Stratford on Avon District Council
Annual Status Report 2018

Bureau Veritas

June 2018

Move Forward with Confidence

Document Control Sheet

Issue/Revision	Issue 1	Issue 2
Remarks	Draft	Final
Date	June 2018	June 2018
Submitted to	Karen Dixon	Karen Dixon
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Project number	6477634	6477634

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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Report Reference number	2018 ASR
Date	June 2018

Executive Summary: Air Quality in Our Area

Air Quality in City of Stratford on Avon District Council

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

In 2017, all but one monitoring site recorded annual mean NO_2 concentrations below 36µg/m^3. The one site that exceeded the annual mean objective was recorded at Studley 4 - 29 Alcester Road and reported an annual mean NO_2 concentration of 40.3µg/m^3. This site is located within the current Studley AQMA and the annual mean concentration at this location has been exceeding or close to exceeding the annual mean NO_2 objective for the past 5 years The concentration recorded at this location continues to be higher than all other sites, with the concentration reaching over 6µg/m^3 higher than the next highest recorded concentration. The diffusion tube is located at the façade of a building where the relevant exposure is located on the first floor. Therefore, no distance correction is required for this location.

There are no sites where the NO_2 annual mean is greater than 60µg/m^3, therefore in accordance with Defra LAQM.TG(16) there are no sites likely to be at risk of exceeding the 1-hour mean AQS objective.

Actions to Improve Air Quality

The Studley Parish Plan 2017-2020 identifies HGV traffic as a particular concern to the residents and has made a number of recommendations for actions to reduce traffic, including restricting and diverting HGVs, traffic calming measures, promotion of alternative transport and building a by-pass.

[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

The Draft Air Quality Action Plan for Studley AQMA 2008 will be updated in 2018 and the general public will be consulted as part of that process.

The general public can take simple measures to help improve air quality, the main ones being, where possible, making short trips and journeys on foot or by bike instead of by car, or using public transport. Car sharing with colleagues, or with other parents on the school run, are some other examples of ways to reduce traffic congestion, for example. Other measures are listed below:

- Purchasing low-emission electric and/or hybrid vehicles, with government funding and grants available.
- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NOx (and carbon) emissions.
- Renewable energy generation via solar photovoltaics installation.

Conclusions and Priorities

The latest monitoring data for 2017 confirms no exceedances in the Stratford upon Avon AQMA. Even with significant new development identified in the Core Strategy, key pollutants are projected to remain below national air quality objectives up to 2028. It is therefore appropriate for the council to consider revoking the AQMA for Stratford.

Whilst air quality within the Studley AQMA has shown an improvement there remains an exceedance in one location associated with traffic emissions. The growth of Redditch has the potential to impact upon Studley. The proposal for the development of 30ha of land for employment use at the Redditch Eastern Gateway has identified potential air quality impacts within the EIA Scoping exercise. The potential for impacts on Studley is acknowledged and consequently the 2008 Draft Studley Air Quality Action Plan is currently being updated.

Local Engagement and How to get Involved

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

The following are suggested alternatives to private travel that would therefore contribute to improving the air quality within the City:

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

Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient cars are available and all have different levels benefits by reducing the amount of emissions being released.

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1 Local Air Quality Management

This report provides an overview of air quality in Stratford on Avon District 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 Stratford on Avon District 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.

A summary of AQMAs declared by Stratford on Avon District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=263. Alternatively, see Appendix D: Maps of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMAs.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Studley AQMA	Declared 23rd February 2006	NO_2 Annual Mean	Studley	A number of properties along a 200m stretch of Alcester Road from the junction with High Street.	NO	62	µg/m^3	40.3	µg/m^3	Action Plan	2008	Draft Air Quality Action Plan for Alcester Road Studley https://www.stratford.gov.uk/environment/air-quality-management.cfm
AQMA Stratford Upon Avon	Declared 21st January 2010	NO_2 Annual Mean	Stratford on Avon	An area encompassing most developed areas of Stratford Upon Avon and Tiddington.	NO	45	µg/m^3	34	µg/m^3	None	-	-

☒ **Stratford on Avon District 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 Stratford on Avon District Council

Defra's appraisal of last year's ASR concluded the results of monitoring not showing significant reductions, the monitoring strategy should at least remain and the Council should provide an update on the situation in relation to measures to address the air quality issues in Studley.

Stratford on Avon District Council will continue the current monitoring strategy. As the Air Quality Action Plan for Alcester Road Studley (2008) has never been adopted and is now out of date, a new Studley AQAP will be developed in 2018 to ensure that all relevant parties are involved and working towards a collective goal. The measures developed within the new AQAP will be based on the most recent dispersion modelling work and monitoring data.

Stratford on Avon District Council will take forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures in progress or planned are set out in Table 2.2.

Stratford on Avon District anticipates that the measures in Table 2.2 will help to contribute towards compliance, and further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Studley AQMA and AQMA Stratford Upon Avon. Additional measures will be developed as part of the update of the AQAP process.

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
1	Development of Supplementary Planning Document which will include objectives on air quality and healthy communities.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Stratford on Avon District Council Planning Policy	In progress	In progress	N/A	N/A	Consultation closed in April 2018	Adoption due October 2018	None identified
2	Member of the Coventry and Warwickshire Air Quality Alliance.	Policy Guidance and Development Control	Regional groups Co-ordinating programmes to develop area wide Strategies to reduce emissions and improve air quality	Warwickshire County Council Public Health	On going	On going	N/A	N/A	Implementation on-going	-	Draft Warwickshire Air Quality SPD has been prepared by Coventry City Council, Nuneaton and Bedworth Borough Council, Rugby Borough Council, Stratford-on-Avon District Council and Warwick District Council

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.

Currently there is no monitoring of $PM_{2.5}$ or PM_{10} completed within Stratford on Avon District Council, therefore no concentration values can be reported or estimated using the method as described in Box 7.7 of LAQM.TG(16).

The current Defra background maps for Stratford (2015 based[4]) show that all background concentrations of $PM_{2.5}$ are far below the 2020 annual mean AQS objective for $PM_{2.5}$. The highest concentration is predicted to be 13.1µg/m^3 within the 1 x 1km grid square with the centroid grid reference of (435500, 255500). This is an area to the east of Stratford on Avon District near B4100.

The Public Health Outcomes Framework data tool[5] compiled by Public Heath England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The 2016 fraction of mortality attributable to $PM_{2.5}$ pollution across England is 5.3%, and in contrast the fraction within Stratford on Avon District Council is slightly lower than the National average at 5.0%.

LAQM.TG(16) Table A.1 Action toolbox presents a list of measures that can be implemented to help reduce concentrations of $PM_{2.5}$.

Where required Stratford on Avon District Council will review any proposed actions to be implemented with the County Council Public Health team to consider the potential impact of the actions and whether any further action is required.

[4] Defra Background Mapping data for local authorities (2015-based), available online at https://uk-air.defra.gov.uk/data/laqm-background-maps?year=20135

[5] Public Health Outcomes Framework, Public Health England. data tool available online at https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000005/ati/101/are/E07000221

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.

Stratford on Avon District Council did not undertake any automatic (continuous) monitoring during 2017.

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

Stratford on Avon District Council undertook non- automatic (passive) monitoring of NO_2 at 18 sites during 2017. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) 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.2 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.

In 2017, all but one monitoring site recorded annual mean concentrations below 36µg/m^3. There was one exceedance of the annual mean objective at Studley 4 - 29 Alcester Road, with a reported annual mean NO_2 concentration of 40.3µg/m^3. This site is located within the current Studley AQMA and the annual mean concentrations at this location has been exceeding or close to exceeding the annual mean NO_2 objective for the past 5 years. The concentration recorded at this location continues to record higher concentrations than all other sites, with the concentration being over 6µg/m^3 higher than the next highest recorded concentration. The diffusion tube at this site is located at the façade of a building where the relevant exposure is located on the first floor. Therefore, no distance correction is required for this location.

Figure A.1, Figure A.2 and Figure A.3 show the trend in annual mean NO_2 concentration over the past five years. In comparison to 2016 concentrations the annual mean NO_2 concentrations fell in 2017 at all the sites except monitoring site Studley 3 - 21 Alcester Road.

There are no sites where the NO_2 annual mean is greater than 60µg/m^3, therefore in accordance with Defra LAQM.TG(16) there are no sites likely to be at risk of exceeding the 1-hour mean AQS objective.

Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
Elizabeth House Garden	-	Urban Background	419931	254693	NO_2	YES	58.7	59.7	NO	2
Shipston Road	-	Roadside	420683	254421	NO_2	YES	0	6	NO	2.5
Brewery Street	-	Roadside	419948	255342	NO_2	YES	0	1.3	NO	2
Guild Street	-	Roadside	420066	255172	NO_2	YES	0	2.5	NO	2.5
Tiddington Road	-	Roadside	420710	254818	NO_2	YES	0	1.7	NO	2.5
Ely Street	-	Roadside	419972	254869	NO_2	YES	0	1.8	NO	3
Grove Road 1	-	Roadside	419759	254917	NO_2	YES	0	1.4	NO	2.5
Grove Road 2	-	Roadside	419758	254931	NO_2	YES	0	1.4	NO	2.5
Greenhill Street	-	Roadside	419768	255016	NO_2	YES	0	2.7	NO	2
Wood Street	-	Roadside	420127	254990	NO_2	YES	0	3.1	NO	2
Studley Office	-	Roadside	407309	263991	NO_2	YES	17	18	NO	2.5
Studley 1	-	Roadside	407300	263986	NO_2	YES	0	2.3	NO	2.5
Studley 2	-	Roadside	407302	263913	NO_2	YES	0	2.5	NO	2.5
Studley 3	-	Roadside	407301	263901	NO_2	YES	0	1.4	NO	2.5

Studley 4	-	Roadside	407297	263850	NO_2	YES	0	1.5	NO	2.5
Studley 5	-	Roadside	407322	263716	NO_2	NO	0	3	NO	1.5
High Street 1	-	Roadside	415078	265542	NO_2	NO	0	1.4	NO	2.5
High Street 2	-	Roadside	415089	265631	NO_2	NO	1	4.0	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.2 – 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
Elizabeth House Garden	Urban Background	Diffusion Tube	91.7%	91.7%	12.6	12.5	13.6	14.8	11.4
Shipston Road	Roadside	Diffusion Tube	100.0%	100.0%	20.2	19.9	21.3	21	20.5
Brewery Street	Roadside	Diffusion Tube	91.7%	91.7%	18.1	17.1	19.9	19.8	18.2
Guild Street	Roadside	Diffusion Tube	91.7%	91.7%	26.2	27.8	30.5	28.3	27.7
Tiddington Rd	Roadside	Diffusion Tube	91.7%	91.7%	37.1	35.3	37.7	38	34.0
Ely Street	Roadside	Diffusion Tube	100.0%	100.0%	19.7	18	18	20.5	18.0
Grove Road 1	Roadside	Diffusion Tube	100.0%	100.0%	34.5	31.2	34.7	35.2	33.4
Grove Road 2	Roadside	Diffusion Tube	100.0%	100.0%	35.3	31.9	35.4	36.1	33.2
Greenhill Street	Roadside	Diffusion Tube	100.0%	100.0%	32.6	33.2	32.2	34.3	33.1
Wood Street	Road	Diffusion Tube	100.0%	100.0%	29.8	32.6	32.5	36.2	30.5
Studley Office	Roadside	Diffusion Tube	91.7%	91.7%	19.1	18.7	28.4	27.4	20.4
Studley 1	Roadside	Diffusion Tube	100.0%	100.0%	32.2	33.2	32.4	35.19	30.3
Studley 2	Roadside	Diffusion Tube	100.0%	100.0%	32.2	36.2	33.8	35.56	32.3
Studley 3	Roadside	Diffusion Tube	83.3%	83.3%	36	34.3	27.4	32.4	33.3
Studley 4	Roadside	Diffusion Tube	100.0%	100.0%	**45.2**	39.8	39.5	**42.1**	**40.3**
Studley 5	Road	Diffusion Tube	100.0%	100.0%	26.1	25.3	26.9	33.93	30.4
High Street 1	Roadside	Diffusion Tube	91.7%	91.7%	33	31.2	26.2	29.3	26.6
High Street 2	Roadside	Diffusion Tube	100.0%	100.0%	26.5	31.9	33.3	34.2	31.2

☒ **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: Stratford

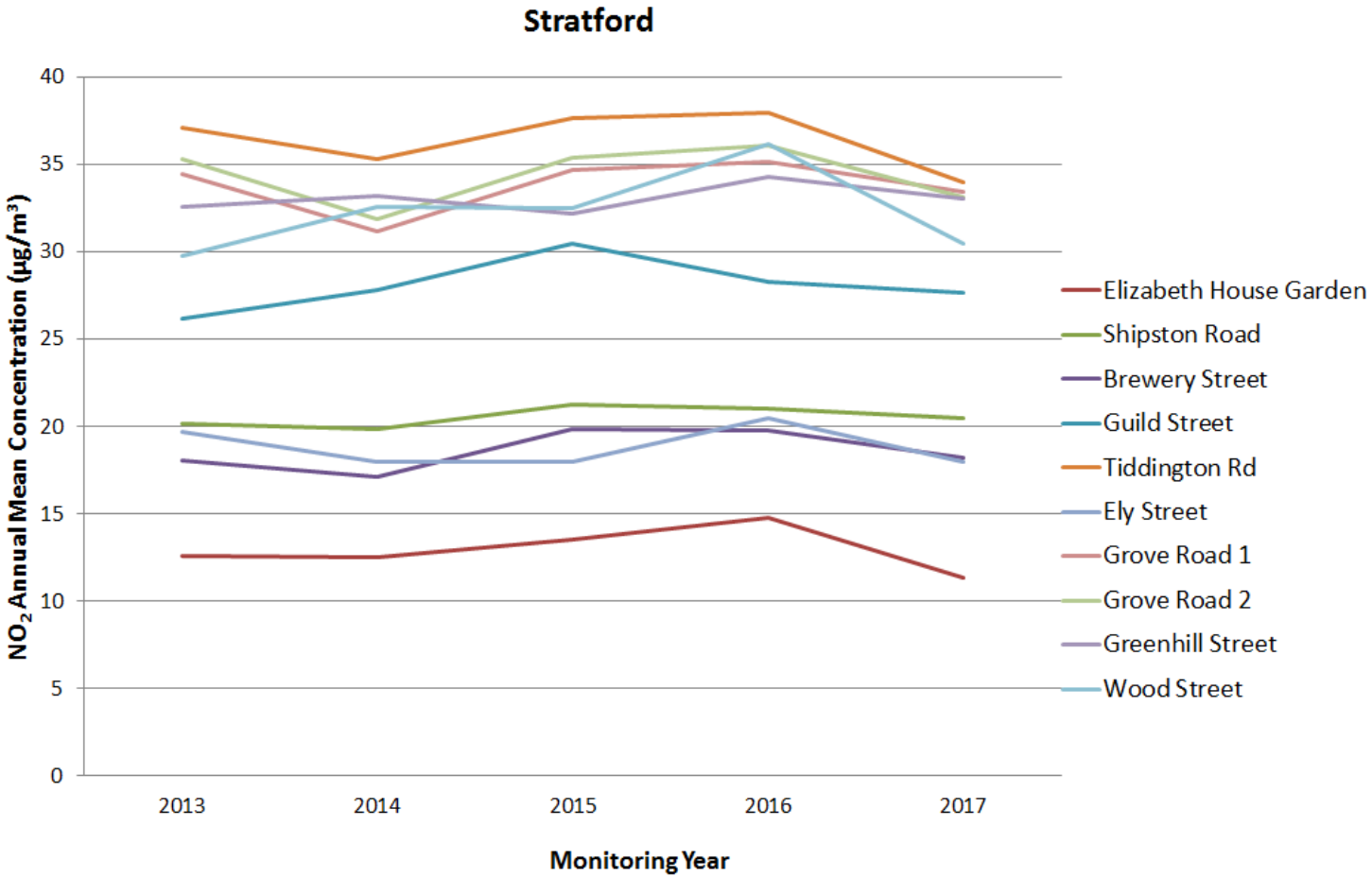


Figure A.2 – Trends in Annual Mean NO_2 Concentrations: Studley

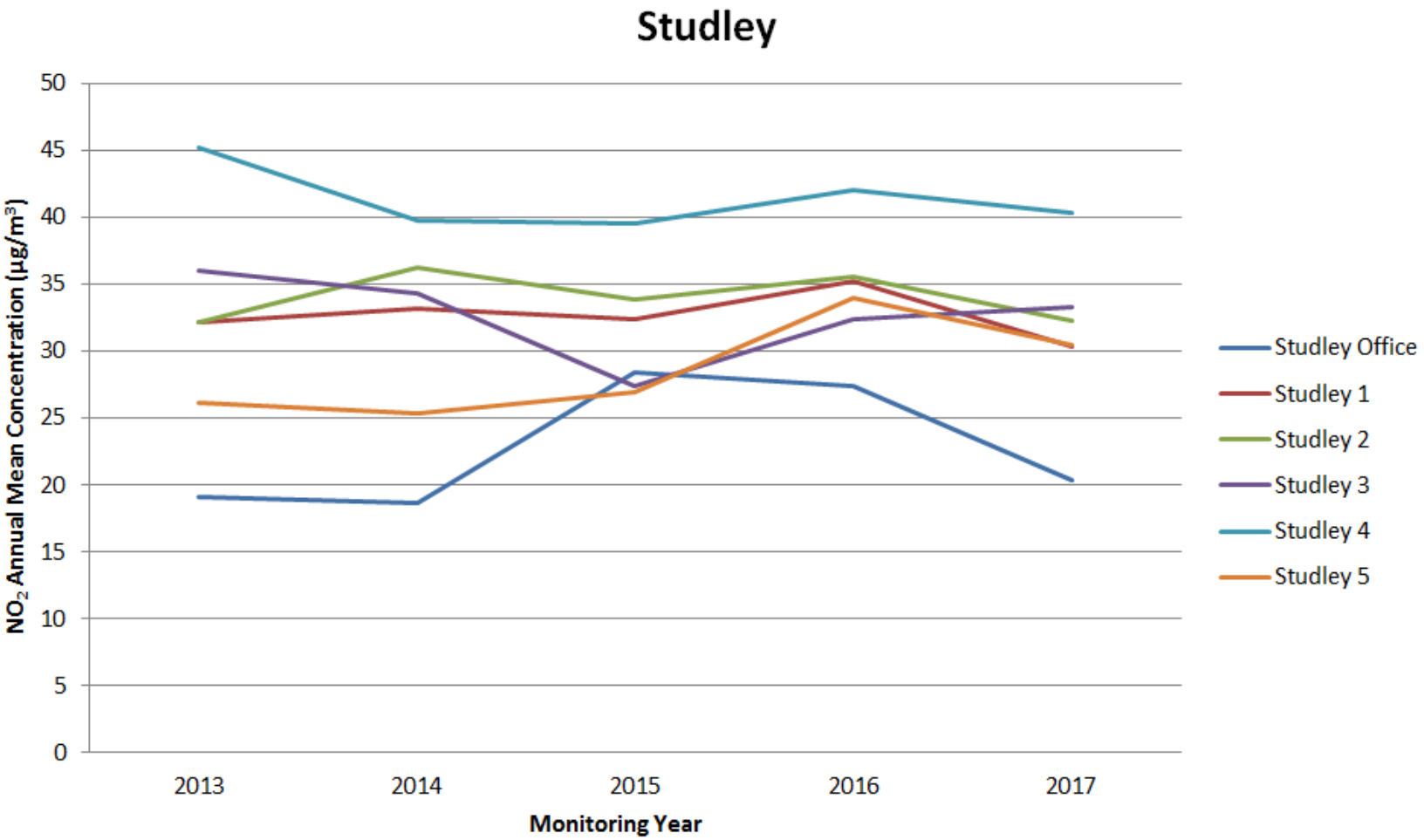
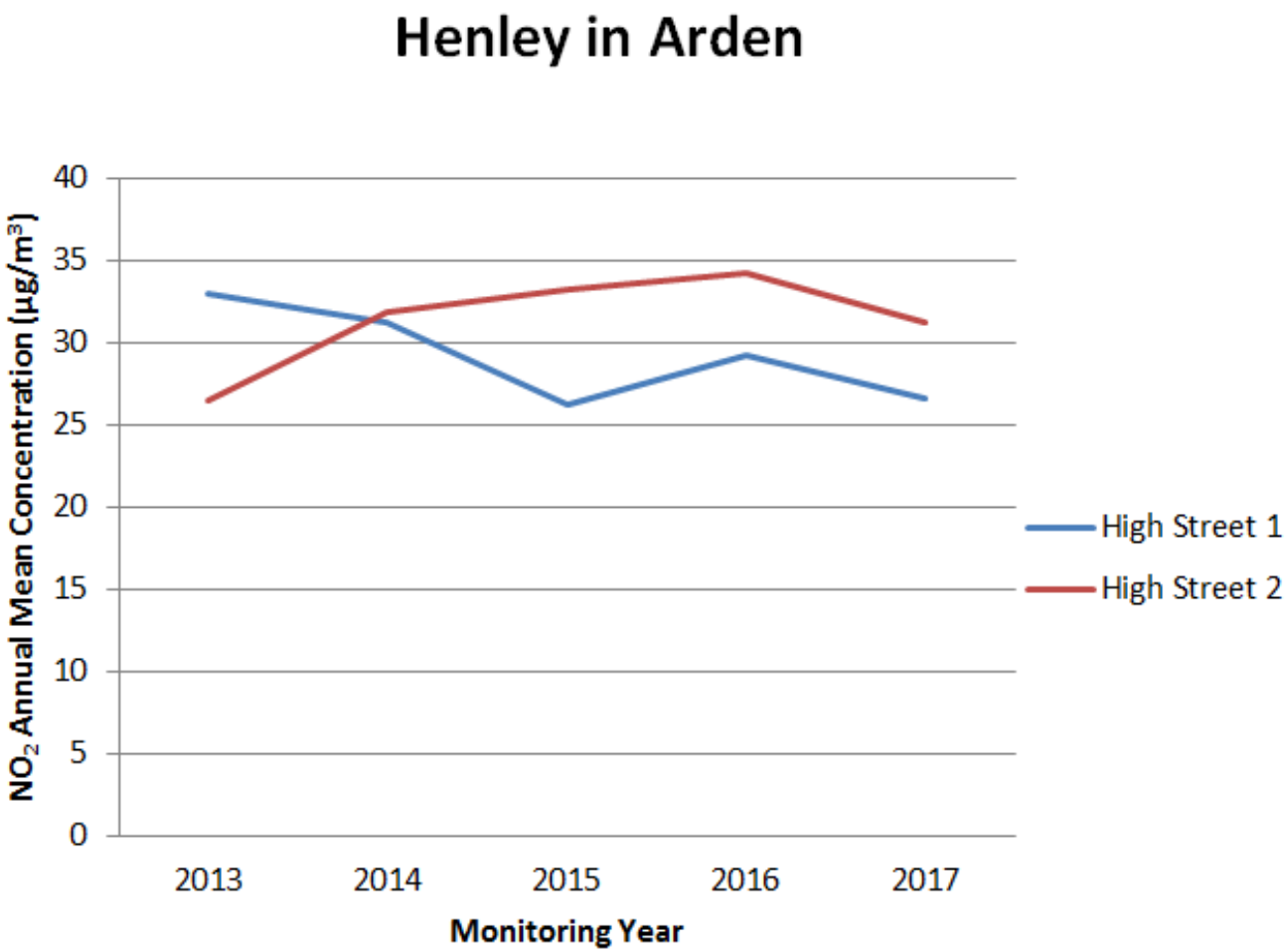


Figure A.3 – Trends in Annual Mean NO_2 Concentrations: Henley in Arden


Henley in Arden
40
35
30
25
20
15
10
5
0
NO2 Annual Mean Concentration (µg/m3)
2013
2014
2015
2016
2017
Monitoring Year
High Street 1
High Street 2

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 (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.89) and Annualised [1]	Distance Corrected to Nearest Exposure ([2])
Elizabeth House Garden	19.9	13.9	15.7	12.4	10.0	7.7	8.3	10.3	12.2	12.0	-	16.6	12.6	11.4	-
Shipston Road	30.4	21.7	21.6	21.4	17.1	20.2	19.0	20.2	22.7	21.4	29.3	28.6	22.8	20.5	-
Brewery Street	30.9	23.5	21.4	16.0	15.0	15.1	15.8	16.4	19.8	21.2	27.7		20.3	18.2	-
Guild Street	48.2	35.8	31.9	30.6	27.8	24.7	25.7	22.3	29.9	24.8	-	36.7	30.8	27.7	-
Tiddington Road	53.6	47.6	38.5	34.5	35.9	37.0	31.1	31.8	34.7	31.4	40.1	-	37.8	34.0	-
Ely Street	33.0	24.4	20.8	18.2	18.2	12.0	14.5	14.7	20.0	16.9	20.4	27.5	20.1	18.0	-
Grove Road 1	49.0	38.9	38.3	35.5	33.8	32.3	32.2	28.0	35.5	34.3	44.5	43.8	37.2	33.4	-
Grove Road 2	53.6	45.5	42.9	38.9	34.3	37.5	34.4	30.8	38.3	0.0	37.2	49.2	36.9	33.2	-
Greenhill Street	53.4	41.5	41.6	31.7	33.4	34.7	30.1	30.2	35.2	31.2	38.9	39.5	36.8	33.1	-
Wood Street	52.0	39.3	38.2	33.1	31.2	31.9	30.9	29.5	31.9	27.8	26.9	34.8	33.9	30.5	-
Studley	35.8	22.3	21.8	24.8	16.0	16.3	19.0	20.1	24.3	20.3	-	28.8	22.7	20.4	-

Office															
Studley 1	48.2	41.0	37.7	36.3	36.8	29.3	28.6	12.2	36.2	27.4	36.7	34.6	33.7	30.3	-
Studley 2	53.2	46.4	38.8	33.0	35.5	30.4	29.8	29.3	36.5	25.1	37.4	36.0	35.9	32.3	-
Studley 3	49.0	37.6	37.3	44.5	36.0	33.9	28.2	29.6	35.3	-	-	39.0	37.0	33.3	-
Studley 4	65.9	53.0	48.2	44.9	55.1	39.2	35.3	33.5	42.4	34.9	44.7	40.2	44.8	40.3	-
Studley 5	56.0	41.7	33.5	33.1	30.2	25.7	26.9	25.7	32.1	26.2	37.7	37.1	33.8	30.4	-
High Street 1	44.6	34.8	31.4	27.7	27.8	24.0	23.1	22.2	29.3	26.1	-	34.1	29.6	26.6	-
High Street 2	46.2	39.8	40.2	33.1	37.2	32.3	28.3	28.9	33.3	27.9	34.9	34.6	34.7	31.2	-

☒ **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

New and Future Local Developments

Redditch Eastern Gateway Development: Planning reference 17/01847/OUT, pending decision. Hybrid application comprising: Outline planning application (with matters of appearance, landscaping, layout, scale and details of internal circulation routes reserved) for the development on a phased basis of 32ha of employment land for business/industrial uses (Use Classes B1, B2, B8). The Environment Statement for air quality concludes that the proposed development is predicted to have a negligible impact on existing receptors.

Diffusion Tube National Bias Adjustment Factors

The diffusion tubes for the year 2017 were supplied and analysed by Gradko International Limited, the tubes were prepared using the 20% Triethanolamine (TEA) in water preparation method. The national bias adjustment factor for Gradko 20% TEA in water is 0.89 (based on 34 studies, version 03/18) as derived from the national bias adjustment calculator[6].

Discussion of Choice of Factor to Use

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

[6] National Diffusion Tube Bias Adjustment Factor Spreadsheet version 06/17 available at https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

With regard to the application of a bias adjustment factor for diffusion tubes, the Defra Technical Guidance LAQM.TG(16) and the LAQM Helpdesk[7] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites. There is no co-location study locally; therefore, the national bias adjustment of 0.89 is used to correct diffusion tube monitoring.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for 2017 were supplied and analysed by Gradko using the 20% TEA in water preparation method. All results have been bias adjusted where required before being presented in Table B.1

Gradko is a UKAS accredited laboratory and participates in the new AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance In the latest available AIR-PT results, AIR-PT AR 0018 (January to February 2017), AIR-PT AR019 (April to May 2017), AIR-PT AR021 (July to August 2017), AIR-PT AR022 (September to October 2017) and AIR-PT AR24 (January to February 2018). Gradko has scored 100% on all results. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$. All local Authority co-location studies in 2017 were rated as ‘good’ (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

[7] Laqm.defra.gov.uk

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – NO_2 Diffusion Tube Locations: Stratford on Avon AQMA

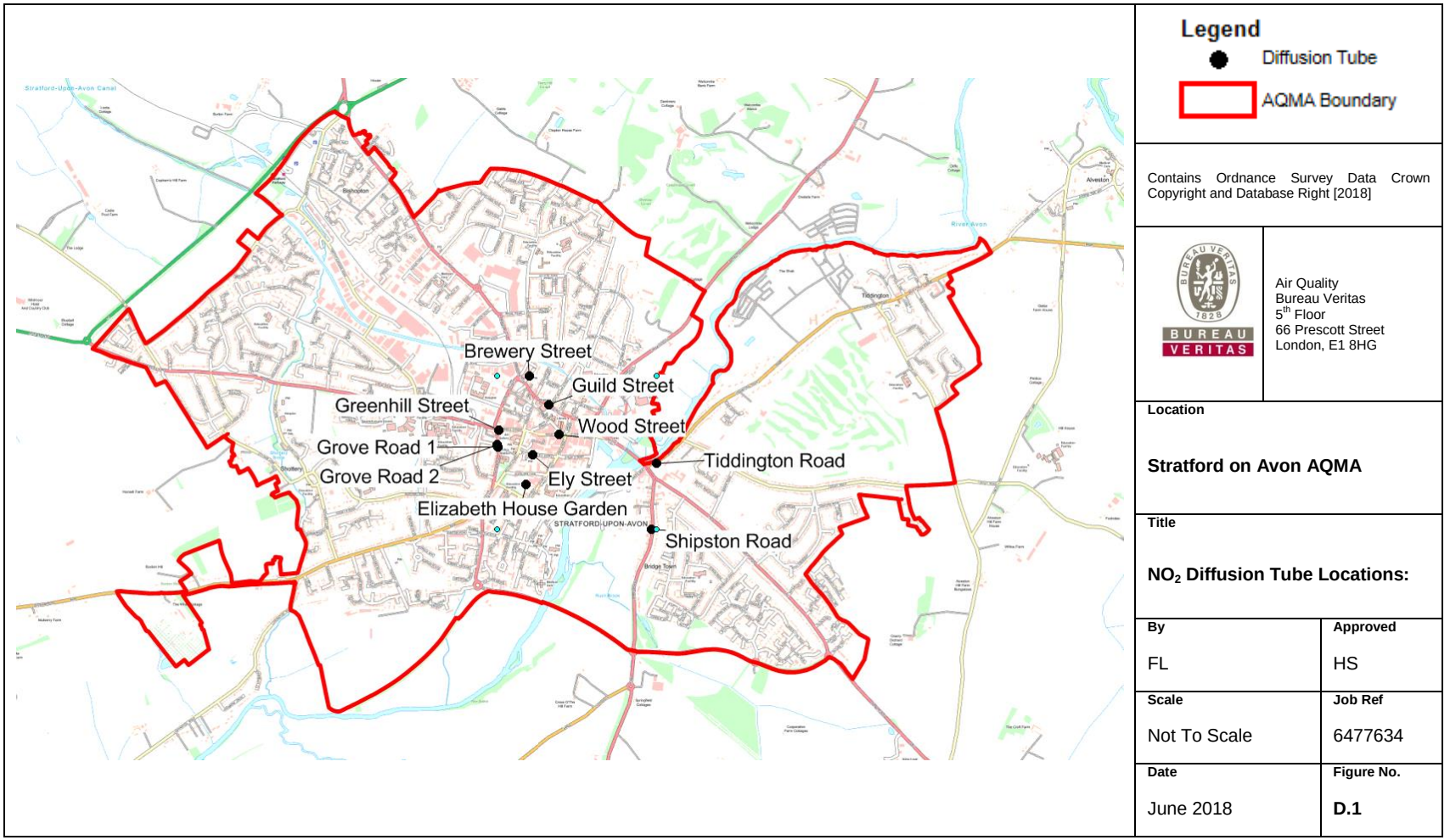
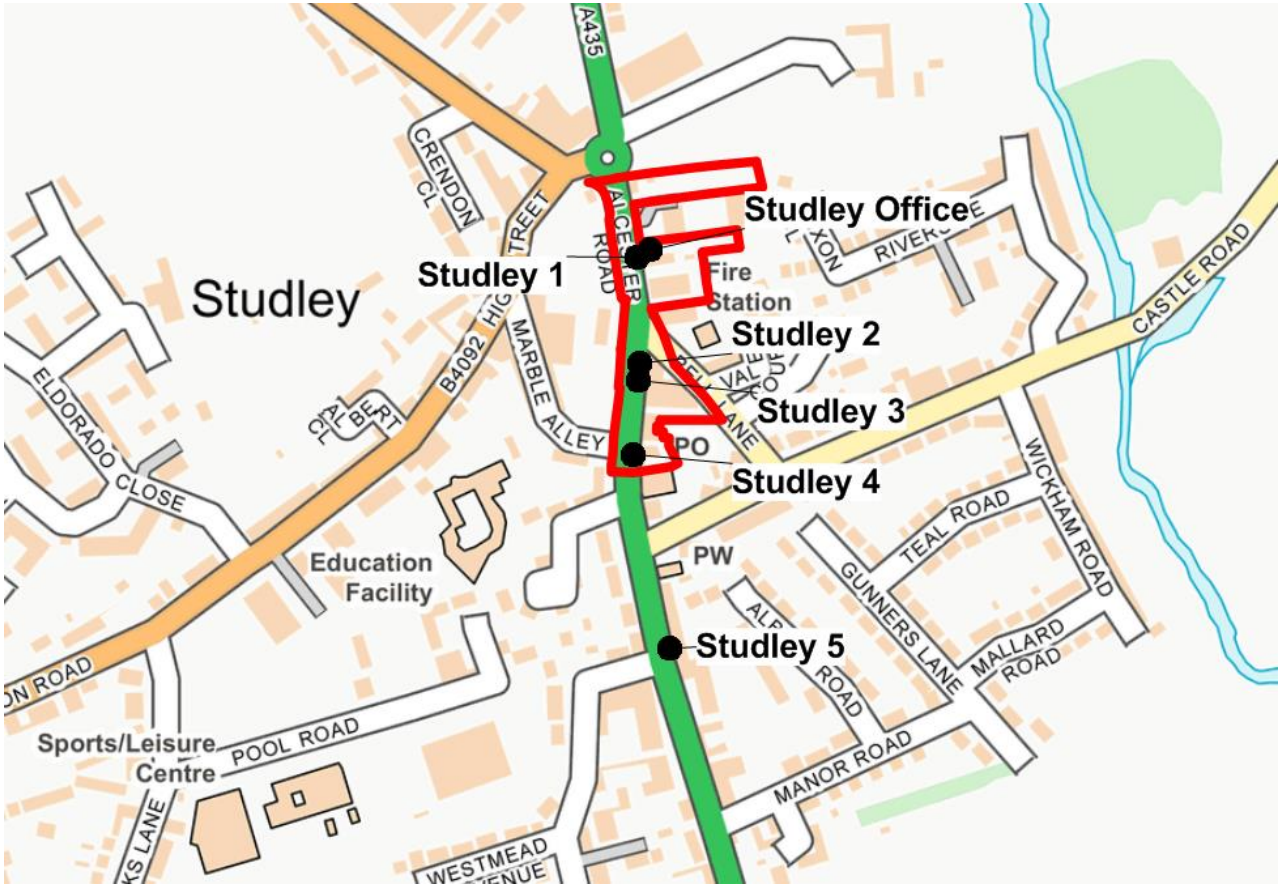


Figure D. 2 – NO_2 Diffusion Tube Locations: Studley



Legend

Diffusion Tube

AQMA Boundary

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**Studley**
Title	**NO_2 Diffusion Tube Locations: Studley**
By	FL
Approved	HS
Scale	Not To Scale
Job Ref	6477634
Date	June 2018
Figure No.	**D.2**

Figure D.3 – NO_2 Diffusion Tube Locations: Henley in Arden

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[8]	
	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

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

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
SPD	Supplementary Planning Document

References

- Local Air Quality Management Technical Guidance LAQM.TG(16). February 2018. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Stratford on Avon District Council, 2008 Air Quality Action Plan.
- Stratford on Avon District Council 2017 Annual Status Report.
- National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/18 V1 published in March 2018.