2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: December 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Epping Forest 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 and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The Council continues to monitor air quality across the district, using nitrogen dioxide as the key indicator. Air quality in the district is reasonably good with only small pockets of elevated concentrations of pollution related to vehicle emissions, which are limited to congested high street areas and busy junctions.

The results for 2020 show a significant improvement in nitrogen dioxide concentrations across the district. It is most likely that this improvement is due to the national lockdown initiated by government in response to the COVID-19 pandemic, as these trends have been seen nationally.

The Council retains one small Air Quality Management Area (AQMA) near the B1393 / Theydon Road junction at Epping, Bell Common. The concentration of nitrogen dioxide measured here during 2020 was 32.5µg/m^3, significantly below both the 60µg/m^3 concentration which is used to indicate that the hourly objective is likely to be exceeded, and the 40µg/m^3 annual mean objective. In normal circumstances this would indicate that

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

the Council should consider the revocation of this management area, however as it is expected that traffic volumes will increase following the end of the current pandemic, it is not appropriate to consider such an action at present.

Details of the AQMA, Epping Forest District Council (No.2) can be found at: http://www.essexair.org.uk/AQInEssex/LA/EppingForest.aspx?View=aqma , alternatively a map showing its location can be found in Appendix D of this report.

In January 2020 four additional nitrogen dioxide diffusion tube monitoring locations were set up. Two of these were close to residential receptors in the vicinity of Rectory Lane Loughton, which experiences high volumes of traffic, and the other two were close to Nazeing crossroads, where queuing traffic is commonplace. These locations all reported concentrations well below the annual mean objective concentration during 2020. Monitoring will continue at these locations to ensure that concentrations do not increase significantly once the pandemic is over and normal travel patterns resume.

The Council continues to work with our partners including Essex County Council and the Environment Agency on environmental protection and air quality matters.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

[5] Defra. Clean Air Strategy, 2019

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

Because the single largest influence on air quality in the District is from motor vehicles, the Council is generally reliant on national strategies and vehicle emissions regulations for the improvement of air quality.

Whilst we consider the migration to electric vehicles as crucial to the reduction of nitrogen dioxide, we are also actively encouraging road users to turn their engines off whilst stationary rather than allow their engines to idle. We have produced a number of posters which are being rotated around various hotspots in the district to provide a visual reminder to drivers.

Due to the national lockdown as a result of the COVID-19 pandemic, traffic numbers were greatly reduced for a significant part of the year. The Council took steps to facilitate social distancing of pedestrians in high streets by suspending taxi ranks and placing barriers to widen kerbs where space had been previously used for roadside parking (see photo below). In addition to this, the highways authority reduced the maximum road speed in town centres to 20mph to reduce the likelihood of accidents and therefore further need of nhs resources. This measure is may affect emissions from road traffic where lower speeds enable traffic to maintain constant flow, therefore accelerating and braking less.

Photo: Suspended Taxi rank to enable social distancing and encourage walking in Epping Town Centre

The Council is currently reviewing its Air Quality Action Plan with a view to introducing a new range of measures aimed at reducing concentrations of nitrogen dioxide and particulates, both within the AQMA at Epping Bell Common, and across the district. Measures will be aimed at developing appropriate infrastructure to support the anticipated

increased uptake in electric and plug-in hybrid vehicles, as well as promoting sustainable transport choices by both local businesses and residents. In addition, we are continuing to explore the possibilities of taking steps that will directly improve the traffic flow at the Epping Bell Common AQMA. This report will be produced following the adoption of the Councils Local Plan.

In order to further advance our progress in measures to improve air quality, the Council has employed additional staff: a Sustainable Transport Officer, a Climate Change Officer as well an additional part time Air Quality Officer in Environmental Health.

Conclusions and Priorities

The results from diffusion tube monitoring undertaken show that the annual mean concentration of nitrogen dioxide in the district significantly reduced during 2020 at all locations. As similar trends have been observed nationwide it can be assumed that this is as a direct result of the national lockdown due to the COVID-19 pandemic.

The annual mean concentration at '3.Epping Bell Vue' in the AQMA reduced from 48µg/m^3 in 2019 to 32.5µg/m^3 in 2020. As this reduction in concentration is unlikely to be sustained in the immediate future, the Council are not considering the revocation of the AQMA at this time. Should future measurements of nitrogen dioxide remain under the 40µg/m^3 objective concentration and this is part of a sustained trend, a revocation of the AQMA will be considered.

No exceedances were identified outside of the Air Quality Management Area where relevant receptors were present, and therefore the Council does not propose to declare any further AQMAs at this time.

Any planning applications that had the potential to have a Likely Significant Effect on the Epping Forest Special Area of Conservation were assessed in accordance with the Habitats Regulations and advice provided by Natural England.

The main priorities for EFDC in 2021 are in relation to:

- A revised Source Apportionment Assessment in respect of the current AQMA No.2 at Bell Common, Epping. This will enable a targeted approach to be designed which should bring about greater reductions in nitrogen dioxide concentrations in the shorter time period.

- Consideration of existing, and development of further measures to improve air quality, for inclusion in the revised Air Quality Action Plan. This will involve collaboration with colleagues in respect of sustainable transport and climate change in both the district and county council, as well as any relevant external partners.

The challenges that EFDC anticipate are in respect of implementing effective actions that directly target air quality in the AQMA. The current approach has been to promote measures that improve air quality district wide, which may only have a limited impact on concentrations at the AQMA. However, it is noted that the long-term impacts of changed working patterns first implemented during the national lockdown are currently unknown. It may be that many people will not return to their previous travel habits, and the change in commuter patterns together with an increased uptake of low emissions vehicles may lead to a sufficient improvement of nitrogen dioxide concentrations in the AQMA to enable the designation to be revoked. Epping Forest will not assume that any temporary improvements as a result of the pandemic will be sufficient to meet the annual mean nitrogen dioxide objective and will continue to work on actions to bring about a long term improvement in nitrogen dioxide concentrations.

Local Engagement and How to get Involved

With an increased awareness of environmental matters in recent years, has come an increase in interest from residents as to what is being done to minimise the effects of pollution in the local area.

The Council plays a pivotal role in addressing air quality issues, but the effectiveness of measures will be determined by the level of their adoption through behaviour change. There are many ways in which members of the public can act to reduce their impact on local air quality:

- Ride your bike, walk or scoot to work, walk your children to school.
- If your car is stationary, turn the engine off. Not only does idling cost you money, it pollutes the environment, and is illegal.
- Are you able to change your vehicle to an electric one? There may be grants available to assist with the cost of doing so.
- Do you have garden bonfires at home? Consider composting instead.

- Do you have a log burner? Make sure it is serviced regularly and always use the appropriate fuel for your appliance. Make sure that all fuel is fully dry before burning it as this will improve combustion, increase the heat produced and reduce pollution.
- If your home has gas or electric heating installed, use this to heat your home rather that use a log burner.
- Reduce household energy bills and reduce pollution by turning down the thermostat in your home by one or two degrees when the outside temperature allows.
- Improving your homes insulation may help to reduce heating bills. You may be eligible for a grant to improve insulation.
- Consider installing solar panels or a heat pump to your property. This will reduce your contribution to air pollution as well as your ongoing fuel bills.

The Essex Air Web site provides useful information with regards to air quality in the various district and unitary authorities in Essex: http://www.essexair.org.uk/

Table of Contents

Executive Summary: Air Quality in Our Area i

Air Quality in Epping Forest District i

Actions to Improve Air Quality ii

Conclusions and Priorities iv

Local Engagement and How to get Involved v

1 Local Air Quality Management 1

2 Actions to Improve Air Quality 2

2.1 Air Quality Management Areas 2

2.2 Progress and Impact of Measures to address Air Quality in Epping Forest District 4

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations 9

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance 12

3.1 Summary of Monitoring Undertaken 12

3.1.1 Automatic Monitoring Sites 13

3.1.2 Non-Automatic Monitoring Sites 13

3.2 Individual Pollutants 14

3.2.1 Nitrogen Dioxide (NO_2) 14

3.2.2 Particulate Matter (PM_{10}) 15

3.2.3 Particulate Matter ($PM_{2.5}$) 15

3.2.4 Sulphur Dioxide (SO_2) 15

Appendix A: Monitoring Results 16

Appendix B: Full Monthly Diffusion Tube Results for 2020 30

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC 36

New or Changed Sources Identified Within Epping Forest District During 2020 36

Additional Air Quality Works Undertaken by Epping Forest District During 2020 36

QA/QC of Diffusion Tube Monitoring 36

Diffusion Tube Annualisation 36

Diffusion Tube Bias Adjustment Factors 37

NO_2 Fall-off with Distance from the Road 37

Appendix D: Maps of Monitoring Locations and AQMAs 39

Appendix E: Summary of Air Quality Objectives in England 54

Appendix F: Impact of COVID-19 upon LAQM 55

Impacts of COVID-19 on Air Quality within Epping Forest District 56

Opportunities Presented by COVID-19 upon LAQM within Epping Forest District 58

Challenges and Constraints Imposed by COVID-19 upon LAQM within Epping Forest District 58

Glossary of Terms **60**
References **61**

Figures

Figure A.1 – Trends in Annual Mean NO_2 Concentrations 22

Figure D.1 – Maps of Non-Automatic Monitoring Site 39

Figure F.1 – Comparison of Annual Mean NO2 Concentrations in 2019 and 2020 56

Figure F.2 – 2-Way Daily Traffic- B1383 High Rd, Near Bell Common Tunnel 2020 57

Tables

Table 2.1 – Declared Air Quality Management Areas 3
Table 2.2 – Progress on Measures to Improve Air Quality 8
Table A.1 – Details of Non-Automatic Monitoring Sites 16
Table A.2 – Annual Mean NO2 Monitoring Results: Non-Automatic Monitoring 19
Table B.1 – NO_2 2020 Diffusion Tube Results ($\mu g/m^3$) 30
Table C.1 – Bias Adjustment Factor 37
Table E.1 – Air Quality Objectives in England 54
Table F 1 - Impact Matrix 59

1 Local Air Quality Management

This report provides an overview of air quality in Epping Forest District during 2020. 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 Epping Forest 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. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives

A summary of AQMAs declared by Epping Forest District Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Epping Forest District. Appendix D: Maps of Monitoring Locations and AQMAs provides a map of the AQMA and also the air quality monitoring locations in the locality. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean; and
- NO_2 hourly mean

Another AQMA (Epping Forest AQMA) had previously been declared in 2008, in respect of the nitrogen dioxide annual mean concentration affecting 7 residential properties on the High Street, Epping. It was subsequently revoked in 2011 following a Detailed Assessment which demonstrated that it was not required. Details of both the current and previous AQMAs can be found at: https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=99.

We do not propose to make any changes to the remaining AQMA at Epping Bell Common (No.2) and no other declarations are required at this time.

Whilst the annual mean concentration of nitrogen dioxide monitored at Bell Common has been below 60 µg/m3 for 3 years, which would normally provide us with confidence that the hourly objective is unlikely to be exceeded, it is felt that due to the large impact of the COVID-19 pandemic on traffic levels, it would be prudent to wait until travel patterns have returned to normal before considering the revocation of the declaration in respect of the hourly objective.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
AQMA Epping Forest District Council No.2	Declared 1st August 2010	NO2 Annual Mean	An area encompassing 2 properties at the junction of Epping High Road and Theydon Road.	NO	68 µg/m3	32.5 µg/m3 (no exceedance)	Air Quality Action Plan 2012	See comments below table (2)
AQMA Epping Forest District Council No.2	Declared 1st August 2010	NO2 1 Hour Mean	An area encompassing 2 properties at the junction of Epping High Road and Theydon Road.	NO	68 µg/m3 (see comment 1 below)	32.5 µg/m3 (no exceedance)	Air Quality Action Plan 2012	See comments below table (2)

☒ **Epping Forest District Council confirm the information on UK-Air regarding their AQMA is up to date.**

☒ **Epping Forest District Council are actively in the process of updating their AQAP.**

(1) As EFDC do not undertake continuous monitoring of NO2, an annual mean of greater than 60 µg/m3 has been used to indicate a likely exceedance of the hourly mean objective (following Defra guidance in TG16).

(2) Epping Forest District Council is currently working towards updating its Air Quality Action Plan. This document will be completed following the adoption of the new Local Plan. At the time of writing, the Planning Inspector is considering modifications of this plan.

2.2 Progress and Impact of Measures to address Air Quality in Epping Forest District

Defra's appraisal of last year's ASR concluded that "on the basis of the evidence provided, by the local authority the conclusions reached are acceptable for all sources and pollutants". A number of comments were raised, which have been addressed as follows:

- Fall off with distance calculations should be calculated where results are within 10% of the objective: During 2020 none of the monitoring locations recorded within 10% of the objective, so this was not relevant to this report.
- Table 2.1 reports nitrogen dioxide exceedances on two rows as one relates to the the annual objective and the other to the hourly objective: As Epping Forest do not undertake continuous air quality monitoring, we have used the 60 µg/m3 surrogate concentration which TG16 confirms can be used to indicate an exceedance of the 1 hourly mean objective.
- The national bias adjustment factor used in this report is the latest one produced at the time of the report submission. The bias adjustment factors used in the last 5 years are provided in Appendix C, Table C.1.
- Typographical errors made in the referencing in the 2020 ASR have been corrected for this report.
- All monitoring data is reported to one decimal place to provide consistency throughout this report.
- Table 2.2 has been expanded to include some of the measures discussed that had not been included in the table previously. Some of the other measures discussed were not added to the table as they did not fit neatly into the categories provided. The Councils Local Plan has yet to be adopted, and it is currently hoped that this will be done in the early part of 2022.
- Additional monitoring at Copped Hall, High Road, Bell Common (just outside of the AQMA) was started in January 2019. This location was chosen as the most appropriate additional monitoring point in respect of the AQMA as it has properties relatively close to the road that may be affected by queuing traffic. There are a number of other properties between Copped Hall and the AQMA however as they are set back further from the road, they would benefit from fall off of nitrogen dioxide concentrations with distance, and are therefore considered less likely to be

exposed to elevated concentrations. As the AQMA consists of just 2 properties (26 metres wide) it was considered that one monitoring location within the AQMA itself was appropriate.

Epping Forest District Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of the measures completed, in progress or planned are set out in Table 2.2. Six measures are included within Table 2.2, which details the type of measure and the progress made during 2020. Where there have been or continue to be barriers restricting the implementation of a measure, these are also presented.

During 2020 the Council have employed additional staff to facilitate a greater focus on the environment. A Climate Change officer is working to produce a Climate Change Action Plan, and a Sustainable Transport Officer is working to enhance public transport as well as improve facilities to charge electric vehicles in the district. In addition to this a further part time Air Quality officer is working in Environmental Health, focussing on the assessment of planning applications and the development of the revised Action Plan.

Air quality has been a major consideration in the Councils emerging Local Plan due to the impact that elevated concentrations of pollutants can have on sensitive species in the Epping Forest Special Area of Conservation (EFSAC) in Epping Forest. The emerging Local Plan includes policies aimed at securing mitigation in respect of air quality issues in the EFSAC alongside policies in relation to the consideration of air quality impacts as they relate to human health. It is anticipated that the emerging Local Plan will be adopted in early 2022. Once the Local Plan has been adopted an updated Air Quality Action Plan in relation to human health will be produced.

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Epping Forest District Council expects the following measures to be continued over the course of the next reporting year:

- Clean Air Day – undertake additional promotional work outside schools, focussing on known problem areas, speaking to parents in vehicles and also raising awareness with the children.
- Idling vehicles promotion campaign – Raising awareness of the impacts of idling vehicles and that idling is an offence that may lead to the issuing of an FPN. This is to include commercial vehicles.

- Targeted enforcement and use of powers to issue fixed penalty notices (FPNs) in respect of idling stationary vehicles especially where complaints are received, such as taxis and buses at train stations, and all vehicles in the vicinity of schools.
- Liaising with Epping Forest Conservators (as landowners) and Essex County Council Highways Department in relation to options to improve air quality in the Air Quality Management Area, with the aim of making sufficient progress to continue updating the Air Quality Action Plan.
- Liaising with internal departments regarding the emerging Local Plan to ensure that policies facilitate mitigation to protect human health going forward.
- Work with Development Control to update standard conditions placed on planning applications, to ensure that they address current and future issues as a result of development.

Epping Forest District Council's priorities for the coming year are:

- Continue liaison with key partners including Essex County Council Highways Department with regards to workable options that will address air quality issues in the Epping Bell Common AQMA. Discussions will be informed by outputs from air quality modelling commissioned by the Council to support the emerging Local Plan. These review the potential for longer term improvements in air quality arising from interventions together with the application of policies proposed in the Plan.
- Undertake a revised Source Appointment exercise in respect of the AQMA to inform the production of the revised Air Quality Action Plan
- Targeted enforcement of idling vehicles where complaints are received.
- Further enhance our programme of nitrogen dioxide monitoring to ensure that busy and congested roads are fully assessed, and appropriate action can therefore be taken where elevated concentrations are identified.

The principal challenges and barriers to implementation that Epping Forest District Council anticipates facing are:

- Availability of land adjacent to the Epping Bell Common AQMA which could facilitate adjustments to the road network and therefore improve traffic flow through the area
- Effective partnership working where interests and required outcomes differ.

- Financial costs of implementing preferred options for measures to reduce pollution concentrations
- Effects of the COVID-19 pandemic. Unknown effects on transport usage and choices made, as well as officer capacity to work towards improvement via promotions and enforcement during this time. Will increased working from home lead to a reduction or increase in air pollution as reduced traffic sources are replaced by additional outputs from heating more residential properties?

Progress on the following measures has been slower than expected due to:

- Local Plan: The Local Plan has been the subject of further work to respond to objections and to queries raised by the inspector.

Unfortunately, the Council was unable to make the desired progress regarding specific effective measures to address nitrogen dioxide concentrations at the Epping Bell Common AQMA No.2. A number of the above measures are linked to the Council's emerging Local Plan. Progress towards the Plan's adoption has been slower than anticipated. This was as a result of the need to address a number of objections received, and to respond to queries raised by the Inspector. In order to respond to these matters the Council had to undertake, amongst other things, more detailed analysis and modelling of air quality impacts within the EFSAC as a result of the Local Plan, together with the development of a mitigation strategy, in consultation with Natural England and the Conservators of Epping Forest. These assessments will further enhance our understanding of air quality in the area immediately to the south of the AQMA, and will be used as part of the evidence to inform the upcoming Air Quality Action Plan, enabling better focus and effectiveness of measures.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Epping Forest District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Epping Bell Common AQMA No 2. These will be fully considered as part of the new Action Plan, which will be completed as soon as we are able to assess the impact of the emerging Local Plan.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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	Environmental Permitting Inspections	Environmental Permits	Introduction/increase of environment charges through permit systems and economic instruments	ongoing	2032	EFDC	N/A	NO	Not Funded	< £10k	Implementation	Applicable to the whole district not just the AQMA	100% of inspections due completed	100% for year ending 31.3.2020	No inspections undertaken between April and December 2020 due to the pandemic
2	Updates to Essex Air Website	Public Information	Via the Internet	ongoing	2032	Essex Air	N/A	NO	Not Funded	< £10k	Implementation	Applicable to the whole district not just the AQMA	None	Ongoing	Website updated with new reports as appropriate.
3	Fleet Vehicle standards for CO2	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2017	2032	EFDC	N/A	NO	Not Funded	£500k - £1 million	Implementation	Applicable to the whole district not just the AQMA	None	2 electric vehicles in the corporate fleet by December 2020. A further 10 vehicles programmed for replacement in 2021.	Fleet will be replaced with electric vehicles as existing vehicles require replacement.
4	Promotion of anti-idling of vehicles.	Public Information	Other	2018	2032	EFDC	N/A	NO	Not Funded	< £10k	Implementation	Applicable to the whole district not just the AQMA	None	Banners erected at sensitive locations & electronic promotional material produced	Despite promotion of law, many drivers claim they are not aware idling is illegal
5	Enforcement of Idling Vehicles	Traffic Management	Anti-idling enforcement	2018	2032	EFDC	N/A	NO	Not Funded	< £10k	Implementation	Applicable to the whole district not just the AQMA	None	Campaigns in problem / sensitive locations to raise awareness and promote behaviour change and enforce if necessary	Law requires drivers are asked to turn off engines to avoid being issued with a Fixed Penalty Notice. All drivers have complied to date.
6	Promotion of sustainable transport to schools	Promoting Travel Alternatives	Other	2017	2032	EFDC	N/A	NO	Not Funded	< £10k	Implementation	Applicable to the whole district not just the AQMA	None	Promotional Campaigns at 4 Schools to raise awareness of idling vehicles and sustainable transport alternatives	2020 Campaign was purely by email to all schools due to the pandemic.

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.

Due to its extremely small size, $PM_{2.5}$ can travel long distances and it is estimated that as much as 50% of the levels found in any given area can be from sources outside a local authority's boundary[7]. Nevertheless, this means that the contribution of local sources is significant, and therefore Defra consider local actions to reduce $PM_{2.5}$ emissions will have significant beneficial impact on overall concentrations.

Epping Forest District is taking the following measures to address $PM_{2.5}$:

Existing / Ongoing Measures:

- Authorisation of officers to issue fixed penalty notices in respect of idling vehicles on the public highway
- Effective regulation of Part B and Part A2 regulated activities including solvent emission activities.
- Investigation of complaints regarding, and regular reviews to search for unpermitted industrial activities.
- Investigation of complaints and effective regulation in respect of industrial and domestic bonfires.
- Investigation of complaints, provision of information and effective regulation of smoke control areas (Loughton and Waltham Abbey).

[7] Defra Local Air Quality Management Technical Guidance (TG16) 2018

- Participation in ‘Clean Air Day’ anti-idling promotion initiatives with a focus outside schools is an annual occurrence however due to COVID-19 restrictions our 2020 Clean Air Day campaign was undertaken via the distribution of electronic promotional material.
- Consideration of planning applications to ensure that appropriate air quality mitigation measures have been identified in the application, and will be incorporated into the development to minimise the impact of the development on air quality
- Consideration of planning applications in respect of dust creation from demolition and construction activities on building sites and ensuring the appropriate mitigation strategies are employed.
- Updating the Councils website, improving information for both residents and local businesses to enable them to make better informed decisions with regards to air quality, in particular the burning of solid fuels.
- The measures listed above in section 2.2 and Table 2.2 will have co-benefits on $PM_{2.5}$ concentrations as they impact sources of particulate pollution.
- Attendance of the Essex Pollution Group meetings where issues such as air quality are discussed with other local authorities, Essex County Council and the Environment Agency.

The above measures will link to the Public Health Outcomes Framework Indicator ‘D01 : Fraction of mortality attributable to particulate air pollution’ and help to bring about a reduction in particulate air pollution ($PM_{2.5}$).

The latest Public Health Outcomes Framework Indicator for Epping Forest shows that the district has a higher percentage of mortality attributed to particulate air pollution than both the East of England and England. The percentage has been tracking above the regional and national percentages by approximately 0.4% and 0.8% respectively in recent years.

The percentages for 2019 are as follows:

Epping Forest District	5.9%
East of England	5.5%
England	5.1%

No information for 2020 is available at the time of writing this report.
Further information regarding this indicator can be found at:
https://fingertips.phe.org.uk/public-health-outcomes-framework#page/4/gid/1000043/pat/6/ati/401/are/E07000072/iid/30101/age/230/sex/4/cat/-1/ctp/-1/cid/4/tbm/1/page-options/ovw-do-0

As Epping Forest District Council do not currently undertake monitoring of particulate matter (either PM_{10} or $PM_{2.5}$), we are unable to monitor concentrations within the district, and therefore rely on Defra background maps which provide modelled $PM_{2.5}$ concentrations for each 1km grid square. These maps, which can be found at https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

show a maximum modelled $PM_{2.5}$ background for Epping Forest District of 11.65 µg/m^3. The location of this concentration was grid reference 542500 192500, which covers part of Chigwell, to the east of the M11 motorway and including West Hatch High School. Much of this area is school playing fields and other green space.

Whilst we are unable to determine the effectiveness of measures in reducing concentrations of $PM_{2.5}$, modelling for this location shows a decrease over the last 3 years (2018: 12.16µg/m^3, 2019: 11.90µg/m^3, 2020: 11.65µg/m^3). It is anticipated that the measures already being taken in respect of other pollutants will assist in the reduction of both primary $PM_{2.5}$ and secondary $PM_{2.5}$.

As the District comprises of a mainly urban south and mainly rural north, the approaches to reduce $PM_{2.5}$ will differ according to the sources present in the local area. As much $PM_{2.5}$ within the district will have originated outside of the district, we will continue to work with neighbouring authorities to achieve a consistent approach to air quality improvement.

The district has a number of historical Smoke Control Areas that cover much of the densely populated parts of Waltham Abbey and Loughton. Information and advice is targeted at the residents of these areas as well as encouraging others who enquire with regards to best practice. The new Environment Act will simplify enforcement with regards to Smoke Control Areas and provide clarity on the fuels that may be burnt within the home. It is hope that it will have a positive impact upon particulate $PM_{2.5}$ concentrations in Epping Forest District as this law applies to all residents, not just those in Smoke Control Areas.

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

This section sets out the monitoring undertaken within 2020 by Epping Forest District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

The monitoring undertaken in 2020 was a continuation of that undertaken by Epping Forest District Council in 2019 with the following alterations:

Additional nitrogen dioxide monitoring locations were set up at the start of 2020:

- 42. Nazeing, Nazeing Road
- 43. Nazeing, North Street
- 44. Loughton, Parsonage Court, Rectory Lane
- 45. Loughton, Colson Road

The monitoring locations in Nazeing were set up in response to complaints of poor air quality due to queuing vehicles at the traffic-light controlled crossroads. There are residential properties along the lengths of these roads and therefore there is potential for residents to be exposed to poor air quality if concentrations are found to exceed the objectives. At the time the complaints were made there had also been significant road works which had worsened the situation for some time, but these were completed by the time monitoring had started.

The additional monitoring locations in Loughton were chosen as they represented residential properties close to Rectory Lane. Rectory lane is the main road between Loughton / Epping Forest and Chigwell / the M11 Motorway, and as a result it is frequently congested with queueing traffic. A significant improvement scheme had recently been undertaken along this road however traffic was still congested especially during busy commuting times. It was considered appropriate to start monitoring here to determine nitrogen dioxide concentrations at residential premises along this road.

Monitoring was discontinued at one location: Palmerston Road, Buckhurst Hill. This site was situated on the façade of a residential property, but the diffusion tubes were removed when it was no longer convenient for this location to be used. As the data from the previous 2 years had indicated that concentrations here were not elevated (being the closest property to this junction) at approximately 22µg/m^3, we did not consider it necessary to monitor at an alternative location in the vicinity.

3.1.1 Automatic Monitoring Sites

Epping Forest District Council did not undertake automatic (continuous) monitoring during 2020. National monitoring results are available at https://uk-air.defra.gov.uk/

3.1.2 Non-Automatic Monitoring Sites

Epping Forest District Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 45 sites during 2020. 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 and bias adjustment are included in Appendix C. Annualisation and distance correction calculations were not required on the monitoring results for this report.

The graphs in Appendix A (Figures A.1a to A.1h) show the trends of annual mean nitrogen dioxide concentrations over the last 5 years (where available) at all sites. It can be seen from these graphs that the concentration reduced significantly at all sites. This is to be expected as traffic levels were greatly reduced for much of the year because of the national lockdown due to the COVID-19 pandemic.

Whilst the annual mean concentration of nitrogen dioxide at the AQMA was below the objective in 2020, it is considered likely that this was as a direct result of reduced traffic due to the national lockdowns. No changes to declarations are therefore proposed at this time however if concentrations remain at 2020 levels in the future, or the downward trend continues, this will be considered once sufficient evidence of this has been obtained.

No additional monitoring sites were set up at the start of 2021. We did not receive any complaints relating to busy and congested roads during 2020.

3.2 Individual Pollutants

The air quality monitoring results presented in this section have been adjusted for bias. No annualisation (required where the annual mean data capture is below 75% and greater than 33%), or distance correction calculations were required on the 2020 monitoring results. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 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. No annualisation was required for any of the locations. The values are exclusive of any consideration to fall-off with distance adjustment.

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B. All of the results from 2020 were below the annual mean objective for nitrogen dioxide, including the monitoring location that is located on the façade of one of the two properties within the AQMA (AQMA Epping Forest District Council No. 2) at Bell Common, Epping.

As none of the locations measured an annual mean concentration within 10% of the annual mean objective (36µg/m^3 or above), no distance to site correction calculations were required to be undertaken on any of the results.

All of the results from the 2020 dataset were considerably lower than those measured in 2019. Generally, the greatest reductions were seen at the locations which have measured the greatest concentrations of nitrogen dioxide in recent years, with the largest of these being at “3. Bell Vue, Epping” (the AQMA), seeing a 15.1ug/m3 reduction in the annual mean concentration of nitrogen dioxide. This equates to a 31.7% reduction from the measured concentration in 2019 and demonstrates that during 2020 this location did not exceed the annual mean objective, as the concentration measured was 32.5ug/m3.

The locations that have measured lower annual mean concentrations of nitrogen dioxide are generally those in more rural locations which do not experience such high volumes of traffic. The reduction in traffic levels in these areas is likely to have been less pronounced as a result of the national lockdown. Of the monitoring locations that have measured lower concentrations of nitrogen dioxide in recent years, the smallest reductions in annual

mean concentrations of nitrogen dioxide were seen in Bowes Drive Ongar, and Netherhall Road Roydon. Here the reductions in annual mean nitrogen dioxide concentrations were approximately 2ug/m3 (approximately a 15 to 19% reduction in concentrations from 2019 to 2020). The average reduction in annual mean nitrogen dioxide concentrations across all sites between 2019 and 2020 was 24.1%.

We continue to use the national bias adjustment factor as we do not have the ability to calculate a figure locally. This figure enables us to account for the inherent uncertainty involved in diffusion tube monitoring and report an adjusted concentration in line with Defra guidance (TG16, paragraph 7.78). Appendix C provides further detail on bias adjustment.

The data capture during 2020 was greater than 75% for each site, and therefore there was no requirement to undertake any annualisation calculations. This approach is in line with TG16, paragraph 7.185.

As the data shows that none of the sites monitored during 2020 measured concentrations of nitrogen dioxide greater than the objective, no further designations are required at this time.

No changes were made to the monitoring network at the end of 2020.

3.2.2 Particulate Matter (PM_{10})

Particulate Matter (PM_{10}) monitoring is not undertaken in the district

3.2.3 Particulate Matter ($PM_{2.5}$)

Particulate Matter ($PM_{2.5}$) monitoring is not undertaken in the district, and because Particulate Matter (PM_{10}) is not undertaken either, it is not possible to estimate ($PM_{2.5}$) from (PM_{10}).

3.2.4 Sulphur Dioxide (SO_2)

Sulphur Dioxide (SO_2) monitoring is not undertaken in the district

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)	Distance to Kerb of Nearest Road (m)	Tube Co-located with a Continuous Analyser	Height (m)
1a, 1b, 1c	Hainault Road, Chigwell	Kerbside	544234	192236	NO2	No	8.5	1.0	No	2.0
2a, 2b, 2c	15 High Street, Epping	Urban Background	545555	201732	NO2	No	0.0	13.7	No	2.0
3a, 3b, 3c	Bell Vue High Road, Bell Common	Roadside	544928	201281	NO2	Yes, AQMA no.2 : Bell Common, Epping	0.0	1.8	No	2.0
4a, 4b, 4c	"Ladbrokes" 254 High Street, Epping	Roadside	546196	202355	NO2	No	0.0	5.6	No	2.5
5a, 5b, 5c	"Superdrug" 202 High Street, Epping	Roadside	546058	202193	NO2	No	0.0	4.0	No	2.5
6a, 6b, 6c	Canes Cottages, Canes Lane, Hastingwood	Suburban	547838	206819	NO2	No	0.0	15.6	No	2.0
7a, 7b	1 Church Hill, Loughton	Roadside	542505	196668	NO2	No	2.5	4.2	No	2.0
8a, 8b	72 Church Hill, Loughton	Roadside	542664	196868	NO2	No	0.0	12.7	No	2.0
9a, 9b, 9c	"Timpson" 249 High Road,Loughton	Roadside	542339	196360	NO2	No	0.0	6.4	No	2.5
10a, 10b	"Bojangle" 252 High Road, Loughton	Roadside	542373	196478	NO2	No	0.0	5.7	No	2.5
11a, 11b	3 Goldings Hill, Loughton	Roadside	543091	197316	NO2	No	4.8	1.0	No	2.5
12a, 12b, 12c	66 Tempest Mead, North Weald	Urban Background	549648	203671	NO2	No	4.2	1.0	No	2.0
13a, 13b, 13c	20 High Street, Roydon	Roadside	540919	209956	NO2	No	0.8	1.2	No	2.0
14a, 14b, 14c	Netherhall Road, Roydon	Suburban	539711	208662	NO2	No	16.0	1.7	No	2.0
15a, 15b	Albion Terrace, Sewardstone Road, Sewardstone	Roadside	537727	196187	NO2	No	3.1	4.6	No	2.0
16a, 16b, 16c	13 The Elms, Waltham Abbey	Other	541308	200037	NO2	No	0.0	36.6	No	2.0
17a, 17b, 17c	15 The Elms, Waltham Abbey	Other	541320	200020	NO2	No	0.0	55.8	No	2.0
18a, 18b	Abbey View, Waltham Abbey	Roadside	537808	200644	NO2	No	6.1	1.5	No	2.0

19a, 19b	Hayden Road, Waltham Abbey	Roadside	538386	199557	NO2	No	0.0	12.0	No	2.0
20a, 20b, 20c	Lodge Lane, Waltham Abbey	Other	538710	199860	NO2	No	7.3	0.5	No	2.0
21a, 21b	Roundhills, Waltham Abbey	Urban Background	538954	199973	NO2	No	6.7	1.0	No	2.0
22a, 22b	Buckhurst Hill Underground Station	Roadside	541719	193979	NO2	No	7.0	1.6	No	2.0
23a, 23b, 23c	St Johns Sch, High Road, Buckhurst Hill	Roadside	540902	194240	NO2	No	11.0	2.5	No	2.0
24a, 24b, 24c	Sheering Road, Sheering	Roadside	548842	212102	NO2	No	30.0	2.0	No	2.0
25a, 25b, 25c	Roding Lane, Buckhurst Hill	Roadside	541913	194020	NO2	No	5.0	2.0	No	2.0
26a, 26b, 26c	131 High Street, Ongar	Roadside	555253	202921	NO2	No	0.0	1.0	No	2.0
27a, 27b, 27c	3 Walter Mead Close, A414, Ongar	Roadside	555125	203944	NO2	No	0.0	7.0	No	2.0
28a, 28b	3 Bowes Drive, Ongar	Other	555117	203531	NO2	No	0.0	17.0	No	2.5
29a, 29b	21 Bowes Drive, Ongar	Other	555044	203530	NO2	No	0.0	19.0	No	2.0
30a, 30b	51 Bowes Drive, Ongar	Other	554906	203550	NO2	No	0.0	16.0	No	2.5
31a, 31b, 31c	Epping Underground Station	Other	546196	201563	NO2	No	0.0	1.5	No	2.5
32a, 32b, 32c	Copped Hall, High Road, Bell Common, Epping	Roadside	544709	201139	NO2	No	4.5	3.0	No	2.0
33a, 33b, 33c	281 Fencepiece Road, Chigwell	Roadside	544238	192212	NO2	No	0.0	10.0	No	2.5
34a, 34b, 34c	414 Fencepiece Road, Chigwell	Roadside	544268	192247	NO2	No	0.0	12.5	No	2.0
35a, 35b, 35c	120 Manor Road, Chigwell	Roadside	544183	192231	NO2	No	5.5	2.0	No	2.5
36a, 36b, 36c	"Anchor" 107 High Street, Ongar	Roadside	555231	202875	NO2	No	0.0	2.0	No	2.5
37a, 37b, 37c	"Queen Bee" 149 High Street, Ongar	Roadside	555253	202964	NO2	No	0.0	5.5	No	2.5
38a, 38b, 38c	"Watsons" 204 High Street, Ongar	Roadside	555265	203108	NO2	No	0.0	2.5	No	2.0
39a, 39b, 39c	"Churchs" 224 High Street, Epping	Roadside	546107	202254	NO2	No	0.0	4.0	No	2.0
40a, 40b, 40c	"Lloyds" 154 High Street, Epping	Roadside	545991	202095	NO2	No	0.0	5.0	No	2.5
41a, 41b, 41c	"Holland & Barrett" 259 High Street, Epping	Roadside	546075	202253	NO2	No	0.0	10.0	No	2.5

42a, 42b, 42c	Nazeing Road, Nazeing	Roadside	533015	205995	NO2	No	15.0	2.0	No	2.5
43a, 43b, 43c	North Street, Nazeing	Roadside	539084	206058	NO2	No	12.0	1.5	No	2.5
44a, 44b, 44c	Parsonage Court, Rectory Lane, Loughton	Roadside	543989	196472	NO2	No	0.0	9.8	No	2.0
45a, 45b, 45c	Colson Road, Loughton	Roadside	544119	196133	NO2	No	3.5	2.0	No	2.5

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 (%)	Valid Data Capture 2020 (%)	NO_2 Annual Mean Concentration (µg/m^3)				
						2016	2017	2018	2019	2020
1a, 1b, 1c	544234	192236	Kerbside	100.0	100.0	**48.0**	**45.3**	39.2	38.9	30.0
2a, 2b, 2c	545555	201732	Urban Background	100.0	100.0	28.4	27.6	24.5	23.9	18.1
3a, 3b, 3c	544928	201281	Roadside	100.0	100.0	**64***	**64.5**	**54.8**	**47.6**	32.5
4a, 4b, 4c	546196	202355	Roadside	100.0	100.0	33.4	30.8	28.3	28.2	21.3
5a, 5b, 5c	546058	202193	Roadside	100.0	100.0	38.9	35.7	35.9	33.5	24.0
6a, 6b, 6c	547838	206819	Suburban	100.0	100.0	25.7	26	21.8	20.1	16.1
7a, 7b	542505	196668	Roadside	92.3	92.3	32.6	27	25.4	22.4	17.4
8a, 8b	542664	196868	Roadside	100.0	100.0	26.9	26.3	23.2	21.2	16.8
9a, 9b, 9c	542339	196360	Roadside	100.0	100.0	35.9	32.8	32.4	28.0	21.2
10a, 10b	542373	196478	Roadside	100.0	100.0	39.0	37.6	32.0	28.3	21.7
11a, 11b	543091	197316	Roadside	100.0	100.0	**41.9**	38.6	38.8	34.4	28.0
12a, 12b, 12c	549648	203671	Urban Background	100.0	100.0	18.8	18.4	16.0	15.1	11.5
13a, 13b, 13c	540919	209956	Roadside	100.0	100.0	24.0	23.2	22.7	20.5	16.1
14a, 14b, 14c	539711	208662	Suburban	100.0	100.0	21.3	17.6	17.0	15.8	13.4
15a, 15b	537727	196187	Roadside	100.0	100.0	33.6	32.7	30.3	27.2	22.6
16a, 16b, 16c	541308	200037	Other	100.0	100.0	34.1	31.8	27.3	26.1	19.7
17a, 17b, 17c	541320	200020	Other	100.0	100.0	31.2	30.3	27.9	25.7	17.0
18a, 18b	537808	200644	Roadside	100.0	100.0	28.9	28.1	24.6	23.8	18.9
19a, 19b	538386	199557	Roadside	100.0	100.0	30.4	25.8	27.1	26.0	20.4

20a, 20b, 20c	538710	199860	Other	100.0	100.0	35.3	33.1	30.5	30.2	22.5
21a, 21b	538954	199973	Urban Background	100.0	100.0	30.3	30.1	26.8	28.2	21.0
22a, 22b	541719	193979	Roadside	100.0	100.0	32.8	30.9	28.7	25.2	19.4
23a, 23b, 23c	540902	194240	Roadside	100.0	100.0	32.9	31.9	29.2	25.7	20.1
24a, 24b, 24c	548842	212102	Roadside	100.0	100.0	32.6	28.7	27.2	23.2	18.3
25a, 25b, 25c	541913	194020	Roadside	100.0	100.0	-		37.3	33.3	26.1
26a, 26b, 26c	555253	202921	Roadside	92.3	92.3	-		38.3	33.4	27.8
27a, 27b, 27c	555125	203944	Roadside	100.0	100.0	-		26.7	24.2	18.3
28a, 28b	555117	203531	Other	100.0	100.0	-	-	16.3	16.1	13.4
29a, 29b	555044	203530	Other	100.0	100.0	-	-	15.8	12.9	10.8
30a, 30b	554906	203550	Other	100.0	100.0	-	-	13.3	12.4	10.1
31a, 31b, 31c	546196	201563	Other	100.0	100.0	-	-	-	37.9	25.3
32a, 32b, 32c	544709	201139	Roadside	100.0	100.0	-	-	-	30.9	23.2
33a, 33b, 33c	544238	192212	Roadside	100.0	100.0	-	-	-	30.3	25.0
34a, 34b, 34c	544268	192247	Roadside	100.0	100.0	-	-	-	21.6	16.9
35a, 35b, 35c	544183	192231	Roadside	92.3	92.3	-	-	-	34.9	24.3
36a, 36b, 36c	555231	202875	Roadside	84.6	84.6	-	-	-	34.1	24.7
37a, 37b, 37c	555253	202964	Roadside	100.0	100.0	-	-	-	28.4	19.8
38a, 38b, 38c	555265	203108	Roadside	92.3	92.3	-	-	-	30.0	19.5
39a, 39b, 39c	546107	202254	Roadside	100.0	100.0	-	-	-	34.9	22.6
40a, 40b, 40c	545991	202095	Roadside	100.0	100.0	-	-	-	33.0	24.3
41a, 41b, 41c	546075	202253	Roadside	100.0	100.0	-	-	-	34.9	22.7
42a, 42b, 42c	533015	205995	Roadside	100.0	100.0	-	-	-	-	23.0

43a, 43b, 43c	539084	206058	Roadside	90.4	90.4	-	-	-	-	21.0
44a, 44b, 44c	543989	196472	Roadside	100.0	100.0	-	-	-	-	16.9
45a, 45b, 45c	544119	196133	Roadside	100.0	100.0	-	-	-	-	17.9

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16.**

☒ **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:

(*) Result for location 3 in 2016 was obtained using the trend between 2014 and 2017 results, as the monitoring location had been moved during this period and the new location was more advantageous. It was relocated to the original location in 2017.

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.TG16 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 :

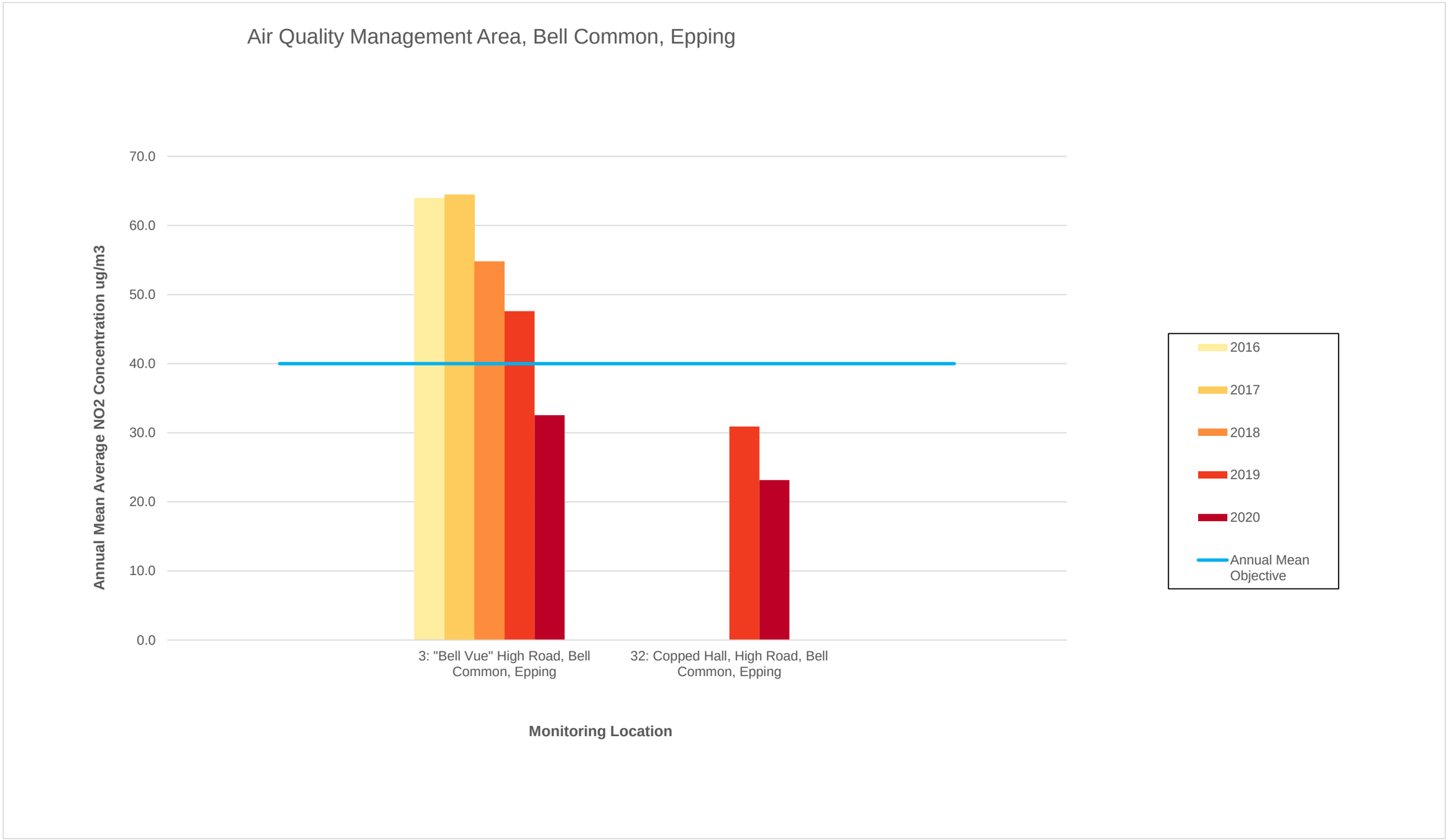


Figure A.1b :

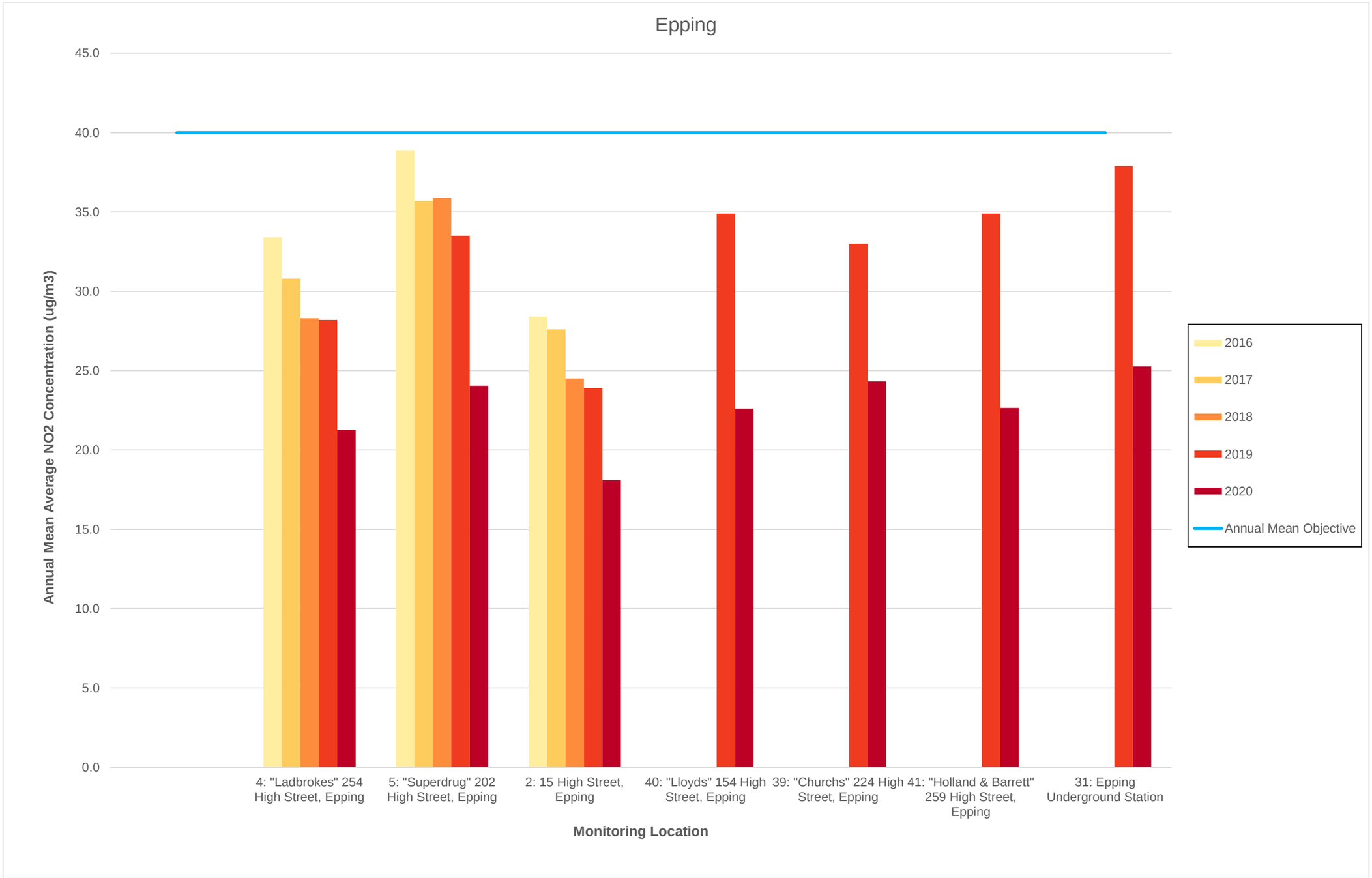

Epping
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
4: "Ladbrokes" 254 High Street, Epping
5: "Superdrug" 202 High Street, Epping
2: 15 High Street, Epping
40: "Lloyds" 154 High Street, Epping
39: "Churchs" 224 High Street, Epping
41: "Holland & Barrett" 259 High Street, Epping
31: Epping Underground Station
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Figure A.1c :

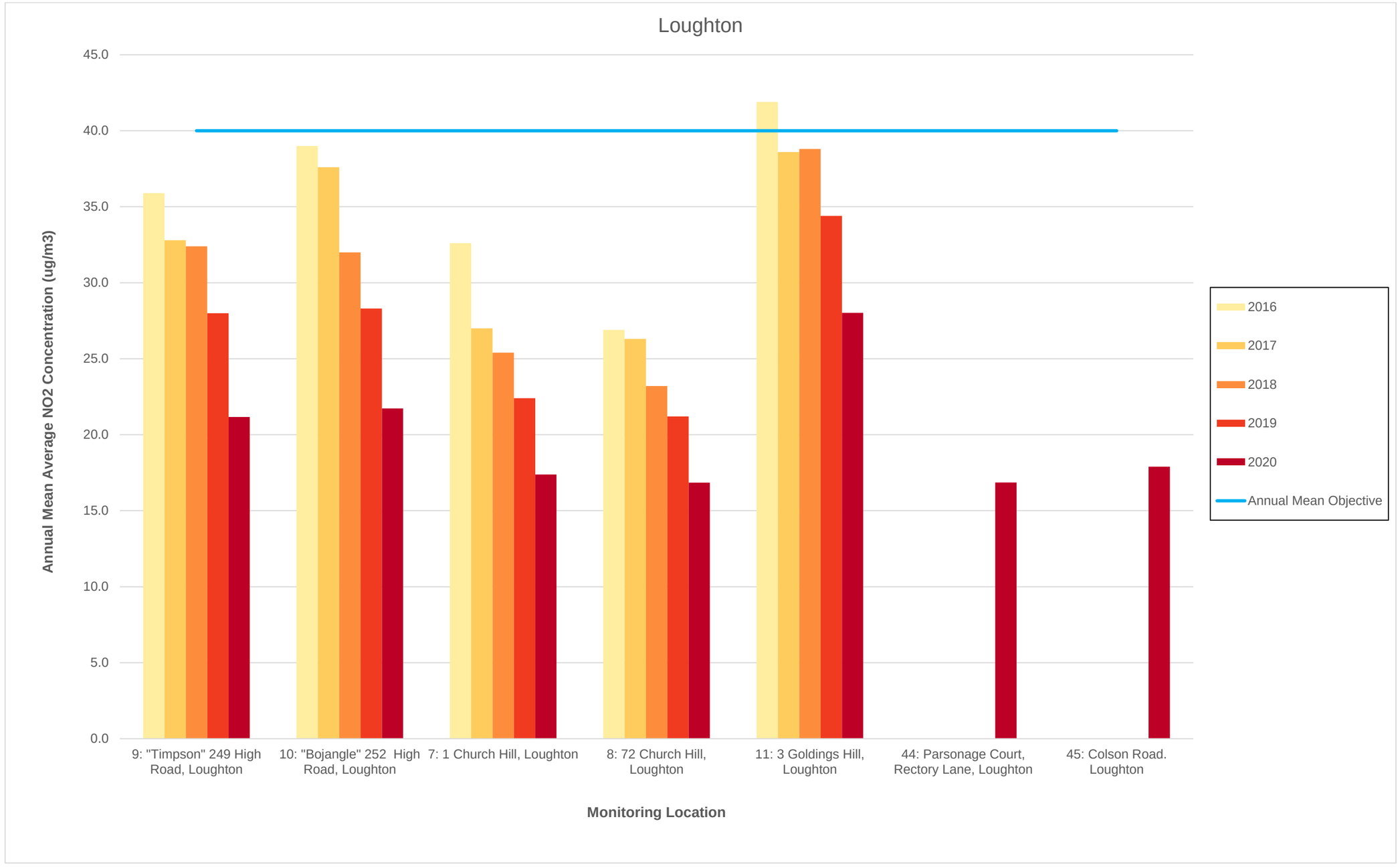

Loughton
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
9: "Timpson" 249 High Road, Loughton
10: "Bojangle" 252 High Road, Loughton
7: 1 Church Hill, Loughton
8: 72 Church Hill, Loughton
11: 3 Goldings Hill, Loughton
44: Parsonage Court, Rectory Lane, Loughton
45: Colson Road. Loughton
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Figure A.1d :

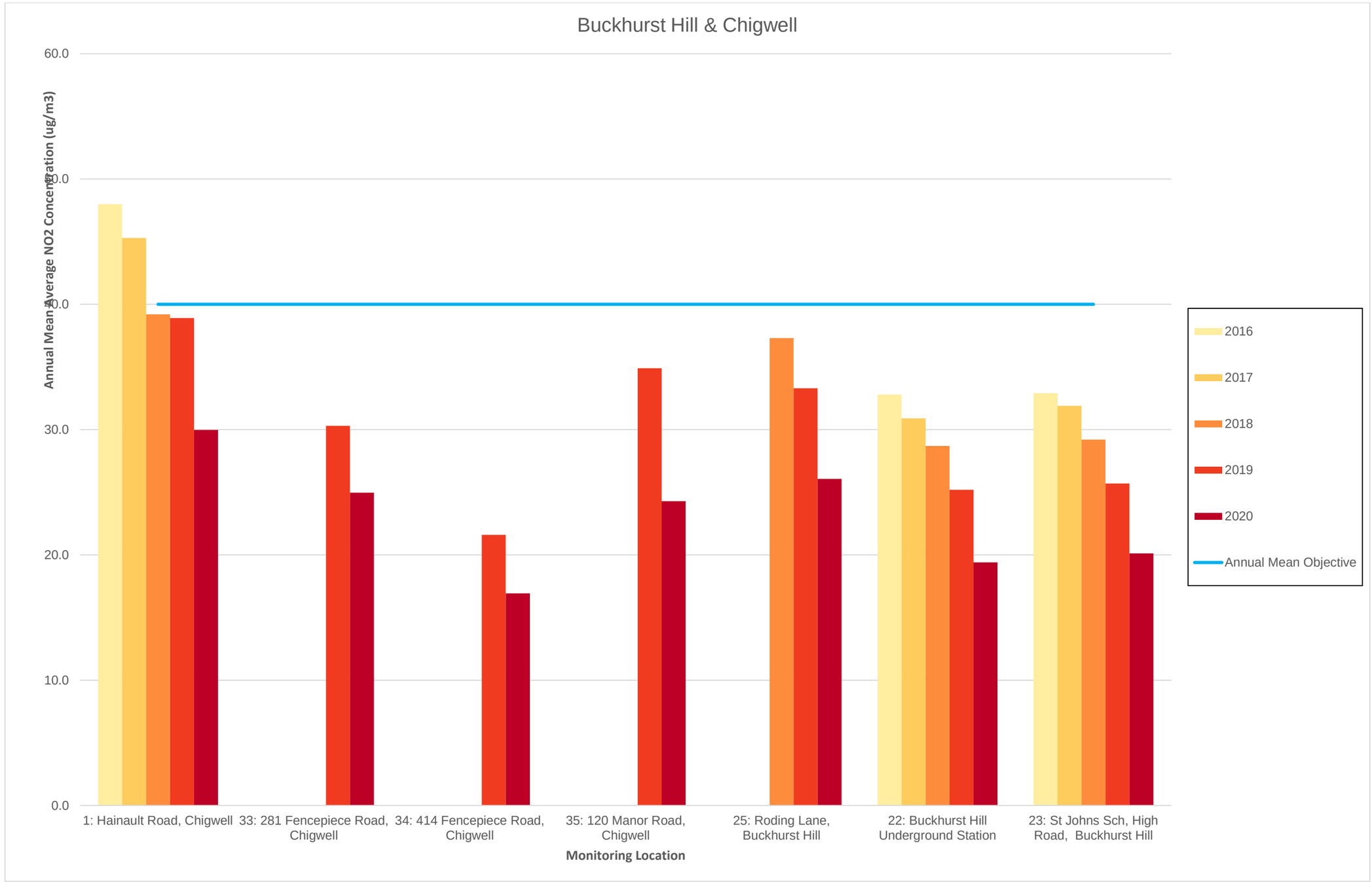

Buckhurst Hill & Chigwell
60.0
40.0
30.0
20.0
10.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
1: Hainault Road, Chigwell
33: 281 Fencepiece Road, Chigwell
34: 414 Fencepiece Road, Chigwell
35: 120 Manor Road, Chigwell
25: Roding Lane, Buckhurst Hill
22: Buckhurst Hill Underground Station
23: St Johns Sch, High Road, Buckhurst Hill
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Figure A.1e :

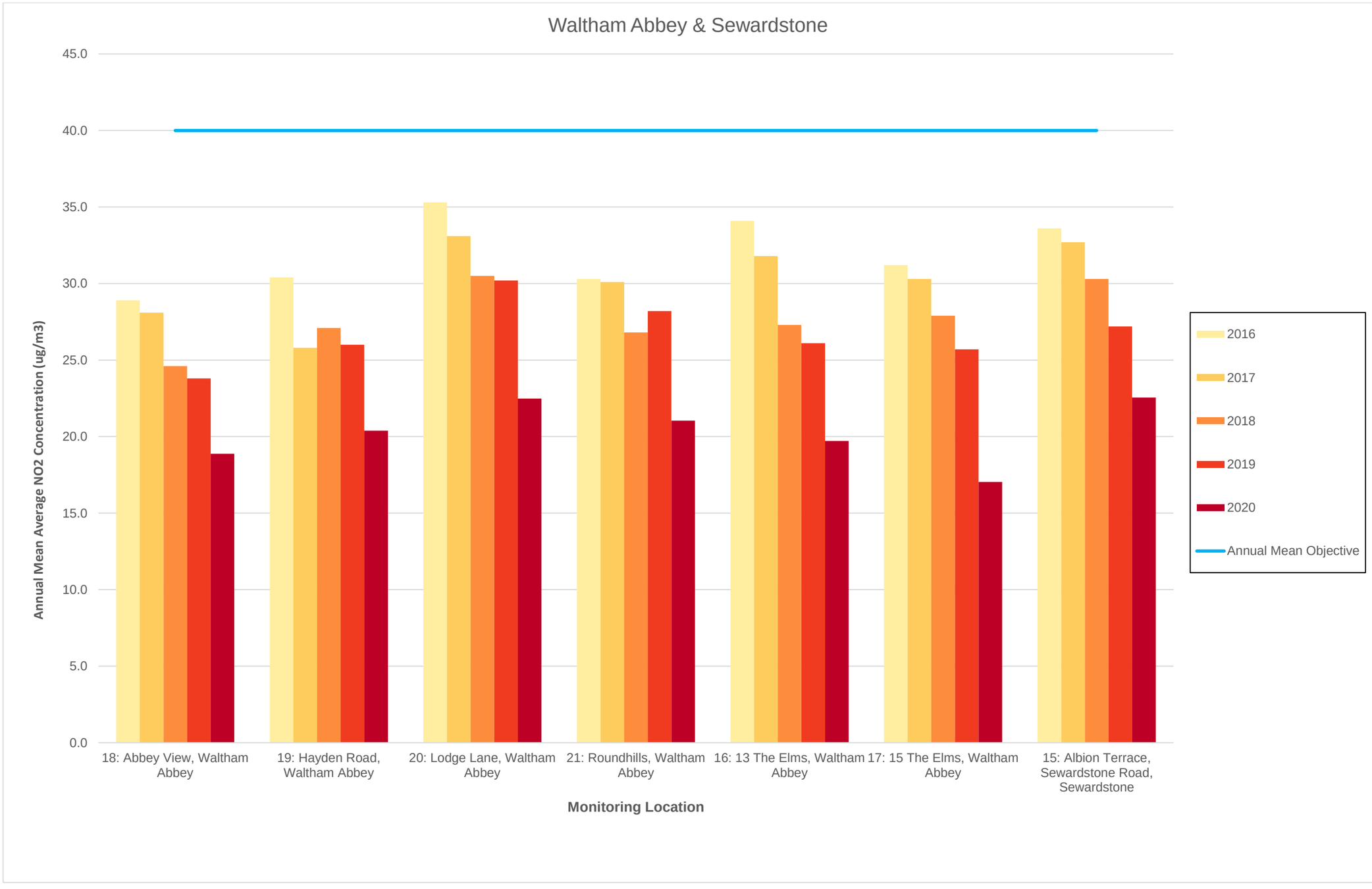

Waltham Abbey & Sewardstone
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
18: Abbey View, Waltham Abbey
19: Hayden Road, Waltham Abbey
20: Lodge Lane, Waltham Abbey
21: Roundhills, Waltham Abbey
16: 13 The Elms, Waltham Abbey
17: 15 The Elms, Waltham Abbey
15: Albion Terrace, Sewardstone Road, Sewardstone
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Figure A1f :

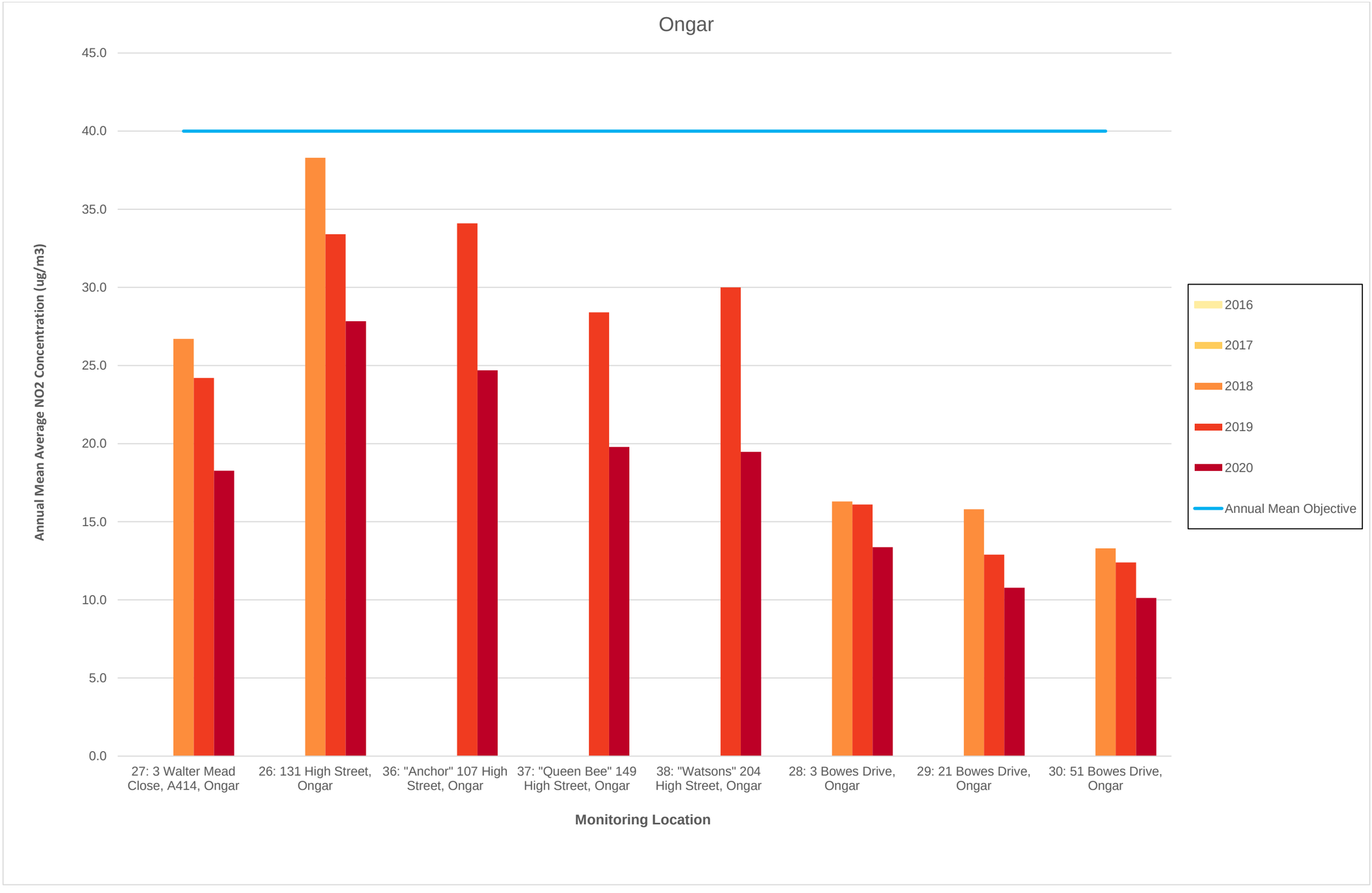

Ongar
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
27: 3 Walter Mead Close, A414, Ongar
26: 131 High Street, Ongar
36: "Anchor" 107 High Street, Ongar
37: "Queen Bee" 149 High Street, Ongar
38: "Watsons" 204 High Street, Ongar
28: 3 Bowes Drive, Ongar
29: 21 Bowes Drive, Ongar
30: 51 Bowes Drive, Ongar
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Figure A.1g :

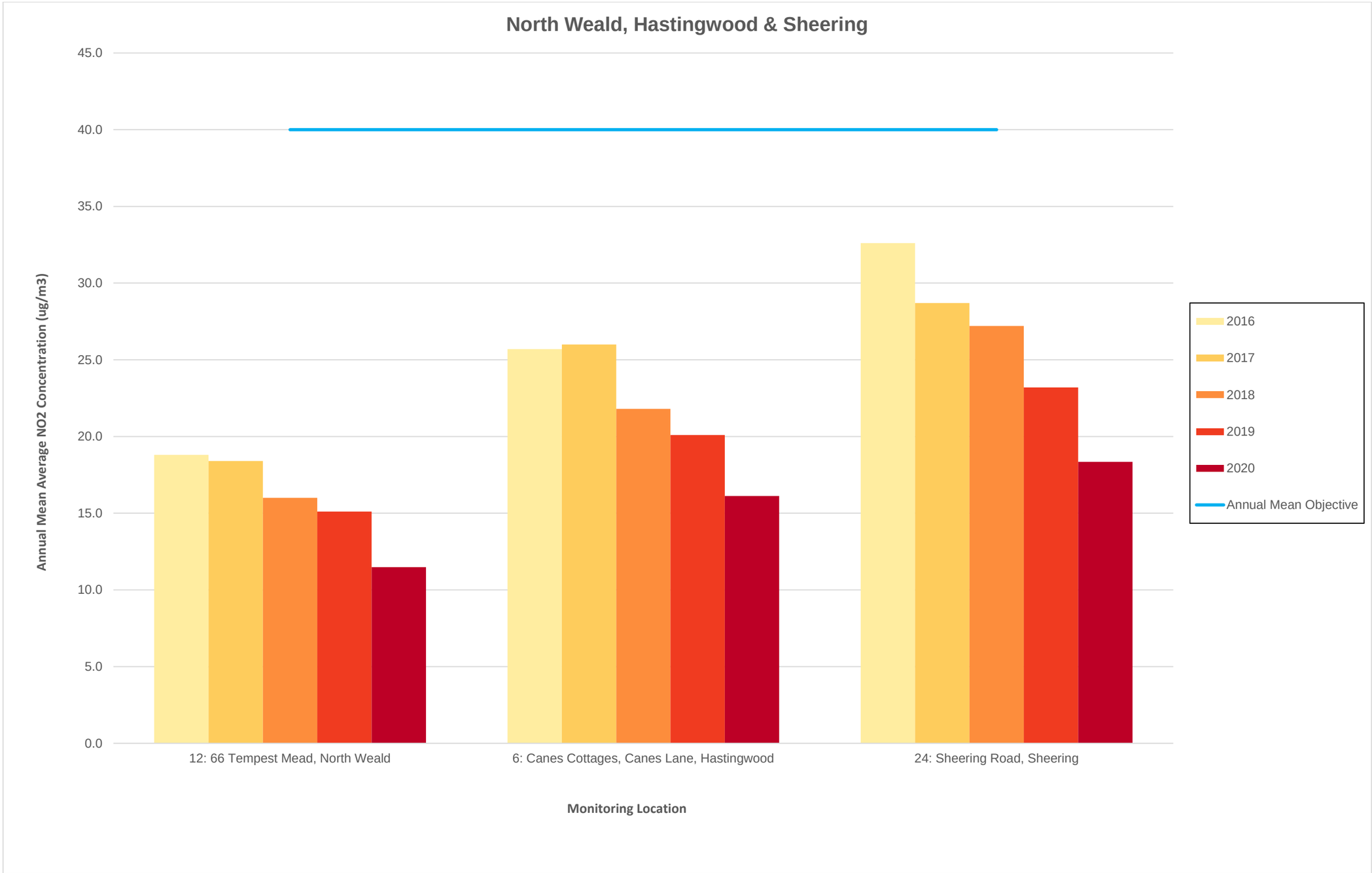
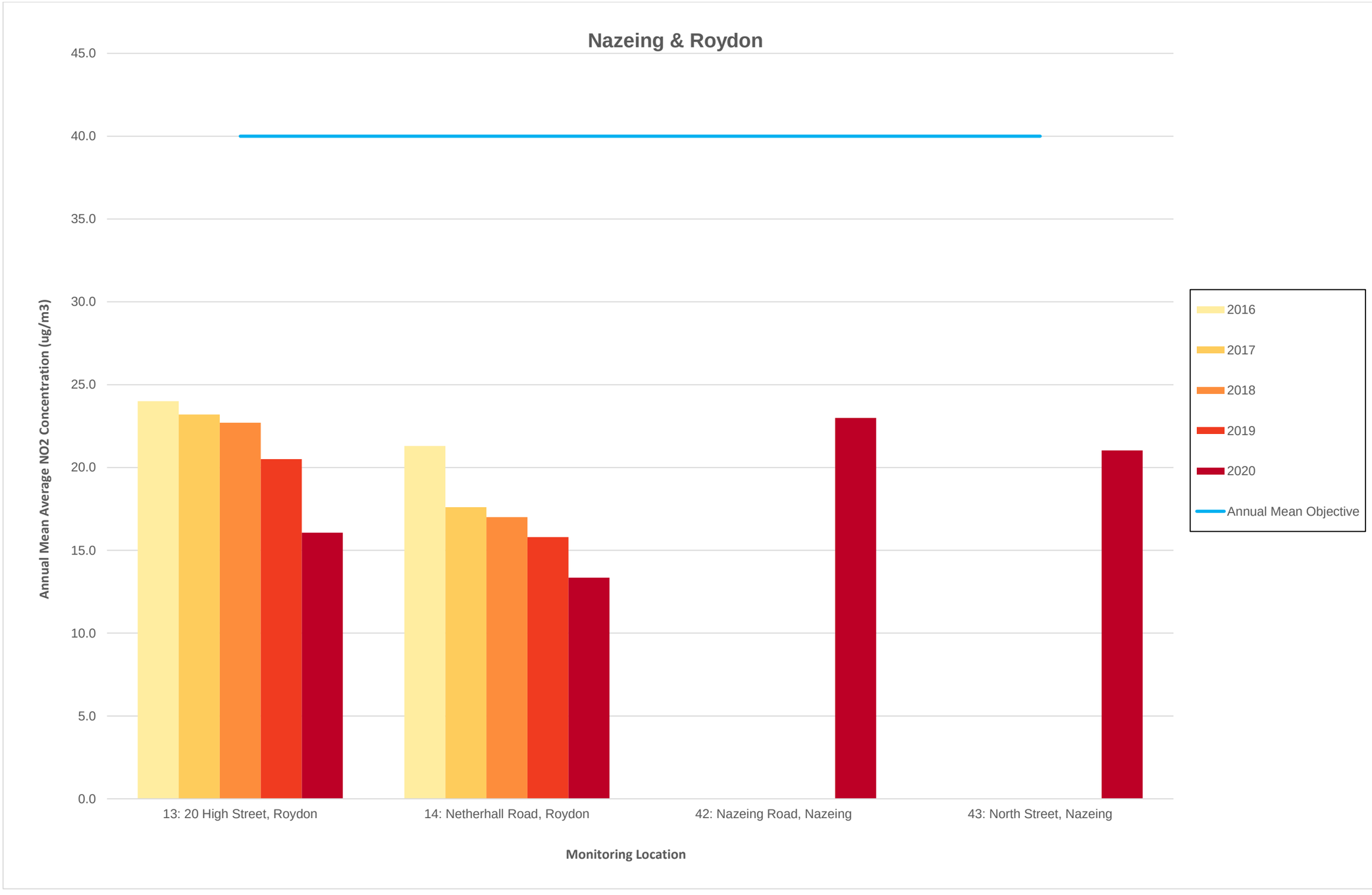

North Weald, Hastingwood & Sheering
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
12: 66 Tempest Mead, North Weald
6: Canes Cottages, Canes Lane, Hastingwood
24: Sheering Road, Sheering
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Figure A.1h :


Nazeing & Roydon
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual Mean Average NO2 Concentration (ug/m3)
13: 20 High Street, Roydon
14: Netherhall Road, Roydon
42: Nazeing Road, Nazeing
43: North Street, Nazeing
Monitoring Location
2016
2017
2018
2019
2020
Annual Mean Objective

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)			Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.76)	Distance Corrected to Nearest Exposure	
1a	544234	192236	59.2		33.8	27.8	29.4	33.3	30.2	36.8	39.9	37.0	50.6	47.2	-	-	-	Triplicate Site with 1a, 1b and 1c - Annual data provided for 1c only
1b	544234	192236	60.9		33.3	30.1	28.9	34.0	32.1	35.6	41.8	31.6	50.1	48.9	-	-	-	Triplicate Site with 1a, 1b and 1c - Annual data provided for 1c only
1c	544234	192236	53.6	48.5	31.3	28.7	27.8	34.7	33.2	36.2	43.0	37.1	48.3	47.8	39.4	30.0	-	Triplicate Site with 1a, 1b and 1c - Annual data provided for 1c only
2a	545555	201732	35.6	35.5	17.8	16.0	14.3	20.2	15.5	19.4	23.9	28.2	34.3	36.5	-	-	-	Triplicate Site with 2a, 2b and 2c - Annual data provided for 2c only
2b	545555	201732	40.6	27.3	20.1	12.2	13.5	18.3	16.4	18.8	24.3	25.4	36.7	32.3	-	-	-	Triplicate Site with 2a, 2b and 2c - Annual data provided for 2c only
2c	545555	201732	36.4	28.0	19.0	15.5	13.4	18.6	15.8	18.4	19.9	23.4	34.2	31.4	23.8	18.1	-	Triplicate Site with 2a, 2b and 2c - Annual data provided for 2c only
3a	544928	201281	61.5	24.7	38.1	29.2	41.2	47.6	43.8	48.2	27.3	52.2	52.7	39.4	-	-	-	Triplicate Site with 3a, 3b and 3c - Annual data provided for 3c only
3b	544928	201281	64.6	30.9	38.6	30.7	39.0	47.0	42.9	46.8	28.4	47.9	54.1	48.0	-	-	-	Triplicate Site with 3a, 3b and 3c - Annual data provided for 3c only
3c	544928	201281	64.9		35.5	28.6	41.8	48.5	41.3	48.5	30.3	46.4	52.4	50.1	42.8	32.5	-	Triplicate Site with 3a, 3b and 3c - Annual data provided for 3c only
4a	546196	202355	47.4	39.7	25.6	13.5	14.0	24.3	21.3	23.3		31.3	35.4	34.6	-	-	-	Triplicate Site with 4a, 4b and 4c - Annual data provided for 4c only
4b	546196	202355	50.0	37.4	26.1	12.6		22.8	21.4		27.1	31.5	37.3	33.7	-	-	-	Triplicate Site with 4a, 4b and 4c - Annual data provided for 4c only
4c	546196	202355	49.3	36.6	24.6	12.9	14.1	23.0	20.8	23.7	27.6	30.7	36.4	32.1	28.0	21.3	-	Triplicate Site with 4a, 4b and 4c - Annual data provided for 4c only
5a	546058	202193	47.1	35.5	27.0	23.6	23.8	32.1	19.3	32.2	31.3	32.5	38.9	35.6	-	-	-	Triplicate Site with 5a, 5b and 5c - Annual data provided for 5c only
5b	546058	202193	48.3	32.2	27.3	24.1	21.7	34.4	20.0	31.7	33.2	32.6	40.5	39.4	-	-	-	Triplicate Site with 5a, 5b and 5c - Annual data provided for 5c only
5c	546058	202193	44.1	35.4	26.9	20.5	21.4	32.2	19.9	30.5	32.8	31.6	38.4	40.8	31.6	24.0	-	Triplicate Site with 5a, 5b and 5c - Annual data provided for 5c only
6a	547838	206819	32.6	24.5	20.7	14.3	10.9	16.6	17.0	17.6	21.0	20.3	31.7	17.4	-	-	-	Triplicate Site with 6a, 6b and 6c - Annual data provided for 6c only
6b	547838	206819	34.0	24.2	19.5	15.4	15.3	19.6	15.5	17.9	21.8	19.7	30.7	28.3	-	-	-	Triplicate Site with 6a, 6b and 6c - Annual data provided for 6c only

6c	547838	206819	33.5	22.4	18.2	14.9	15.5	16.5	16.0	19.2	21.1	21.7	29.2	29.1	21.2	16.1	-	Triplicate Site with 6a, 6b and 6c - Annual data provided for 6c only
7a	542505	196668	37.5	24.4		15.4	13.3	17.2	14.9	16.5	21.8	21.6	32.3	32.0	-	-	-	Duplicate Site with 7a and 7b - Annual data provided for 7b only
7b	542505	196668	35.8	27.9		15.4	12.9	18.0	14.4	18.4	22.0	23.2	33.7	34.5	22.9	17.4	-	Duplicate Site with 7a and 7b - Annual data provided for 7b only
8a	542664	196868	33.9	22.7	20.2	15.1	14.1	17.1	17.0	16.5	19.2	22.6	31.2	33.9	-	-	-	Duplicate Site with 8a and 8b - Annual data provided for 8b only
8b	542664	196868	33.8	26.6	19.1	15.8	14.1	17.2	17.5	18.3	19.9	23.9	31.9	30.2	22.2	16.8	-	Duplicate Site with 8a and 8b - Annual data provided for 8b only
9a	542339	196360	40.7	29.2	24.3	21.5	19.8	27.2	18.5	26.7	25.9	29.3	34.6	33.5	-	-	-	Triplicate Site with 9a, 9b and 9c - Annual data provided for 9c only
9b	542339	196360	43.9	29.9	23.0	20.3	19.1	27.1	18.3	25.6	24.9	28.6	37.0	38.9	-	-	-	Triplicate Site with 9a, 9b and 9c - Annual data provided for 9c only
9c	542339	196360	44.4	31.3	20.9	20.5	19.6	26.2	19.0	24.8	23.1	30.1	38.0	36.8	27.8	21.2	-	Triplicate Site with 9a, 9b and 9c - Annual data provided for 9c only
10a	542373	196478	45.0	36.4	28.4	17.1	18.2	23.8	24.6	20.4	30.7	27.6	34.3	33.2	-	-	-	Duplicate Site with 10a and 10b - Annual data provided for 10b only
10b	542373	196478	44.1	36.3	26.5	16.3	17.7	22.8	24.9	22.6	28.5	31.7	37.2	37.8	28.6	21.7	-	Duplicate Site with 10a and 10b - Annual data provided for 10b only
11a	543091	197316	47.6	36.6	36.0	31.8	28.5	35.2	26.9	32.4	38.3	35.5	47.2	45.9	-	-	-	Duplicate Site with 11a and 11b - Annual data provided for 11b only
11b	543091	197316	49.6	39.2	31.9	30.8	28.6	36.0	26.9	31.2	39.2	34.7	49.2	45.4	36.9	28.0	-	Duplicate Site with 11a and 11b - Annual data provided for 11b only
12a	549648	203671	25.9	19.0	14.8		8.3	10.4	10.0	9.3	13.7	18.4	22.7	24.1	-	-	-	Triplicate Site with 12a, 12b and 12c - Annual data provided for 12c only
12b	549648	203671	23.1	17.3	13.0	8.9	8.1	10.1	9.8	9.3	13.5	15.4	22.9	21.4	-	-	-	Triplicate Site with 12a, 12b and 12c - Annual data provided for 12c only
12c	549648	203671	25.0	19.9	14.2	10.0	8.2	9.7	9.4	11.1	15.8	16.4	23.6	22.0	15.1	11.5	-	Triplicate Site with 12a, 12b and 12c - Annual data provided for 12c only
13a	540919	209956	34.1	21.8	19.5	14.8	13.6	16.4	13.3	18.0	20.0	20.4	30.5	30.0	-	-	-	Triplicate Site with 13a, 13b and 13c - Annual data provided for 13c only
13b	540919	209956	35.9	24.6	18.7	15.4	14.2	16.7	14.1	18.0	20.0	19.6	29.6	22.8	-	-	-	Triplicate Site with 13a, 13b and 13c - Annual data provided for 13c only
13c	540919	209956	37.3	25.3	18.8	14.4	13.5	16.2	14.9	18.0	19.5	19.1	30.6	31.2	21.1	16.1	-	Triplicate Site with 13a, 13b and 13c - Annual data provided for 13c only
14a	539711	208662	30.1	31.2	13.7	10.0	10.4	13.1	12.0	12.8	17.0	16.8	42.5	25.5	-	-	-	Triplicate Site with 14a, 14b and 14c - Annual data provided for 14c only
14b	539711	208662	30.0	19.9	13.9	11.9	11.1	13.3	11.0	11.2	13.3	19.4	24.7	26.1	-	-	-	Triplicate Site with 14a, 14b and 14c - Annual data provided for 14c only
14c	539711	208662	28.9	20.5	15.1	10.3	11.4	4.7	11.1	11.9	12.9	17.8	25.5	21.4	17.6	13.4	-	Triplicate Site with 14a, 14b and 14c - Annual data provided for 14c only
15a	537727	196187	46.7	32.5	25.2	21.6	23.0	28.5	20.9	22.3	27.9	32.2	42.8	41.7	-	-	-	Duplicate Site with 15a and 15b - Annual data provided for 15b only
15b	537727	196187	44.6	25.4	17.5	24.0	24.3	30.2	22.9	27.1	29.1	35.8	25.0	41.0	29.7	22.6	-	Duplicate Site with 15a and 15b - Annual data provided for 15b only

16a	541308	200037	35.7	31.3	22.7	16.3	18.5	20.4	24.6	21.4	27.1	25.4	29.8	33.7	-	-	-	Triplicate Site with 16a, 16b and 16c - Annual data provided for 16c only
16b	541308	200037	40.9	30.7	24.9	17.8	20.4	20.9	25.4	21.2	26.6	27.9	32.2	29.9	-	-	-	Triplicate Site with 16a, 16b and 16c - Annual data provided for 16c only
16c	541308	200037	36.7	31.9	25.1	17.6	18.6	20.4	24.7	21.1	26.6	26.2	30.4	28.8	25.9	19.7	-	Triplicate Site with 16a, 16b and 16c - Annual data provided for 16c only
17a	541320	200020	36.9	30.2	23.2	17.0	17.9	19.9	22.4	19.5	24.7	24.3	28.8	0.7	-	-	-	Triplicate Site with 17a, 17b and 17c - Annual data provided for 17c only
17b	541320	200020	34.3	31.3	22.1	15.2	18.0	18.7	24.1	20.2	24.7	25.6	29.9	<0.5	-	-	-	Triplicate Site with 17a, 17b and 17c - Annual data provided for 17c only
17c	541320	200020	39.0	32.0	24.2	16.8	16.7	20.1	22.9	19.9	26.3	26.3	31.5	<0.5	22.4	17.0	-	Triplicate Site with 17a, 17b and 17c - Annual data provided for 17c only
18a	537808	200644	43.8	25.9	23.3	17.4	15.2	19.6	15.0	18.0	23.7	28.0	35.2	34.9	-	-	-	Duplicate Site with 18a and 18b - Annual data provided for 18b only
18b	537808	200644	40.5		23.5	16.5	14.7	18.1	15.3	20.0	23.6	29.0	35.5	33.6	24.8	18.9	-	Duplicate Site with 18a and 18b - Annual data provided for 18b only
19a	538386	199557	35.1	36.7	23.9	24.5	20.7	23.4	20.3	23.8	23.6	24.5	33.4	32.6	-	-	-	Duplicate Site with 19a and 19b - Annual data provided for 19b only
19b	538386	199557	36.1	26.9	26.0	21.0	25.1	22.7	20.4	23.4	28.5	24.2	32.0	35.0	26.8	20.4	-	Duplicate Site with 19a and 19b - Annual data provided for 19b only
20a	538710	199860	43.9	30.0	21.3	23.1	25.8	26.5	21.9	24.7	31.4	29.6	33.2	35.8	-	-	-	Triplicate Site with 20a, 20b and 20c - Annual data provided for 20c only
20b	538710	199860	40.0	37.9	27.0	21.2	24.6	25.3	25.2	24.4	34.4	32.1	34.7	35.9	-	-	-	Triplicate Site with 20a, 20b and 20c - Annual data provided for 20c only
20c	538710	199860	43.8	36.2	21.1	21.2	23.6	25.2	26.3	25.0	32.1	29.1	33.3	38.1	29.6	22.5	-	Triplicate Site with 20a, 20b and 20c - Annual data provided for 20c only
21a	538954	199973	48.9	31.9	18.6	15.6	15.9	20.2	17.6	22.2	26.6	30.4	39.3	36.8	-	-	-	Duplicate Site with 21a and 21b - Annual data provided for 21b only
21b	538954	199973	48.1	38.0	25.5	16.7	16.8	23.3	20.0	21.5	22.1	33.6	38.4	36.6	27.7	21.0	-	Duplicate Site with 21a and 21b - Annual data provided for 21b only
22a	541719	193979	40.7	29.6	25.5	18.8	14.0	19.9	15.7	20.8	25.5	28.5	37.4	36.1	-	-	-	Duplicate Site with 22a and 22b - Annual data provided for 22b only
22b	541719	193979	36.2	28.7	24.6	20.2	14.6	20.3	16.7	19.9	26.3	22.9	35.6	34.0	25.5	19.4	-	Duplicate Site with 22a and 22b - Annual data provided for 22b only
23a	540902	194240	42.2	31.4	22.4	16.9	16.0	22.9	18.8	21.2	25.3	27.3	39.4	34.6	-	-	-	Triplicate Site with 23a, 23b and 23c - Annual data provided for 23c only
23b	540902	194240		29.6	22.2	17.6	17.2	22.7	16.8	19.0	26.5	29.9	41.2	31.6	-	-	-	Triplicate Site with 23a, 23b and 23c - Annual data provided for 23c only
23c	540902	194240		29.9	24.1	18.7	16.7	22.7	18.6	18.3	25.1	29.7	39.1	32.9	26.5	20.1	-	Triplicate Site with 23a, 23b and 23c - Annual data provided for 23c only
24a	548842	212102	40.2	28.2	20.9	14.9	18.4	18.1	17.9	18.1	23.8	27.8	36.9	31.2	-	-	-	Triplicate Site with 24a, 24b and 24c - Annual data provided for 24c only
24b	548842	212102	41.3	27.5	19.7	15.5	16.7	20.0	18.8	17.4	23.7	29.0	33.4	29.7	-	-	-	Triplicate Site with 24a, 24b and 24c - Annual data provided for 24c only
24c	548842	212102	41.2	25.1	14.7	15.7	17.5	18.6	16.3	18.3	21.1	28.6	33.1	29.7	24.1	18.3	-	Triplicate Site with 24a, 24b and 24c - Annual data provided for 24c only

25a	541913	194020	61.2	44.5	29.0	18.6	20.8	28.2	26.4	28.1	34.2	40.0	45.0	42.1	-	-	-	Triplicate Site with 25a, 25b and 25c - Annual data provided for 25c only
25b	541913	194020	59.0	43.1	23.9	21.1	20.5	29.1	28.3	30.4	40.4	32.0	47.5	26.4	-	-	-	Triplicate Site with 25a, 25b and 25c - Annual data provided for 25c only
25c	541913	194020	60.7	47.0	30.7	20.3	20.5	28.5	27.4	27.0	37.5	34.5	46.7		34.3	26.1	-	Triplicate Site with 25a, 25b and 25c - Annual data provided for 25c only
26a	555253	202921	52.4			22.1	26.3	43.8	35.0	33.0	40.5	32.8	43.5	40.8	-	-	-	Triplicate Site with 26a, 26b and 26c - Annual data provided for 26c only
26b	555253	202921	48.5	37.0		21.2	27.4	39.3	35.0	31.0	38.8	38.3	40.2	40.6	-	-	-	Triplicate Site with 26a, 26b and 26c - Annual data provided for 26c only
26c	555253	202921	50.4	40.6		21.2	27.0	36.4	35.1	33.8	38.7	33.3	42.4	43.4	36.6	27.8	-	Triplicate Site with 26a, 26b and 26c - Annual data provided for 26c only
27a	555125	203944	35.6	25.7	19.5	17.4	18.1	22.5	17.3	22.1	26.1	22.4	32.8	30.5	-	-	-	Triplicate Site with 27a, 27b and 27c - Annual data provided for 27c only
27b	555125	203944	34.1		20.5	18.5	17.3	23.1	15.6	22.4	23.7	24.0	34.2	33.0	-	-	-	Triplicate Site with 27a, 27b and 27c - Annual data provided for 27c only
27c	555125	203944	33.1	24.1	19.7	17.6	18.0	22.1	16.8	21.3	24.8	23.2	33.1	30.0	24.0	18.3	-	Triplicate Site with 27a, 27b and 27c - Annual data provided for 27c only
28a	555117	203531	30.9	20.3	17.8	12.8	9.7	11.9	8.9	10.1	15.1	18.1	27.1	29.3	-	-	-	Duplicate Site with 28a and 28b - Annual data provided for 28b only
28b	555117	203531	29.7	18.9	20.4	12.3	9.5	12.0	9.4	10.0	12.4	16.9	28.9	29.9	17.6	13.4	-	Duplicate Site with 28a and 28b - Annual data provided for 28b only
29a	555044	203530	22.7	15.7	13.6	9.7	8.3	9.9	9.0	9.8	13.6	16.3	22.6	22.4	-	-	-	Duplicate Site with 29a and 29b - Annual data provided for 29b only
29b	555044	203530	21.6	15.3	13.3	9.4	8.7	10.6	9.6	9.2	10.6	13.5	22.9	22.0	14.2	10.8	-	Duplicate Site with 29a and 29b - Annual data provided for 29b only
30a	554906	203550	23.2			10.2	7.6	10.3	8.7	8.8	12.2	11.3	20.4	18.6	-	-	-	Duplicate Site with 30a and 30b - Annual data provided for 30b only
30b	554906	203550	22.0	15.5	14.9	9.9	7.8	10.2	8.4	8.9	9.9	10.2	20.5	19.9	13.3	10.1	-	Duplicate Site with 30a and 30b - Annual data provided for 30b only
31a	546196	201563	57.4	42.2	28.2	20.5	20.7	28.9	23.4	27.9	33.9	36.0	38.0	39.3	-	-	-	Triplicate Site with 31a, 31b and 31c - Annual data provided for 31c only
31b	546196	201563	54.0	44.5	28.2	22.4	19.3	29.5	22.4	28.5		30.5	42.0	38.9	-	-	-	Triplicate Site with 31a, 31b and 31c - Annual data provided for 31c only
31c	546196	201563	59.2	42.8	30.0	20.2	20.5	29.6	23.6	30.3	35.4		43.0	37.6	33.2	25.3	-	Triplicate Site with 31a, 31b and 31c - Annual data provided for 31c only
32a	544709	201139	51.1	28.4	29.3	20.1	21.7	26.8	24.0	26.6	32.9	34.3	33.1	34.0	-	-	-	Triplicate Site with 32a, 32b and 32c - Annual data provided for 32c only
32b	544709	201139	51.1	39.3	26.6	19.8	21.9	27.5	22.4	23.7	34.6	29.6	38.7	28.4	-	-	-	Triplicate Site with 32a, 32b and 32c - Annual data provided for 32c only
32c	544709	201139	50.4	35.9	22.1	19.1	21.8	28.7	23.8	24.8	33.6	36.0	41.1	34.1	30.5	23.2	-	Triplicate Site with 32a, 32b and 32c - Annual data provided for 32c only
33a	544238	192212	46.8	43.4		20.8	22.9	27.7	28.2	28.9	35.7	34.7	41.6	39.1	-	-	-	Triplicate Site with 33a, 33b and 33c - Annual data provided for 33c only
33b	544238	192212	47.5	32.0	21.6	21.2	24.3	25.9	27.7	29.2	30.8	35.4	41.6	37.8	-	-	-	Triplicate Site with 33a, 33b and 33c - Annual data provided for 33c only

33c	544238	192212	47.8	41.7	31.1	32.4	22.7	26.8	29.9	30.1	37.1	35.4	38.5	38.0	32.9	25.0	-	Triplicate Site with 33a, 33b and 33c - Annual data provided for 33c only
34a	544268	192247	33.5	22.3	20.1	15.8		17.1	15.6	18.6	23.2	25.0	33.1	31.6	-	-	-	Triplicate Site with 34a, 34b and 34c - Annual data provided for 34c only
34b	544268	192247	34.8		20.1	16.4	13.2	16.8	16.7	18.7	23.2	24.3	31.9	31.9	-	-	-	Triplicate Site with 34a, 34b and 34c - Annual data provided for 34c only
34c	544268	192247	35.1	15.7	18.9	16.9	13.7	17.0	16.2	19.2	22.3	26.6	31.8	32.5	22.3	16.9	-	Triplicate Site with 34a, 34b and 34c - Annual data provided for 34c only
35a	544183	192231	34.3		28.6	22.2	24.0	26.7	32.3		39.3		25.8	40.1	-	-	-	Triplicate Site with 35a, 35b and 35c - Annual data provided for 35c only
35b	544183	192231	50.3		28.3	20.4	23.1	28.4	30.2	32.2	37.1	38.3	43.8	18.2	-	-	-	Triplicate Site with 35a, 35b and 35c - Annual data provided for 35c only
35c	544183	192231			29.4	21.5	21.4	28.3	28.9	32.3	40.5		38.3	39.0	32.0	24.3	-	Triplicate Site with 35a, 35b and 35c - Annual data provided for 35c only
36a	555231	202875	45.6			19.3	25.3	33.1	25.9	30.2	33.9	29.4	42.8	41.5	-	-	-	Triplicate Site with 36a, 36b and 36c - Annual data provided for 36c only
36b	555231	202875	41.2			18.0	26.7	31.5	28.4	30.0	32.7	34.4	39.2	37.5	-	-	-	Triplicate Site with 36a, 36b and 36c - Annual data provided for 36c only
36c	555231	202875	47.8			18.3	25.4	31.2	28.8	30.7	32.9	35.3	37.2	40.5	32.5	24.7	-	Triplicate Site with 36a, 36b and 36c - Annual data provided for 36c only
37a	555253	202964	39.5	31.7	22.8	16.4	19.0	25.5	24.4	24.6	28.0	28.9	30.8	32.0	-	-	-	Triplicate Site with 37a, 37b and 37c - Annual data provided for 37c only
37b	555253	202964	38.9		18.4	16.0	21.4	25.6	24.9	24.2	27.1	21.3	31.4	26.5	-	-	-	Triplicate Site with 37a, 37b and 37c - Annual data provided for 37c only
37c	555253	202964	38.0	26.1	22.2	14.7	20.9	27.1	22.4	23.6	24.8	27.1	29.2	33.3	26.0	19.8	-	Triplicate Site with 37a, 37b and 37c - Annual data provided for 37c only
38a	555265	203108		22.8	21.5	17.6	18.7	28.7	18.3	25.6	26.8	30.3	33.3	35.6	-	-	-	Triplicate Site with 38a, 38b and 38c - Annual data provided for 38c only
38b	555265	203108		28.0	18.4	17.9	18.6	29.8	18.0	24.6	26.1	31.6	31.5	36.8	-	-	-	Triplicate Site with 38a, 38b and 38c - Annual data provided for 38c only
38c	555265	203108				18.2	17.8	29.7	16.8	23.3	25.6	29.7	37.1	41.5	25.6	19.5	-	Triplicate Site with 38a, 38b and 38c - Annual data provided for 38c only
39a	546107	202254	44.9		23.9	17.8	18.5	34.6	19.7	30.4	31.5	34.4	38.1	30.8	-	-	-	Triplicate Site with 39a, 39b and 39c - Annual data provided for 39c only
39b	546107	202254	40.5		24.7	18.0	19.3	29.3	20.5	33.1	31.9	32.7	37.7	33.3	-	-	-	Triplicate Site with 39a, 39b and 39c - Annual data provided for 39c only
39c	546107	202254	43.2	34.2		16.9	21.7	30.1	20.1	30.6	32.9	30.3	36.9	35.6	29.7	22.6	-	Triplicate Site with 39a, 39b and 39c - Annual data provided for 39c only
40a	545991	202095	41.1	58.7	24.5	20.5	20.2	26.7	24.4	29.3	50.4	27.6	36.2	34.5	-	-	-	Triplicate Site with 40a, 40b and 40c - Annual data provided for 40c only
40b	545991	202095	39.4	55.4	21.9	19.8	21.6	26.7	24.9	25.1	51.3	29.2	34.3	27.1	-	-	-	Triplicate Site with 40a, 40b and 40c - Annual data provided for 40c only
40c	545991	202095		52.3	21.9	20.0	19.5	26.0	22.4	27.2	51.3	30.7	36.0	33.8	32.0	24.3	-	Triplicate Site with 40a, 40b and 40c - Annual data provided for 40c only
41a	546075	202253	47.3	38.9	27.5	18.3	21.4	26.4	18.3	26.2	33.7	34.7	35.9	38.4	-	-	-	Triplicate Site with 41a, 41b and 41c - Annual data provided for 41c only

41b	546075	202253	48.4	28.7	26.1	17.4	20.6	23.9	18.0	27.8	32.4	29.6	39.5	37.6	-	-	-	Triplicate Site with 41a, 41b and 41c - Annual data provided for 41c only
41c	546075	202253	46.6	38.7	23.4	17.6	20.3	27.5	16.8	26.7	35.6	34.4	40.1	28.2	29.8	22.7	-	Triplicate Site with 41a, 41b and 41c - Annual data provided for 41c only
42a	533015	205995	39.5	35.6	23.9	22.2	22.6	25.4	19.7	33.4	33.7	31.3	40.2		-	-	-	Triplicate Site with 42a, 42b and 42c - Annual data provided for 42c only
42b	533015	205995	38.7	38.7	26.3	21.6	22.7	24.3	20.5	31.3	33.2	28.8	38.8	34.9	-	-	-	Triplicate Site with 42a, 42b and 42c - Annual data provided for 42c only
42c	533015	205995	41.0	35.1	24.3	22.2	23.3	26.4	20.1	31.7	32.7	30.7	39.0	38.7	30.3	23.0	-	Triplicate Site with 42a, 42b and 42c - Annual data provided for 42c only
43a	539084	206058	38.0	28.0	20.7	19.1		26.1	21.5	27.1	26.8	25.9	37.8	29.6	-	-	-	Triplicate Site with 43a, 43b and 43c - Annual data provided for 43c only
43b	539084	206058	36.4	26.5	21.0	18.4		23.9	22.3	28.5	29.6	30.1			-	-	-	Triplicate Site with 43a, 43b and 43c - Annual data provided for 43c only
43c	539084	206058	34.6	31.4	21.5	18.2		27.9	22.9	28.4	27.4	31.3	36.0		27.7	21.0	-	Triplicate Site with 43a, 43b and 43c - Annual data provided for 43c only
44a	543989	196472	33.9	26.1	16.1	13.6	14.7	17.0	18.0	19.4	23.2	24.1	33.4		-	-	-	Triplicate Site with 44a, 44b and 44c - Annual data provided for 44c only
44b	543989	196472	36.5	24.2	16.6	13.8	14.6	17.7	17.0	18.0	22.3	22.2	32.9	29.8	-	-	-	Triplicate Site with 44a, 44b and 44c - Annual data provided for 44c only
44c	543989	196472	35.1	21.3	18.1	10.1	13.5	18.6	17.2	18.7	22.6		33.0	31.6	22.2	16.9	-	Triplicate Site with 44a, 44b and 44c - Annual data provided for 44c only
45a	544119	196133	36.7	28.4	17.9	16.4	16.6	18.2	14.9	20.2	22.4	24.4	36.0	34.1	-	-	-	Triplicate Site with 45a, 45b and 45c - Annual data provided for 45c only
45b	544119	196133	34.1	25.7	18.6	17.0	16.4	18.3	15.1	20.2	25.4	26.4	32.8	36.0	-	-	-	Triplicate Site with 45a, 45b and 45c - Annual data provided for 45c only
45c	544119	196133	35.5	27.7	21.5	17.5	16.9	17.9	14.9	18.6	19.7	23.8	33.2	28.2	23.5	17.9	-	Triplicate Site with 45a, 45b and 45c - Annual data provided for 45c only

☒ **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 >33% in line with LAQM.TG16.**

☒ **National bias adjustment factor used.**

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

☒ **Epping Forest District Council confirm that all 2020 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 Epping Forest District During 2020

Epping Forest District Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Epping Forest District Council During 2020

Epping Forest District Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

The supplier used for diffusion tubes was SOCOTEC and the method of preparation was 50% TEA in acetone;

SOCOTEC participates in the AIR NO2 PT laboratory performance scheme. Rounds AR036, AR037, AR039, and AR040 cover the 2020 monitoring period contained in this Air Quality Status Report. SOCOTEC prescribe 2 sets of tests (2 x 4 test samples on each round). The results for AR036 and AR040 were good, with 100% performance. Rounds AR037 and AR039 were cancelled due to the COVID-19 pandemic and therefore did not report a result.

The monitoring has been completed in adherence with the 2020 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Epping Forest District recorded data capture of at least 75%, therefore annualisation of monitoring data was not required for 2020.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 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.TG16 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.

Epping Forest District Council have applied a national bias adjustment factor of 0.76 to the 2020 monitoring data. This factor was calculated using the locally produced factors at other locations who also use SOCOTEC diffusion tubes with a 50% TEA in acetone preparation. A summary of bias adjustment factors used by Epping Forest District Council over the past five years is presented in Table C.1.

Epping Forest District Council use the national bias adjustment factor as they do not have a continuous analyser and therefore cannot undertake a co-location study.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Number of studies used to determine the average bias adjustment	Adjustment Factor
2020	National	09/21	24	0.76
2019	National	09/20	24	0.75
2018	National	03/19	21	0.76
2017	National	03/18	27	0.77
2016	National	06/17	38	0.78

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support

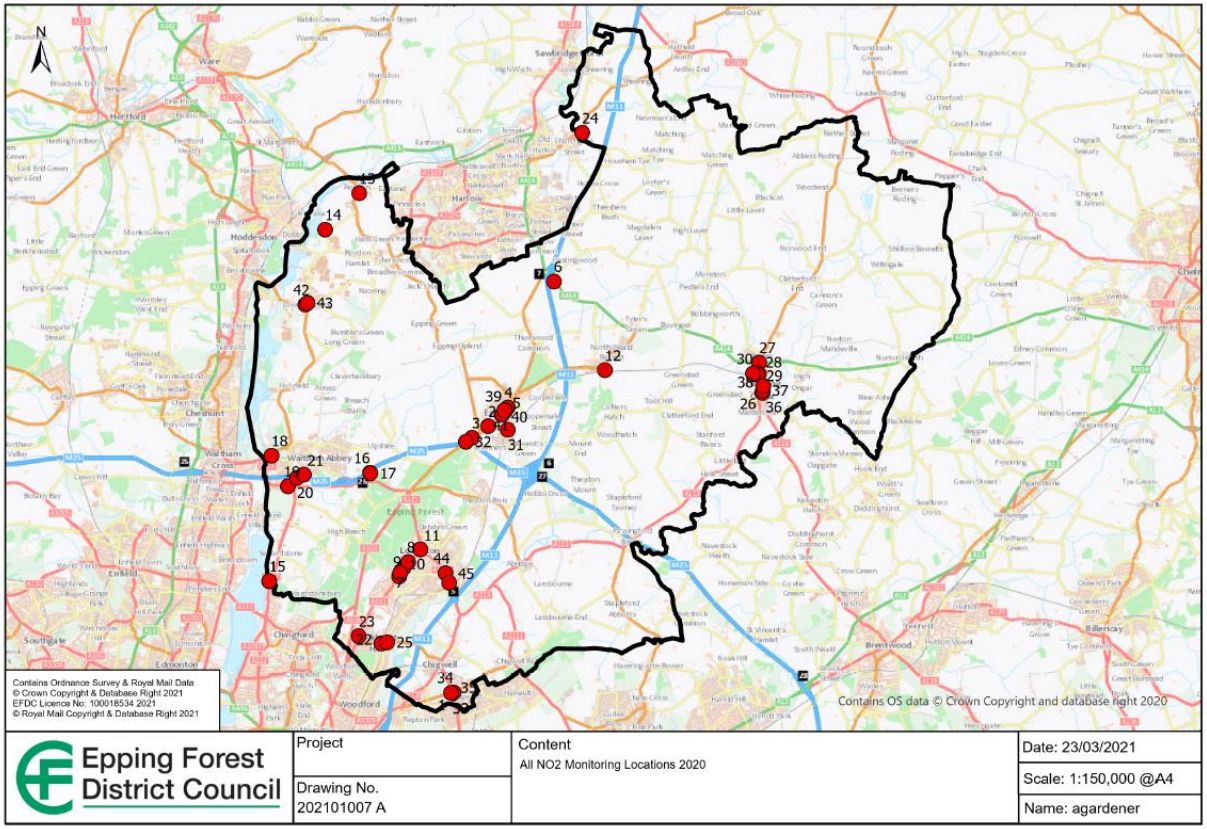
website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Epping Forest District required distance correction during 2020. This correction is only required where a result that is not representative of relevant exposure measures within 10% of the objective concentration.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Maps of Non-Automatic Monitoring Sites

D.1a District wide monitoring locations:



D.1b Air Quality Management Area, Bell Common

D.1c Epping :


N
4
41
39
40
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31
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32
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EFDC Licence No: 100018534 2021
© Royal Mail Copyright & Database Right 2021
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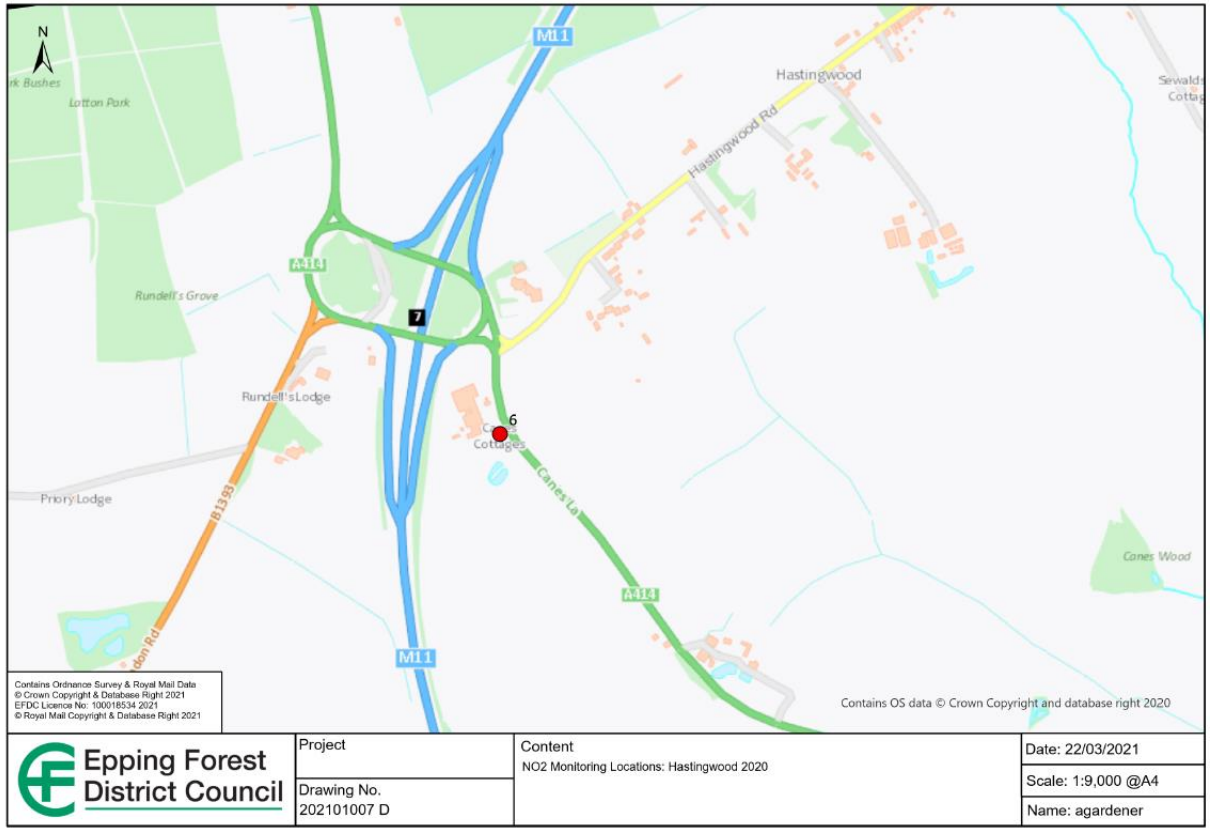
D.1d Hastingwood :



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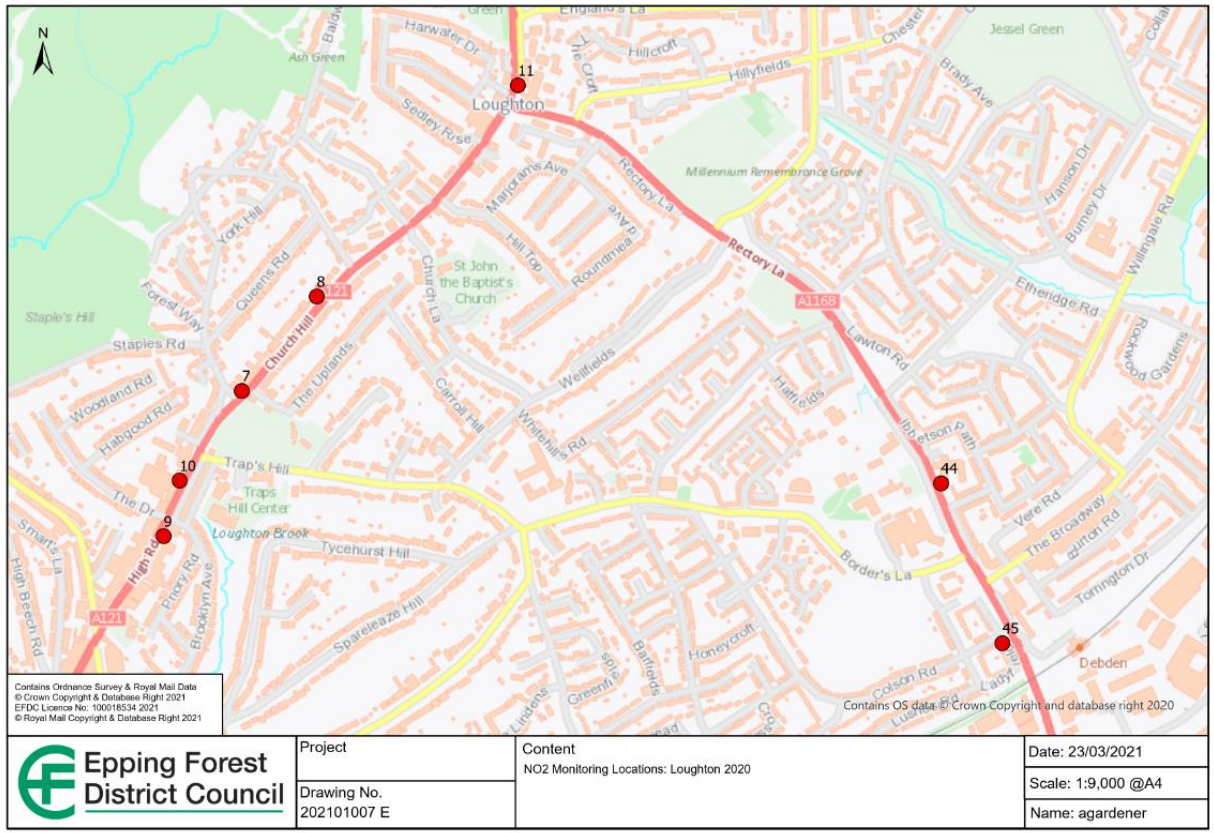
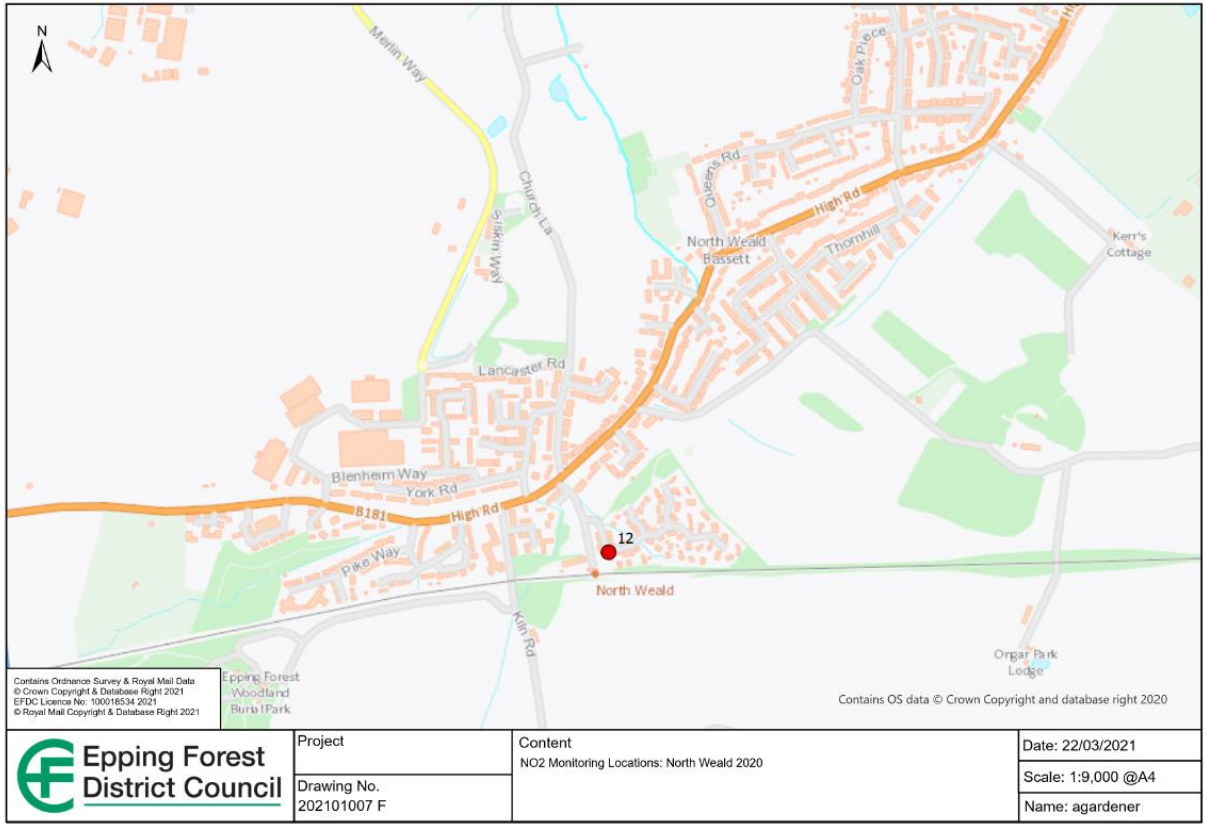
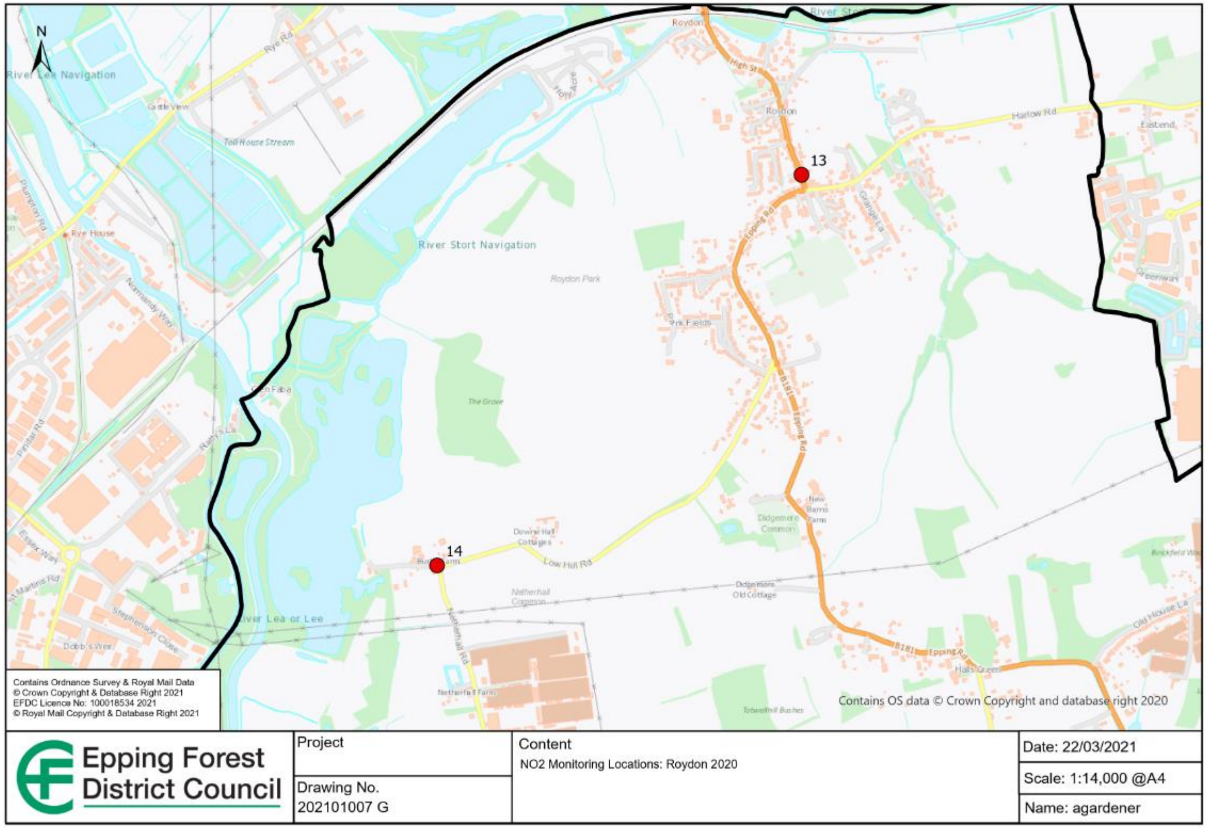


D.1f North Weald :



D.1g Roydon :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River Stort Navigation
Roydon Park
Harlow Rd
Low Hill Rd
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14
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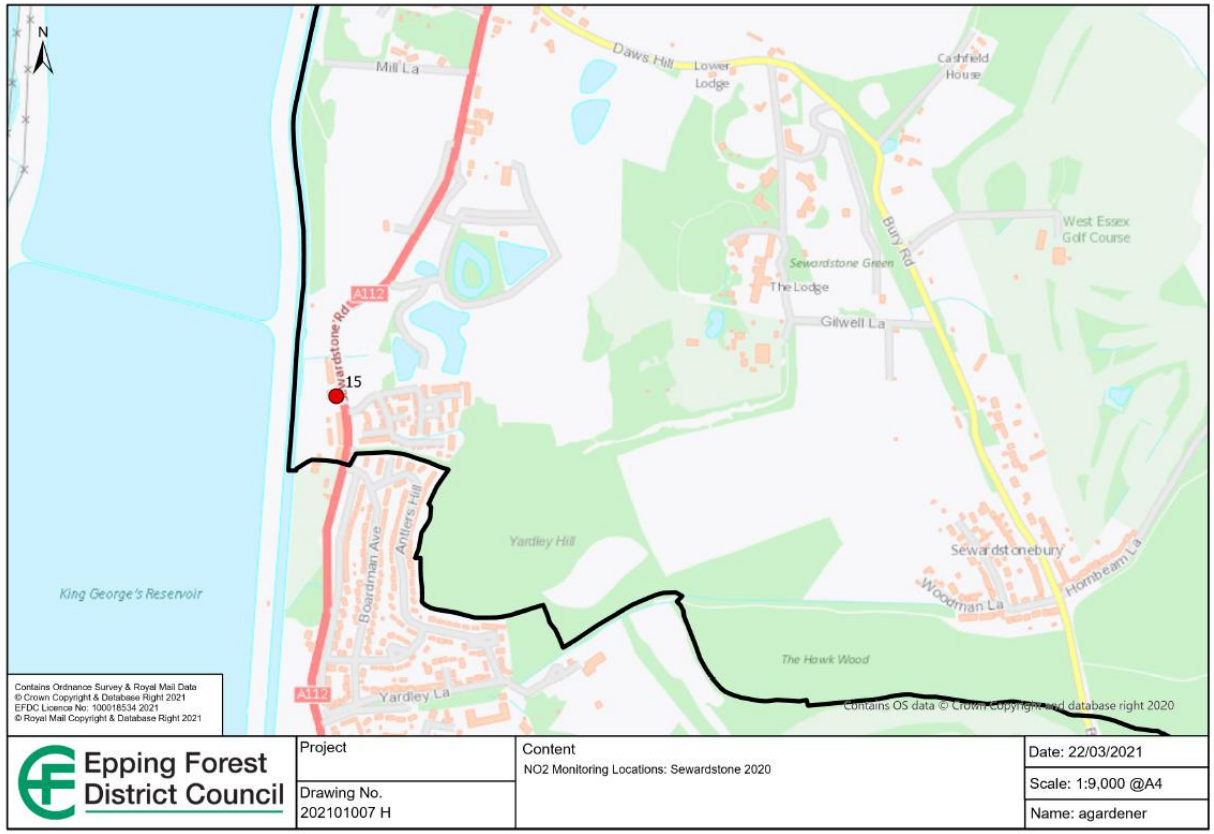
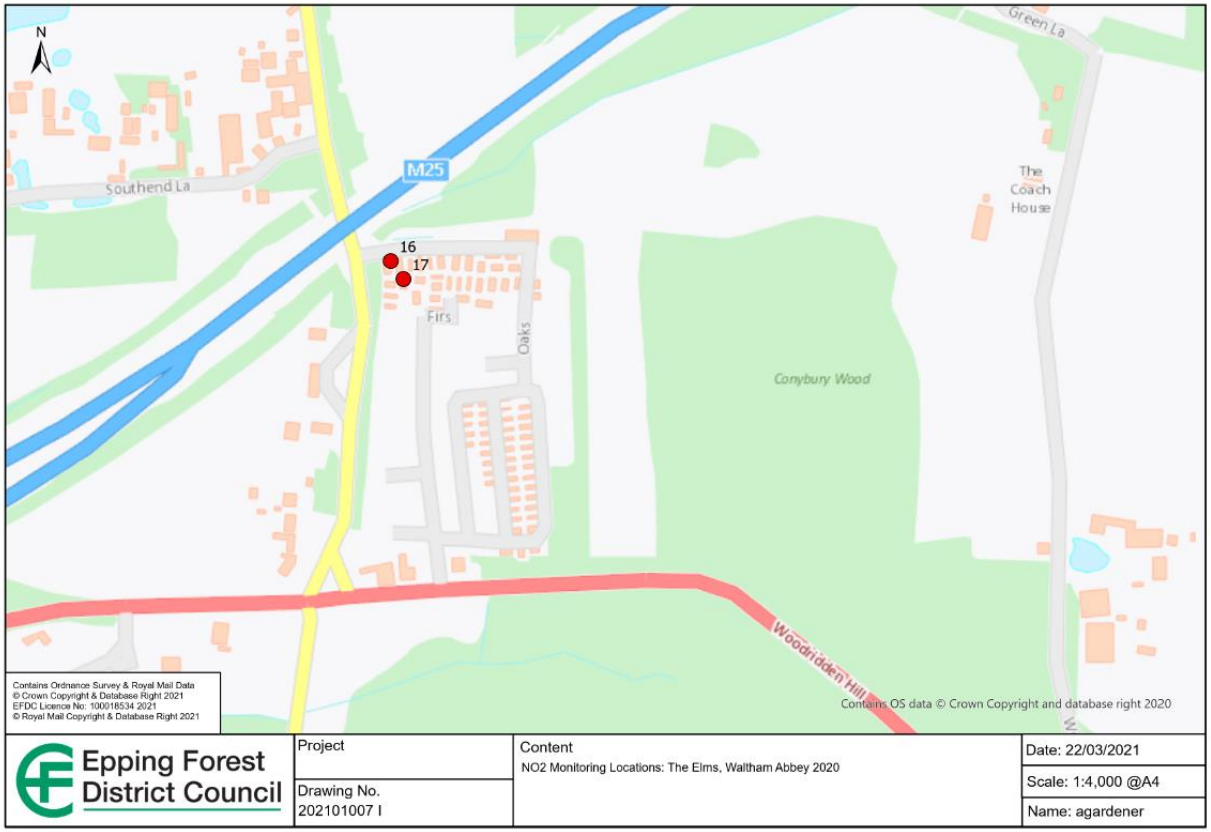
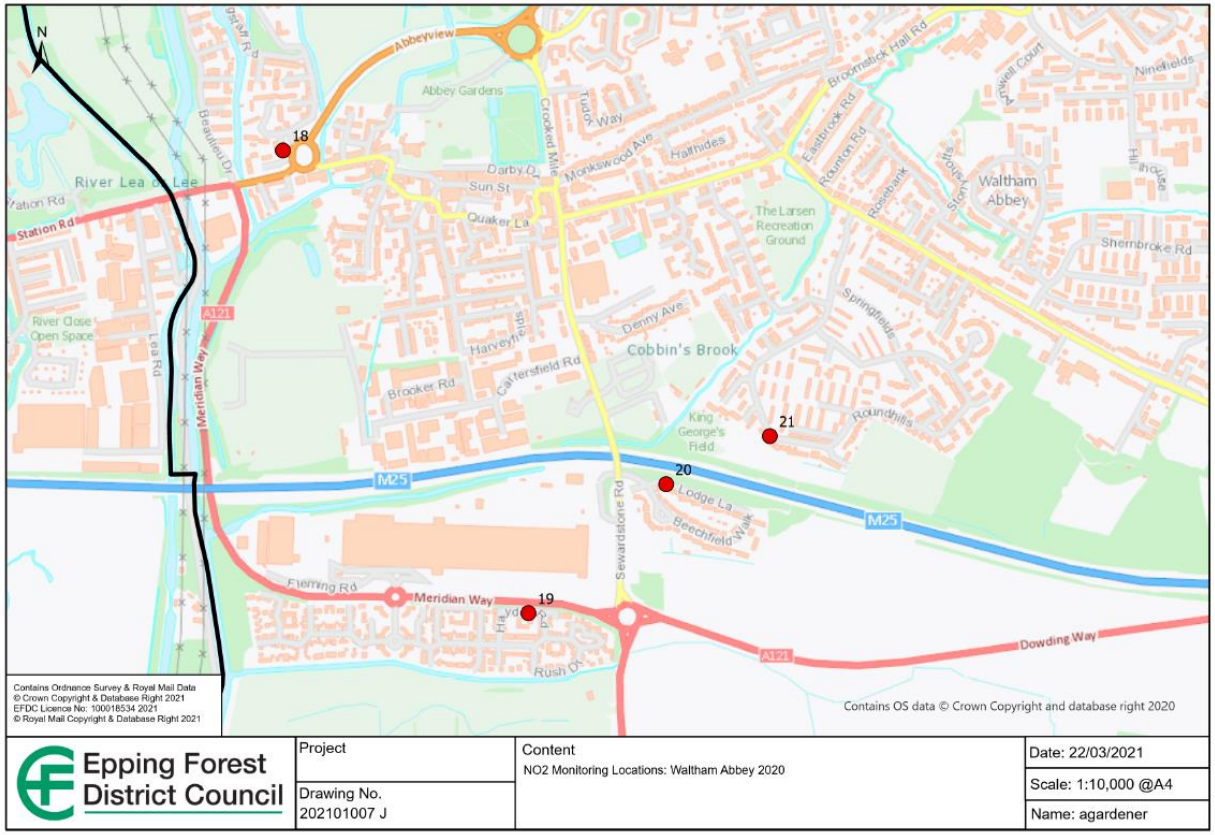
D.1h Sewardstone :



D.1i The Elms, Waltham Abbey :



D.1j Waltham Abbey :



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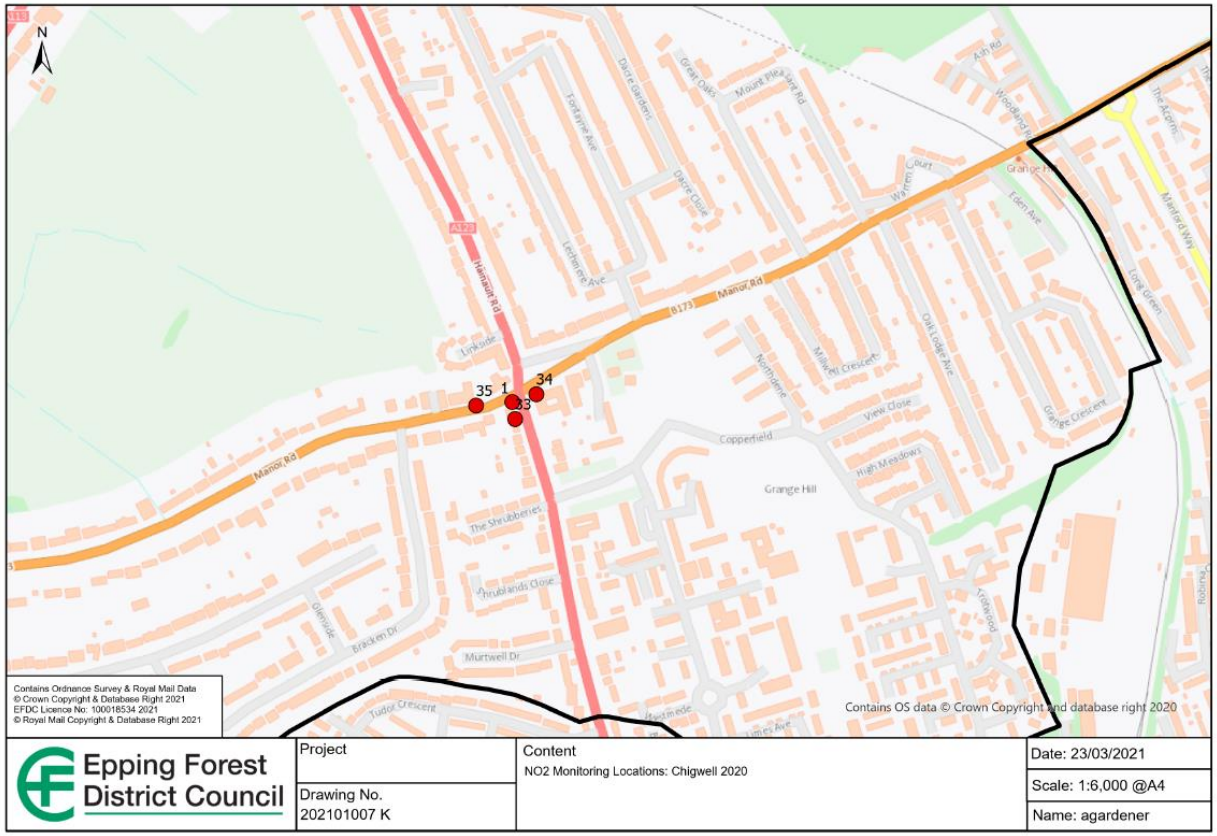

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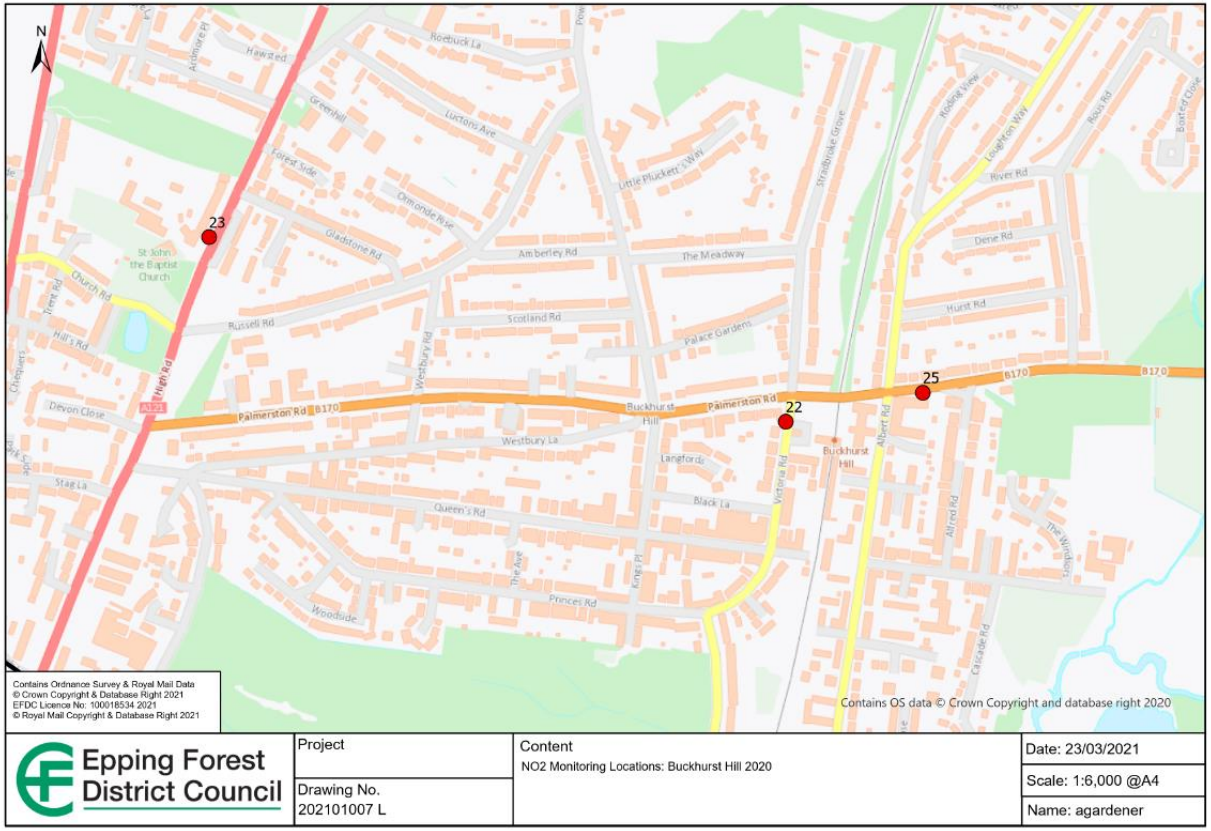
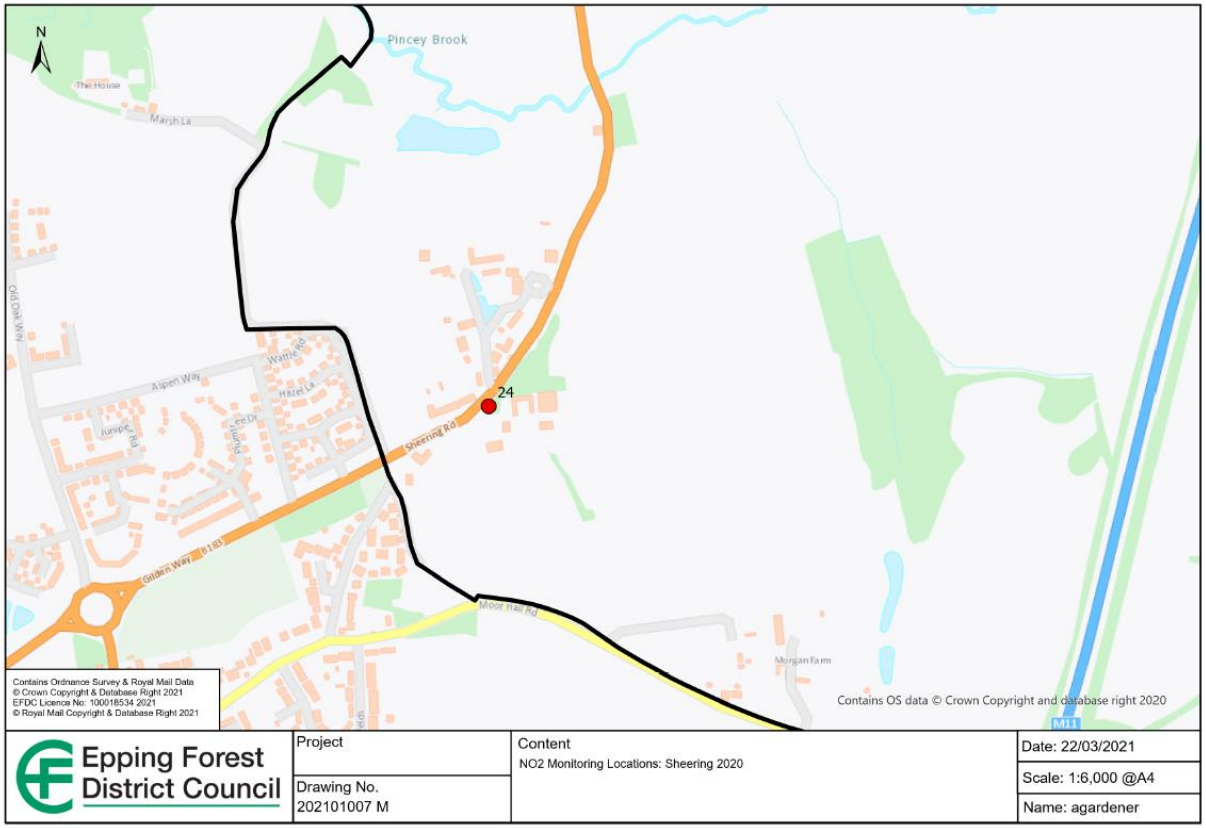
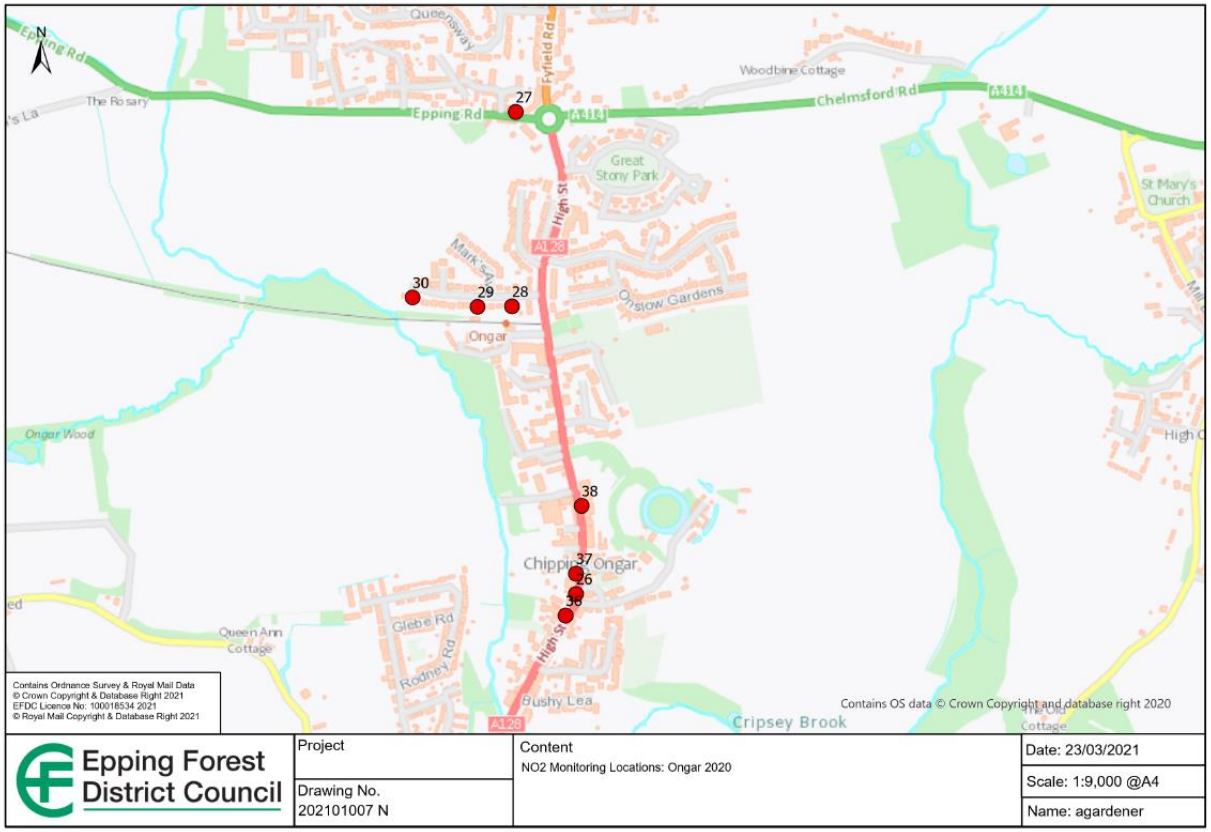


D.1m Sheering :



D.1n Ongar :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Fyfield Rd
Woodbine Cottage
The Rosary
Epping Rd
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Chelmsford Rd
A414
Great Stony Park
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High St
A128
Mark's Rd
Onslow Gardens
Ongar
30
29
28
27
Ongar Wood
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37
36
35
Chipping Ongar
Glebe Rd
Queen Ann Cottage
Rodney Rd
High St
A128
Bushy Lea
Cripsey Brook
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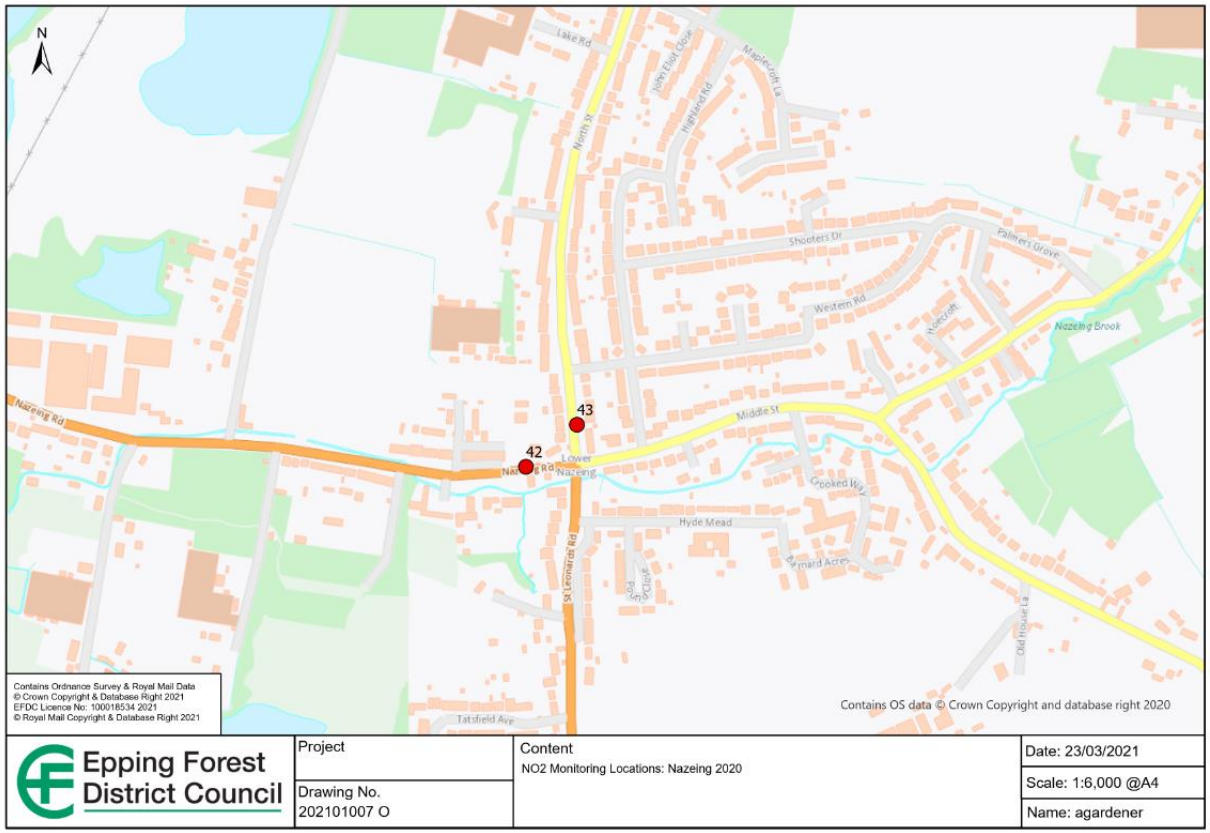
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Shooters Dr
Western Rd
Palmers Grove
Nazeing Brook
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Appendix E: Summary of Air Quality Objectives in England

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).

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[8] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[9] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean

[8] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[9] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

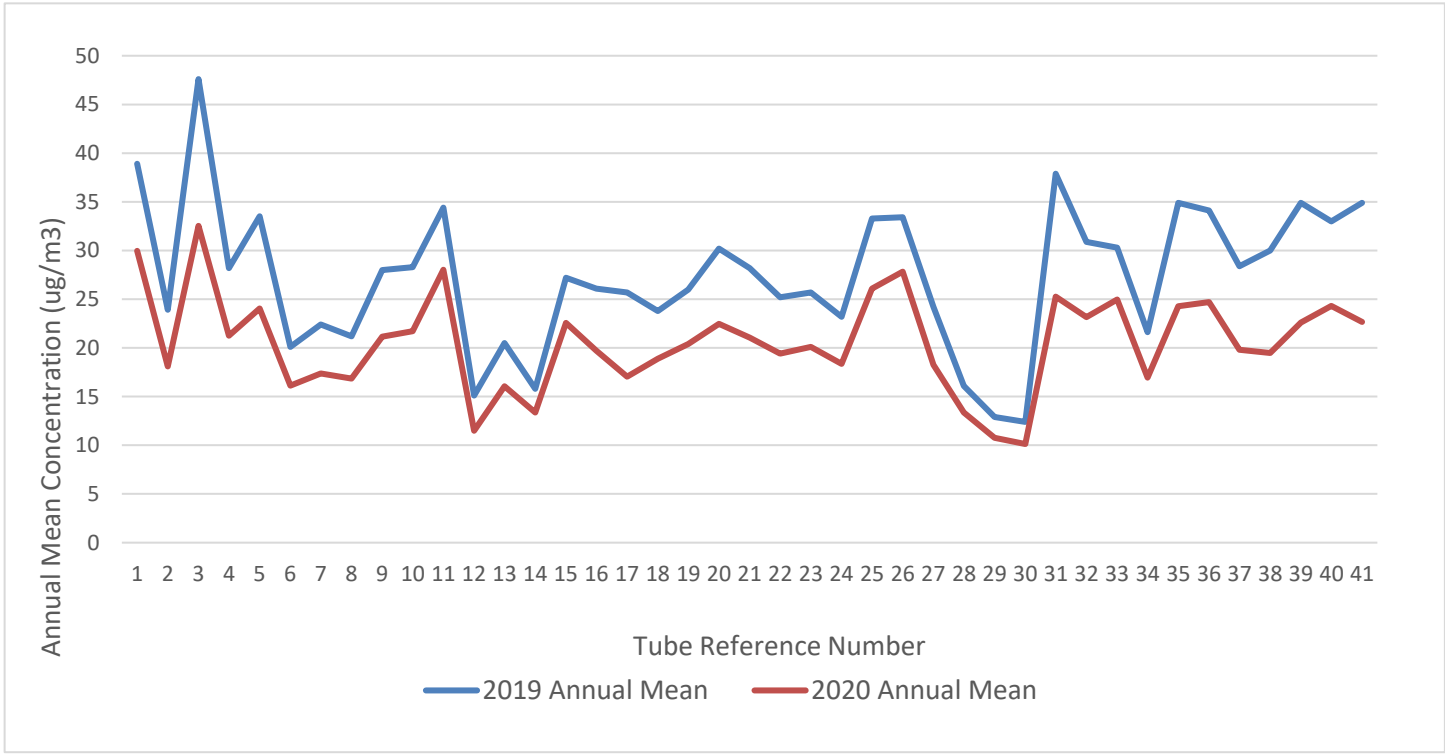
concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Epping Forest District

The measures introduced to limit the spread of COVID-19 seem to have had a significant impact on the concentrations of nitrogen dioxide monitored across Epping Forest District during 2020. The following chart shows the difference in annual mean concentrations at all sites which were measured during both 2019 and 2020:

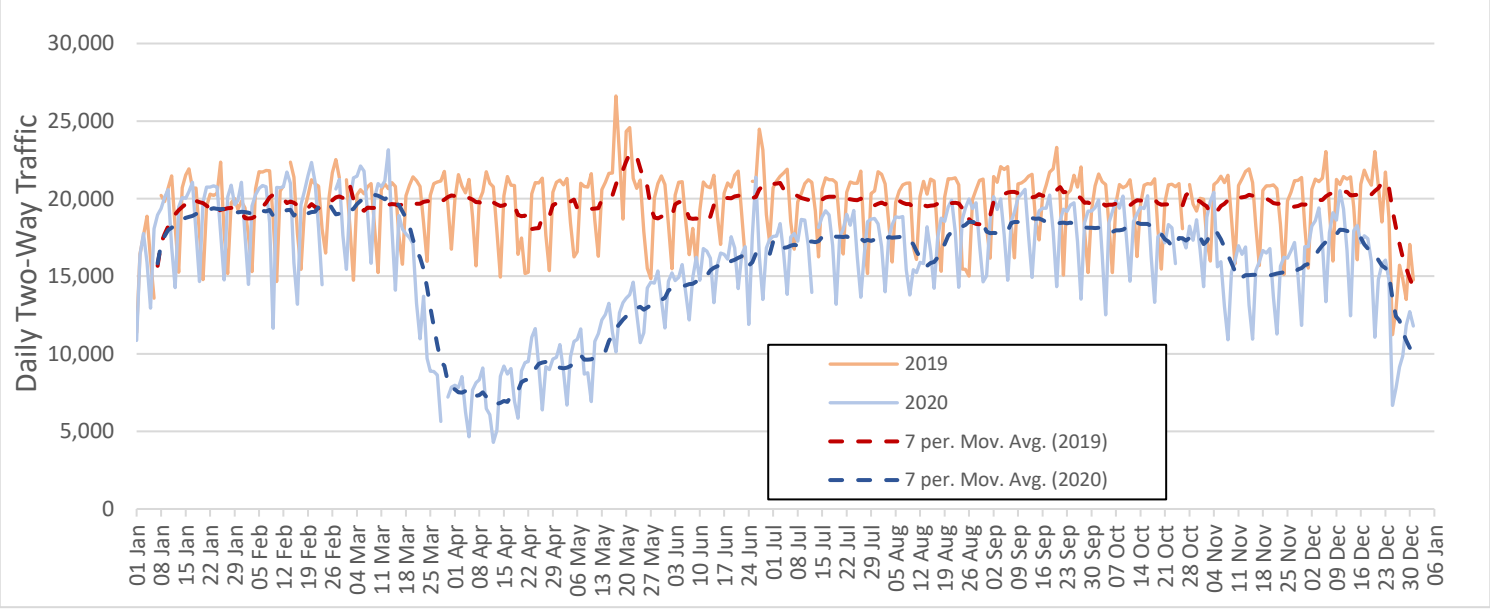
Figure F.1 – Comparison of annual mean NO2 concentrations in 2019 and 2020



The impact of COVID-19 appears to be most pronounced at roadside locations on busy and congested roads. The monitoring results are detailed in table A.2, and the 5 year trends at the various localities are illustrated within the charts in figure A.1.

The AQMA (monitoring location no.3, Bell Vue High Road, Bell Common) measured an annual average nitrogen dioxide concentration of 32.5µg/m^3 in 2020, which equates to a 31.7% reduction from the 47.6µg/m^3 measured during 2019. This was the first year which an annual average lower than the objective for nitrogen dioxide was recorded here, and demonstrates that with reduced traffic volumes, the objective concentrations is achievable. A comparison of traffic data at this location across 2019 and 2020 shows the reduction in vehicle numbers, with the dips in the blue line reflecting periods when people were under some form of restriction. The greatest reduction in traffic numbers during 2020 was following the first national lockdown which was introduced towards the end of March. Traffic information obtained during 2020 will allow estimations to be made for the reduction in traffic numbers required to achieve compliance with the annual mean NO_2 objective going forward.

Figure F.2 – Daily Two-Way Traffic B1383 High Road, Near Bell Common Tunnel, Epping



Similar percentage drops in nitrogen dioxide concentrations were seen at other sites close to the main roads in both Epping and Ongar where they represent busy and often congested sections. At Epping Underground Station a significant drop was also measured,

which may not only be due to the national lockdowns, but also the subsequent reluctance to return to public transport once restrictions were eased.

Opportunities Presented by COVID-19 upon LAQM within Epping Forest District

As a result of the national lockdowns, and the need for everyone to maintain social distancing, Epping Forest District Council took steps to temporarily increase the width of pavements in the main shopping areas. In order to do so, a number of roadside parking spaces were coned off to make space for additional pavement space. In addition to this, and in order to improve safety, road speed limits were reduced to 20 mph through the town centres. It was hoped that these two measures would have encouraged people to feel safer in these areas, and therefore encourage people to walk to the shops as part of their daily exercise rather than to use their vehicles. Whilst we are unable to confirm this as no data is available, it was felt that these changes were beneficial in Epping, and some parking spaces have since been permanently converted to make additional pavement space.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Epping Forest District

During 2020 we did not experience any difficulties in maintaining our air quality monitoring programme. Diffusion tubes were replaced in line with the Defra calendar, and the laboratory that we used did not have any supply issues. **No Impact**

The development of the revised AQAP was delayed partially due to the reallocation of Council resources during 2020. Whilst the AQAP will not be finalised until the Councils revised Local Plan is implemented, source apportionment work and development of additional measures was not progressed as quickly as hoped during 2020. This was recommenced in 2021. **Small Impact**

The impacts as presented above are aligned with the criteria as defined in Table F 1, with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: High
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

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 Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm 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.TG16. April 2021. 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.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.