



2019 Air Quality Annual Status Report (ASR)

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

(Aug 2019)



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Executive Summary: Air Quality in Our Area

Air Quality in Braintree District

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease, cancer and asthma symptoms. 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 billion³.

The main source of air pollution within the district is road traffic. The main pollutant of concern is nitrogen dioxide (NO₂) from vehicle combustion engines. Whilst the A120, A131 and A12 pass through the district there are no points of relevant exposure immediately alongside these roads. The three main towns are Braintree, Halstead and Witham and there are increasing traffic flows in the town centres due to both commercial and residential development. It is in the towns where there is the potential for elevated NO₂ levels at residential facades (point of relevant exposure).

During 2018 the general trend for the NO₂ levels within the district was downwards. Two new monitoring points were introduced in town areas during 2018, one at Bridge Street Witham and one at Halstead town centre. There is an elevated concentration of NO₂ measured on the small roundabout junction at Head Street/Colchester Road Halstead. The annual average is calculated as 59.9µg/m³. This is based on an incomplete year of monitoring (11 months). Given that levels above 60µg/m³ indicates that the short term objective level of 200µg/m³ (1 hour average) may be exceeded then in response five further monitoring points were added in Halstead town centre from January 2019 to allow a more informed assessment to be made about the nitrogen dioxide concentrations due to road traffic

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

On the basis of the information gathered in 2018 and 2019 Braintree District Council will need to consider the necessity to declare an AQMA (Air quality management area) in Halstead. To date no AQMA's have had to be declared in Braintree District and therefore air quality with the district is still broadly considered good.

In addition to air pollutant monitoring, permitted processes are routinely inspected by Braintree District Council under the provisions of the Environmental Permitting Regulations 2016 to ensure that emissions to air from the more polluting industrial processes are controlled. Larger industrial processes with polluting emissions to air are regulated by the Environment Agency.

Braintree District Council is a member of the Essex Air Quality Group which comprises representatives of all Local Authorities in Essex, Essex County Council, the Environment Agency, London Stansted Airport and the University of Essex. The purpose of the group is to promote improvements in air quality related issues by providing assistance to all members regarding their obligations under current UK Air Quality legislation. The group also discuss common air quality issues, sharing experiences and best practice amongst its members. It hosts an Essex air quality website accessible at www.essexair.org.uk

Current air pollution challenges are to balance the desire to develop in the Braintree District area with its transport links (rail and road), close vicinity to Colchester, Chelmsford and Cambridge, and also close proximity to the A12, M11 and Stansted Airport whilst maintaining good air quality within the district.

Actions to Improve Air Quality

Braintree District Council endeavours to maintain good air quality throughout the District.

The Council's four year Corporate Strategy has a clear priority of "Supporting the delivery of strong sustainable transport infrastructure links". Braintree District Council seeks to improve sustainable forms of transport such as public transport, walking and

cycling, reducing carbon emissions from these sources whilst balancing the demand for development and economic growth.

Braintree District Council works with Essex County Council, the Highways Agency and bus and railway providers to improve accessibility, provide sustainable transport and reduce congestion. It also aims to manage travel behaviour and demand for transport to reduce the rate of road traffic growth.

Braintree District Council intends to bring about a shift away from car use towards public transport, walking and cycling, by ensuring urban extensions are linked to the urban structure through pedestrian and cycling routes and a high standard of public transport both locally and area wide. Through the Livewell Campaign talks are given to schools to encourage physical activity including walking to school and other means of active transport.

Through the planning process sustainable travel is encouraged through the requirement for travel plans from major developments, employers and institutions.

Traffic and car parking will be carefully managed to encourage sustainable travel. The promotion of community based initiatives such as car pools, car sharing and voluntary mini- bus services will be included in travel plans.

Highway improvements are required to provide for the future development of Halstead, Braintree and Witham. The preferred route for the new A120 route has been announced (with funding to be confirmed). Essex County Council are undertaking an air quality assessment as part of the project planning. Braintree District Council is supporting improvements to the road layout in the vicinity of the existing A120 Galleys roundabout (adding slip roads to and from A120) which is subject to congestion and will facilitate access to and from Braintree's out of town retail outlet shopping centre. There are also improvements proposed to the A12 which runs to the south of the District which will improve relevant exposure to sensitive receptors as well as proposed improvements to the A131 in the North of the District.

Through development controls Braintree District Council will ensure the appropriate protection from air pollution through careful siting of sensitive receptors and polluting sources. To encourage the use of low emission vehicles the provision of electric charging points is required through the planning process. Increasing electric charging provision is part of the Climate Local Strategy of Braintree District Council.

As well as preventing deterioration of and providing improvements to the air quality of the District through development control Braintree District Council has a regulatory role under local air pollution control legislation and prevention of localised nuisance emissions to air through the statutory nuisance legislation (Environmental Protection Act 1990) and Environmental Permitting Regulations 2016 (as amended).

Braintree District Council also has Climate Change initiatives which promote greener transport and low emission energy sources encouraging the use of low emission alternatives. The Council also actively supports residents to reduce energy consumption, insulate their houses etc all of which contributes to a reduction in the release of air pollutants.

See Table 2.2 for details of actions being undertaken.

Conclusions and Priorities

A possible exceedance of the air quality objective level for NO₂ was identified at Head Street Halstead at ground floor level. At this location there is derelict first floor residential property. Further diffusion tube monitoring will continue during 2019 to assess whether the exceedance of short term and annual mean objective are likely in the area of Colchester Road, Head Street roundabout. Braintree District Council will consider the need to declare an AQMA and the extent of that AQMA area and formulate an action plan to reduce NO₂ levels. The challenge is that the elevated level occurs on the main route through Halstead and currently there is no practicable alternative route for that traffic flow.

Aside from the new monitoring point in Halstead then in the past five years the general trend of NO₂ is downwards and all results below the air quality objective level as shown in Appendix B. The elevated single diffusion tube result in Halstead indicates that even though the Braintree District comprises small towns and large rural areas, good air quality is not guaranteed and as the District further develops to meet housing need there will be the inevitable increase in the volume of road traffic resulting in increased levels of pollution along our major routes and points of traffic congestion before low emission transport and road layout and flow changes (if practicable) can provide any reduction in pollutant concentrations.

Local Engagement and How to get Involved

Braintree District Council is a member of the Essex Air Quality Group (a group of representatives for Essex local authorities including Essex County Council (highways and Public Health) and other interested parties (e.g. Stansted Airport and University of Essex). <http://www.essexair.org.uk/> contains information about Essex air quality. <https://www.cleanairday.org.uk/> provide advice on how the public can get involved.

Members of the public are encouraged to comment on planning applications and the new local plan.

Any queries about air quality matters or related strategies may be sent to the Public Health and Housing Team. Email– PublicHealthandHousingTeam@braintree.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Braintree District during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Braintree District 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 **Error! Reference source not found.** in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

Braintree District Council currently does not have any AQMAs. For reference, a map of Braintree District's monitoring locations is available in Appendix D.

Braintree District Council will consider the declaration of a new AQMA in Halstead area (see monitoring section).

2.2 Progress and Impact of Measures to address Air Quality in Braintree District Council

Defra's appraisal of last year's ASR concluded as follows:-

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1. *There has been some progress in implementing and completing measures over the last year. However the status of many measures is unclear. The Council are encouraged to review their list of measures, ideally including target dates, objective KPIs, reduction targets, and discussion of progress/challenges. This will help the Council to objectively review the effectiveness of each measure. For further guidance please refer to LAQM Technical Guidance 16 (TG16)*
2. *The Council state they plan to expand their monitoring programme over the next reporting period to understand the impact of a number of developments, or to provide a better reflection of current emissions. This decision is supported.*
3. *Furthermore, the Council may wish to redeploy existing resources, from sites that have experienced historically low concentrations.*
4. *Example calculations have been provided which are useful and encouraged for all future reports.*

5. *Generally air quality in the District is good and in general NO₂ concentrations have been decreasing over the past 5 years. The Council should continue their hard work to ensure that future developments do not negatively impact local air quality.*

The main criticism of the report is that where measures have been included in Table 2.2 of the previous report, the measures are open ended with no clear targets or assessment of the progress/challenges of implementation.

Braintree District Council does implement measures which have an impact of offsetting the effects of air pollution in the district but has not quantified these measures and to date given that no AQMA has been declared has not needed to formulate an action plan to reduce levels at a specific site.

In the next year the Braintree District Council will confirm the extent of any AQMA in Halstead based on the ongoing monitoring. An action plan will need to be developed to determine measures that need to be implemented to reduce exposure to road traffic pollutants within an AQMA.

Other ongoing measures to improve air quality generally across the district are set out in

Table 2.1. Braintree District Council will proactively assess how the impact of these measures in terms of reduction of pollutants/emissions may be quantified and how various Braintree District Council Departments (Development Control, Health and Wellbeing, Braintree Energy Action/ Climate Team, Taxi Licensing, Procurement, Fleet management etc) can improve outcomes of the measures listed.

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 specific to AQ impact assessment (e.g provision of EV charging points and measures to offset adverse impact)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	LA Environmental Health, LA Transport Dept.	consultation	awaiting approval	n/a	No AQMA - not quantified	Implementation on-going	2019	Awaiting approval of local plan
2	Provision of air impact assessment and mitigation for construction and demolition stage by developers	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	LA Environmental Health	In place	Ongoing	n/a	No AQMA - not quantified	ongoing	ongoing	need to standardise process
3	Provision of travel plans through planning process	Promoting Travel Alternatives	Other	LA Environmental Health, LA Transport Dept.	In place	Ongoing	n/a	No AQMA - not quantified	ongoing	ongoing	None
4	Enforcement and inspection of pollution industry through environmental permitting and statutory nuisance legislation	Environmental Permits	Other measure through permit systems and economic instruments	LA	In place	Ongoing	local/national	n/a	good level of compliance	ongoing	None

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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
5	Biomass/combustion chimney height assessments	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT		In place	Ongoing	n/a	No AQMA - not quantified	Implementation ongoing	ongoing	few in number annually
6	Implementation of climate change strategy	Promoting Low Emission Plant	Other	LA Climate Change and ECC	In place	Ongoing	n/a	n/a	complete	ongoing	CHP at local fitness centre, provision of 5 public EV Charging points, solar panels on public buildings
7	Live well campaign	Promoting Travel Alternatives	Promotion of cycling	LA Health Protection with other partners	In place	Ongoing	n/a	n/a	ongoing	ongoing	also to include promotion of walking /combined with planning policy to facilitate safe walking and cycling routes
8	"Routine attendance of Essex Air Quality Consortium derivation of Essex wide policy	Policy Guidance and Development Control	Other	LA Environmental Health, LA Transport Dept.	In place	Ongoing	n/a	n/a	ongoing	ongoing	Essex Air website as public information source
11	Adopted road traffic act powers to require switching off of engines	Traffic Management	Anti-idling enforcement	LA Environmental Health	In place	Ongoing	n/a	n/a	ongoing	ongoing	used as educational tool
12	Requirement for new licensed taxis to be less than 5 years old on first licensing	Promoting Low Emission Transport	Taxi Licensing conditions	LA licensing	In place	ongoing	n/a	n/a	ongoing	ongoing	Intention to review policy

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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
13	Encouraging staff to use lower emission vehicles through leased car and cycle schemes	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	LA Climate Change	In place	Ongoing	n/a	approx 15 vehicle uptake for lease vehicles	ongoing	ongoing	
14	The Council will continue to promote alternatives to domestic bonfires. We will encourage residents to recycle or compost as much waste as possible or dispose of it responsibly at a civic amenity site and free LA collection of green waste.	Public Information	Via other mechanisms	ECC & BDC	In place	ongoing	Number of complaints relating to domestic bonfires	Usually via reactive complaints, with records maintained	Advisory Letters reviewed and updated	Ongoing statutory duty	
15	Climate change working group	Other	Reduce atmospheric emissions	group of elected members and representatives of the business community, key partners, academic experts and community groups with interest and experience in this area	Group to be formed in October 2019	Planning	Reduction in atmospheric emission's	All atmospheric pollutants	Planning stage	Action plan delivered to Cabinet April 2020	Will be presented by climate change working group within report

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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
16	School travel plans	Promoting Travel Alternatives	School Travel Plans	BDC & ECC	In place in some schools	Part of the healthy schools initiative	% children travelling to school by Active transport	SHUE Survey Results 2018	80% of primary schools have an active travel policy	April 2020	

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.

There is no regulatory standard applied to PM 2.5 (for local authorities in England) to require action to reduce emissions or concentrations of fine particulate air pollution, although action to tackle PM10/NOx would usually contribute to this. The EU Ambient Air Quality Directive does however set out air quality standards for PM 2.5 including an exposure reduction obligation for urban background, a target value and a limit value. The target annual mean value is given as 25µg/m³ although the aim should be for all local authorities to reduce and minimise levels of PM_{2.5} even where there is compliance with the target values.

The National Local Air Quality Technical guidance (TG 16 paragraph 2.57) states that it is estimated that as much as 40% to 50% of the PM_{2.5} levels found in any given area can be from sources outside a local authority's direct boundary.

An area where more work is required is communicating with the public about air pollution, (AQ1010 Final Report¹³) this is referred to in the TG16 guidance which promotes more active stakeholder engagement.

The Public Health Outcomes Framework introduced a PM_{2.5} indicator “fraction of adult mortality attributed to particulate air pollution. The information for Braintree indicates that the level is average when compared to the results in the Eastern region with no increasing trend.

Braintree District Council does not have any smoke control areas within its district. It does however limit particulate emissions through industrial process regulation, waste enforcement, prevention of burning through waste enforcement and statutory nuisance investigations and restrictions on planning consents during site clearance and construction processes.

Sustainable travel and reduction of congestion is promoted through the planning process and local Highways Panels which can reduce emissions from brakes and tyres.

Braintree District Council will continue to review air quality and focus on reducing and preventing air pollution (including PM2.5) through the planning regime, air pollution and regulatory control, traffic management with Highways assistance and various local initiatives including but not exclusively the Climate Change and Livewell campaigns as shown in Table 2.2.

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 national objectives.

Braintree District Council has no automatic (continuous) monitoring sites.

NB. Local authorities do not have to report annually on the pollutants: 1,3 butadiene, benzene, carbon monoxide, and lead, unless local circumstances indicate otherwise as the objective levels have typically been met and are well within limit values for Local Authorities in England and Wales.

3.1.2 Non-Automatic Monitoring Sites

Braintree District Council undertook non- automatic (passive) monitoring of NO₂ at 12 sites during 2018. Table A.12 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. The need to adjust the results is to ensure the concentration of NO₂ is represented at the point of which a resident will be exposed to the pollutant. Many of the tubes are located on street furniture above head height.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

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

All results clearly demonstrate compliance EXCEPT for the site at Halstead (BR14).

For this site there is a possible exceedance of the short term pollutant objective for NO₂ as the annual monitored level is 59.9 µg/m³. It is positioned roadside on a post with 3m to the façade of a commercial premises. There is a residential property at the neighbouring commercial premises at first floor level and therefore there will be some dispersion to reduce levels. However the monitoring position is on a pavement and therefore there is risk of exposure to persons using that pavement hence the requirement to consider the short term objective level. It is also necessary to consider exceedance of the annual mean of 40µg/m³ at relevant locations (residential facades) and declaration of an AQMA. Six further diffusion tubes have been placed in the area from January 2019 to inform this process.

During previous years DEFRA had expressed concern about the possible exceedance at BR5 site, Chipping Hill Witham. The concentration level in Table A.3 in Appendix A shows that there is reduction of the NO₂ annual mean concentration at the Chipping Hill Site (BR5) for 2018. As this site it may be distance corrected and derives 33.0µg/m³ and is therefore not within 10% of the annual mean air quality objective of 40µg/m³. As stated previously, the location of the BR5 tube is likely to represent the highest concentration on the road bridge (above the railway), given that the traffic will queue as travelling towards the mini roundabout (connecting to Collingwood Road and The Avenue). Braintree District Council accepts that the Chipping Hill bridge location is not at a point of representative exposure and has placed another diffusion tube in the immediate area at a residential façade during 2019. Provisional results are indicating compliance at the residential façade and will be fully reported in the next annual status report.

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)
BR1	Blandford House London Road Braintree	Roadside	575600	222900	NO2	NO	6	1.2	NO	2
BR3	Foxden A12 Rivenhall	Roadside	583859	216497	NO2	NO	19	2	NO	1.8
BR4	Beckers Green Road	Urban Background	577800	222500	NO2	NO	12.2	8.3	NO	2
BR5	Chipping Hill Bridge	Roadside	582002	215111	NO2	NO	7	2	NO	1.9
BR6	Railway Street/Victoria St	Roadside	576204	222958	NO2	NO	4	2	NO	2
BR7	Stilemans Wood	Roadside	577680	221964	NO2	NO	20	9	NO	1.8
BR9	Hotel Rivenhall	Roadside	583891	216467	NO2	NO	10	1.5	NO	1.8
BR11	High Street Kelvedon	Roadside	58386	219106	NO2	NO	0	3.5	NO	1.9
BR12	The Street Bradwell	Roadside	580625	223115	NO2	NO	11.7	2.9	NO	1.8
BR13	Bridge Street, Witham	Roadside	214151	581851	NO2	NO	0	1	NO	1.9
BR14	11 Head Street, Halstead	Kerbside	230738	581542	NO2	NO	3	0.5	NO	1.9
BR15	23 Colchester Road, Halstead	Roadside	230699	581592	NO2	NO	0	2	NO	1.9

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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
BR1	Roadside	Diffusion	100	100	<u>34.7</u>	29.8	31	31	28.2
BR3	Roadside	Diffusion	100	92	<u>52.1</u>	47.1	46.4	51.9	46.1
BR4	Urban background	Diffusion	100	100	<u>19.8</u>	15.9	17.3	18.3	16.2
BR5	Roadside	Diffusion	100	100	<u>38.8</u>	40.8	45.9	45.3	40.4
BR6	Roadside	Diffusion	100	100	<u>29.2</u>	22.8	23.2	24.6	22.9
BR7	Roadside	Diffusion	100	100	<u>33.5</u>	30.5	28.3	31.6	29.2
BR9	Roadside	Diffusion	100	100	<u>43.6</u>	43.9	46.3	46.1	40.7
BR10	Roadside	Diffusion	100	100	<u>47.7</u>	46	46.1	45.5	23.1
BR11	Roadside	Diffusion	100	75	<u>27.9</u>	27.3	30.1	27.1	25.9
BR13	Roadside	Diffusion Tube	100	83	-				33
BR14	Kerbside	Diffusion Tube	100	92	-				59.9
BR15	Roadside	Diffusion Tube	100	67	-				20

☒ Diffusion tube data has been bias corrected

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

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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.

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

Site ID	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 (10.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
BR1	43.1	40.9	39.1	39.4	32.0	26.5	30.6	30.9	37.1	42.7	39.7	43.6	37.1	28.2	21.5
BR3	74.0	65.6	66.9	66.8	45.1	42.7	63.4	59.1	66.2	49.4	63.5	65.2	60.7	46.1	29.6
BR4	21.8	28.7	24.5	22.5	15.6	11.9	15.8	17.8	20.7	24.4	26.5	26.1	21.4	16.2	15.7
BR5	60.8	48.1	52	57.3	47.9	34.3	51.9	59.2	64.3	62.4	55.9	43.4	53.1	40.4	33.0
BR6	38.3	34.8	32.8	32.8	28	20.9	25	24.5	26.3	33.2	31.3	34.2	30.2	22.9	n/a
BR7	36.8	39.5	41.4	46	31.3	26.3	43.4	40.4	36.4	32.3	47.5	39.3	38.3	29.2	24.4
BR9	38.3	67.5	56.7	60.4	54	42.9	54.4	53.9	52.7	59.7	52.4	49.3	53.5	40.7	29.9
BR11	38.3	27	35.5	31.6	28.6	24.2	24.5	27.2	27.8	33.3	32.7	33.7	30.4	23.1	23.1
BR12	29.2	28	42.3	11.8	42.3	30.9	33.6	38.6	37.7	41.3	33	40.6	34.1	25.9	20.5
BR13			34.5	50	42.4	36.9	47.2	40.3	42.9	45.5	49.2	45.6	43.5	33.0	33.0
BR14		73.5	76	94.8	79.9	67.8	68.1	80	77	85.9	85.2	79.1	78.8	59.9	n/a
BR15					29.4	21.7	22.4	24.6	23.9	29.6	28.9	30.2	26.3	20.0	23.1

☐ 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 NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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

The nitrogen dioxide diffusion tubes are prepared and analysed by Socotec formerly known as Environmental Scientifics Group (ESG Didcot). The preparation method uses 50% triethanolamine (TEA) in acetone. The UKAS testing laboratory number is 1015.

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combined two long running quality assurance schemes.

AIR offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air. One such sample is the AIR NO₂ test sample type that is distributed to participants in a quarterly basis.

Every quarter, roughly January, April, July and October each year, each laboratory receives four diffusion tubes doped with an amount of nitrite, known to LGC Standards, but not the participants. At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. The masses of nitrite on the spiked tubes are different each quarter, and reflect the typical analytical range encountered in actual NO₂ ambient monitoring in the UK

The results shown in the table below from the LAQM website

<https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.pdf> indicate that SOCOTEC meets a satisfactory standard for analysis.

Fig C.1 AIR PT –Performance Results for SOCOTEC

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR0019, 21, 22, 24, 25, 27, 28 and 30

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $\leq \pm 2$ as defined above.

AIR PT Round	AIR PT AR019	AIR PT AR021	AIR PT AR022	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030
Round conducted in the period	April – May 2017	July – August 2017	September – October 2017	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	50 %	0 %	100 %	100 %	100 %	50 %	100 %	100 %
Gradko International [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 %	100 %	100 %	75 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [2]	NR [2]	100 %	NR [2]	NR [2]	NR [2]	25 %	50 %
Milton Keynes Council	75 %	0 %	75 %	100 %	75 %	100 %	100 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	75 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	50 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	75 %	100 %	100 %	100 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR No results reported

[3] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO₂ diffusion tube monitoring and therefore did not submit results.

Diffusion tube bias adjustment factor

The diffusion tube bias adjustment factor is derived from the national data base on the LAQM website. This allows correction of diffusion tube results to account for inherent inaccuracies of the diffusion tube method. The factor is derived by comparing continuous analyser results with SOCOTEC diffusion tube results collocated alongside the continuous analysers operated across the UK by various local authorities. The bias adjustment factor has been determined as 0.76 for year 2018.

Fig C.2 National Diffusion Tube Bias Adjustment Factor Spreadsheet

B2409

SOCOTEC Didcot

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/19

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 2019

LAQM Helpdesk Website

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:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	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 a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data for this year.	If you have your own co-location study then see footnote ⁶ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953								
Analysed By ¹	Method ²	Year ³	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu\text{g}/\text{m}^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu\text{g}/\text{m}^3$)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Cambridge City Council	12	42	30	40.2%	G	0.71	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Canterbury City Council	11	38	28	35.8%	G	0.74	
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Canterbury City Council	12	16	12	36.3%	G	0.73	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Hambleton District Council	12	21	18	20.8%	G	0.83	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Ipswich Borough Council	12	34	29	17.9%	G	0.85	
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	12	41	27	54.2%	G	0.65	
SOCOTEC Didcot	50% TEA in acetone	2018	UB	City of York Council	11	22	15	52.0%	G	0.66	
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	12	34	26	30.8%	G	0.76	
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	11	30	23	32.3%	G	0.75	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Dumfries and Galloway Council	12	36	30	19.8%	G	0.83	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Knowsley MBC	12	47	38	26.5%	G	0.79	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Suffolk Coastal DC	11	44	33	32.4%	G	0.76	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Thanet District Council	10	26	21	25.4%	G	0.80	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	11	33	23	42.2%	G	0.70	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	12	33	29	17.2%	G	0.85	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	12	30	26	16.1%	G	0.86	
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Slough Borough Council	10	38	31	25.6%	G	0.80	
SOCOTEC Didcot	50% TEA in acetone	2018	SU	Slough Borough Council	11	32	22	46.7%	G	0.68	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Slough Borough Council	11	39	32	22.5%	G	0.82	
SOCOTEC Didcot	50% TEA in acetone	2018	R	Vale of Glamorgan	12	39	25	57.8%	G	0.63	
SOCOTEC Didcot	50% TEA in acetone	2018	KS	Marylebone Road Intercomparison	9	95	87	3.1%	G	0.92	
Overall Factor ⁵ (21 studies)										Use	0.76

¹For Casella Strangen/Bureau Veritas (NUT) Bureau Veritas Labs/ use Uradko 50% TEA in Acetone.

²For Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofin/ use Environmental Scientific Groups.

Distance correction calculations

The distance correction calculations are given below for the relevant monitoring sites using the LAQM NO₂ Fall-off with Distance Calculator *Version 4.2)

(<https://lagm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>)

**Fig C.3a distance correction calculation for monitoring site BR1
Blandford House, Braintree**



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.2	metres
Step 2	How far from the KERB is your receptor (in metres)?	6	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	8.3	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	28.2	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	21.5	µg/m ³

**Fig C.3b distance correction calculation for monitoring site BR3
Foxden A12 Rivenhall**



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	19	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	14.8	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	46.1	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	29.6	µg/m ³

**Fig C.3c distance correction calculation for monitoring site BR4
Beckers Green Braintree**



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	8.3	metres
Step 2	How far from the KERB is your receptor (in metres)?	12.2	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	16.2	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	15.7	µg/m ³

**Fig C.3d distance correction calculation for monitoring site BR5
Chipping Hill Witham**



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.3	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	40.4	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	33.0	µg/m ³

**Fig C.3e distance correction calculation for monitoring site BR7
Stilemans Wood Braintree**



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	9	metres
Step 2	How far from the KERB is your receptor (in metres)?	20	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	29.2	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	24.4	µg/m ³

**Fig C.3f distance correction calculation for monitoring site BR9
Rivenhall Hotel A12**



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	10	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	14.8	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	40.7	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	29.9	µg/m ³

**Fig C.3g distance correction calculation for monitoring site BR12
The Street Bradwell**

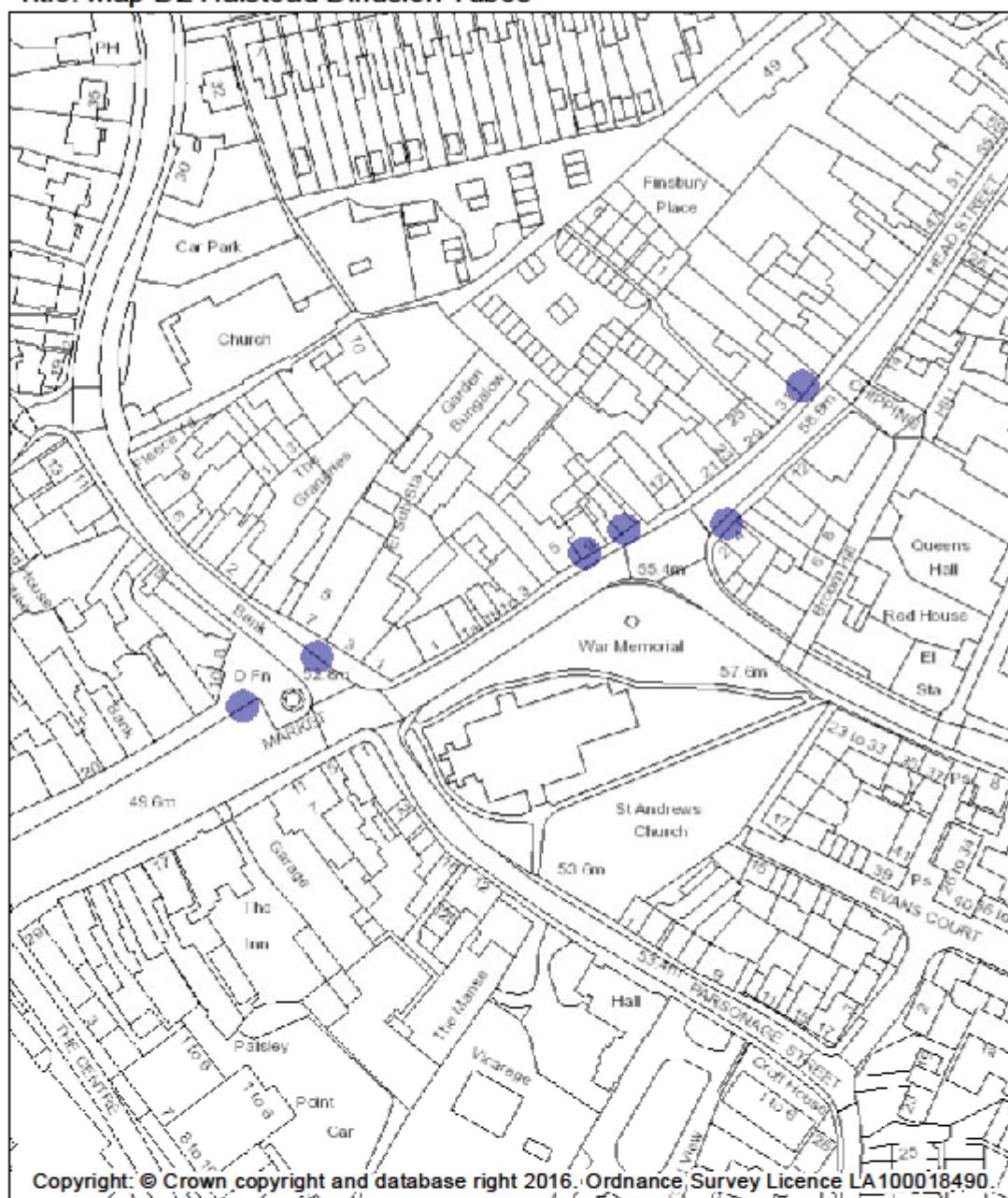


Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2.9	metres
Step 2	How far from the KERB is your receptor (in metres)?	11.7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	10.9	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	25.9	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	20.5	µg/m ³



Title: Map D2 Halstead Diffusion Tubes



Scale: 1:1,250

Date: 17 Aug 2019

Author: Web AppBuilder for ArcGIS

A scale bar labeled "Meters" with markings at 0, 5, 10, 20, 30, and 40.



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/m³).

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
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

- 1) [Air Quality Review and Assessment Website](#)
- 2) [Defra \(2016\) Local Air Quality Management, Technical Guidance \(TG16\)](#)
- 3) Braintree [District](#) Councils, Draft Local Plan www.braintree.gov.uk