2024 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June, 2024

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Executive Summary: Air Quality in Our Area

This 2024 report summarises the results of air pollutant monitoring undertaken by Braintree District Council as part as of its Local Air Quality Management role during 2023.

Monitoring locations were the same as 2022. In total 24 diffusion tubes were placed around the district at 20 different locations to assess nitrogen dioxide (NO_2) levels in 2023. Two locations at Halstead were diffusion tubes in triplicate.

No exceedances of the air quality objective levels at locations of relevant exposure (i.e locations at residential facades for annual mean and at kerbside for one hour mean) were determined and therefore no Air Quality Management Area has been confirmed.

As for previous years the highest measured pollutant levels were determined at Head Street/Colchester Road junction in Halstead where this is a kerbside location which assesses the exceedance of the short term objective level. Braintree District Council will continue to monitor this location and there is no risk of exceedance if the downward trend in roadside concentrations continues year on year.

Improvements to air quality are achieved by behavioural and technological changes. Braintree District Council's Climate Change and Cycling strategies support both and implementation of key projects to encourage and support low emission travel, technology and behaviour are detailed in Table 2.1 of the report.

There are always added challenges to maintaining good air quality within the Braintree District as major housing developments and business projects progress with potential to increase road traffic pollution. All are carefully assessed against the relevant air quality objective levels and designed to avoid exceedances at sensitive receptors.

Braintree District Council is committed to producing an Air Quality Strategy to maintain good air quality throughout the district, integrating with the climate change strategy and the air pollutant reduction objectives and activities of other working partners such as Essex County Council Highways Authority (Local transport strategy). We need to protect our environment to safeguard it for current and future generations. Our Corporate Strategy confirms this commitment of Braintree District Council to work with people, partners, developers and other businesses across the district to help them fulfil their responsibilities and be mindful of their impact on the local environment.

Contact and comments from members of the public and businesses within the district and any other interested parties are welcomed on how Braintree District Council may improve or do better on reducing air pollution.

Air Quality in Braintree District

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

Braintree District Council monitors nitrogen dioxide from road traffic sources. As shown in Appendix 1 pollutant levels in the District are still below pre covid levels and this is in line with National Air quality statistics in the UK National Air Quality Statistics which state '*In 2023, annual mean concentrations of NO_2 showed a decrease of 9 per cent at urban background sites and a decrease of 7 per cent at roadside sites from 2022 levels.* This is cited as being a result of tighter emission standards for road vehicles.

No exceedances of the short term and long term air quality objectives have been determined at relevant locations in 2023 within the Braintree District. NO_2 concentrations at Head Street /Colchester Road junction Halstead reflect the downward trend across the district and will continue to be monitored. Monitoring results are discussed further in section 3.2.1.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

[5] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Braintree District Council has not declared an Air Quality Management Area (AQMA) as no monitoring results for 2023 determine any exceedance of the relevant objective levels. It continues to promote good air quality through local strategies in particular Climate Change and Cycling strategies in cooperation with partnership organisations. In 2023 an independent review of Braintree District air quality was undertaken by Ricardo and its recommendations will be adopted to enhance air quality monitoring. See Appendix C -- Additional Air Quality Works undertaken by Braintree District Council in 2023. Details of local action are reported in Table 2.2.

Currently Braintree District Council does not monitor particulate matter but will carry out indicative particulate monitoring using low cost sensors to determine any indicative trends in particulate matter concentrations and so support the objectives of The Environmental Improvement Plan..

As a member of the Essex Air Quality consortium then Braintree District Council continues to work with other Essex local authorities including Essex County Council to drive forward good practice in AQ monitoring, implementation of local action plans and quantifying improvements, where possible as shown in Table 2.2. The Essex Air website was relaunched in 2023 project led by Essex County Council through DEFRA Grant funding Essex Air website

Braintree District Council within its Annual Plan commits to develop a local Air Quality Strategy See Priority 2 Air Quality and respond to legislative requirements in relation to air quality.

Conclusions and Priorities

All monitoring locations are indicating NO_2 levels below the air quality objective of 40µg/m3 (annual mean) and 200µg/m^3 (1 hour) at relevant receptors for 2023. There is no requirement to declare an AQMA. Braintree District Council will adjust and augment monitoring in 2024 following recommendations of an independent air monitoring review report of 2023. The review is referenced in Appendix C.

Braintree District Council will continue to work with external partners such as other local authorities and communicate, promote discussion and sharing of knowledge between internal departments to maintain and promote good air quality and to fulfil the requirements of its ambitious Climate Change BDC Climate change page and Cycling Strategy BDC Cycling Strategy

It will continue to maintain and progress other projects and controls as shown in Table 2.2 of this report. Air Quality Reports may be viewed at Essex Air website www.essexair.org.uk

Local Engagement and How to get Involved

Braintree District Council would encourage members of the public to liaise with us where there are concerns about air quality. For new development this can be via the Planning section of the District Council. For any air quality related queries or suggestions to improve or promote local air quality and stakeholder engagement of the topic then please make contact

Go online and make a comment on our website at www.braintree.gov.uk

e-mail our Customer Service Centre at csc@braintree.gov.uk

Leave written comments at our main office - Causeway House, Braintree CM7 9HB

Telephone our Customer Service Centre on 01376 552525

Speak to your local District Councillor local councillor

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Services Department of Braintree District Council with the support and agreement of the following officers and departments:

Josie Falco – Head of Environmental Services

Chris Shipham – Public Health and Housing Manager

This ASR has been sent to Essex County Council Director of Public Health.

If you have any comments on this ASR please send them to the public health and housing team at: Braintree District Council. Causeway House, Bocking End, Braintree, CM7 9HB

Tel 01376 552525 or csc@braintree.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Braintree District during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Braintree District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

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.

Braintree District Council currently does not have any declared AQMAs. A local Air Quality Strategy is under development to prevent and reduce polluting activities and for the adoption of cleaner and sustainable forms of transport and heating.

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

Defra's appraisal (ref ASR23-1866) of last year's ASR concluded (in italics)

Braintree District Council (BDC) does not have any declared Air Quality Management Areas (AQMAs). BDC is continuing to review NO_2 concentrations across the district. As such, the Council have included a detailed discussion on the key measures which are being implemented in order to improve air quality within the district. BDC undertook an Air Quality Review in late 2022 (details awaiting Management Board/Councillor level approval), which will be used to inform the production of their Air Quality Strategy this coming year.

BDC undertook non-automatic (passive) monitoring of NO_2 and 20 sites in 2022 During 2021, there was one exceedance at BR14, NC1, NC2 (triplicate location) with an NO_2 concentration of 49.1 ug/m3. BDC present and discuss the trends in NO_2 concentrations over the past 5 years (where data is available). Overall, the data exhibits a downward trend, with the Council attributing depressed concentrations in 2020 to the travel restrictions imposed during the COVID-19 lockdown. Increases in concentrations have been observed in 2022; likely a results of traffic levels increasing towards pre-pandemic level.

Overall, this report is comprehensive and well detailed. The Council is encouraged to continue their good work in future years.

Separate strategies such as Climate Change and Cycling strategies support the reduction of polluting emissions by reducing greenhouse gas emissions and promoting low emission vehicles and supporting the infrastructure and behavioural change required to progress towards Net Zero having the consequence that emissions to air may reduce, they do not focus on specific pollutant concentrations of the air pollutants (nitrogen dioxide and particulate matter) and the associated health risks from those pollutants where the concentration is elevated at a site of relevant exposure. Therefore the current Corporate Strategy makes a commitment to progressing an air quality strategy in the coming year.

Braintree District Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality.

This includes an independent Air Quality Monitoring Review by Ricardo which took place in late 2022 and has now been approved in full by Management Board of the District Council to expand diffusion tube locations in 2024 in residential areas and close to schools and to install three low cost AQ sensors at locations to be confirmed. The latter will provide indicative concentrations of NO_2 and particulate matter within the District.

Braintree District Council continues to maintain the ongoing measures within Table 2.2 which complement Braintree's Climate Change and cycling strategies.

Regulatory work continues using the Environmental Protection Act 1990 and Environmental Permitting Regulations 2016 in connection with regulation of permitted processes, investigation of smoke nuisance and commercial burning, dust and odour complaints and implementation of controls to limit emissions to air through the planning consultation processes for new development to mitigate and minimise adverse effects to air quality.

The District's cycling climate change strategies both promote Green travel lowering emissions to air and the implementation of safer alternative travel routes through collaboration with Essex County Council and other Essex local authorities. Braintree District Council has active involvement with The Essex Environmental Protection and Air Quality Study Group, Essex Climate Change Strategy Group and a local Highways Panel.

Details of all measures completed, in progress or planned are set out in Table 2.1. 22 measures are included within Table 2.1, with the type of measure and the progress Braintree District Council has made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

In 2024 Braintree District Council will continue to implement the air quality review recommendations for increasing monitoring across the District, meeting the aims and objectives of the Climate Change and Cycling strategy through the respective action plans and development of an Air Quality Strategy. These would include promotion of low emission transport, communication with local businesses and members of the public to adopt low emission and sustainable travel and development.

Braintree District Council's priorities for the coming year are to continue to monitor emissions and continue to progress with all the measure given in Table A2.2 as part of legal requirements and in cooperation with local stakeholders

The principal challenges and barriers to implementation that Braintree District Council anticipates facing are resource limitations in funding projects and personnel.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Air Quality Monitoring Review	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2023	Local Authority Environmental Health	District Council	NO	Funded	£10k - 50k	Implementation	No AQMA - not quantified	in Braintree District Council	Report complete and recommendations being implemented with focus on producing an AQ strategy	None
2	Electrification of local authority vehicles	Vehicle Fleet Efficiency	Other	2023	2025	District and County local authorities	District Council	NO	Funded	£50k - £100k	Implementation	No AQMA - not quantified	n/a	In progress as part of climate change commitments	n/a
3	Implementation of priority cycling routes	Promoting Low Emission Transport	Other	2023	2026	District and County local authorities	ECC	NO	Funded	£50k - £100k	Implementation	No AQMA - not quantified	n/a	Commenced construction	None
4	Planning considerations specific to AQ impact assessment and mitigation (e.g provision of EV charging points and measures/site design to offset adverse impact)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2021	2040	District local authority	District LA	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Implemented through local planning and transport cooperation. In 2023 BDC Planning Authority introduced a Sustainability Statement Guidance Note for developers of residential property which also promotes sustainable travel at the design stage and provision of electric charging points.	None

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
5	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	2012	2040	District Local Authority	District Local Authority	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Climate annual action plan to reinforce this	None
6	Provision of travel plans through planning process	Alternatives to private vehicle use	Workplace Travel Planning	2020	2040	Local Authority Environmental Health, Local Authority Transport Dept	Local Authority	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Implemented through local Planning and transport authority cooperation	None
7	Enforcement and inspection of polluting industry and emissions to air through environmental permitting and statutory nuisance legislation	Environmental Permits	Other measure through permit systems and economic instruments	2012	2040	Local Authotity Environmental Health	Local Authority	NO	Funded	£10k - 50k	Implementation	No AQMA - not quantified	n/a	Actively enforced	None
8	Biomass/combustion chimney height assessments	Environmental Permits	Other measure through permit systems and economic instruments	2018		Local Authority Environmental Health	Local Authority	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Actively enforced	
9	Implementation of climate change strategy	Other	Other	2021	2030	Local Authority Climate Change	Local Authority	NO	Partially Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Actively promoted - key BDC pririty	
10	Live well campaign	Alternatives to private vehicle use	Other	2017	2023	District Local Authority	District Local Authority	NO	Funded	£10k - 50k	Implementation	No AQMA - not quantified	n/a	Actively promoted walking/cycling for health since 2017 now being promoted through BDC Climate Change and cycling strategies	Public hesitancy to adopt different lifestyle
11	Routine attendance of Essex Air Quality Consortium (derivation of Essex wide policy)	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2012	2040	Local Authority Environmental Health	District Local Authority	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Four times per year	None
12	Adopted road traffic act powers to require switching off of engines	Traffic Management	Anti-idling enforcement	2017	2040	Local Authority Environmental Health	Distrcit Local Authority	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Public Information tool e.g. school talks	Supported by Cliimate Change Action Plan

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
13	Review of Licensing Policies to create greener fleet of taxis in The District	Promoting Low Emission Transport	Taxi Licensing conditions	2021	2040	Local Licensing Authority	BDC	NO	Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Implementation ongoing	Supported by Cliimate Change Action Plan
14	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	2012	2030	BDC	BDC	NO	Partially Funded	< £10k	Implementation	No AQMA - not quantified	n/a	Implementation ongoing	Part funded by vehicle users
15	The Council will continue to promote alternatives to domestic bonfires and responsible waste management.	Public Information	Via the Internet	2023	2024	BDC	BDC	NO	Funded	£50k - £100k	Completed	No AQMA - not quantified	n/a	Promoted	provision of greenwaste collection schemes promoted - charged scheme so persons may burn as alternative
16	School Travel Plans	Public Information	Via the Internet	2020		BDC/ECC	BDC/ECC	NO	Funded	£10k - 50k	Implementation	No AQMA - not quantified	n/a	Promoted	Supported by Cliimate Change Action Plan
17	Public electric charging points in all BDC owned car parks and nnuali ECC to increase electric charging infrastructure on streets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	2030	Local Authority	OLEV	NO	Funded	£100k - £500k	Implementation	No AQMA - not quantified	n/a	Promoted as climate change action plan initiative	Supported by Cliimate Change Action Plan
18	Climate change Action - installing solar panels on its existing estate and any new buildings	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	2030	Local Authority	Local Authority	NO	Funded		Implementation	No AQMA - not quantified	n/a	Implementation onging - will be reviewed - in excessf 0.5MW	Supported by Cliimate Change Action Plan
19	Climate Change Action - boiler replacements including from solid fuel boilers to A rated boilers	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	2030	Local Authority	Local Authority	NO	Funded		Implementation	No AQMA - not quantified	n/a	Implementation ongoing as part of Climate Change Action Plan	Supported by Cliimate Change Action Plan

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
20	Climate Change Action - facilitating schemes for reduced gas/oil use such as Air source heat pumps	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	2030	Local Authority	Eco/Green grants	NO	Funded		Implementation	No AQMA - not quantified	n/a	implementation ongoing as part of Climate Change Action Plan	Supported by Cliimate Change Action Plan
21	Climate Change Action - developed its I-Construct flagship building to provide an exemplar of sustainable development and encourage developers to build to high sustainable standards.	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021	2030	Local Authority	Local Authority	NO	Funded		Completed	No AQMA - not quantified	n/a	Implementation ongoing as part of Climate Change Action Plan	Supported by Cliimate Change Action Plan

2.2 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Braintree District Council is taking the following measures to address $PM_{2.5}$:

LAQM-TG22-August-22-v1.0 provides guidance on Local Action to Reduce $PM_{2.5}$

2.83 For the effective targeting of local action to help reduce $PM_{2.5}$ concentrations, it is important to first understand the source apportionment to total PM2.5. Although this will vary by location, and it is acknowledged that there will be limited local $PM_{2.5}$ source apportionment studies (if any), consideration should be given to taking action that will address $PM_{2.5}$ associated with the following:

• Primary $PM_{2.5}$ Sources (approximately 50% of UK total)35 . Comprising man made emissions from combustion (industrial processes and road traffic exhausts) and non-combustion processes (e.g. fugitive emissions from agricultural and industrial material handling; non-exhaust emissions from vehicles - tyre and brake wear, and road abrasion);

and • Secondary $PM_{2.5}$ Sources (approximately 50% of UK total)35 . Not all of the particulate matter found in the atmosphere has been directly emitted into the atmosphere by man-made sources. Secondary $PM_{2.5}$ is formed by natural and transboundary sources.

2.84 To assist local authorities, the Action Toolbox of AQAP measures provided in ‘ LAQM Action Toolbox’ and measures available on the Air Quality Hub indicate the measures that will likely be beneficial to reducing $PM_{2.5}$ levels (in addition to other pollutants).

Local authorities may already be implementing some of these measures to address other pollutants such as PM_{10} and NO_x. Local authorities should therefore review any existing measures already currently being implemented to determine whether they are already taking positive action to reduce $PM_{2.5}$ emissions;

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

In 2023 report the following measures were considered and details have been updated in Table 2.2 Such measures might include

1) assessment of bus fleet operating in local area and improvements to exhaust systems/updating fleet. There is a small mini bus company operating directly from the Gridserve (one of few all electric charging forecourt in England) at Great Notley. This is reported in Essex County Council's sustainability transport plan. Such models could be replicated as charging infrastructure increases.

2) car sharing schemes (promotion of essexcarshare.com which is an essex wide scheme already active)

3) development planning (building in sustainable/active travel/heat sources) – this is done as a standard procedure within development planning b BDC Planning sustainabilty statement Guidance

4) promoting active travel –(aside from point 3) through cycling strategy of Braintree District Council involves liaison with Essex Highways Authority to increase the cycle lane network/routes. Essex County Council local sustainable travel strategy for Braintree

5) liaising with transport intensive businesses (Braintree District Council has a number of industrial estates within its area and will consider means of improving liaison). Braintree District's Climate Change Officer has liaised directly with a small number of transport businesses in the past year (2023) to promote sustainable fuel. Whilst this may not lead to the electrification of goods vehicles, the use of cleaner non- fossil fuels such as hydrogenated vegetable oil can reduce particulate emissions. For its own fleet then BDC has added six Euro 6 vehicles to its own fleet to replace older refuse vehicles and has rechargeable electric bin lifts to reduce overall combustion emissions with investment in charging infrastructure secured.

6) Anti idling education campaign outside schools (Essex Council Council has carried out a campaign during 2023 in a number of schools in Essex to educate and promote behavioural change including one in Braintree District). Braintree District Council is looking to progress its own campaign to link to indoor air quality in schools which can be linked to outdoor air pollution.

Through actions like those given above as included within Table 2.2 to address NO_2 and PM_{10} from vehicle emissions then this will lead to some reduction in $PM_{2.5}$.

For other sources such as burning, construction sites and industrial processes then localised enforcement by Braintree District Council through statutory nuisance, environmental permitting, smoke and waste control regimes seeks to prevent emissions at source.

It is also appropriate to note that 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 and Braintree District Council recognises that reduction in air pollutants is a proactive requirement alongside Climate change and other environmental initiatives.

The Public Health Outcomes Framework introduced a $PM_{2.5}$ indicator "fraction of adult mortality attributed to particulate air pollution'. In the last reported period (2023) the information for Braintree as shown below indicates that the level is 5.39%. This is comparable to the East of England region average of 5.47% and England at 5.50% as found at Public Health Outcomes Framework at the gov.uk website and as shown in graphical form below in Fig 2.1 against the England data.

Fig 2.1 The Public Health Outcomes Framework – $PM_{2.5}$ indicator "fraction of adult mortality attributed to particulate air pollution.

During 2021 then the indicator would be influenced by behavioural changes in vehicle use and COVID measures in place such as mask wearing and restrictions on movement.

From the Defra Background Mapping Resource the maximum background annual mean $PM_{2.5}$ concentration is 11.5 µg/m_3. Of the 617 grid square (1km) for the district referenced to 2022 then two are greater than 11 µg/m_3, seven are greater than 10 µg/m_3 and the rest range from 8.5 to 10 µg/m_3.

Braintree District Council does not have any smoke control areas within its district and as in previous years will continue to limit particulate emissions through industrial process regulation, waste enforcement, prevention of burning through education and 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 also reduce emissions from brakes and tyres.

Braintree District Council will continue to review air quality and focus on reducing and preventing air pollution (including $PM_{2.5}$) through the planning regime, air pollution and regulatory control, traffic management with Highways assistance and various local initiatives to promote behavioural change shown in Table 2.1

The air quality monitoring review to be produced in 2023 will inform Braintree District Council's $PM_{2.5}$ monitoring strategy.

LAQM-TG22-August-22-v1.0 provides guidance on *Local Action to Reduce $PM_{2.5}$*

2.83 For the effective targeting of local action to help reduce $PM_{2.5}$ concentrations, it is important to first understand the source apportionment to total $PM_{2.5}$. Although this will vary by location, and it is acknowledged that there will be limited local $PM_{2.5}$ source apportionment studies (if any), consideration should be given to taking action that will address $PM_{2.5}$ associated with the following:

• *Primary $PM_{2.5}$ Sources (approximately 50% of UK total)35 . Comprising man made emissions from combustion (industrial processes and road traffic exhausts) and non-combustion processes (e.g. fugitive emissions from agricultural and industrial material handling; non-exhaust emissions from vehicles - tyre and brake wear, and road abrasion);*

and • *Secondary $PM_{2.5}$ Sources (approximately 50% of UK total)35 . Not all of the particulate matter found in the atmosphere has been directly emitted into the atmosphere by man-made sources. Secondary $PM_{2.5}$ is formed by natural and transboundary sources.*

2.84 To assist local authorities, the Action Toolbox of AQAP measures provided in ' LAQM Action Toolbox' and measures available on the Air Quality Hub indicate the measures that will likely be beneficial to reducing $PM_{2.5}$ levels (in addition to other pollutants).

Local authorities may already be implementing some of these measures to address other pollutants such as PM_{10} and NOx. Local authorities should therefore review any existing measures already currently being implemented to determine whether they are already taking positive action to reduce $PM_{2.5}$ emissions;

Such measures might include

1) assessment of bus fleet operating in local area and improvements to exhaust systems/updating fleet (Braintree District Council has monitored Victoria Street tube

BR6 which is where the Braintree Town Bus Station is situated. There is no evidence of exceedances. ECC has worked with a local minibus company to be based at the electric forecourt in Braintree (A131 Great Notley) as an alternative. The smaller buses to and from the out of town shopping centre still operate as a free service.

2) car sharing schemes (promotion of essexcarshare.com which is an essex wide scheme already active, BDC has 31 active users)
3) development planning (building in sustainable/active travel/heat sources) – this is done as a standard procedure within development planning. A BDC sustainable development planning policy statement was released in 2023.
4) promoting active travel –(aside from point 3) through cycling strategy of Braintree District Council involves liaison with Essex Highways Authority to increase the cycle lane network/routes.In 2023 construction of lanes and speed limit changes in areas of town centres
5) liaising with transport intensive businesses (Braintree District Council has a number of industrial estates within its area and will consider means of improving liaison). BDC has added six Euro 6 vehicles to its own fleet to replace older refuse vehicles and has rechargeable electric bin lifts to reduce overall combustion emissions. (Climate change officer has lised directly with businesses including a larger operator at Earls Colne Business Park.
6) Anti idling education campaign outside schools (Essex Council Council has carried out a campaign during 2022 in a number of schools in Essex to educate and promote behavioural change).

Through actions like those given above and those within Table 2.2 to address NO_2 and PM_{10} from vehicle emissions then this will lead to some reduction in $PM_{2.5}$.

For other sources such as burning, construction sites and industrial processes then localised enforcement by Braintree District Council through statutory nuisance, environmental permitting, smoke and waste control regimes seeks to prevent emissions at source.

It is also appropriate to note that 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 and Braintree District Council recognises that reduction in air pollutants is a proactive requirement alongside Climate change and other environmental initiatives.

The Public Health Outcomes Framework introduced a $PM_{2.5}$ indicator "fraction of adult mortality attributed to particulate air pollution'. In the last reported period (2022) the information for Braintree as shown below indicates that the level is 6.0%. This is comparable to the East of England region average of 6.2% and for England 5.8%

2022 Fraction of mortality attributable to particulate air pollution

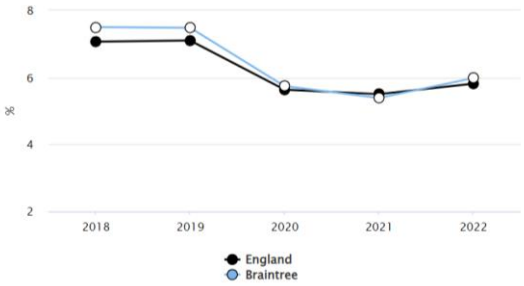
Public Health Outcomes Framework at the gov.uk website and as shown in graphical form below in Fig 2.1 against the England data.

D01 - Fraction of mortality attributable to particulate air pollution (new method)

Proportion - %

Show confidence intervals Show 99.8% CI values

▶ More options



Recent trend: Could not be calculated

Period		Braintree Count	Value	95% Lower CI	95% Upper CI	England
2018	○	-	7.5%	-	-	7.1%
2019	○	-	7.5%	-	-	7.1%
2020	○	-	5.7%	-	-	5.6%
2021	○	-	5.4%	-	-	5.5%
2022	○	-	6.0%	-	-	5.8%

Source: Background annual average PM2.5 concentrations for the year of interest are modelled on a 1km x 1km grid using an air dispersion model, and calibrated using measured concentrations taken from background sites in Defra's Automatic Urban and Rural Network (https://uk-air.defra.gov.uk/interactive-map). By approximating LA boundaries to the 1km by 1km grid, and using census population data, population weighted background PM2.5 concentrations for each lower tier LA are calculated. This work is completed under contract to Defra, as a small extension of its obligations under the Ambient Air Quality Directive (2008/50/EC). Concentrations of total PM2.5 are used for estimating the mortality burden attributable to particulate air pollution (COMEAP, 2022).

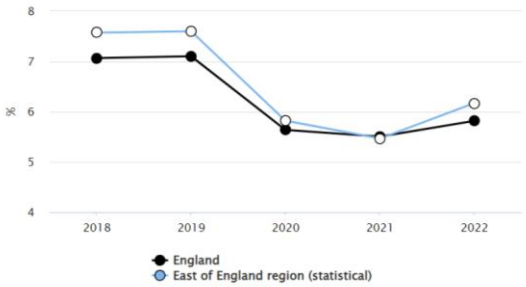
Indicator Definitions and Supporting Information

D01 - Fraction of mortality attributable to particulate air pollution (new method)

Proportion - %

Show confidence intervals Show 99.8% CI values

▶ More options



Recent trend: Could not be calculated

Period		East of England region (statistical) Count	Value	95% Lower CI	95% Upper CI	England
2018	○	-	7.6%	-	-	7.1%
2019	○	-	7.6%	-	-	7.1%
2020	○	-	5.8%	-	-	5.6%
2021	○	-	5.5%	-	-	5.5%
2022	○	-	6.2%	-	-	5.8%

Source: Background annual average PM2.5 concentrations for the year of interest are modelled on a 1km x 1km grid using an air dispersion model, and calibrated using measured concentrations taken from background sites in Defra's Automatic Urban and Rural Network (https://uk-air.defra.gov.uk/interactive-map). By approximating LA boundaries to the 1km by 1km grid, and using census population data, population weighted background PM2.5 concentrations for each lower tier LA are calculated. This work is completed under contract to Defra, as a small extension of its obligations under the Ambient Air Quality Directive (2008/50/EC). Concentrations of total PM2.5 are used for estimating the mortality burden attributable to particulate air pollution (COMEAP, 2022).

Indicator Definitions and Supporting Information

Fig 2.1a and b above The Public Health Outcomes Framework – $PM_{2.5}$ indicator “fraction of adult mortality attributed to particulate air pollution.

As expected there is an increase in the indicator value for 2022 as England emerges from CoVid restrictions on movement and compulsory.

From the Defra Background Mapping Resource the maximum background annual mean PM2.5 concentration is 11.5 µg/m3. Of the 617 grid square (1km) for the district referenced to 2022 then two are greater than 11 µg/m^3, seven are greater than 10 µg/m^3 and the rest range from 8.5 to 10 µg/m^3.

Braintree District Council does not have any smoke control areas within its district and as in previous years will continue to limit particulate emissions through industrial process regulation, waste enforcement, prevention of burning through education and 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 also reduce emissions from brakes and tyres.

Braintree District Council will continue to review air quality and focus on reducing and preventing air pollution (including $PM_{2.5}$) through the planning regime, air pollution and regulatory control, traffic management with Highways assistance and various local initiatives to promote behavioural change shown in Table 2.1

The air quality monitoring review approved in 2023 recommends positioning of three low cost sensors in 2024 to help inform Braintree District Council’s $PM_{2.5}$ monitoring strategy.

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

This section sets out the monitoring undertaken within 2023 by Braintree District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Braintree District Council has no automatic monitoring sites using referenced methods but has acquired three low cost air quality sensors in 2024 to provide indicative air pollutant concentrations at sites to be agreed.

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Non-Automatic Monitoring Sites

Braintree District Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 20 sites during 2023. Table A.1 in Appendix A presents the details of the non-automatic 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 (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

In Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant. It shall be noted that Diffusion Tube reference BR14 has not been corrected as this is a pavement/kerbsite site at the junction of Head Street and Colchester Road in Halstead and is to assess possible exceedance of the short term objective for NO_2 indicated by the annual mean value being greater than 60µg/m^3. At an annual average for 2023 of 43.3µg/m^3 at site BR14 then the short term objective relevant to pedestrians has not been exceeded.

3.2.2 Particulate Matter (PM_{10})

Braintree District Council does not undertake particulate matter monitoring but does propose to undertake indicative assessment using low cost sensors in 2024.

Appendix A: Monitoring Results

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BR1	Blandford House Braintree	Roadside	575600	222900	NO_2	n/a	6.0	1.2	No	2.0
BR3	A12 Foxden Rivenhall	Roadside	583859	216497	NO_2	n/a	19.0	2.0	No	1.8
BR4	Beckers Green Road Braintree	Urban Background	577800	222500	NO_2	n/a	12.2	8.3	No	2.0
BR5	Chipping Hill Witham	Roadside	582002	215111	NO_2	n/a	7.0	2.0	No	1.9
BR6	Victoria Street Braintree	Roadside	576204	222958	NO_2	n/a	4.0	2.0	No	2.0
BR7	Stilemans Wood Braintree	Roadside	577680	221964	NO_2	n/a	20.0	9.0	No	1.8
BR9	A12 Rivenhall Hotel	Roadside	583891	216467	NO_2	n/a	10.0	1.5	No	1.8
BR11	High St Kelvedon	Roadside	586386	219106	NO_2	n/a	0.0	3.5	No	1.9
BR12	A120 The Swan Bradwell	Roadside	580625	223115	NO_2	n/a	11.7	2.9	No	1.8
BR13	Bridge Street Witham	Roadside	581851	214151	NO_2	n/a	0.0	1.0	No	1.9

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BR14, NC1, NC2	Head Street Halstead	Kerbside	581542	230738	NO_2	n/a	N/A	0.7	No	1.9
BR16, NC3, NC4	Corner of Head St/Sudbury Road Halstead	Roadside	581564	230742	NO_2	n/a	1.4	1.0	No	1.9
BR17	Oswicks Head St Halstead	Kerbside	581530	230731	NO_2	n/a	N/A	1.0	No	1.9
BR18	Hedingham Road Halstead	Kerbside	581471	230711	NO_2	n/a	N/A	0.5	No	1.9
BR20	33 Head Street Halstead	Roadside	581586	230775	NO_2	n/a	0.0	2.3	No	1.9
BR21	Collingwood Road Witham	Roadside	582143	214630	NO_2	n/a	1.0	2.6	No	1.9
BR22	60 Avenue Road Witham	Roadside	582033	215081	NO_2	n/a	0.0	8.7	No	1.8
BR24	14 St Michaels Road Braintree	Roadside	575611	222892	NO_2	n/a	0.0	5.0	No	1.9
BR25	Corner Maldon Road/The St Hat Pev	Roadside	579402	211916	NO_2	n/a	6.0	3.0	No	1.9
BR26	The Street Hat Pev	Roadside	578823	211654	NO_2	n/a	0.0	3.0	No	1.8

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 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
BR1	575600	222900	Roadside	100	100.0	29.4	23.6	23.0	22.1	19.9
BR3	583859	216497	Roadside	100	100.0	**45.8**	37.2	33.8	33.6	30.4
BR4	577800	222500	Urban Background	100	100.0	16.6	12.7	13.3	13.3	11.0
BR5	582002	215111	Roadside	100	100.0	39.1	32.3	30.9	33.2	30.6
BR6	576204	222958	Roadside	100	100.0	21.4	16.9	18.5	17.6	13.3
BR7	577680	221964	Roadside	100	100.0	27.8	21.5	19.5	24.7	19.2
BR9	583891	216467	Roadside	100	100.0	35.5	26.6	27.9	33.6	22.6
BR11	586386	219106	Roadside	100	100.0	22.1	17.2	18.0	19.9	16.5
BR12	580625	223115	Roadside	100	100.0	27.3	20.9	22.0	22.0	18.9
BR13	581851	214151	Roadside	100	100.0	32.9	28.2	26.3	30.1	27.2
BR14, NC1, NC2	581542	230738	Kerbside	100	100.0	**56.8**	**47.6**	**45.0**	**49.1**	**43.3**

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
BR16, NC3, NC4	581564	230742	Roadside	100	100.0	**44.1**	35.2	36.3	39.3	33.5
BR17	581530	230731	Kerbside	100	92.3	**42.3**	32.6	33.6	36.5	32.1
BR18	581471	230711	Kerbside	100	100.0	33.0	24.1	27.3	28.0	26.6
BR20	581586	230775	Roadside	100	100.0	37.5	30.6	31.7	34.5	33.4
BR21	582143	214630	Roadside	100	100.0	28.2	20.0	24.1	22.3	19.4
BR22	582033	215081	Roadside	100	100.0	24.0	19.5	18.9	20.6	17.9
BR24	575611	222892	Roadside	100	100.0			25.0	21.3	18.2
BR25	579402	211916	Roadside	100	100.0			28.0	24.7	21.1
BR26	578823	211654	Roadside	100	100.0			27.8	26.1	21.8

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **Diffusion tube data has been bias adjusted**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as µg/m^3.

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

Figure A.1a – Trends in Annual Mean NO_2 Concentrations in Braintree town 2019 to 2023

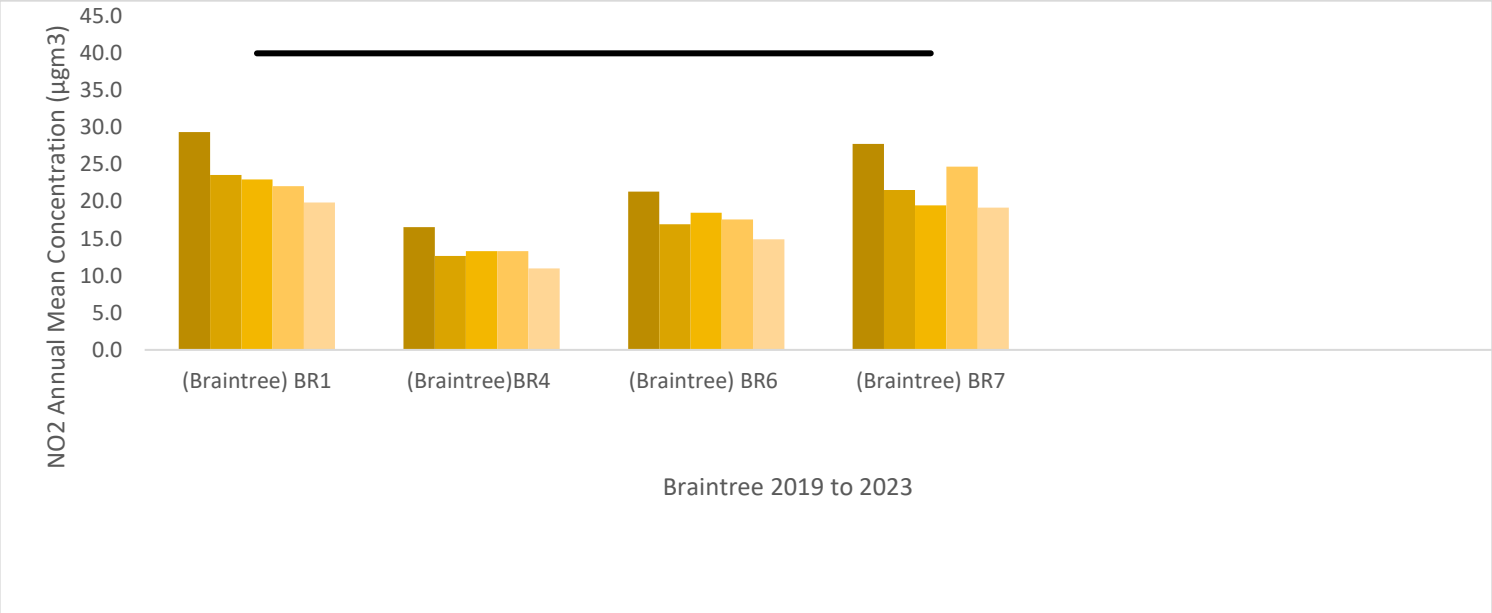


Figure A.1b – Trends in Annual Mean NO_2 Concentrations in Witham town 2019 to 2023

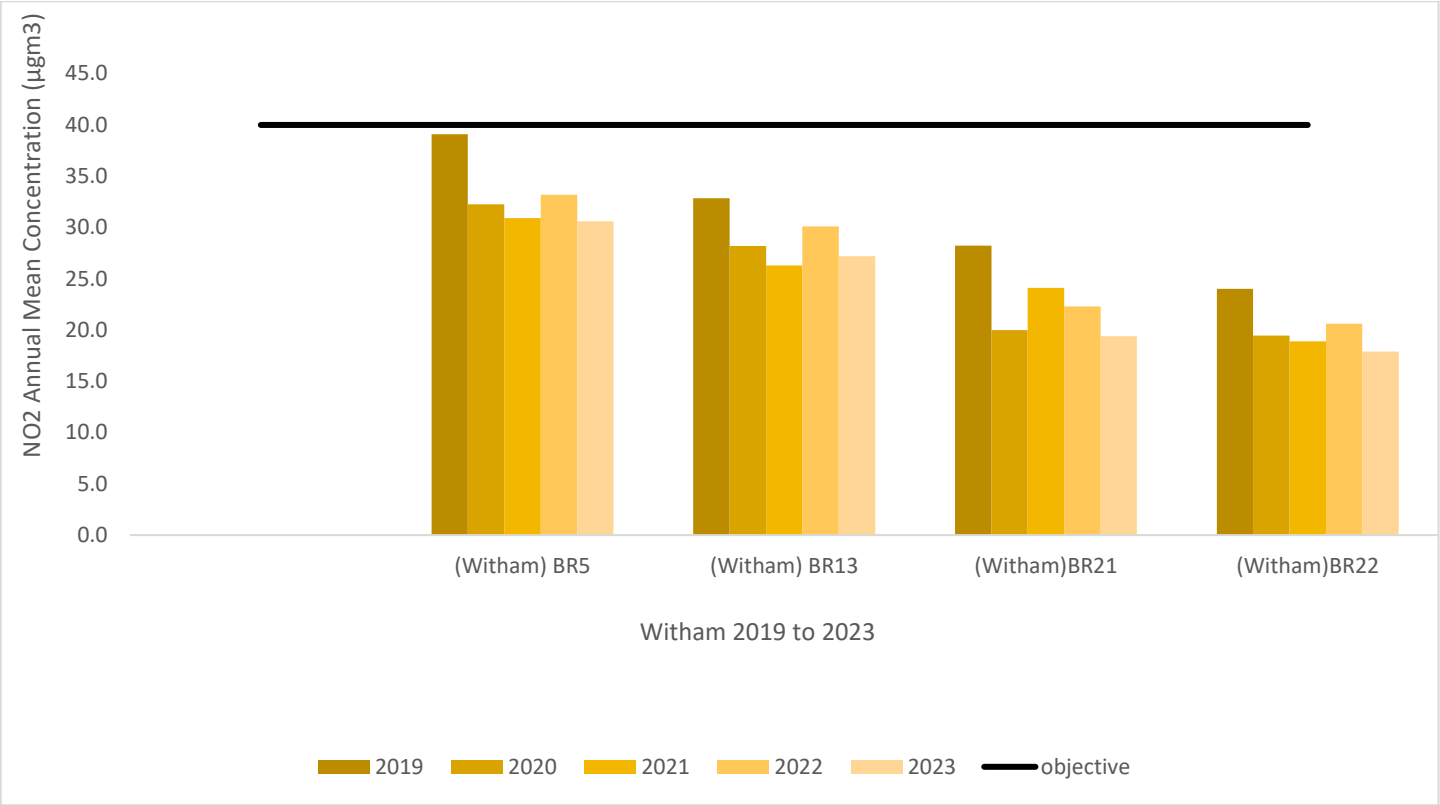


Figure A.1c – Trends in Annual Mean NO_2 Concentrations in Halstead town 2019 to 2023

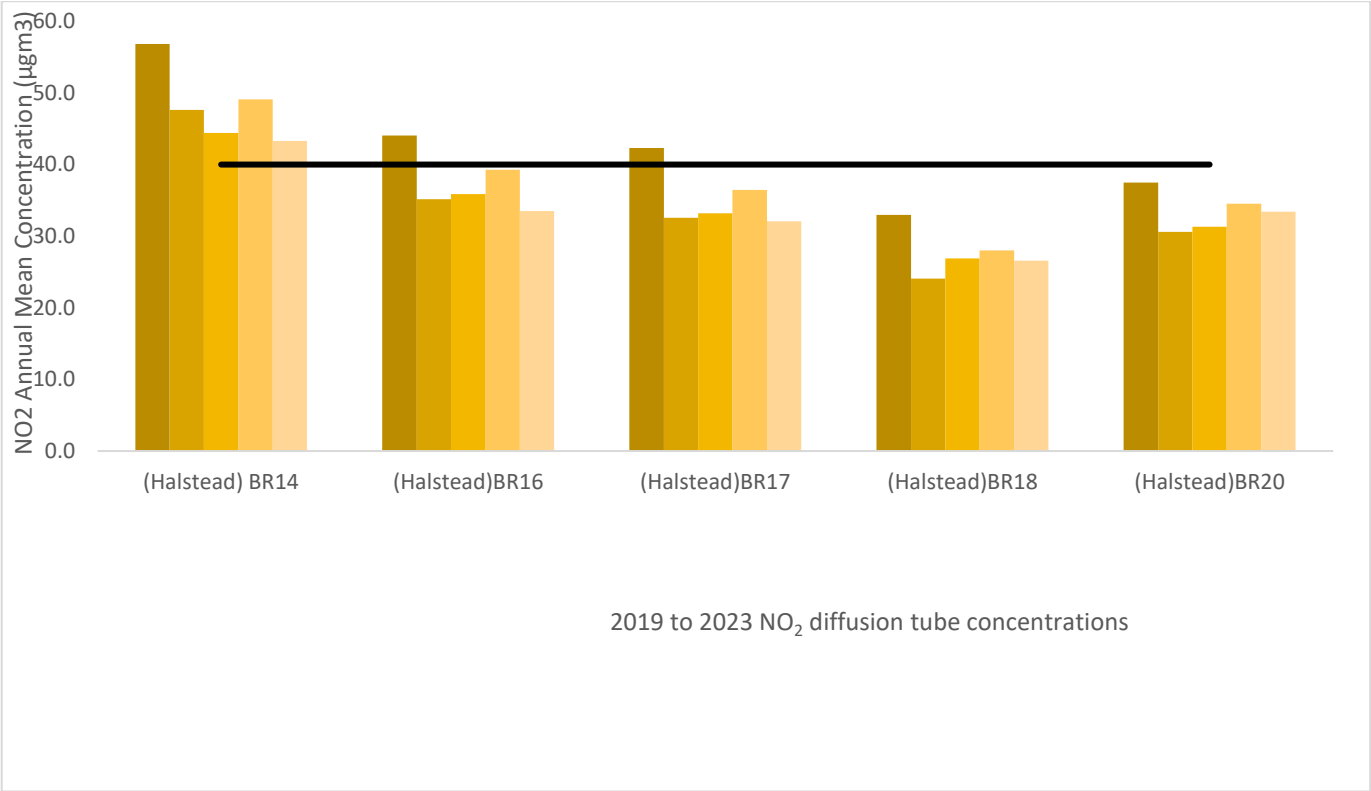
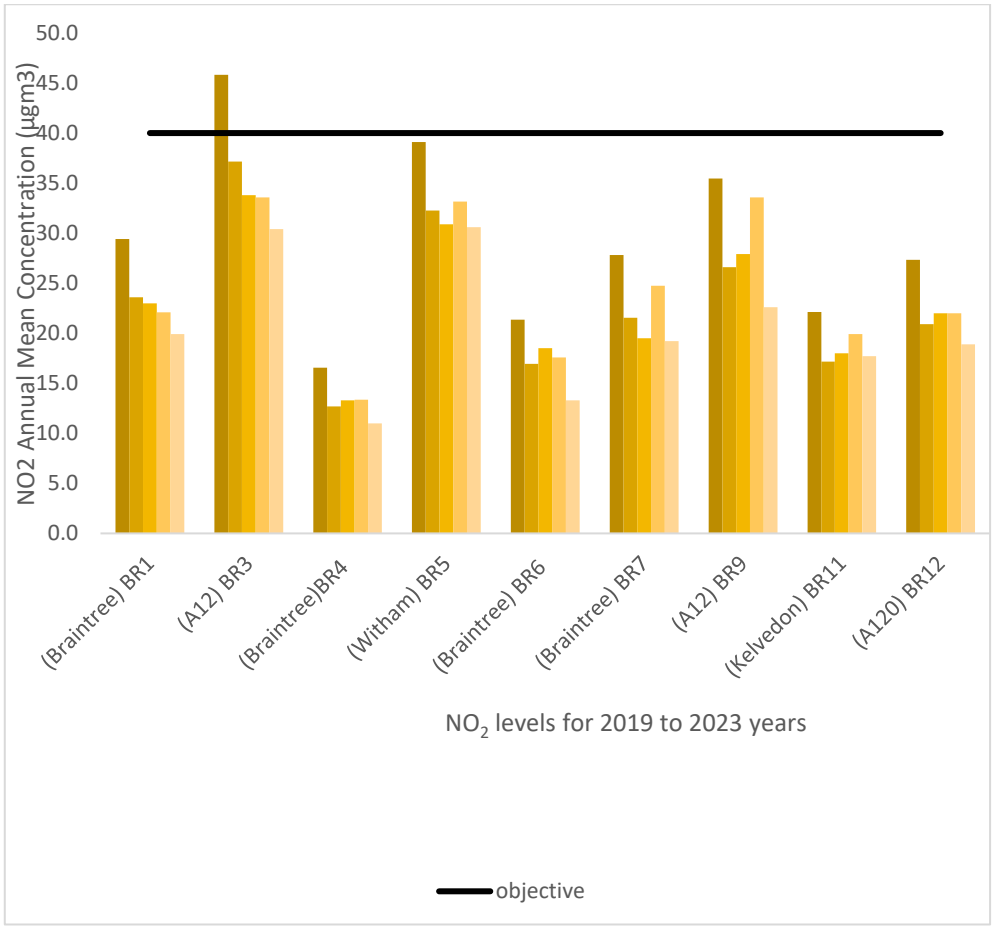


Figure A.1d – Trends in Annual Mean NO_2 Concentrations in areas outside main towns 2019 to 2023


50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
NO2 Annual Mean Concentration (µgm3)
(Braintree) BR1
(A12) BR3
(Braintree)BR4
(Witham) BR5
(Braintree) BR6
(Braintree) BR7
(A12) BR9
(Kelvedon) BR11
(A120) BR12
NO2 levels for 2019 to 2023 years
objective

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
BR1	575600	222900	31.3	34.5	27.6	22.3	21.3	21.6	18.0	25.7	23.7	30.4	31.4	22.9	25.9	19.9	-	
BR3	583859	216497	41.1	37.5	44.3	32.4	26.3	32.9	41.9	42.4	45.6	54.1	46.4	28.9	39.5	30.4	-	
BR4	577800	222500	20.7	11.0	16.9	11.8	8.6	15.4	9.6	11.8	15.0	20.7	17.4	12.8	14.3	11.0	-	
BR5	582002	215111	45.6	46.7	39.1	36.5	32.3	31.5	40.3	38.5	39.1	44.5	49.0	34.3	39.8	30.6	-	
BR6	576204	222958	24.5	26.2	-	20.0	15.9	-	14.6	15.2	19.2	27.0	14.5	17.0	19.4	14.9	-	
BR7	577680	221964	29.4	31.1	27.7	25.7	14.6	18.5	17.8	22.7	29.8	32.6	23.6	25.4	24.9	19.2	-	
BR9	583891	216467	35.8	13.7	33.7	31.8	29.8	23.2	22.8	29.4	28.4	36.6	35.9	31.4	29.4	22.6	-	
BR11	586386	219106	28.1	31.6	23.9	19.0	21.5	20.3	17.0	20.9	23.6	26.4	Too low	20.7	23.0	17.7	-	
BR12	580625	223115	30.3	28.1	20.8	24.0	22.6	21.9	20.7	25.5	26.9	32.6	21.6	19.6	24.6	18.9	-	
BR13	581851	214151	39.6	38.9	39.2	39.9	34.0	37.8	32.8	34.6	33.8	39.9	25.3	28.3	35.3	27.2	-	
BR14	581542	230738	65.2	55.8	57.0	58.4	60.8	59.5	49.6	48.7	63.5	65.9	37.7	38.6	-	**-**	-	Triplicate Site with BR14, NC1 and NC2 - Annual data provided for NC2 only
NC1	581542	230738	59.1	52.2	45.4	48.6	55.9	56.7	46.2	61.7	65.1	67.2	58.2	42.6	-	**-**	-	Triplicate Site with BR14, NC1 and NC2 - Annual data provided for NC2 only
NC2	581542	230738	66.0	60.9	55.8	59.2	63.4	65.7	54.1	57.6	59.0	65.6	54.8	43.8	56.3	**43.3**	-	Triplicate Site with BR14, NC1 and NC2 - Annual data provided for NC2 only
BR16	581564	230742	17.1	48.6	43.0	43.2	41.8	46.2	38.7	44.3	48.3	52.8	34.6	31.1	-	**-**	-	Triplicate Site with BR16, NC3 and NC4 - Annual data provided for NC4 only
NC3	581564	230742	38.0	37.0	49.3	48.5	45.1	50.5	37.8	44.0	49.0	52.6	missing	39.5	-	**-**	-	Triplicate Site with BR16, NC3 and NC4 - Annual data provided for NC4 only
NC4	581564	230742	50.5	51.9	51.2	45.7	41.9	50.4	43.6	42.6	51.0	54.3	32.2	35.0	43.5	33.5	-	Triplicate Site with BR16, NC3 and NC4 - Annual data provided for NC4 only
BR17	581530	230731	40.2	47.3	39.3	43.2	43.7	43.7	missing	44.0	49.8	49.9	36.3	20.6	41.6	32.1	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
BR18	581471	230711	36.0	40.9	32.2	37.8	41.4	40.5	27.1	31.6	31.5	36.9	36.7	21.3	34.5	26.6	-	
BR20	581586	230775	46.5	53.7	45.8	36.2	44.3	39.7	43.4	40.8	42.2	49.1	44.4	34.8	43.4	33.4	-	
BR21	582143	214630	32.1	25.7	27.4	27.2	21.8	19.0	17.7	22.1	24.8	33.0	31.0	21.0	25.2	19.4	-	
BR22	582033	215081	26.9	27.3	25.3	20.1	18.2	17.6	20.0	21.9	23.5	27.3	30.4	20.5	23.3	17.9	-	
BR24	575611	222892	30.5	31.8	26.6	22.1	21.9	21.0	17.5	26.5	22.8	28.9	26.3	Too low	25.1	19.3	-	
BR25	579402	211916	32.6	36.2	28.4	25.6	25.4	27.0	21.7	24.8	27.1	34.2	22.5	23.4	27.4	21.1	-	
BR26	578823	211654	28.4	37.0	16.9	29.5	26.5	24.6	25.3	27.8	26.6	35.4	33.2	27.9	28.3	21.8	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 .**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column.**

☒ **Braintree District Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Braintree District

The Horizon 120 project to the west of A131 next to the Great Notley residential area is operational and building continues to construct new business and industrial units on the site. Air quality assessment submitted with the planning permission do not indicate any risk of breaching the AQ objective levels.

The Rivenhall Integrated waste management site which has historic planning permission from Essex County Council to process 600000 tonnes of waste per annum including burning of refuse derived fuel has commenced construction during 2023. There is concern about the potential increase in HDV movements on the A120 if it reaches maximum capacity throughput levels. The quarry haul road entrance on A120 is 500m from the residential properties fronting the A120 at Bradwell. This will be reviewed in more detail in 2024.

The widening scheme to the A12 to the south of the Braintree District has received planning consent although is subject to judicial review. The assessment of air quality did not predict exceedances of air quality objectives within the Braintree District area due to the widening works nor as a consequence of the finished scheme.

Additional Air Quality Works Undertaken by Braintree District Council During 2023

To assist in producing an air quality strategy a review of monitoring was undertaken by Ricardo Energy and Environment, a reputable Air Quality consultant to

1) Review the current air quality methodology in place in the District of Braintree

2) Provide an Options Appraisal Report for future Air Quality Methodologies

The main recommendations from the review are:

• Monitoring focused in the three main towns and on busy roads continues.

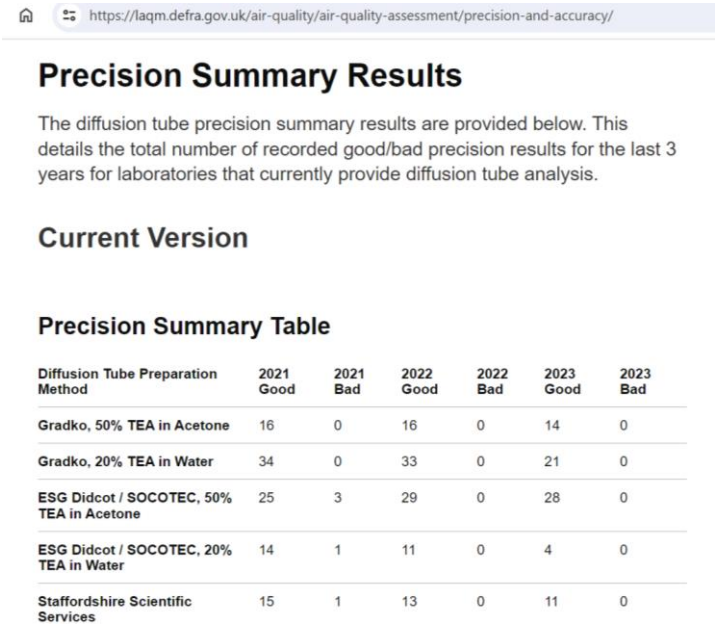
• Initial screening assessments continue to be undertaken for areas where the traffic is expected to increase significantly due to development. This would include larger residential development sites and a continuing review in the progress of the Integrated Waste management site at Rivenhall which has commenced construction where traffic access and exit points are in to the A120 close to Bradwell village.

Braintree District Council is accepting of the conclusions of the report at senior management and cabinet level and will increase the diffusion tubes in the area to assess not only potential exceedances but to assess air pollution levels in residential areas. Three low cost sensors will be purchased and located to support Braintree District Council's assessment of air pollutant levels in the district and to maintain good air quality within the district in the vicinity of areas of significant development e.g Proposed Rivenhall Integrated Waste Management site, A12 widening scheme (currently under judicial review) and other locations with potential for significant increase over time due to permitted planned development.

QA/QC of Diffusion Tube Monitoring

The supplier of diffusion tubes used throughout 2023 was Socotec (Didcot) using a 50% TEA in acetone. Precision information on the LAQM website - LAQM precision data including Socotec

indicates good precision accuracy for a high number of test results.


https://laqm.defra.gov.uk/air-quality/air-quality-assessment/precision-and-accuracy/

Precision Summary Results

The diffusion tube precision summary results are provided below. This details the total number of recorded good/bad precision results for the last 3 years for laboratories that currently provide diffusion tube analysis.

Current Version

Precision Summary Table

Diffusion Tube Preparation Method	2021 Good	2021 Bad	2022 Good	2022 Bad	2023 Good	2023 Bad
Gradko, 50% TEA in Acetone	16	0	16	0	14	0
Gradko, 20% TEA in Water	34	0	33	0	21	0
ESG Didcot / SOCOTEC, 50% TEA in Acetone	25	3	29	0	28	0
ESG Didcot / SOCOTEC, 20% TEA in Water	14	1	11	0	4	0
Staffordshire Scientific Services	15	1	13	0	11	0

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC

Standards and supported by the Health and Safety Executive (HSE). AIR PT is a new scheme, started in April 2014, which combined two long running PT schemes: LGC Standards STACKS PT scheme and HSE WASP PT scheme. The AIR PT scheme uses laboratory spiked Palmes type diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis and continues the format used in the preceding WASP PT scheme. The latest results up to August 2023 are shown below and shows 100% satisfactory analysis results for Socotec. Source address is [Summary of Laboratory Performance in AIR NO_2 Proficiency Testing Scheme (July

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR045, 46, 49, 50, 52, 53, 55, 56 and 58

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

AIR PT Round	AIR PT AR045	AIR PT AR046	AIR PT AR049	AIR PT AR050	AIR PT AR052	AIR PT AR053	AIR PT AR055	AIR PT AR056	AIR PT AR058
Round conducted in the period	July – August **2021**	September – October **2021**	January – February **2022**	May – June **2022**	July – August **2022**	September – October **2022**	January – February **2023**	May – June **2023**	July – August **2023**
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	0 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	75 %	NR [2]	50 %	100 %	100 %	100 %	75 %	100 %
SOCOTEC	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	NR [2]	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Gradko International	100 %	100 %	100 %	100 % [1]	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	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]	NR [3]
Lambeth Scientific Services	75 %	75 %	50 %	75 %	100 %	50 %	0 %	75 %	50 %
Milton Keynes Council	100 %	100 %	75 %	100 %	100 %	100 %	50 %	75 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	75 %	100 %	75 %	100 %	100 %	75 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]
Staffordshire County Council, Scientific Services	100 %	100 %	100 %	100 %	0 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [2]	100 %	NR [2]	NR [2]	100 %	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]

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

It shall be noted that some readings appeared erroneous without reasons such as low traffic flows, known roadworks or laboratory errors and are cited as 'too low' in table B.1. These are Victoria Street (5.1µg/m^3 in March 2023, 8.7µg/m^3 in June 2023), Kelvedon 4.4µg/m^3 in November 2023 and St Michaels Road 7.1 µg/m^3 in December 2023 and have been removed when calculating the annual mean (Table B1).

Diffusion Tube Annualisation

There was no requirement to carry out annualisation for any site.

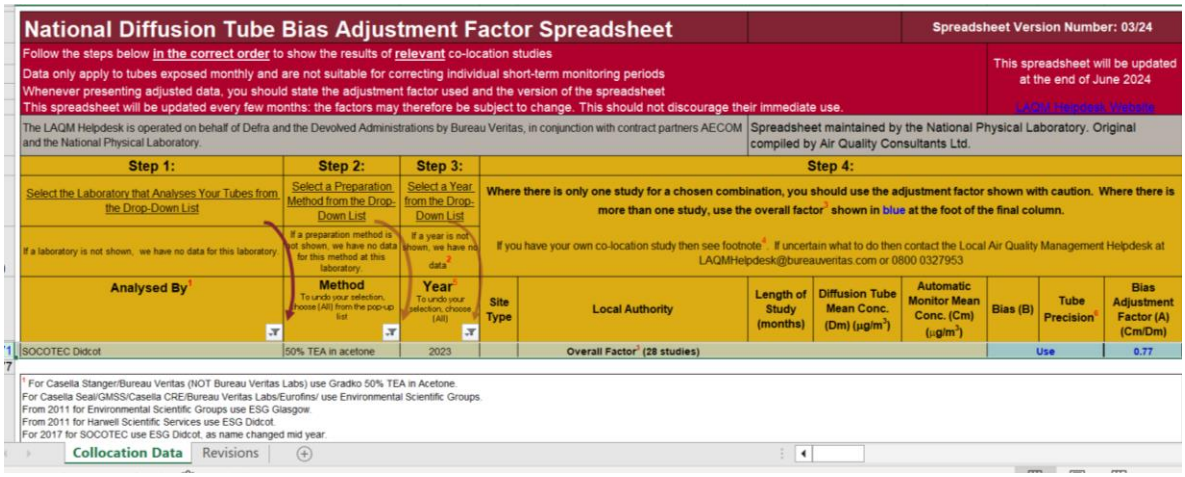
Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2024 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 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.

Braintree District Council have applied a national bias adjustment factor of 0.77 to the 2023 monitoring data. A summary of bias adjustment factors used by Braintree District Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.77
2022	National	03/22	0.76
2021	National	03/21	0.78
2020	National	03/20	0.77
2019	National	03/19	0.75



National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/24

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 2024

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[2] 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[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	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[4]	Bias Adjustment Factor (A) (Cm/Dm)	
SOCOTEC Didcot	50% TEA in acetone	2023		Overall Factor[3] (28 studies)				Use		0.77	

[1] For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone.
For Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins/ use Environmental Scientific Groups.
From 2011 for Environmental Scientific Groups use ESG Glasgow.
From 2011 for Harwell Scientific Services use ESG Didcot.
For 2017 for SOCOTEC use ESG Didcot, as name changed mid year.

Collocation Data | Revisions

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1. This has not been necessary for Braintree District's 2023 results.

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Site

Figure D2.1 – Map of Non-Automatic Monitoring Sites Areas (detailed maps below)

- Denotes area of diffusion tubes with more detail in Figs D.1.2 to 1.7

Fig D.1.2 - NO_2 Diffusion Tube Locations for Braintree Town (central)

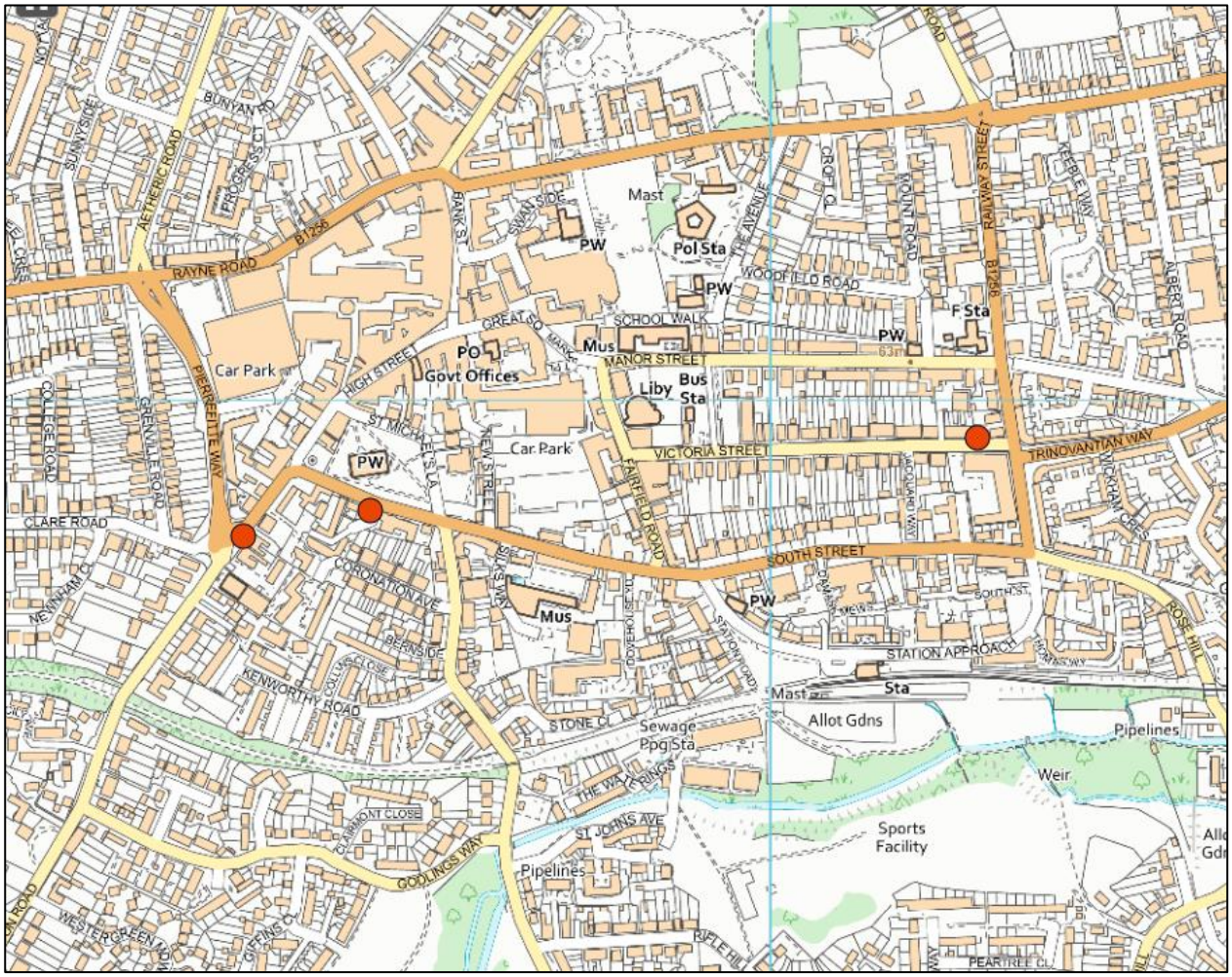


Fig D.1.3 - NO_2 Diffusion Tube Locations for Braintree Town (south east)

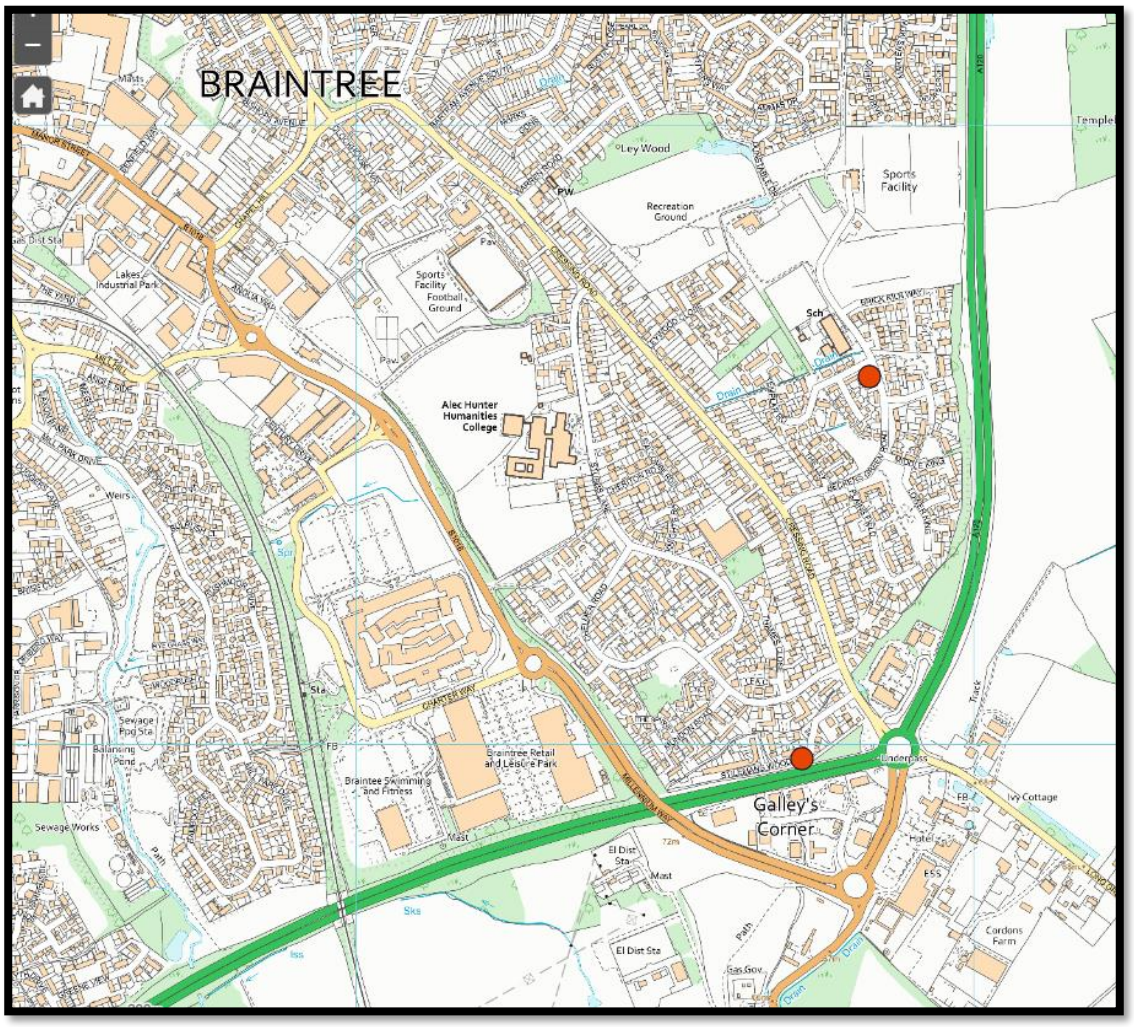


Fig D.1.4 - NO_2 Diffusion Tube Locations for Witham

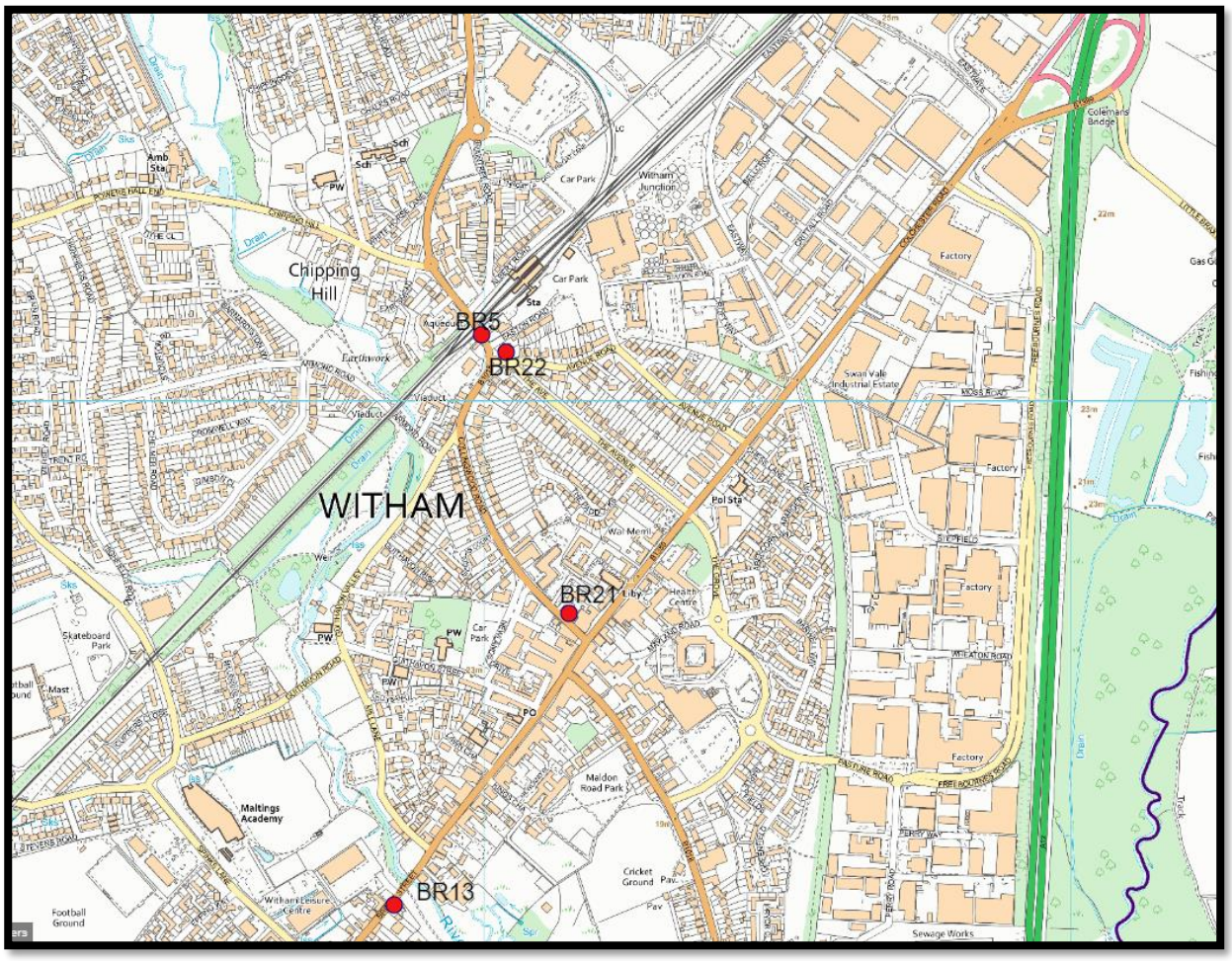


Fig D.1.5 - NO_2 Diffusion Tube Locations for Halstead (overview)

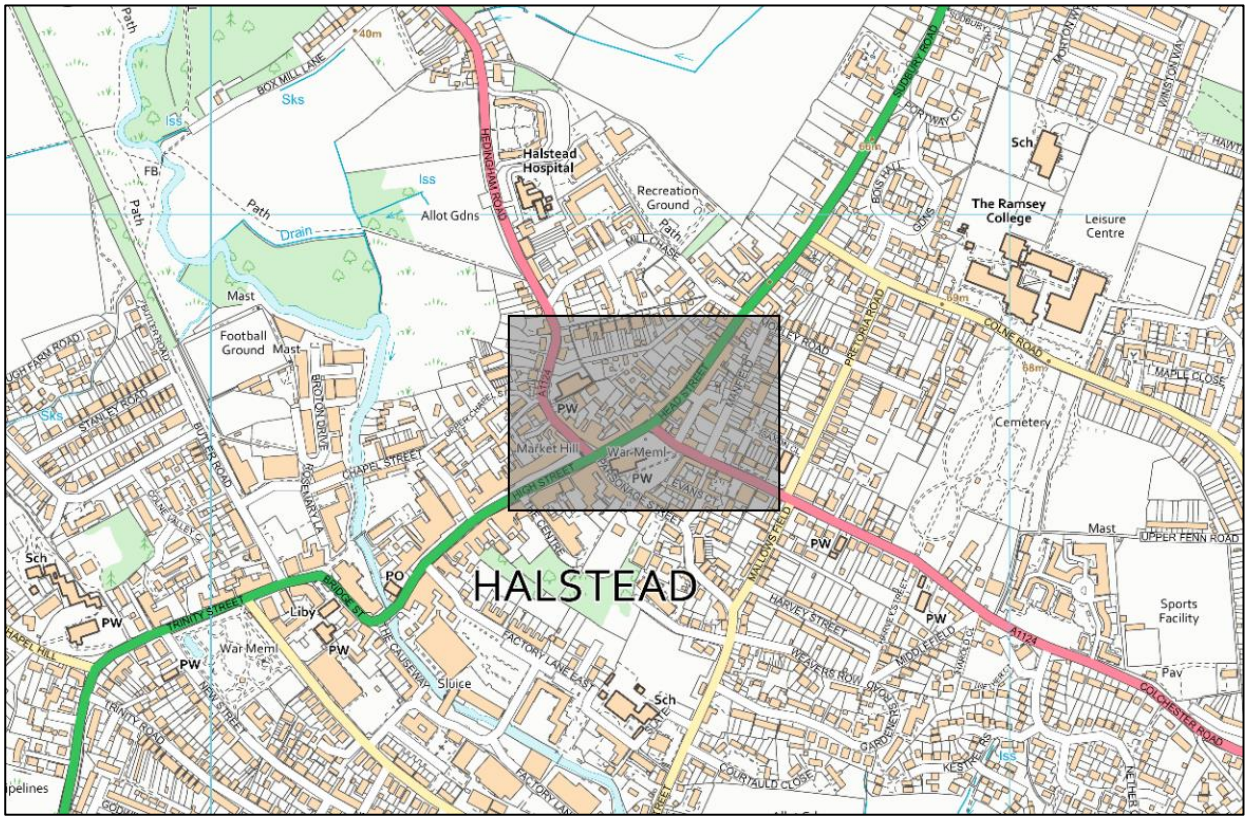


Fig D.1.6 - NO_2 Diffusion Tube Locations for Halstead

Fig D.1.7 - NO_2 Diffusion Tube Locations for Hatfield Peverel

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

[7] 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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
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 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

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. 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.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.