | x | x | x | 46.38 | n/a | n/a |
| 34 | x | x | 59.7 | 59.44 | 55 | 65.92 | 56.93 | 60.23 | 61.09 | 35.22 | 80.03 | 57.52 | 59.11 | **57.33** | n/a3 |
| 35 | x | x | 25.18 | 22.88 | 22.7 | 20.43 | 21.21 | 25 | 29.3 | 24.84 | 34.38 | 28.03 | 25.40 | 24.63 | n/a3 |

☒ **Local bias adjustment factor used** **(confirm by selecting in box)**

☒ **National bias adjustment factor used** **(confirm by selecting in box)**

☒ **Annualisation has been conducted where data capture is <75%** **(confirm by selecting in box)**

☒ **Where applicable, data has been distance corrected for relevant exposure** **(confirm by selecting in box)**

**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.

(3) Greater than 50m to relevant exposure
(4) Tube at greater distance to road than receptor

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

## Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Gradko International Ltd. Tubes are all 50% TEA in acetone. The bias factor used is the national figure of 0.97. Distance correction was applied where necessary.

## QA/QC of diffusion tube monitoring

The Stevenage nitrogen dioxide diffusion tube programme is operated through an approved laboratory (Gradko International Ltd) with formal accreditation to BS standards, and one that participates in the AIR-PT programme.

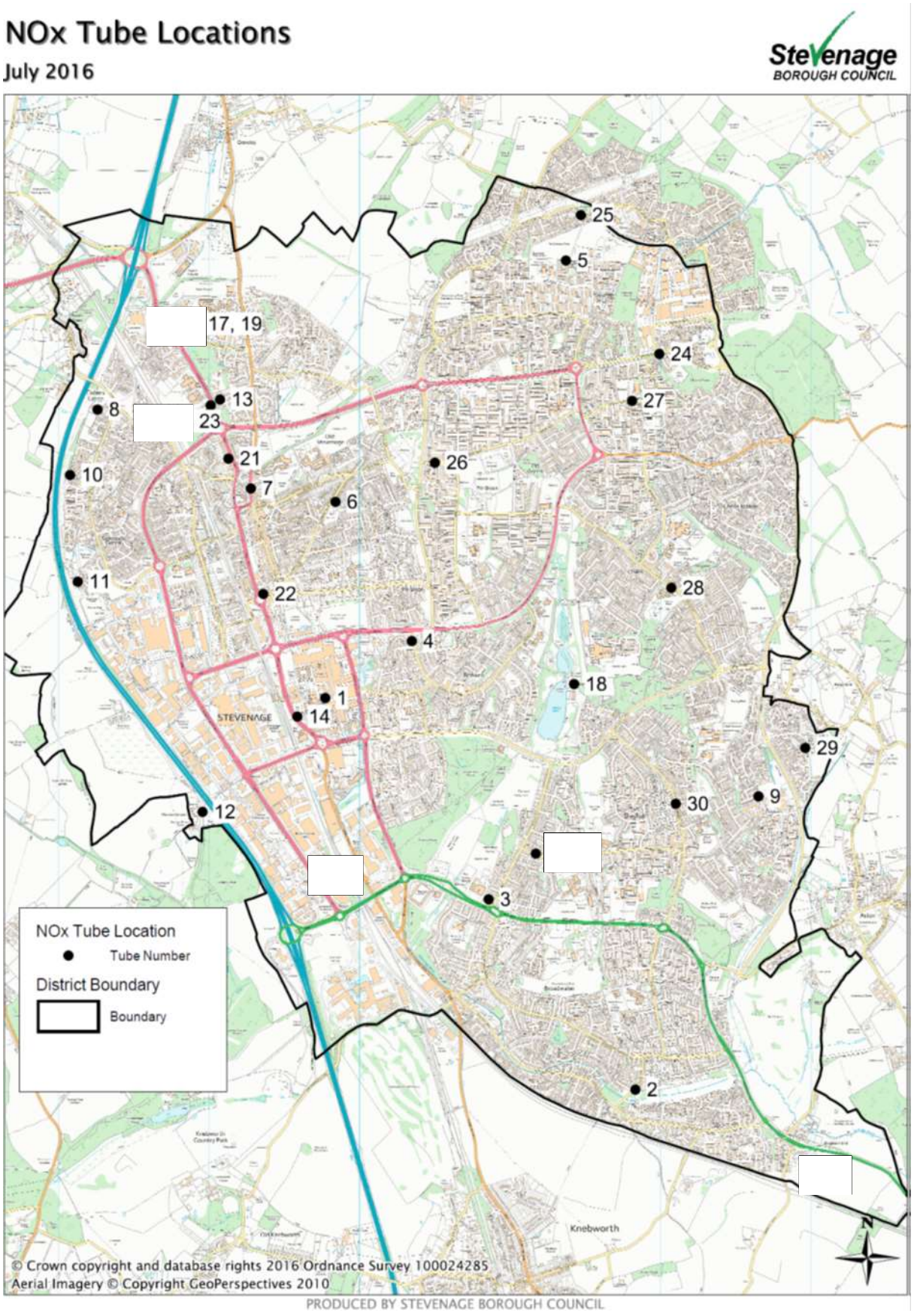
## QA/QC of automatic monitoring

Automatic measurements of $PM_{2.5}$ were made using a BAM-1020, a beta attenuation mass monitor.

Measurements of $NO_x$ were made using an Enviro Technology Model 200E, a chemiluminescent method analyser.

All measurements were logged by the instruments themselves and collected by Enviro Technology hourly. Measurements from the monitoring site were validated by Ricardo using the most up to date calibration factors and publicly disseminated in near real time on the HBAQN web page http://www.airqualityengland.co.uk/local-authority/?la_id=408

# Appendix D: Maps of Monitoring Locations



# NOx tube locations




FAIRLANDS WAY
4
5
6

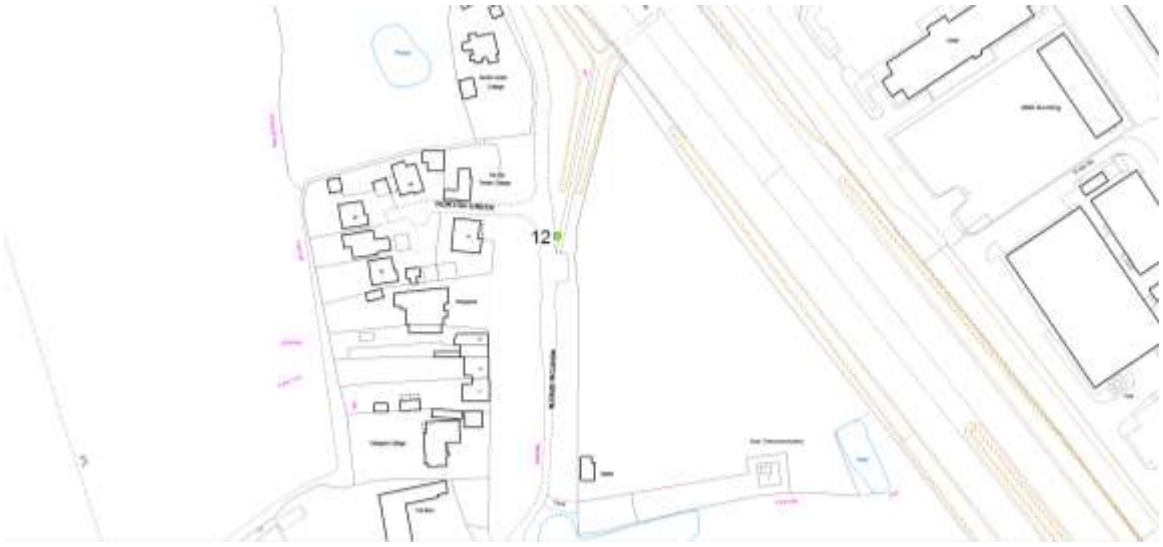

7


FISHERS GREEN
8


9

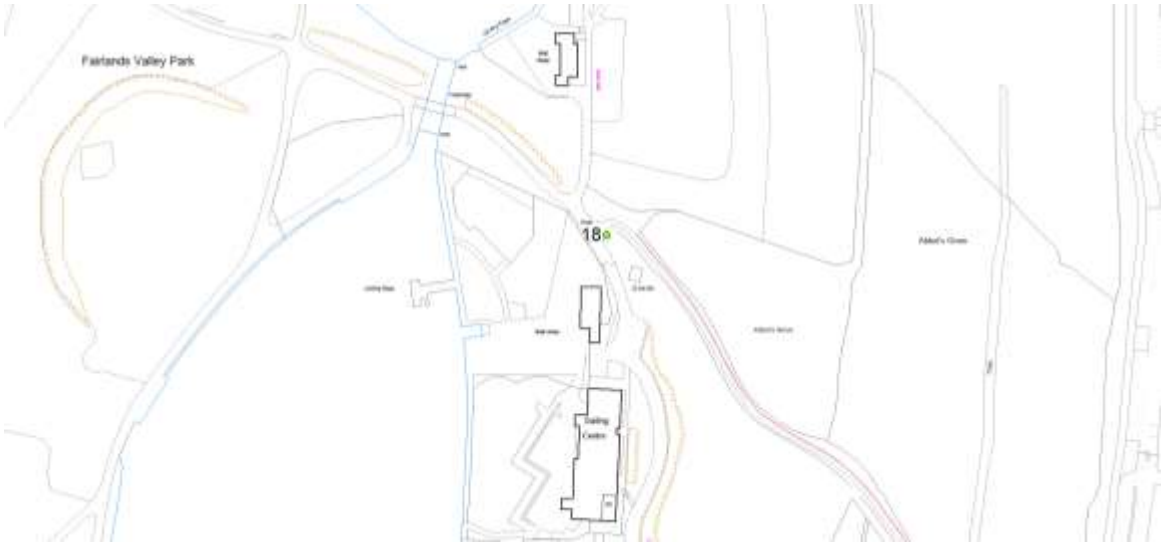

10


11

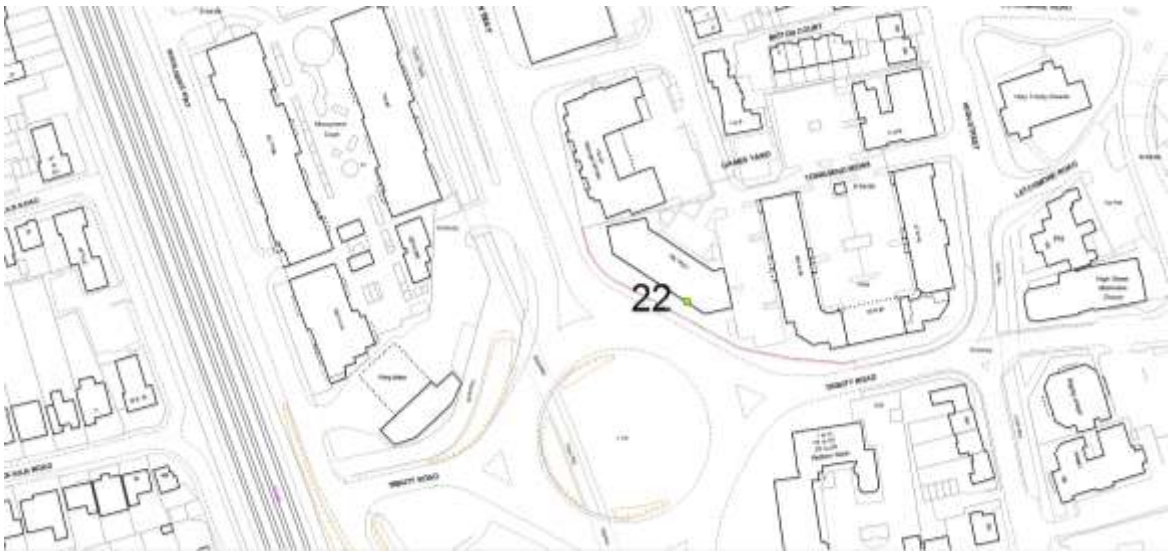

12


13
23
33


19
17
32


Fairlands Valley Park
18


21


22


24


25


26


27

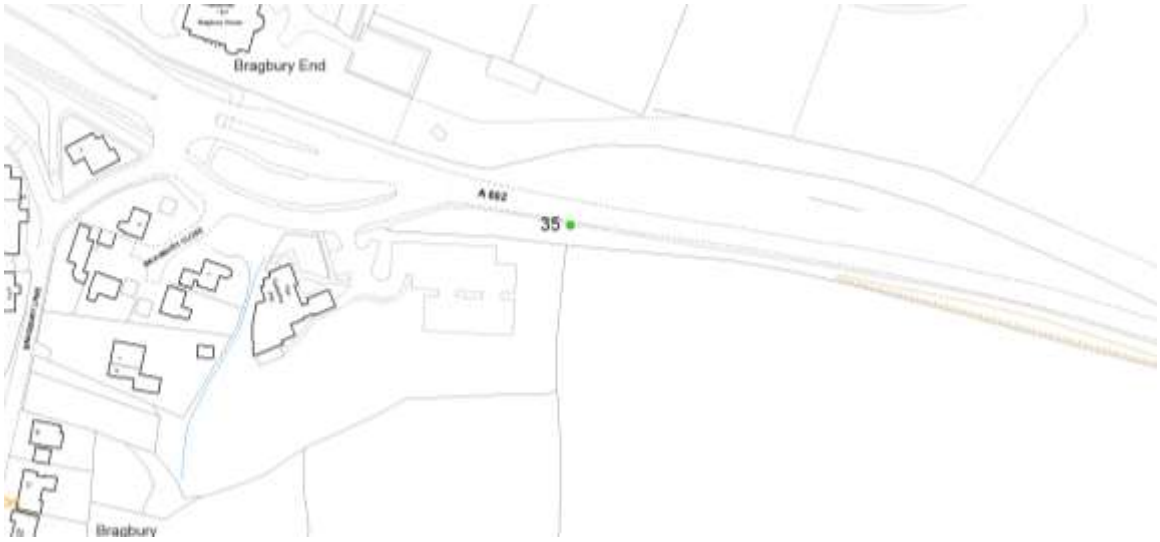

28


29
OAKLEAF CLOSE
SIX BELLS LANE
TEN ACRES CRESCENT


30


31


34


Bragbury End
A 602
35
Bragbury

# Appendix E: Summary of Air Quality Objectives in England

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

| Pollutant | Air Quality Objective[4] | |
|---|---|---|
| | 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 |

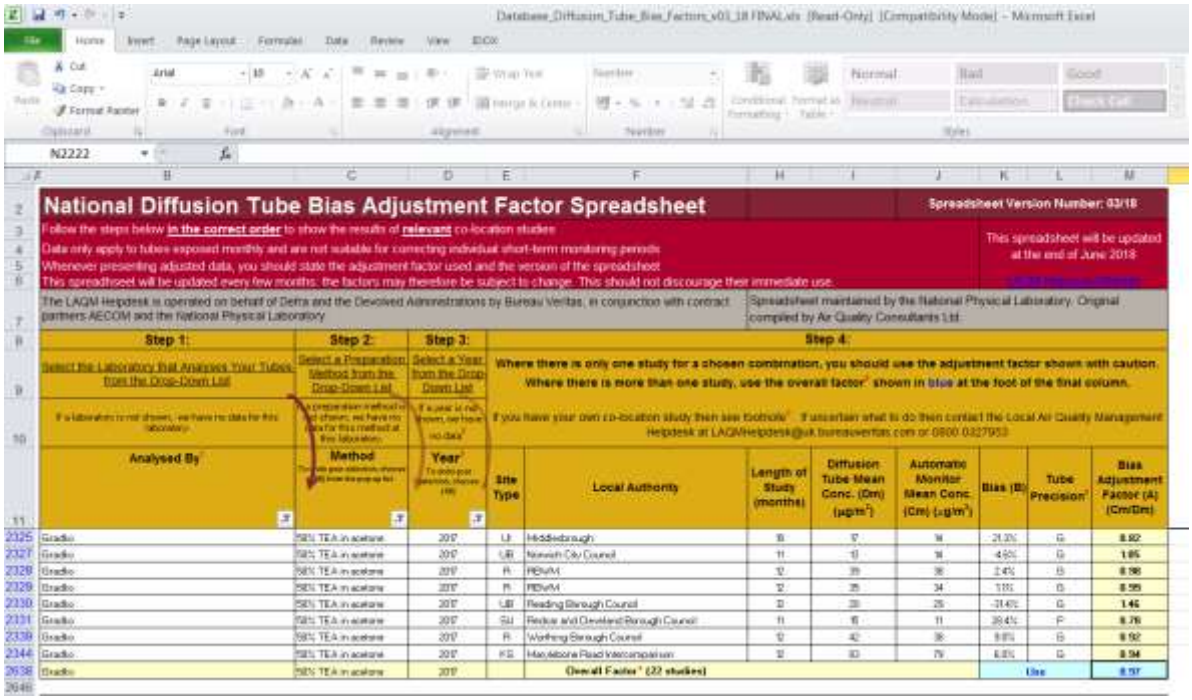
[4] The units are in microgrammes of pollutant per cubic metre of air (µg/m$^3$).

# Appendix F: Photo showing location of tubes 17, 19 and 20

Tube 19 Tube 17 Tube 20

Photo above shows the location of tube 17, responsible for the higher readings in Stevenage, the location of tube 19, which is considered representative, and the former location of tube 20.

# Appendix G: Bias adjustment



National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/18

Follow the steps below in the correct order to show the results of relevant co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2018.

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data.

Step 4:

Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.

If you have your own co-location study then see Box(es). If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

| Analysed By | Method | Year | Site Type | Local Authority | Length of Study (months) | Diffusion Tube Mean Conc. (Dm) (µg/m³) | Automatic Monitor Mean Conc. (Cm) (µg/m³) | Bias (B) | Tube Precision | Bias Adjustment Factor (A) (Cm/Dm) |
|---|---|---|---|---|---|---|---|---|---|---|
| Gradko | 50% TEA in acetone | 2017 | UI | Middlesbrough | 10 | 17 | 14 | 21.3% | G | 0.82 |
| Gradko | 50% TEA in acetone | 2017 | UB | Norwich City Council | 11 | 13 | 14 | 4.6% | G | 1.05 |
| Gradko | 50% TEA in acetone | 2017 | R | RBvM | 12 | 35 | 36 | 2.4% | G | 0.98 |
| Gradko | 50% TEA in acetone | 2017 | R | RBvM | 12 | 35 | 34 | 5.1% | G | 0.95 |
| Gradko | 50% TEA in acetone | 2017 | UB | Reading Borough Council | 12 | 20 | 25 | 31.4% | G | 1.46 |
| Gradko | 50% TEA in acetone | 2017 | SU | Redcar and Cleveland Borough Council | 11 | 16 | 11 | 39.4% | P | 0.78 |
| Gradko | 50% TEA in acetone | 2017 | R | Worthing Borough Council | 12 | 42 | 38 | 9.8% | G | 0.92 |
| Gradko | 50% TEA in acetone | 2017 | KS | Marylebone Road Intercomparison | 12 | 80 | 79 | 0.8% | G | 0.94 |
| Gradko | 50% TEA in acetone | 2017 | | Overall Factor (22 studies) | | | | Use | | 0.97 |

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Air quality Annual Status Report |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| EU | European Union |
| FDMS | Filter Dynamics Measurement System |
| LAQM | Local Air Quality Management |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| $PM_{10}$ | 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 |
| QA/QC | Quality Assurance and Quality Control |
| $SO_2$ | Sulphur Dioxide |

# References

Stevenage Borough Council Green Travel Plan 2013 to 2018

Stevenage Air Quality Strategy

Local Plan Mobility Strategy

LAQM TG16

Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance