2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2021

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Executive Summary: Air Quality in Our Area

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].

During 2020, there have been unprecedented widespread reductions in vehicle volumes across the borough during the course of the pandemic. This subsequentially has resulted in improvements in air quality across the borough. However, this improvement may only be temporary and air pollution levels within the Borough of Slough continue to remain a significant environmental and public health concern. Slough Borough Council, the 'Council', continues to work hard to improve air pollution and comply with national air quality objectives (AQOs) and EU limit values.

Good air quality is not only important to improve health outcomes of our residents, but also for enhancing the natural and built environment and for attracting residents, visitors and businesses to Slough.

The wellbeing of those living in Slough are the highest priority and continued implementation of strategies such as the Low Emission Strategy (LES) and its programmes, and emerging strategies such as the new Air Quality Action Plan (AQAP) and Clean Air Plan (CAP), over the next few years will improve air quality and therefore health for all of those living and working in the Borough.

Certain LES programmes have progressed since implementation in 2018, which includes:

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[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

- Slough Electric Car Club Programme
- Electric Vehicle (EV) Infrastructure Programme (rapid and public chargers for public and taxis)
- Taxi EV Rapid Charger Infrastructure Programme
- Bus Fleet Programme (retrofit and electric bus routes)
- Cycle Infrastructure and Hire Programme
- Clean Air Zone (CAZ) Feasibility Programme

However, 2020 saw a reduction in progress in the programme as resources were limited. Delays to projects such as the implementation of the OLEV Rapid Charger project and continued implementation of the Fleet Challenge and EV workplace charging project have occurred as a result of the pandemic and will recommence mid 2021. Despite the disruption of COVID-19, projects such as the Slough Electric Vehicle Plan and CAZ Feasibility Programme have progressed, and the award of a successful funding bid towards reducing taxi emissions was confirmed in 2021 (bid submitted October 2020).

During 2020, there were plans to develop the new AQAP, CAZ Feasibility Study and CAP. Existing AQAPs are in place to address NO_2 exceedances in Slough's 5 Air Quality Management Areas (AQMAs): AQMA 1 and AQMA 2 (2006) and also AQMA3 and AQMA 4 (2012). These are out of date and require a refresh under one comprehensive action plan, to address air quality issues in all of Slough's AQMAs. It should be noted that despite particulate matter (PM_{10} and $PM_{2.5}$) meeting their respective AQOs, the Council continually strives to reduce concentrations due to the health impacts associated with PM exposure.

The AQAP currently in development aims to determine existing NO_2 and PM concentrations, test the effectiveness of the measures outlined in the LES programme in achieving compliance with AQOs, and identify additional measures to tackle air pollution in the Borough. The AQAP will align with upcoming transport strategies including the Strategic Transport Infrastructure Plan (STIP) and new Local Transport Plan (LTP4), to reflect regeneration of the town centre and impacts posed by upcoming major infrastructure schemes including the Heathrow expansion and Smart M4. The AQAP will support the aims of the LES, primarily to design additional measures to reduce NO_2 emissions from road transport and improve health outcomes. Programmes such as the Slough EV Plan will help to achieve this aim, by implementing electric public infrastructure such as fast and rapid electric charging points and promote the operation of electric and ultra-low emission vehicles (ULEVs), including electric car clubs and electric taxis.

The CAZ Feasibility Study is designed to test the effectiveness of a CAZ in Slough on air pollution concentrations and to indicate whether it is feasible to implement such a zone. A CAZ is defined as an area where targeted action is taken to improve air quality from traffic sources – it can be a single road or part/all of a town or city. It would set emission standards to encourage the uptake of EVs and ULEVs which meet the latest European Emission Standard, applicable to a range of vehicles dependent on what CAZ class is implemented. The CAZ may be charging or non-charging. The outcome of the feasibility study will be presented to Cabinet and will demonstrate whether a CAZ is necessary in Slough to improve air quality in the shortest possible time.

The CAP will act as the overarching strategy for air quality in Slough, which will set out all of the Council's aspirations for improving air quality, including measures to address $PM_{2.5}$, supplementary planning guidance to support air quality considerations in the planning process, the air quality communication plan and updates to the air quality network.

Both the new AQAP, CAZ Feasibility Study and CAP have experienced delays due to the pandemic. For example, as traffic levels were greatly depressed, particularly at the start of the pandemic, opportunities to understand fleet compositions to inform the AQAP whilst maintaining a robust methodology were severely reduced. Utilising automatic number plate recognition (ANPR) during this period would have underestimated traffic fleet mix and would have resulted in non-representative air quality data. Delays to the AQAP had caused a knock on delay to the CAP, as much of the information from the AQAP modelling exercises would influence the CAP. It is expected that the AQAP will be progressed from August 2021 and will be ready for consultation at the end of 2021.

Air quality cannot be tackled alone by the Council. The public, businesses and other public and third party sectors need to also play a significant role; either through changes of lifestyle to reduce dependency on the car (modal shift away from the car), increased walking and cycling, adoption of sustainable travel plans, and adoption of EV infrastructure and operation of lower emission vehicles. The Council will lead by example, by adopting policies to increase its EV fleet, reduce grey fleet emissions, and promote modal shift amongst its workforce.

Air Quality in Slough

Sources of Poor Air Quality

The principal source of poor air quality within Slough relates to road traffic emissions, but local construction activities (there is significant regeneration taking place in Slough), diesel trains operating on the Great Western Mainline (some of these are being changed to electric), the town centre bus station (as fleet is relatively old), local industrial processes, larger combustion processes (Energy from Waste Incinerators), airport emissions (affect our receptors in Colnbrook and Poyle), and back-up diesel generators (data centres), as well as transboundary pollutants (e.g. pollutants outside Slough) also contribute to the background pollution levels, and will continue to do so. The Borough has declared 'smoke controlled areas' across Slough's wards, and wood burning and smoke is not known to be a significant source of emissions within Slough, as suggested in early source apportionment modelling.

Future significant sources of air pollution may arise from permitted local developments and Nationally Significant Infrastructure Projects in the wider area planned over the next 5-10 years, including:

- Construction and operation of M4 Smart Motorway - this is designed to allow up to 15,000 additional vehicle movements a day during its operation from 2022 (peaking by 2030) and re-routing of traffic through Slough at times during the construction phase (2019-2021) (Impacts: M4 AQMA, Tuns Lane AQMA, Town Centre AQMA and Brands Hill AQMA).
- Construction of M4 construction compound 9 at Sutton Lane on the edge of the Brands Hill AQMA (2019-2021).
- Operation of Sand and Gravel extraction 'Cemex' sites at Riding Court Road and North Park Road (up to 450 HGV movements a day through Brands Hill/M4 AQMAs and Langley area) (2018 – 2030).
- Rail Borne Aggregate Distribution Depot and Concrete Batching Plant at Thorney Mill Sidings, Thorney Mill Road, Iver, (up to 82 HGV movements a day through Brands Hill AQMA and Langley) (2019 onwards).
- Significant Town Centre regeneration (construction HGV movements and operational vehicle movements) up to 6,000 residential properties, new offices and commercial and retail uses (Town Centre/Tuns Lane AQMA) (2016 – 2036).

- Western Rail Access to Heathrow with significant construction HGV movements through Langley and Brands Hill AQMA (2022 – 2027).
- Heathrow Expansion - a legal challenge to the Airports National Policy Statement had delayed the Development Consent Order process for permission to expand. An application for expansion could still be made in the next couple of years for Heathrow's 3rd runway (runway located within Slough) and changes to associated airport operations, with impacts including the re-routeing of the A4 and diversion of the A3044 into Slough, together with construction HGV and operational movements (2023 – 2040) (All AQMAs).
- Potential demolition, and construction of the new Grundons Energy from Waste facility 200m north of the current site to accommodate the 3rd runway, including a 55m stack (20m lower than the current stack) (currently on hold, potentially 2022-2024) (Iver AQMA and Brands Hill AQMA).
- Slough Northern Extension – a shortfall is predicted in Slough being able to meet its housing allocation within the local plan term, and a proposal for at least 5,000 (and up to 10,000) new homes on Green Belt land within Buckinghamshire is being explored. If pursued, this urban extension could generate significant additional vehicle movements in both the construction and operational phases (2026 – 2036) (All AQMAs).

Air Quality Modelling

Detailed air quality modelling and source apportionment (e.g. which vehicles are mostly responsible for air pollution) was commissioned in 2015 to assist with the development of the Councils LES (the modelling used 2014 air quality data, road traffic data and Heathrow weather data). The modelling determined that local road traffic contributes around 50% towards NO_2 concentrations at relevant receptors (i.e. those modelled within the AQMAs and surrounding area). The remainder is due to background levels that prevail in the area.

Light passenger diesel cars are the main source of air pollution in the Borough accounting for between 7% and 30% of the total NO_2 concentrations. HGVs; artic and rigid HGVs and buses also contribute significantly to poor air quality in the Brands Hill AQMA.

Updated baseline modelling and source apportionment commenced in 2020. Early results indicate that road transport is still the greatest contributor to poor air quality in Slough. The specific sources were modelled in a source apportionment exercise, which indicates that source contributions vary across the borough. A greater proportion of emissions from buses and taxis occurs in the town centre when compared to other locations, and HGV emission sources are greatest in areas where industry is concentrated, such as the Slough Trading Estate and Poyle area, when compared to other locations. A significant proportion of NO_2 emissions arise from private diesel cars.

The future year projections include 2022 and 2026, in conjunction with scenario modelling, will be completed to determine the effectiveness of measures at reducing NO_2 concentrations. The AQAP will determine:

- The baseline NO_2, PM_{10} and $PM_{2.5}$ concentrations within Slough.
- If any existing AQMAs should be revoked or amended.
- If any new AQMAs should be declared within Slough in future (particularly Langley due to the potential impact of the Western Rail Link to Heathrow).
- The effectiveness of the LES measures and additional measures brought up in the AQAP study, in addressing poor air quality.
- The effectiveness of implementing transport measures (e.g. dedicated bus lane, junction re-design etc.) in addressing poor air quality.

Air Quality Monitoring and Future Proposals

The Council has monitored air quality for over 20 years and operates both passive (diffusion tubes) and continuous air quality monitoring stations in the Borough. The Council is continually looking to extend and improve the air quality network. An overview of both the continuous monitoring network, passive diffusion tube network and new air quality sensor network is given below.

Continuous Monitoring

The Council continuously monitors air quality at 5 locations: 5 monitoring stations monitor nitrogen dioxide (NO_2) concentrations; 3 monitoring stations monitor particulates (PM_{10}) concentrations, using established reference methods (TEOM or BAM). The Council also operated 2 Osiris indicative particulate monitors which measured $PM_{1.0}$, $PM_{2.5}$ and $PM_{1.0}$, which ceased January 2020. In November 2019, the operation of Salt Hill Park continuous monitoring station (NO_2 and PM_{10}) ceased due to ongoing faults caused by the age of the equipment and previous water ingress. Data for this area of Slough will continue to be collected at the nearby Windmill monitor (SLH 12), which is more representative of roadside NO_2 concentrations.

The Council upgraded its air quality monitoring network by adding 3 new air quality monitoring stations within the AQMA 4 (Wellington Road, Town Centre), AQMA 2 (London

Road, Brands Hill) and AQMA 3 extension (Windmill, Bath Road) in October 2017. The installation of two additional continuous monitoring stations had been commissioned in 2020, to be installed in Langley (to monitor the impact of increasing transport infrastructure and development in the local area) and Chalvey (relocated from the waste depot to be more representative of residential exposure to emissions arising from the M4). Pippins Colnbrook monitoring station is also due to be replaced and will include the provision of a $PM_{2.5}$ monitor. This project is likely to be progressed during 2021.

Additionally, the Council has access to air quality data (NO_2, PM_{10} and $PM_{2.5}$) from a monitoring station operated by Grundons Lakeside Energy from Waste plant in Colnbrook. Access to real-time and historic monitoring data can be found on the following website Slough Air - AEAT.

Passive (Diffusion Tube) Monitoring

Slough Borough Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 95 sites (123 diffusion tubes) during 2020. Changes to the network from 2019 to 2020 are as follows:

- Salt Hill Park (SLO 1, 2 & 3) – these diffusion tubes were originally co-located with the Salt Hill Park continuous monitor (SLH 4). Upon decommissioning the site, the tubes were redistributed in Salt Hill Park to obtain 'clean' baseline background NO_2 monitoring data. This was completed in April 2020 therefore data for both locations is reported in this ASR.
- Lansdowne Avenue (SLO 4) – after frequent issues of theft, the tube was relocated to a nearby residential block. As this occurred in May 2020, annualised monitoring data is provided for both the previous and new site location.
- Sensor Study Co-location (SLO 98 – SLO 111) – in support of the Slough Sensor Study, diffusion tubes were co-located with Vaisala sensors to compare the accuracy of the sensors. One sensor was also co-located with a continuous analyser (Colnbrook Pippins SLH 3). These tubes were deployed from June 2020.
- A4 Bus Lane Monitoring (SLO 112 – SLO 123) – At request of local Councillors, diffusion tubes were located on six roads surrounding the A4 to monitor potential traffic and congestion increase as a result of the temporary A4 bus lane. More information on this trial is presented in Appendix F.

The 2020 ratified data is reported within the Appendix A, Table A.4 of the report. Please refer to Appendix D to see maps of all the air quality monitoring sites in the Borough.

Sensor Study

One of the key objectives within Slough's 5-year plan is to protect the livelihood and wellbeing of children. As the health impacts related to poor air quality are becoming more apparent, the need to monitor the impact of vehicle emissions outside of schools is increasing. Evidence obtained through monitoring can be used to support the aims of the LES, encourage behavioural change of parents to use sustainable travel methods and aid engagement with public health campaigns.

The project's initial focus was on monitoring NO_2 emissions originating from idling vehicles and congestion around four local primary schools over 8-12 months, including Cippenham, Claycots, Pippins and Penn Wood Primary Schools. However, the pandemic has resulted in disruption to the project as schools were required to deliver remote education to most pupils except for children of key workers and vulnerable children, therefore activity on school boundaries was greatly reduced. As a result, the project plan was adapted and will report on the differences in pollutant concentrations before and after lockdown restrictions were introduced. Early monitoring results from the co-located diffusion tubes are presented in Figure A.12. In the original project plan, monitoring was to cease in November 2020, however due to the disruption caused by COVID-19, this was extended to February 2021. Full details of the influence of the pandemic are presented in Appendix F. Data obtained during this period will be reported to the Department for Environment, Food and Rural Affairs (Defra) within 6 months of monitoring completion (due August 2021).

The main objectives of the study were to:

- Develop a QA/QC methodology including a local correction factor via comparison of sensor measurements with automatic analysers; with diffusion tube results; and a review of inter-comparability between the 15 sensors.
- Analyse nitrogen dioxide (NO_2) and particulate matter (PM_{10}/$PM_{2.5}$) concentrations associated with emissions from school activities including: The contribution of school activities to ambient NO_2 and PM concentrations; and the impact of efforts to reduce these emissions such as walk-to-school days, school travel plans etc.
- Assess the fitness-for-purpose of Vaisala sensor systems and the deployment technique in terms of wider application in the UK and roll out across Smart Cities infrastructure.
- Carry out a cost-benefit analysis to assess a low-cost sensor network versus an NO_2 diffusion tube network taking into account materials, analysis and personnel costs.

Initial results indicate that measurements of NO, O3 and $PM_{2.5}$ from the Vaisala AQT 410 and AQT 420 were unreliable, however both NO_2 and PM_{10} performed well. Figure A.12 demonstrates that with a reduction of nearby influences (as traffic was reduced during the pandemic), background sources of NO_2 were dominant and all co-located diffusion tube sites track each other well. The full detailed report will be released in August 2021.

Air Quality Management Areas (AQMAs)

AQMAs are defined geographical areas where air pollution levels are, or are likely to, exceed national AQOs at relevant locations (where the public may be exposed to harmful air pollution over a period of time e.g. residential homes, schools etc.). These are also shown within Appendix D.

Five AQMAs have been declared within Slough due to breaches of the annual mean concentrations for NO_2 (40µg/m^3). Due to officer resource constraints, the number of residential properties within AQMAs has not yet been updated, therefore the information presented is in reference to 2019 data.

AQMA 1: including land adjacent to the M4 along the north bound carriageway (junctions 5-7) and southbound carriageway (junction 5 – Brands Hill) up to a distance of approximately 100m from the central carriageway. In June 2019, there were 559 residential properties located within AQMA1.

AQMA 2: incorporates A4 London Road east of junction 5 M4, 300m past Sutton Lane along the Colnbrook by-pass and covers the entire gyratory system on the A4 and both sides of the A4 carriageway. In June 2019 there were 28 residential properties located within AQMA 2. A new residential development (Rogans) being developed opposite the A4 gyratory (within the AQMA 2) will at least double the number of residential properties exposed in this location.

AQMA 3: incorporates the A355 Tuns Lane from junction 6 of the M4 motorway in a northerly direction to just past its junction with the A4 Bath Road approximately 200m north along A355 Farnham Road, the area is known as the "Three Tuns". In June 2019 there were 351 residential properties located within AQMA 3.

AQMA 4: incorporates the A4 Bath Road from the junction with Ledgers Road/Stoke Poges Lane, in an easterly direction, along Wellington Street, up to the Sussex Place junction. In June 2019, there were 823 residential properties located within the AQMA 4.

AQMA 3 Extension: The Council declared the new extended AQMA 3 on 10th May 2018 and formally submitted this to DEFRA. In June 2019, there were 227 residential properties located within the extended AQMA3.

In June 2019, 1988 residential properties were located within one of Slough's AQMAs. There are no schools located within Slough's AQMAs. The playing grounds of Foxborough Primary School just skirts the edge of the AQMA1 M4. The number of residential properties is set to increase as more residential units will be built within the Town Centre and along the A4 Bath Road.

Air Quality Concentrations 2020

This report covers the air quality results obtained during 2020 and compares these results over the past five years (or less time if sites are new) at the same sites to determine if there are any clear trends in pollution levels. These rolling trends must be treated with caution as they do not include statistical confidence, and air quality can change significantly from one year to the next due to metrological conditions and pollution episodes.

The air quality trend in 2020 shows a significant improvement in NO_2 concentrations when compared to previous years, primarily caused by the reduction of traffic caused by the pandemic. This trend is reflected nationally as all of the UK had lockdown restrictions imposed. In previous years, both nationally and locally, the trend has tended to show a decrease in pollution concentrations. In order to determine whether the reduction of NO_2 experienced in 2020 will be sustained in the longer term, continued monitoring is required.

The headlines of the 2020 Slough monitoring results, compared with 2019 data (see Appendix A, Table A.3 and Appendix B, Table B.1 for all results) are that:

- Pre-existing diffusion tubes located in AQMA 1 had been below 10% of the AQO level since 2017. Diffusion tubes deployed as part of the Highways England M4 Monitoring Programme indicated that 5 receptor sites experienced concentrations within 10% of the AQO in 2019. This trend was disrupted by data recorded in 2020, with the highest concentration recorded at Spackmans Way (Highways England Receptor 3, SLO 73) at 25.0µg/m^3.
- The monitoring locations at residential receptors within AQMA 2 are typically high, particularly at SLO 18 (Brands Hill (A)). Data from 2019 indicates that 4 sites were above the AQO prior to distance correction, with a further 2 sites within 10% of the AQO. When comparing with 2020 data, only SLO 18 is within 10% of the AQO at

38.5μg/m^3 (33.3μg/m^3 once distance corrected). All other sites are below 30μg/m^3 for 2020.

- Within AQMA 3, only Tuns Lane (B) (SLO 50) exceeded the AQO for NO_2, at 42.8μg/m^3 in 2019. The remaining diffusion tubes recorded concentrations below 32μg/m^3. When comparing to 2020, the NO_2 concentration at SLO 50 was 30.6μg/m^3.
- In 2019 within the AQMA 3 Extension, the co-located Windmill diffusion tubes (SLO 57 – 59) averaged at 38.4μg/m^3. Comparatively in 2020, concentrations averaged at 27.3μg/m^3, with concentrations at Windmill (Bath Road) lower at 25.0μg/m^3.
- The highest NO_2 concentration recorded in AQMA 4 during 2019 was Yew Tree Road (SLO 29) at 48.5μg/m^3 and was the only diffusion tube to exceed the AQO within this AQMA. Comparing to 2020, no diffusion tube concentrations are within 10% of the AQO, although the highest concentration is still experienced at SLO 29, at 33.8μg/m^3.

In regards to diffusion tube locations outside of AQMAs, the results indicate that:

- The highest concentration in Langley in 2019 was 39.9μg/m^3 at High Street Langley (A) (SLO 53), with other diffusion tube concentrations in Langley <35.0μg/m^3. Comparing to 2020, this has reduced by 12.0μg/m^3 and no diffusion tube concentrations are within 10% of the AQO.
- Roadside and kerbside sites show an expected drop in NO_2 concentrations in 2020. Prior to this, there had been a more continuous decline in NO_2 concentrations at many sites.
- As expected, suburban and urban background sites have concentrations much lower than roadside and kerbside sites, particularly in 2020, due to the lack of traffic. High concentrations were previously recorded at Horton Road (Caravan site) (SLO 17) (peak in 2018, at 41.5μg/m^3) due to high volumes of HGV traffic. The impact of the pandemic has brought concentrations at SLO 17 to 24.9μg/m^3 (a reduction of 8.4μg/m^3 from 2019), which is just below concentrations recorded in 2017. However, it should be noted that meteorological effects may have influenced this data.
- The 5 year trend at rail and industrial sites shows a very slow decline in NO_2 from 2016 to 2019, with a steeper decline from 2019 to 2020. Similarly to SLO 17, Lakeside Road (SLO 12) experiences heavy HGV traffic which would have been greatly reduced during the pandemic. This has resulted in an NO_2 reduction of 12.9μg/m^3. Other diffusion tubes show a more gradual decline over the last 5 years, however it is noted that both Sandringham Court (SLO 41) and Walpole Road (SLO 42) consistently have

the lowest concentrations, particularly in 2020, at 13.6µg/m^3 and 12.8µg/m^3, respectively.

In summary, 18 diffusion tube monitoring locations were exposed to NO_2 concentrations within 10% of the AQO, and a further 6 exceeded the AQO (inside and outside of AQMAs) in 2019. Comparing to 2020, concentrations across Slough have reduced dramatically, with only one diffusion tube location recording concentrations within 10% of the AQO (SLO 18 at 38.5µg/m^3).

While NO_2 concentrations obtained over 2020 are much lower than usual due to the pandemic, the data should not be considered in the support of revoking any AQMAs. More evidence in future reporting years is required to determine whether any of the AQMAs should be revoked or any new AQMAs declared (such as Langley). Any trend would have to be sustained and show a persistent reduction below 36µg/m^3 for at least 5 years. Currently, this is not the case for any existing AQMAs. It is noted that lockdown restrictions and therefore reduced traffic volumes has continued into mid 2021, therefore it is likely that the conditions will not be typical (i.e. not similar to conditions prior to 2020) until 2022.

The impact of the pandemic has clearly been positive on NO_2 concentrations in Slough. Concentrations recorded in 2020 demonstrate that if traffic levels were reduced and sustained for future years, all AQMAs could potentially be revoked. Increasing mode share targets and encouraging uptake of sustainable transport to reduce car use are therefore key in reducting concentrations, however there must be stronger interventions to accelerate the rate of uptake and reduce car use to the extent of pandemic levels.

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

[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

out the approach to reduce exhaust emissions from road transport through a number of mechanisms. This is extremely important given that the majority of AQMAs are designated due to elevated concentrations heavily influenced by transport emissions.

The Council reported to Defra in 2019 on 40 measures that are aimed at directly or indirectly improving air quality in Slough. The number of measures reported within this ASR stands at 46, due to the introduction of Emergency Active Travel Funded (EATF) measures provided by DfT. A number of these measures are still ongoing, some have yet to start, and others are in the planning stage. Whilst these measures may have had some positive effects on air pollution concentrations and contribute towards the downward trend, there is a need for more robust measures to be co-ordinated through a live strategy (e.g. refreshed AQAP, the LES and emerging STIP).

It is also clear that improving air quality requires a multi-disciplinary approach across all Council Services and its Partners and across the wider residential and business community.

The Council has developed AQAPs for AQMAs 1-4, however there is a need to update these action plans and make them more relevant to reflect the significant regeneration of the town centre, as well as considering the transport impacts of major permitted infrastructure schemes (Smart M4) and potentially the expansion of Heathrow Airport and Western Rail Access to Heathrow.

Due to the disruption caused by the pandemic, no measures were completed during 2020. However, many measures were newly introduced during 2020 or are ongoing from previous years, some of which came about due to the pandemic and subsequently released EATF. This includes the A4 bus lane trial scheme and the eScooter trial. Full details of these schemes are provided in Table 2.2 and Appendix F – 'Opportunities Presented by COVID-19 upon LAQM within Slough Borough Council'.

Slough Borough Council expects the following measures to be completed over the course of the next reporting year:

- Initiation of the Defra funded EV taxi demo project
- Finalisation/installation of rapid chargers – OLEV funded for taxi project
- Consultation of AQAP
- Development of CAP
- Strategy for the funding and implementation of AQAP measures
- Development of Climate Change Strategy, will have positive implications for air quality

Conclusions and Priorities

Due to the reduction of traffic during 2020, there are no exceedances of the annual NO_2 AQO at any passive or continuous monitoring location. However, it is not yet clear how long this trend will continue and as this is an anomalous year, it is not recommended that any AQMAs are revoked, until concentrations of <36µg/m^3 persist for at least 5 years. The Council will continually strive to reduce concentrations and sustain this level of compliance. The Council is in the process of producing a new AQAP to co-ordinate and outline robust measures to address poor air quality.

The key challenges Slough faces in addressing poor air quality are:

• Our population is growing at a significant rate. We are expected to build nearly 20,000 new homes over the next 20 years within a heavily populated and congested urban Borough (Slough is only 32.54 km^2). We will need to reduce the amount of parking allocated to town centre residential developments and ensure significant EV charging infrastructure is installed and EV/ULEV car clubs are operating to enable residents to have a low emission vehicle option.

• The main challenges are non-conforming EURO 6 light passenger diesel cars and vans, coupled with the significant growth in diesel vehicles over the past 20 years, although these are now showing a significant decline in sales following the VW emissions scandal. The Government needs to ensure newer diesel vehicles entering the market will meet the tougher real-world emission standards. There needs to be more promotion and awareness of EVs and their air quality benefits over diesel cars. The Government has announced the ban of sale of all petrol and diesel cars from 2035.

• A lack of public awareness and understanding of air pollution is a significant barrier to change. There is a need for a public awareness campaigns at national level and at a local level, and Slough will work collaboratively with Public Health and all its stakeholders and officers on local communication and awareness of air quality.

• Over the next 10 years – significant traffic growth locally, associated with the operation of M4 Smart Motorway, Town Centre Development, and potentially the expansion of Heathrow airport will place significant strain on the highway network and will adversely impact air quality.

Local Engagement and How to get Involved

Slough residents can find out more about air quality by visiting Slough Borough Council's air quality webpages.

Slough residents have access to the free app, AirTEXT, which provides air quality alerts and health advice for at-risk groups and the general population[7].

The LES has its own dedicated web page on the Slough Borough Council website[8].

Slough has prepared a communication campaign in 2018 to raise awareness of poor air quality and to advise what actions can be taken at a local level to address air pollution. This will be published on the website.

In May 2019, Public Health Slough launched a new website. A dedicated air quality page has been set up and will be populated with information on air quality, how members of the public can reduce their impact on air quality and the health benefits. This can be found on the following website: Air quality - Slough Public Health

[7] Airtext website

[8] Slough Local Emission Strategy 2018 - 2025

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1. Local Air Quality Management

This report provides an overview of air quality in Slough 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 AQOs are likely to be achieved. Where an exceedance is considered likely, the local authority must declare an AQMA and prepare an 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 Slough Borough Council to improve air quality and any progress that has been made.

The statutory AQOs applicable to LAQM in England are presented in Table E.1.

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas (AQMAs)

AQMAs are declared when there is an exceedance or likely exceedance of an AQO. After declaration, the authority should prepare an 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 Slough Borough Council can be found in Table 0.1. The table presents a description of the 5 AQMAs that are currently designated within Slough Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The AQO pertinent to the current AQMA designations is the NO_2 annual mean.

Table 0.1 – Declared Air Quality Management Areas (AQMAs)

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
Slough AQMA 1	Declared 23/06/2005	NO_2 Annual Mean	An area encompassing land adjacent to the M4 motorway along the north carriageway between junctions 5 and 7 and along the south carriageway between junction 5 and Sutton Lane.	YES	44	26.3	Annex C of the Local Transport Plan - 2006	Slough Local Transport Plan
Slough AQMA 2	Declared 23/06/2005	NO_2 Annual Mean	Incorporates A4 London Road east of junction 5 M4, 300m past Sutton Lane along the Colnbrook by-pass and covers the entire gyratory system on the A4 and both sides of the A4 carriageway.	NO	62	38.5	Annex C of the Local Transport Plan - 2006	Slough Local Transport Plan
Slough AQMA 3	Declared 24/01/2011	NO_2 Annual Mean	The Designated Area incorporates the A355 Tuns Lane from junction 6 of the M4 motorway in a northerly direction to just past its junction with the A4 Bath Road and A355 Farnham Road, known as the Three Tuns.	NO	51	30.6	"Action Plan for Slough Air Quality Management Areas Nos. 3 and 4	Action plan for Slough AQMA nos 3 and 4 (PDF) (DEFRA)

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
							(19/11/2012)	
Slough AQMA 4	Declared 24/01/2011	NO_2 Annual Mean	The Designated Area incorporates the A4 Bath Road from the junction with Ledgers Road/Stoke Poges Lane, in an easterly direction, along Wellington Street, up to Sussex Place junction.	NO	63	33.8	Action Plan for Slough Air Quality Management Areas Nos. 3 and 4 (19/11/2012)	Action plan for Slough AQMA nos 3 and 4 (PDF) (DEFRA)
Slough AQMA Extended 3	Declared 10/05/2018	NO_2 Annual Mean	The Designated Area incorporates a stretch of road between Tuns Lane Junction known as the "Three Tuns" and 30 Bath Road and also includes Quadrivium Point.	NO	42	27.3	TBC	Slough Local Emission Strategy 2018 - 2025

☒ **Slough Borough Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Slough Borough Council

Defra's appraisal of last year's ASR concluded that the evidence provided by the local authority to support the conclusions reached are accepted for all sources and pollutants. In addition, Defra supported Slough Borough Council's concerns over increasing NO_2 concentrations in Langley, particularly on Langley High Street (SLO 53) and agreed that Slough Borough Council should be prepared to declare a new AQMA if necessary. Due to the impact of the pandemic, no new AQMAs will be declared on the basis of 2020 monitoring data, as concentrations were very low borough wide during 2020. Lockdown measures implemented at the beginning of the year are anticipated to persist until 19th July 2021 as a minimum, therefore the annual averages obtained during 2021 are likely to be lower than concentrations prior to 2020 due to continued reduction in traffic levels. It is therefore difficult to determine whether a new AQMA will be declared in the near future for Langley. It is therefore likely that this confirmation will be provided once a full year of data is obtained with typical (before 2020) traffic levels, in ASR 2022.

The development of the new AQAP was also noted. Progress on the development of the AQAP is discussed in section 2.2.1.

Slough Borough 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 all measures completed, in progress or planned are set out in Table 0.2. 45 measures are included within Table 0.2, with the type of measure and the progress Slough Borough Council have made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 0.2.

More detail on these measures can be found in their respective Action Plans (AQMA 1 and AQMA 2 (2006) and also AQMA3 and AQMA 4 (2012)). The LES forms the basis of the emerging AQAP which is due for consultation at the end of this year.

No measures were completed during 2020. However many measures were newly introduced during 2020 or are ongoing from previous years. Many of which came about due to the pandemic and subsequently released EATF. This includes the A4 bus lane trial scheme and the eScooter trial. Full details of these schemes are provided in Appendix F – 'Opportunities Presented by COVID-19 upon LAQM within Slough Borough Council'.

Slough Borough Council expects the following measures to be completed over the course of the next reporting year:

- Initiation of the Defra funded EV taxi demo project (to run until 2022)
- Finalisation/installation of rapid chargers – OLEV funded for taxi project
- Consultation of AQAP
- Development of CAP
- Strategy for the funding and implementation of AQAP measures
- Development of Climate Change Strategy, will have positive implications for air quality

Slough Borough Council’s priorities for the coming year are to complete the AQAP revision and continue with the development of the CAP. It is anticipated that the development of this strategy will help to facilitate the successful implementation of air quality measures. As part of the new AQAP, the impact of specific measures will be presented.

The principal challenges and barriers to implementation that Slough Borough Council anticipates facing are related to funding. Many suggested measures are time consuming and costly to implement, and are sometimes opposed politically. It is critical that the messaging behind the benefits of these measures are widely understood across the Council and those living and working in the borough, to enable measures to have political support and enable implementation, through continued funding and support.

Progress on some of the LES measures has been slower than expected due to the impacts of the COVID-19 pandemic and Council transformation programme. For example, it was anticipated that over 2020, new electric pool vehicles were to be purchased and be stationed at the new headquarters, however the office has been mostly unoccupied since March 2020, therefore a decision was made to postpone the procurement.

The Council is currently undergoing a restructure, which has resulted in the deletion of the LES programme officer and project manager roles who were to be dedicated to LES implementation. The restructure process has however welcomed a new Programme Officer to the team, but resources are still limited. It is therefore anticipated that there will be ongoing challenges with the implementation of LES projects as resource has been reallocated. Although this may slow the implementation of such measures, it is expected that implementation of all measures will be achievable.

Slough Borough Council anticipates that the measures stated above and in Table 0.2 will achieve compliance in AQMA 3 and 4. Although steps are being taken to improve air quality in AQMA 1, additional action is required by Highways England to manage pollution arising from the M4. It is not yet clearly understood whether the Smart Motorways scheme will benefit air quality in the local area by reducing congestion on the M4, or if it will allow for more traffic capacity and subsequently result in a deterioration of air quality. Air quality monitoring was commissioned in 2019 to monitor the impact of the M4 scheme, however the trend has been disrupted by the pandemic during 2020, so further data is required before the impact of the scheme can be determined. A discussion on the impact of COVID-19 on air quality in Slough is discussed further in Appendix F.

Due to high volumes of HGVs using the Brands Hill gyratory and expected increases in traffic as a result of major infrastructure projects in the area, harder measures may be required to reduce NO_2 to meet compliance levels. Currently, transport infrastructure works are ongoing in the Brands Hill area, including modifications to the gyratory and the introduction of a bus lane. The impact that these schemes have on air quality may be evident in data collected over 2022.

Whilst the measures stated above and in Table 0.2 will help to contribute towards compliance, Slough Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of AQMA 1 and AQMA 2.

2.2.1 Air Quality Action Plan (AQAP) Revision

In last year's ASR, plans to revise the existing AQAPs under a new consolidated plan to address NO_2 exceedances across the borough was proposed. Due to delays to the project, this work has taken longer than anticipated to complete. Progress on each stage of the AQAP is reported below:

- Establishment of steering group – as the development of the AQAP has coincided with the pandemic and restructure process, engagement with steering group members has been challenging with ongoing officer resource constraints. As a consequence, steering group meetings have been held on a 1-2-1 basis, to ensure maximum engagement.
- Review of local policy and strategies – Slough's existing AQAPs are underpinned by the LTP that was in place at the time of the action plan's development. As a consequence, the AQAPs are based on out of date information that is no longer applicable. All existing policy and strategy within Slough Borough Council which have an impact on air quality have been reviewed and consolidated to form the structure of the action plan, bringing the action plan up to date.

- Transport modelling – baseline transport modelling was required for the years 2017, 2022 and 2026 to inform the air quality model. This was particularly challenging as traffic levels were and still are impacted by the pandemic, and therefore automatic number place recognition (ANPR) could not be used to determine vehicle fleets. To overcome this issue, national fleet data and comparative data from other local authorities had been used.
- Updated baseline air quality modelling (using 2017 base year, 2022 and 2026 future years) – baseline modelling was last completed for the development of the LES, using a baseline year of 2014. Similarly to local policy, this information required a refresh, therefore baseline modelling has been completed for 2017, with future projections for 2022 and 2026. This has been completed for NO_2, PM_{10} and $PM_{2.5}$.
- Source apportionment – to understand the sources of Slough's pollutants, source apportionment has been completed for the 2017 baseline year. This allows Slough Borough Council to produce an AQAP that is focused on key sources of NO_2, PM_{10} and $PM_{2.5}$ across the borough.
- Scenario modelling – This aspect of the AQAP is currently in progress (as of June 2021). The scenario modelling focuses on measures which have the greatest potential to improve air quality, also considering the technical feasibility, cost and timescale implications of their implementation. Delays to obtaining a baseline of low emission vehicles in the borough has resulted in delays to the modelling. It is critical that issues highlighted in the modelling work are resolved to ensure evidence which informs the AQAP is as accurate and representative as possible, to ensure a greater degree of confidence in the future projection modelling results.

It is anticipated that the modelling scenario results will be processed and incorporated into the AQAP in Q3 2021 ready for release for consultation in Q4. Defra are a key consultee and will be notified when the AQPA is ready for comment. Subsequent to this, the AQAP will be presented to Cabinet for approval and implementation.

2.2.2 Slough's Low Emission Strategy (LES 2018-2025)

The LES was approved by Cabinet in September 2018.

The principal aim of the LES is to improve air quality and health outcomes across Slough by reducing vehicle emissions through the accelerated uptake of cleaner fuels and technologies. The LES is detailed and broad, extending to 2025 and it can be broken down into three key themes:

1. Evidence for Change – why are we taking action to improve air quality?
2. Creating a Low Emission Future: Leading by Example - what the council can do with its powers to improve emissions.
3. Clean Air Zone (CAZ) Framework for Slough: A framework to control emissions delivery in partnership with key stakeholders.

The Strategy has an accompanying Low Emission Programme, consisting of 52 projects which focus on increase and maintenance of Slough's air quality network, implementation of EV charging infrastructure, initiation of the Slough car club programme and reducing emissions of public transport (including taxis) and the Council fleet.

An update to the Slough LES at the two year formal review period was presented to Cabinet in December 2020. It was established that significant funding is required to enable successful delivery of the LES, totalling approximately £14.8 million, £10.4 of which had been secured through grant fund applications and S106 contributions.

2.2.3 Strategic Transport Infrastructure Plan (STIP)

In February 2019, the Council's Cabinet approved the key principles of a transport vision to support the emerging Local Plan and regeneration of the town centre. The key principles focussed on improving public transport, improving cycling and walking and improving the public realm to make the Centre of Slough a place where residents want to live, and where businesses want to be based.

The key principles document showed that Slough's road network is under significant pressure, particularly at peak times, resulting in congestion, safety and air quality issues. This plan has been prepared alongside work to refresh the emerging Local Transport Plan (LTP4) to be released in 2021. The plans are complementary, working towards a common set of objectives.

The key proposals of the STIP include:

- Public transport improvements, including the implementation of a Slough Mass Rapid Transit network, and infrastructure improvements for traditional bus services.
- Enhancements of walking and cycling infrastructure and public realm, to create gateway schemes and improve the pedestrian environment.
- Development of the Highway network, such as junction improvements to reduce vehicle capacity on specific roads.
- Town centre and public parking strategy development, including the consolidation of parking outside of the town centre and the introduction of a park and ride scheme.

The STIP is due to be presented to Cabinet mid 2021.

2.2.4 Slough Access Fund

The Slough Access Fund programme is aimed to support the local economy by addressing traffic congestion, boosting levels of cycling and walking and by improving access to jobs, skills, training and education. The Access Fund covers 4 key elements:

1. Smarter travel for Slough businesses. This includes cycle events, lift sharing and financial support for increased uptake of active travel, such as cycle parking.
2. Supporting sustainable access to jobs. This includes public transport travel plans, particularly focussing on rail stations.
3. Smarter travel for schools. This includes cycle training (Bikeability), active travel competitions and events, and active movement for schools.
4. Targeted marketing of sustainable and healthy travel. This includes Slough cycle hire, adult cycle training and schemes to increase cycling update.

Specific measures which fall into these themes are presented in Table 2.2. The Access Fund programme had been on hold during 2020 and is still on hold at present (June 2021). It is expected that progress is made towards the end of 2021 into 2022.

2.2.5 Slough's Clean Air Plan (CAP)

During 2021/22, the Council will be developing the new CAP. The CAP will consolidate all air quality aspirations and improvement plans across the Borough into one comprehensive strategy. This plan will include the following:

- The new AQAP, including the LES measures to improve air quality (including the CAZ feasibility study) and any new measures which emerge from the AQAP process.
- Planning policy supplementary planning document, to support the LES in setting clear guidance on air quality assessments and securing mitigation against significant air quality impacts as a result of major development schemes.
- A study focusing on improvements in $PM_{2.5}$ and smoke control. Despite Slough not exceeding the EU limit for PM, it is important that action is taken to reduce emissions as far as possible. Public Health will have a key role in this study.
- A comprehensive communication plan, which outlines the methodology to increase awareness of air quality for residents in the Borough, including use of media such as AirTEXT, results from Slough's Sensor Study and one to one consultations with GPs.

- Improvements and aspirations for Slough's air quality network, including adaptations to the continuous monitoring network, introducing new monitors (e.g. $PM_{2.5}$ monitors) and increasing the use of air quality sensors (dependent on the outcome of Slough Sensor Study).

Delays to the AQAP has resulted in a knock on impact to the development on the CAP. It is anticipated that development of the CAP can progress as the AQAP is finalised, with the aim to have a first draft complete by the end of 2021.

Table 0.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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	Access Fund Smarter Travel for Slough Business Programme	Promoting Travel Alternatives	Workplace Travel Planning	2017	2021	SBC, Slough Workplaces	DfT	NO	Funded	£1 million - £10 million	Implementation	Borough Wide	% mode share	No formal metrics to indicate modal shift. Active Travel and Behavioural change / modal shift remain a Council priority.	Introduced April 2017. Funding share of £2m. Further £500k awarded by DfT, now running until 2021. Cycle September 2019 involved 21 organisations to participate. Currently no further funding by DfT, but work continuing where possible given existing funds.
2	Access Fund Smarter Travel for Slough Schools Programme	Promoting Travel Alternatives	School Travel Plans	2017	2021	SBC, Slough Schools	DfT	NO	Funded	£1 million - £10 million	Implementation	Borough Wide	% mode share	No formal metrics to indicate modal shift. Active Travel and Behavioural change / modal shift remain a Council priority.	Introduced April 2017. Funding share of £2m. Further £500k awarded by DfT, now running until 2021. Cycle September 2019 involved 21 organisations to participate. Currently no further funding by DfT, but work continuing where possible given existing funds.
3	Access Fund Smarter Travel for Slough residents Programme	Promoting Travel Alternatives	Other	2017	2021	SBC, charities, voluntary groups	DfT	NO	Funded	£1 million - £10 million	Implementation	Borough Wide	% mode share	No formal metrics to indicate modal shift. Active Travel and Behavioural change / modal shift remain a Council priority.	Introduced April 2017. Funding share of £2m. Further £500k awarded by DfT, now running until 2021. Cycle September 2019 involved 21 organisations to participate. Currently no further funding by DfT, but work continuing where possible given existing funds.
4	Marketing and Promotion of Sustainable	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2017	2021	SBC	DfT	NO	Funded	£1 million - £10 million	Implementation	Borough Wide	% mode share	No formal metrics to indicate modal shift.	Introduced April 2017. Funding share of £2m. Further £500k

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
	travel options in Slough													Active Travel and Behavioural change / modal shift remain a Council priority.	awarded by DfT, now running until 2021. Cycle September 2019 involved 21 organisations to participate. Currently no further funding by DfT, but work continuing where possible given existing funds.
5	Promote use of rail SBC staff	Promoting Travel Alternatives	Promote use of rail and inland waterways	2011		SBC	SBC / LEP	NO	Partially funded	£10k - 50k	Implementation	Borough Wide and Outside Borough	% mode share rail travel, % increase of travel warrants	No formal metrics to indicate modal shift. Data requested from GWR	Introduced January 2011. Increased partnership work with GWR recommended to further promote rail travel. LEP funded MIP Project for Stoke Road Regeneration ongoing. This includes joint working with Network Rail / GWR with the northern forecourt enhancements. Due to complete March 2022.
6	Access Fund: Personalise Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	2017	2021	SBC, Slough schools and businesses	DfT	NO	Funded	£1 million - £10 million	Implementation	Borough Wide and Outside Borough	Numbers of personalised travel plans	No formal metrics to indicate modal shift. Active Travel and Behavioural change / modal shift remain a Council priority.	Introduced April 2017. Funding share of £2m. Further £500k awarded by DfT, now running until 2021. Cycle September 2019 involved 21 organisations to participate. Currently no further funding by DfT, but work continuing where possible given existing funds.
7	Home Working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2019		SBC	SBC	NO	Not funded		Implementation	Borough Wide and Outside Borough	% take up of staff	No formal metrics to indicate modal shift. Data likely to be available vis SBC HR	Ongoing since April 2019. Currently happening successfully en masse as part of the COVID-19 impacts. Likely to lead to ongoing widespread

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															practice. No formal announcement yet from SBC CMT, but flexible / agile working expected to continue post COVID scenario.
8	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	2017		SBC	SBC	NO	Not funded		Implementation	N/A	cycling counts	Limited cycle count data across the borough. Some indications of increased cycling levels	Ongoing, first introduced April 2017. LCWIP SD signed off in May 2020. Subsequently, the plan has been amended to include new scheme proposals, including the A4 cycle route (from Huntercombe to Uxbridge Road – major West to East route). Cycling still permitted as part of the EATF bus lane scheme on the A4.
9	Promotion of walking	Promoting Travel Alternatives	Promotion of walking	2017		SBC	SBC	NO	Not funded		Implementation	N/A	walking counts	No formal metrics to indicate walking levels	Ongoing, first introduced in April 2017. LCWIP SD signed off in May 2020. Currently no major schemes proposed specifically for walking improvements. However, included in the Stoke Road Regeneration scheme in progress. Also in bids for funding for redevelopment of the transport interchange in the town centre.
10	Freight Partnerships	Freight and Delivery Management	Freight Partnerships for town centre deliveries	2021		SBC	SBC	NO	Not funded	£10k - 50k	Planning	AQMA2 & AQMA 4	Reduction in emissions of freight deliveries		Not yet introduced. Freight sub-strategy (SSD) to be prepared as part of the overall LTP4 project 2020/21. Ongoing requirement. LTP4 programme currently under review. Freight strategy also being

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															reviewed at regional level by TFSE.
11	Slough Cycle Hire Scheme	Transport Planning and Infrastructure	Public cycle hire scheme	Oct-13		SBC	SBC	NO	Partially funded	£50k - £100k	Implementation	Borough Wide	cycle usage	Expanded via community funds. 17 docking stations.	Ongoing, first introduced October 2013. Stations have recently been closed temporarily due to the COVID-19 impacts
12	Pedestrian Wayfinding System	Transport Planning and Infrastructure	Other	2017	2018	SBC	S.106	NO	Partially funded	£50k - £100k	Completed	Borough Wide	% mode share	No formal metrics to indicate level of success	Introduced April 2017. Funded by S106 funding
13	Local safety and accessibility schemes to schools and businesses	Transport Planning and Infrastructure	Cycle network	2017		SBC	SBC & DfT	NO	Partially funded	£50k - £100k	Implementation	Borough Wide	% mode share	No formal metrics to indicate level of success	Ongoing, first introduced April 2017. Addressed via the Access fund programme. 20mph policy introduced around schools in Slough – measures being implemented as resources allow. Policy now in place for response to requests for speed management.
14	Bus route improvements	Transport Planning and Infrastructure	Bus route improvements	2010	2022	SBC	SBC, DfT, Bus Operators	NO	Partially funded	£100k	Implementation	Borough Wide	Bus patronage	Ongoing	Ongoing, first introduced 2001. The main focus is currently on the Slough response to the National Bus Strategy. SBC is developing a Bus Service Improvement Plan in partnership with the local bus operators, in an Enhanced Partnership arrangement. The BSIP will include extensive reviews of and proposals for all aspects, including route planning and funding sources for scheme proposals. Various bids and expressions of interest continually being considered for possible DfT

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															funding (including an 'all electric bus town'). Emergency funding of services still in place in response to the COVID-19 impacts.
15	Public transport improvements-interchanges stations and services	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2011	2022	SBC	LEP	NO	Partially funded	£1 million - £10 million	Implementation	Borough Wide	Bus patronage	Improved central transport interchange and out of town station facilities. No formal metrics to indicate level of modal shift or improved connectivity	Bus station completed in 2011. Burnham Station access scheme with LEP funding is complete. Langley station access scheme now complete, also LEP funded. Stoke Road Regeneration including enhancements to norther forecourt of Slough railway station in progress, due to complete March 2022. Scheme proposals developed for redevelopment of the town centre transport interchange. Subject to available funding. Strategic Transport Infrastructure Plan approved in principle by cabinet in February 2021. Programme of schemes still to be agreed. In further consultation with SBC Planning team.
16	Slough Mass Rapid Transit	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, bus priority (dedicated bus lane). Includes Park and Ride in phase 2	2018	2022	SBC	LEP, bus operators, utility companies, developers, HE	NO	Funded	> £10 million	Implementation	AQMA 2, AQMA 3, AQMA 4	Bus usage & NO_2 concentrations	Early reports from Stewarts (the service operator) report a high level of patronage by business users, very limited patronage by the public.	SMaRT 1 infrastructure completed early 2018. Bus operations from Slough Trading Estate to town centre using Euro VI buses become operational December 18'. SMaRT 2 (LEP funded again) split into two phases

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															now (MRT and P&R). Construction of phase 1 in progress. Due to complete end 2021. Phase 2 subject to redesign as part of a decarbonisation hub, to also include a relocated Grundon site and a hydrogen fuelling station. All subject to successful land purchase.
17	Reduction of speed limits, 20mph zones	Traffic Management	Reduction of speed limits, 20mph zones	2010		SBC	SBC, residents, schools	NO	Partially funded	£50k - £100k	Implementation	Borough Wide	Number of Zones	Reduction in accident levels to be assessed.	Ongoing, first introduced 2010. No AQMA declared in areas with 20 mph zone. New 20mph zones will be declared. Additionally, some 40mph roads are being reduced to 30mph along the A4. 20mph policy in place. Infrastructure measures being introduced as funds become available.
18	Parking Enforcement on highway	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2018		SBC	SBC, DfT	NO	Partially funded	£50k - £100k	Implementation	Borough Wide	Congestion	No data available	Ongoing. Parking contract commenced with Indigo, June 2018. Moving traffic enforcement commenced on the A4 (SMaRT) 2019. Enforcement currently in place for the EATF experimental bus lane scheme. To be reviewed.
19	Emissions based parking charges	Traffic Management	Emission based parking or permit charges	2021		SBC	SBC	NO	Funded	£10k - 50k	Planning	Borough Wide	Number of spaces		Ongoing. Will be introduced in 2021. Additional spaces to be secured over 2018-2025
20	EV Parking Provision – New Developments	Policy Guidance and Development Control	Low Emission Strategy	2018		SBC	SBC	NO	Not Funded		Implementation	Borough Wide	Number of new EV Parking spaces		Ongoing, first introduced September 2018. New Parking must include at least

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															10% EV provision all new parking
21	Air Quality Assessments for new developments in AQMAs and all Major Developments (significant net increase in trip rates	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance (Low Emission Strategy)	2018		SBC	SBC	NO	Not funded		Implementation	All AQMAs	Negligible Air Quality Impacts (following mitigation and offsetting)		Ongoing, first introduced in 2018. Included in the Planners Developers Guide
22	Securing developer air quality contributions for low emission infrastructure and EV car clubs	Policy Guidance and Development Control	Low Emission Strategy	2018		SBC, Developers	S.106	NO	Not funded		Implementation	All AQMAs	Financial Contributions amount (£s)		Ongoing. Funded by S106 Funding
23	Ceiling figure on long stay car parking in town centre (5000 spaces)	Policy Guidance and Development Control	Other	2020		SBC	SBC	NO	Not funded		Implementation	AQMA 4	Number of spaces		Introduced October 2020. To be reviewed as part of new Local Plan. Possible MIP bid submission for LEP funding for MSCP projects. TBA
24	EV infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging	2018		SBC	SBC, S.106, OLEV	NO	Funded	£500k - £1 million	Implementation	All AQMAs and Wider Borough	Number of EV chargers in Borough. Number of EV charge events		Ongoing since 2018. S106/OLEV/Capital funding
25	Taxi emission incentives	Promoting Low Emission Transport	Taxi emission incentives – free charging and licensing for early adopters	2018	2022	SBC	SBC, S.106, OLEV	NO	Funded	£10k - 50k	Implementation	AQMA 4, and Borough Wide	Number of Taxi Rapid Chargers		7 Rapid Chargers to be installed by summer 2022
26	Taxi Licensing	Promoting Low Emission Transport	Taxi Licensing conditions	2018		SBC	SBC, Taxi Operators	NO	Not Funded		Implementation	AQMA 4, and Borough Wide	Number of ULEV taxi/PHVs licenses		Report to sub-licensing committee – approved all PHVs/ taxis (except disabled access) to be ULEVs by 2025
27	Council Electric Pool Car and Bike Scheme	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2018		SBC	SBC	NO	Not Funded		Implementation	Borough Wide	Number of electric business miles travelled. Reduction in CO2 (tonnes). Reduction in		Objective is to reduce 90% CO2 and 85% NOx emissions from grey fleet

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
													NO_2 and PM (Kg and grams)		
28	Council – ULEV staff company salary sacrifice car scheme	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2018		SBC	SBC	NO	Funded	£50k - £100k	Implementation	Borough Wide	Number of ULEV Company cars		Aim was 50 ULEV company lease cars by Dec 2020 in the Councils grey fleet - postponed due to pandemic.
29	Council – Low Emission Hire Car Scheme	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles			SBC	SBC	NO	Funded	£50k - £100k	Planning	Outer Borough	Number of miles in Low Emission - EURO 6 hire case and Car club car		Not yet introduced. Funding is available. Objective is to reduce 90% CO2 and 85% NOx emissions from grey fleet and operational cost
30	Clean Air Zone Feasibility Study	Promoting Low Emission Transport	Ultra Low Emission Zone (ULEZ)			SBC	SBC	NO	Not Funded	£500k - £1 million	Planning	AQMA 2, AQMA3 and AQMA 4 to be modelled	Successful feasibility study		May Lead to policy to adopt CAZ in summer 2022.
31	SBC Car & lift sharing schemes	Alternatives to private vehicle use	Car and Lift Sharing Schemes	2019		SBC	SBC					Borough Wide	Car share %		First introduced June 2019. Car sharing still promoted, but in limited use. Faxi app trialled 2019 but limited take-up so not continued. Move to Observatory House HQ has prompted changes in staff commuting habits. To be analysed. Currently only limited parking needed due to COVID-19.
32	Town Centre E car club	Alternatives to private vehicle use	Car Clubs			SBC	S.106, SBC	NO	Funded	£1 million - £10 million	Planning	AQMA 4	Number of Electric Cars operating and number of E-Car clubs users		S106 funding being secured. Capital money secured, but not yet implemented.
33	Bus park and ride	Alternatives to private vehicle use	Bus based Park & Ride	2018	2022	SBC	LEP, Heathrow PTL, bus operators, utility companies, private land owners, HE	NO	Partially funded	£1 million - £10 million	Planning	Borough Wide	Number of journeys		See line 16 above for both MRT phase 1 (in operation) and P&R as part of the MRT2 (phase 2) scheme. Ongoing design and land negotiations. No further progress with P&R plans for

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															the west of the borough.
34	Rail based park and ride	Alternatives to private vehicle use	Rail based Park & Ride			SBC	SBC	NO	Not Funded	£1 million - £10 million	Planning	AQMA 4 and Borough Wide	Number of journeys		Not successful. Possible bid re-submission in 2022.
35	Promoting Low Emission Public Transport	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2018		SBC	DfT	NO	Not Funded	£500k - £1 million	Planning	AQMA 4 and Borough Wide	Euro Fleet Emissions		Engaged local bus operators for DfT Zebra Bus Fund Application (June 2021). To continue to work with operators regarding National Bus Strategy and future funding bids."
36	Air Quality Communicatio n Plan	Public Information	Via all Media	2021	2022	SBC	SBC	NO	Not funded		Planning	Borough Wide	Number of re-tweets		Using Defra six principles of communication. Communication plan developed end of 2021 along with CAP.
37	New Air Quality Action Plan	Public Information	via leaflets and social media	2021	2022	SBC	SBC	NO	Funded	£100k - £500k	Planning	Borough Wide	Leaflets		Action plan will bring new measures to improve air quality
38	Clean Air Campaigns	Public Information	Signed up	2020		SBC, GAP	SBC	NO	Not funded		Planning	Borough Wide	Various media sources		Ongoing. Next year to be set up in Town Centre
39	AirText Service	Public Information	Via the Internet and text (smart phones	2017	2021	SBC	SBC	NO	Funded	< £10k	Aborted	Borough Wide	Number of subscribers		Public Awareness Campaign. Due to insufficient funding, the services will be aborted from June 2021.
40	Stoke Road Sustainable Transport Infrastructure and Highways Works (regeneration)	Transport Planning and Infrastructure	Public Transport and Infrastructure	2020	2022	SBC	LEP, bus operators, utility companie s, developer s, Network Rail, Canal and Rivers Trust, Slough Urban Renewal	NO	Funded	> £10 million	Implementation	Town Centre	Number of journeys (via sustainable modes)		Initiated February 2020. Total cost £10.9m. Part of the wider town centre regeneration. See line 15 re Stoke Road Regeneration.
41	A4 Bus Lane experimental scheme	Transport Planning and Infrastructure	Bus route improvements	2020	2021	SBC	DfT	NO	Partially funded	£500k - £1 million	Implementation	A4 from Huntercombe roundabout to Uxbridge Road roundabout	Journey time, volume, flow, plus a raft of related metrics		Reduced level of bus patronage during the COVID-19 period has countered the encouragement for

Measure No.	Measure	Category	Classification	Year Measure Intro-duced	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
															PT uptake. Network conditions remain challenging.
42	eScooter trial	Alternatives to private vehicle use	Other	2020	TBA	SBC	DfT	NO	Funded	£50k - £100k	Implementation	Borough wide	Number of users		Trial in progress. Proving to be a popular scheme with Slough subject to a high level of participation.
43	A4 cycle way scheme	Transport Planning and Infrastructure	Other	TBA	TBA	SBC	SBC	NO	Partially funded	£500k - £1 million	Planning	A4 from Huntercombe roundabout to Uxbridge Road roundabout	Volume of cyclists (plus any available modal shift metric)		Infrastructure constraints, including route continuity and scale of measures. Public attitudes to cycling.
44	Strategic Transport Infrastructure Plan (STIP)	Transport Planning and Infrastructure	Other	2020	ongoing	SBC	SBC, likely to include British Land, GWR and others	NO	Not funded	£100k - £500k	Planning	Borough wide, with a focus on the town centre	Various metrics re modal shift		Seeking funding. Adopted in principle February 2021. Includes plans for town centre redevelopment, plus infrastructure developments in key out of town locations. Potentially resistance from the Planning team re the need for greater alignment with the emerging local plan
45	Local Transport Plan revision	Transport Planning		2020	2022	SBC	SBC	NO	Funded	£100k - £500k	Planning	Borough wide	Various metrics		Currently LTP3 under review. LTP4 expected to follow. To be aligned with the Strategic Transport Infrastructure Plan (STIP) and the Carbon Strategy.
46	Electric Bus Trial	Transport Planning and Infrastructure	Bus route improvements	2020	2020	SBC, Thames Valley Buses, BYD UK.	SBC	NO	Funded	£50k - £100k	Completed	Cippenham to Uxbridge Road	Number of passengers		13 week trial, ending December 2020, and was free to customers, ran from Cippenham to Uxbridge Road roundabout and backagain on a variation of route 4 known as 4a.

Dark green = most effective measure
Light green = effective measure but small impact

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.

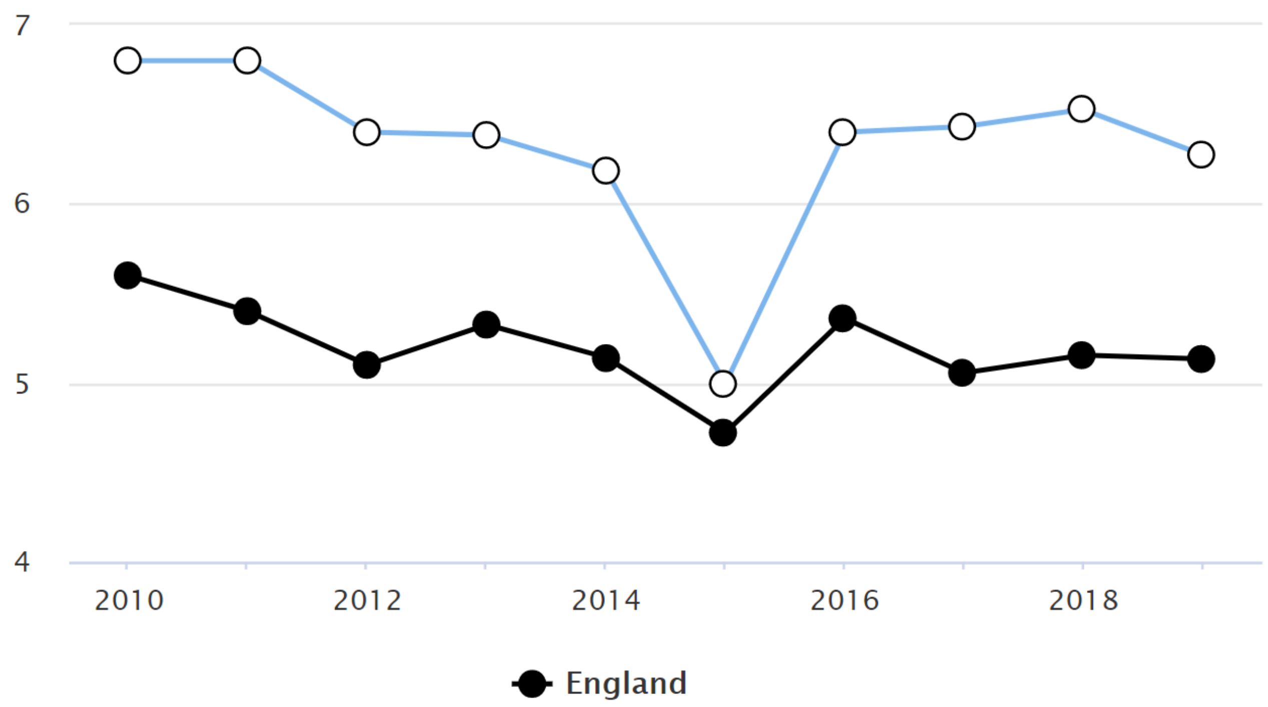
Work carried out by Public Health England as part of the Public Health Outcomes Framework (PHOF) shows that the fraction of mortality associated with particulate air pollution in 2019 within Slough Borough Council is 6.3%[9]. This is lower than 2018 (6.4%).

Figure 2.1 below shows the fraction of mortality attributable to particulate air pollution calculated for Slough Borough Council over the past 5 years and compares this with the England average. It is noted over this 5 year trend, the mortality had progressively worsened in Slough from 2016 to 2018, with the England average more variable with a 0.3% improvement from 2016 to 2017. The trend improves from 2018 to 2019 in both England and Slough, with a greater rate of improvement (0.2%) observed in Slough.

The England average in 2019 was 5.1% and the regional average in the south east was 5.2%. Despite recent improvements, Slough continues to remain above these mortality rates, at 6.3% (2019). However, as a note of caution regarding the trends; Slough does not monitor $PM_{2.5}$ using reference methods and there may be local sources that could give rise to higher concentrations.

[9] https://fingertips.phe.org.uk/profile/public-health-outcomesframework/data#page/4/gid/1000043/pat/102/par/E06000039/ati/101/are/E06000039/iid/30101/age/230/sex/4

Figure 2.1 – Fraction of mortality attributable to particulate air pollution for Slough



Provisional air quality modelling undertaken as part of the new emerging AQAP, using a baseline year of 2017, indicates that across Slough, concentrations range from 12.4µg/m^3 to 17.1µg/m^3. Over 80% of $PM_{2.5}$ concentrations are attributable to background sources, almost half of which is attributable to secondary particulate matter. Emissions of the primary gaseous pollutants ammonia, oxides of nitrogen and sulphur dioxide from sources in the UK and Europe act as precursor species to $PM_{2.5}$, as they contribute to the formation of secondary PM through chemical reactions in the atmosphere.

It should be noted, however, that modelling concentrations of $PM_{2.5}$ from emissions data is complicated by the fact that it requires inventories for a range of pollutants, including direct emissions of $PM_{2.5}$ itself as well as its precursor gases SO_2, NOx, NH_3 and NMVOCs. These pollutants are emitted in varying amounts from different sources and exhibit different spatial and temporal behaviour. To understand $PM_{2.5}$ concentrations in Slough, continuous monitoring using accredited monitors is recommended.

Slough Borough Council strive to reduce $PM_{2.5}$ concentrations in Slough through the following measures:

- All of the Slough area is covered by smoke control orders. These were made to reduce air pollution in the town, mainly arising from the use of coal for heating purposes. However, smoke control areas only restrict smoke from domestic chimneys and do not cover garden bonfires or bonfires on construction sites, therefore additional measures are required to control $PM_{2.5}$ emissions.

- The Council Five Year Plan (2020-2025)[10] is a rolling 5 year plan and has outcomes based on improving children's and adults health, wellbeing and the ability to manage their health through increases in levels of physical activity and hence less dependency on car use (which is very high within Slough). In the latest iteration of the plan, improvement of air quality is a specific measure to support one of the key outcomes: Slough will be an attractive place where people choose to live, work and stay.
- The LES is aimed at enabling and accelerating the uptake of ULEVs through the installation of more EV chargers, setting up of a town centre EV car club, and promoting electric taxis. This in turn will reduce NOx and some PM emissions.
- The LES is also aimed at promoting best practice dust controls on construction sites including adoption of Non Road Mobile Machinery Emission (NRMM) standards; construction machinery above net power rating of 37kW will be required to meet stage BIII, enforced as a requirement of the planning permission on the development, normally through a S106.
- The LES will require planning controls on major developments that all HDVs travelling through the AQMAs will use best endeavours to operate to EURO VI standards (i.e. CAZ compliant).
- The emerging STIP (a development of the Slough Transport Vision) supports the new Local Plan that is being developed for Slough. The strategy is aimed at reducing congestion by significantly increasing modal shift away from dependency on cars in Slough, as well as road widening to enable traffic to flow more smoothly, a new mass rapid transit system on the A4, future proposals for park and ride schemes and improved cycle infrastructure.
- The Slough Wellbeing Board takes a lead on promoting a healthier Slough. A new Health and Wellbeing Strategy (2020-2025) developed in June 2020 outlines the plans to improve the health and wellbeing of its residents over the lifetime of the plan. The strategy highlights how the densely populated urban nature of Slough with high levels of personal car use result in high levels of congestion and poor air quality, and aims to address air quality as part of the SMART neighbourhood plans.

[10] Slough Borough Council corporate plan and past plans

Slough Borough Council will be taking the following additional measures to address $PM_{2.5}$:

- Publication of the emerging AQAP. Although the measures within the action plan are aimed at reducing NO_2 emissions, particularly from road transport sources, there will be co-benefits in reducing $PM_{2.5}$ through modal shift and sustainable transport related measures.
- Finalising and publishing the borough wide $PM_{2.5}$ dispersion modelling and source apportionment completed as part of the emerging AQAP. The results have been discussed briefly above but will be confirmed upon the consultation launch. Refined measures for targeting $PM_{2.5}$ reduction specifically will be developed on the basis of this modelling and will be incorporated into the emerging CAP.
- Revision of Slough's Smoke Control Policy to determine whether stricter controls on burning is required in the Borough, such as an outright ban on burning fuels outdoors.
- Creation of the Air Quality and Health group. In 2021, a partnership between health professionals and air quality experts will be established, which aims to be an informative and technical group, to build a stronger relationship between public health and air quality, and improve public awareness of air quality impacts to health. An element of this will be to develop guidance on how to reduce emissions of PM.
- To aid awareness of $PM_{2.5}$, Slough Borough Council require a means of gathering live data on $PM_{2.5}$ concentrations across the Borough and to begin seeking funding to support introduction of $PM_{2.5}$ monitors in key hotspot areas (for example, introducing a $PM_{2.5}$ monitor at Pippins Colnbrook, to monitor the impact of increased aviation at Heathrow airport).
- Restricted non-mobile road machinery (NRMM) controls to reduce $PM_{2.5}$ emissions from construction sites. Currently, NRMM are required to meet Stage BIII controls, however this may be revised and restricted further with the development of the CAP.

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

This section sets out the monitoring undertaken during 2020 by Slough Borough Council and how it compares with the relevant AQOs. 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

3.1.1 Automatic Monitoring Sites

Slough Borough Council undertook automatic (continuous) monitoring at 6 sites during 2020, which includes:

- Slough-Colnbrook-(Pippins) SLH 3
- Slough-Chalvey, M4 SLH 7 (AQMA 1)
- Slough Town Centre (Wellington Street) SLH 10 (AQMA 4)
- Slough Brands Hill (London Road) SLH 11 (AQMA 2)
- Slough Windmill (Bath Road) SLH12 (AQMA 3)

Additionally Lakeside Energy from Waste Ltd operate an EfW in Colnbrook, Slough since 2010. The plant processes over 450,000 tonnes of residual waste per year, generating up to 37MW of power. The operator of the site as well as undertaking continuous stack monitoring as part of their Permit, operate ambient air quality monitoring as part of their planning consent, and the data is released to Slough to report on an annual basis. The monitoring includes NOx, PM_{10} and $PM_{2.5}$ monitoring.

- Slough-Lakeside-2 (Lakeside Road) SLH8 & SLH9

Air quality monitoring at Salt Hill Park (SLH 4) ceased in November 2019. The site equipment and enclosure were dated and frequently suffered from water leaks. Data for this area of Slough will continue to be collected at the nearby Windmill monitor (SLH 12), which is more representative of roadside NO_2 concentrations.

Indicative Osiris monitors of $PM_{2.5}$ were removed from both the Colnbrook Pippins (SLH 6) and Lakeside Tan House Farm (SLH 5) sites, in anticipation of providing an MCERTs accredited continuous $PM_{2.5}$ analyser at the Pippins site. The Pippins enclosure and monitors are identical to those previously present at Salt Hill Park and have in the past also suffered water ingress. Short term roof repairs have sustained water tightness since 2019 however in the long term, Slough Borough Council propose to replace the enclosure and provide new updated equipment to measure both PM (10 & 2.5) and NO_2. The need to introduce certified $PM_{2.5}$ monitoring is becoming increasingly apparent with the review of $PM_{2.5}$ WHO limit and Heathrow runway expansion plans.

Chalvey monitoring station (SLH 7) is also due to be replaced. Currently, the Chalvey station is positioned in a waste depot. Although this area is within AQMA 1 (M4 corridor), it does not represent residential exposure, therefore it is being relocated to Spackmans Way, to represent exposure at the nearest residential receptor to the M4. This site is due to be installed before the end of June 2021.

Finally, a new continuous roadside monitor will be located in Langley. Due to passive monitoring results showing increases in NO_2 since 2016, there is a need to continuously monitor NO_2 and PM. This will produce an evidence base of air quality trends which will allow the Council to determine whether Langley will be declared an AQMA. This monitor will also allow the Council to observe the impact of planned and proposed infrastructure projects, which may influence traffic volumes and subsequently worsen air quality.

Table A.1 in Appendix A shows the details of the automatic monitoring sites. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The Air Quality England[11] page presents automatic monitoring results for Slough, with automatic monitoring results also available through the UK-Air website.

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

3.1.2 Non-Automatic Monitoring Sites

Slough Borough Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 95 sites (123 diffusion tubes) during 2020. Table A.2 in Appendix A presents the details of the non-automatic sites. Changes to the network from 2019 to 2020 are as follows:

[11] Slough Borough Council Monitoring Data (Air quality England)

- SLO 1, 2 & 3 – these diffusion tubes were originally co-located with the Salt Hill Park continuous monitor (SLH 4). Upon decommissioning of the site, the tubes were redistributed in Salt Hill Park to obtain a 'clean' baseline background sample. This was completed in April 2020 therefore data for both locations is reported in this ASR.
- SLO 4 – after frequent issues of theft, the tube was relocated on a nearby residential block. As this occurred in May 2020, annualised monitoring data is provided for both the previous and the new site location.
- SLO 98 – SLO 111 – in support of the Slough Sensor Study, diffusion tubes were co-located with Vaisala sensors to compare the accuracy of the sensors. One sensor was also co-located with a continuous analyser (Colnbrook Pippins SLH 3). These tubes were deployed from June 2020.
- SLO 112 – SLO 123 – At request of local Councillors, diffusion tubes were located on six roads surrounding the A4 to monitor potential traffic and congestion increase as a result of the temporary A4 bus lane. More information on this trial is presented in Appendix F.

Maps showing the location of the monitoring sites are provided in Appendix D. These tubes are collected on a 4 or 5 weekly basis and analysed at a UKAS accredited laboratory (Gradko International). Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C. Sites that have been included for distance correction include all sites that are within 10% or above the AQO and locations where the receptors are closer to the road than the monitoring location.

Due to changes to the network mid-year, the diffusion tube locations described above had to be annualised, except for SLO 112 – 123, where there was not enough data collected during 2020 to allow for annualisation (requires minimum 25% data capture). SLO 34, 35, & 36 also required annualisation. This is because these tubes are co-located with a continuous analyser in the Chalvey waste depot and access was restricted over the course of the pandemic. Data for these sites should therefore be treated with caution, as annualised data is less accurate than measured data.

In addition to this, the Council operate a network of sensors as part of the Defra funded Slough Sensor Study. This project was carried out in conjunction with Ricardo-AEA and

SSE Enterprise, who installed 15 lower cost Vaisala air quality sensor systems, collecting data via their Mayflower Smart Lighting network and Smart Cities infrastructure.

The 15 air quality sensor systems deployed consisted of five Vaisala AQT410 systems, measuring NO_2, nitric oxide (NO) and ozone (O_3); and 10 AQT420 systems, measuring NO_2, NO, O_3, PM_{10} and $PM_{2.5}$.

The projects initial focus was on monitoring NO_2 emissions originating from idling vehicles and congestion around four local primary schools over 8-12 months, including Cippenham, Claycots, Pippins and Penn Wood Primary Schools.

The full report is due to be issued to Defra in August 2021 and will subsequentially be available publicly.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, ratified, adjusted for bias, annualised (where the annual mean data capture is below 75% and greater than 25%), and distance corrected. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the AQO of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant. at AQMA 1

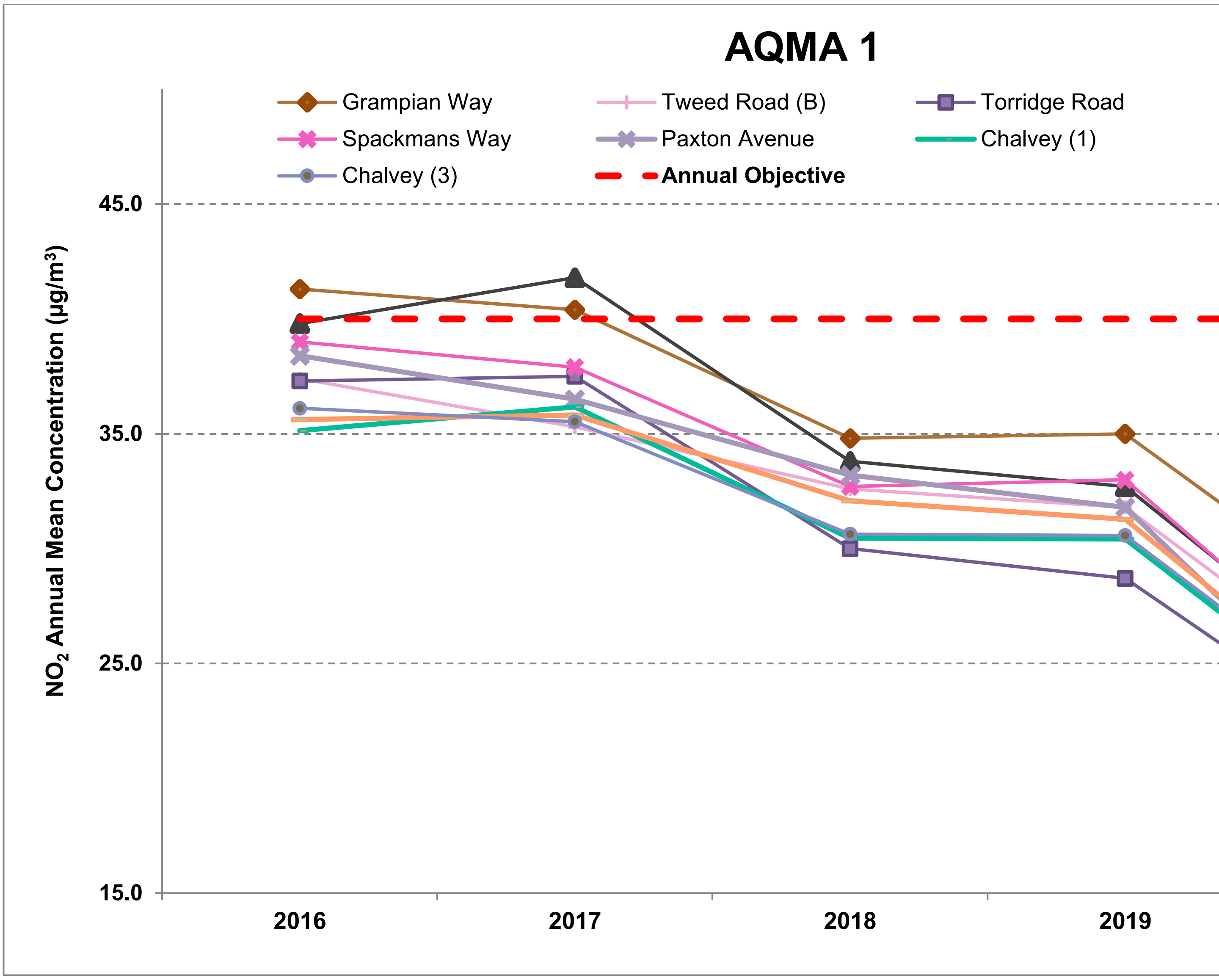


Figure A.4 – Trends in Annual Mean NO_2 Concentrations at AQMA 2

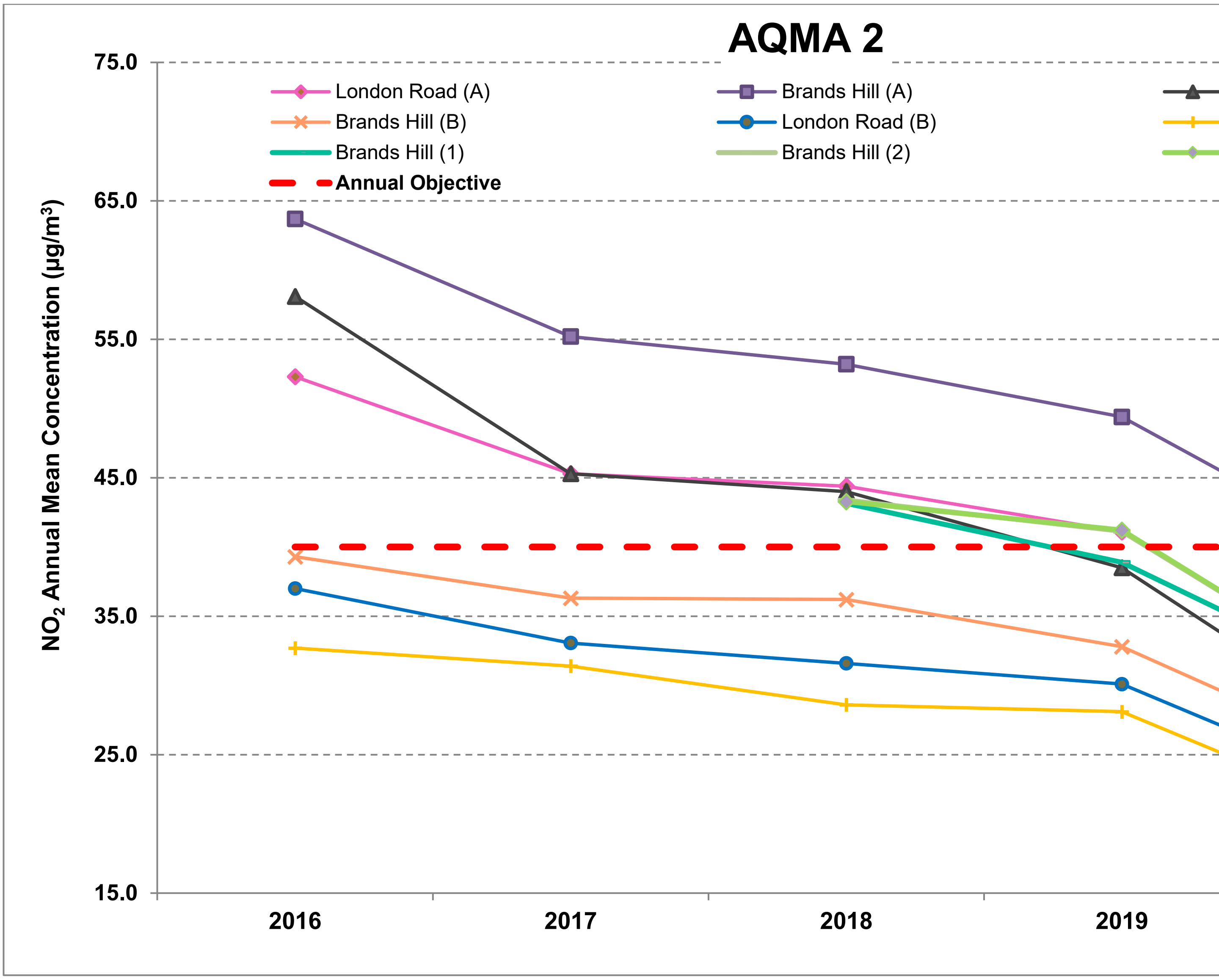


Figure A.5 – Trends in Annual Mean NO_2 Concentrations at AQMA 3

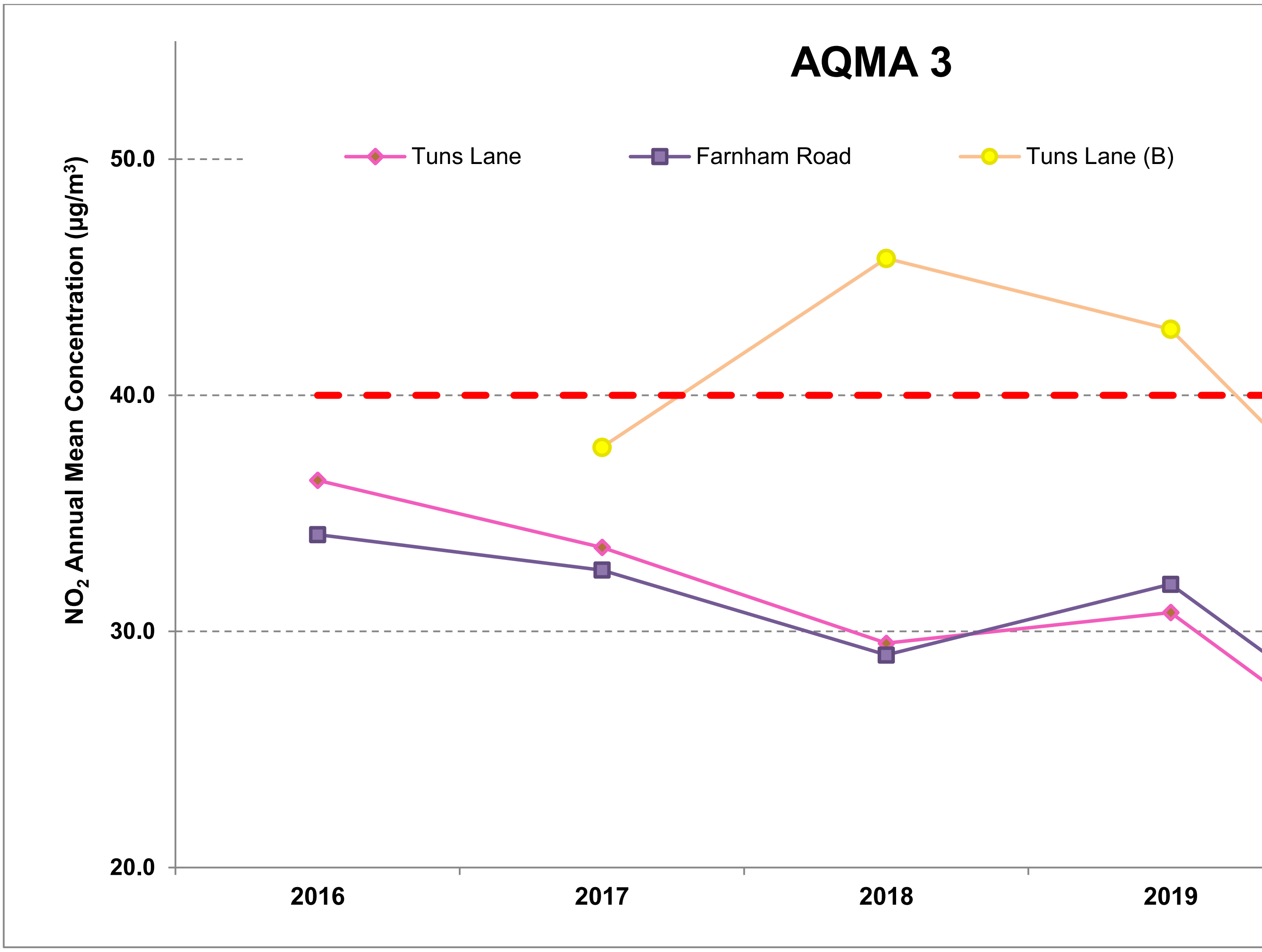


Figure A.6 – Trends in Annual Mean NO_2 Concentrations at AQMA 3 Extension

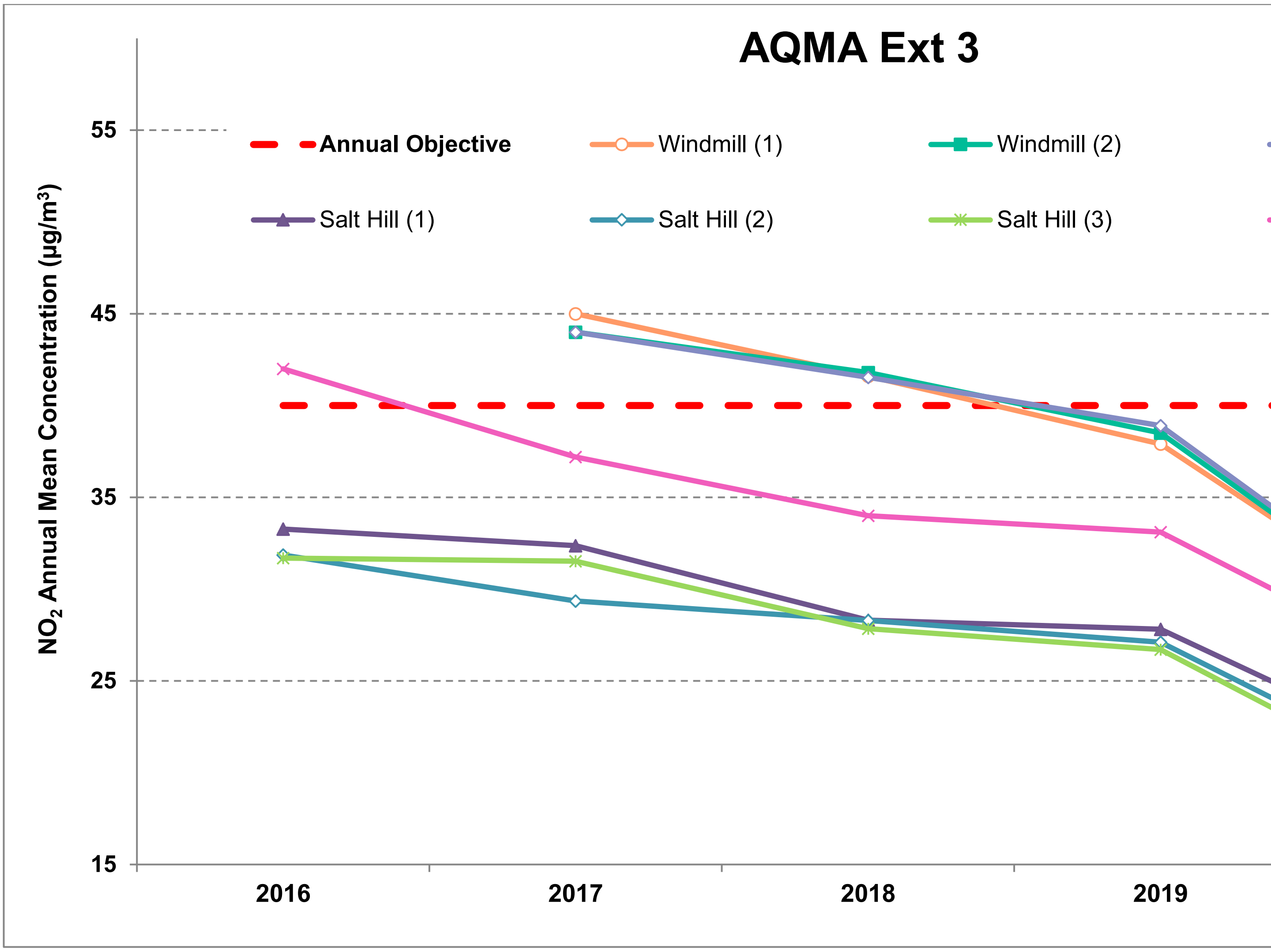


Figure A.7 – Trends in Annual Mean NO_2 Concentrations at AQMA 4

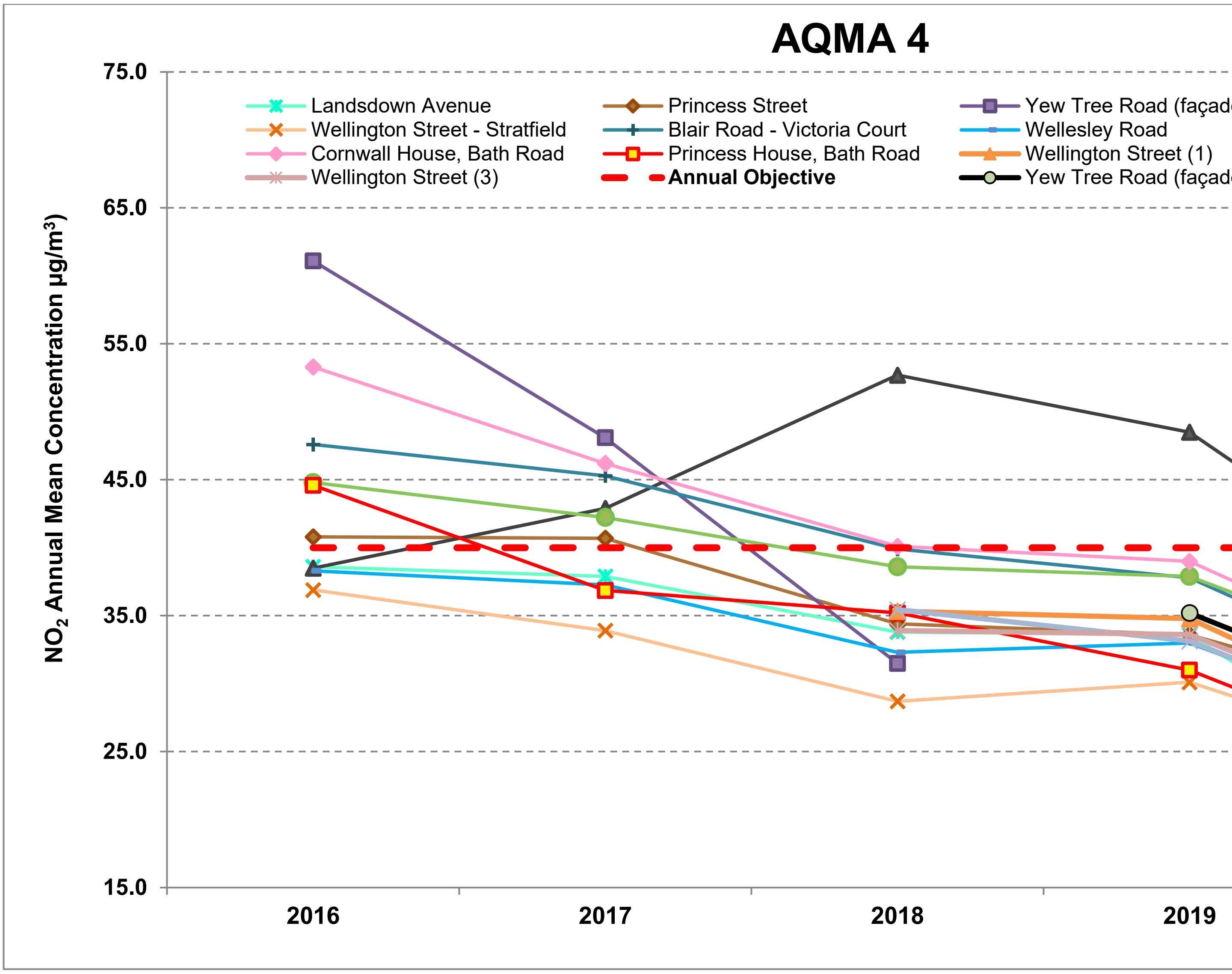


Figure A.8 – Trends in Annual Mean NO_2 Concentrations in Langley

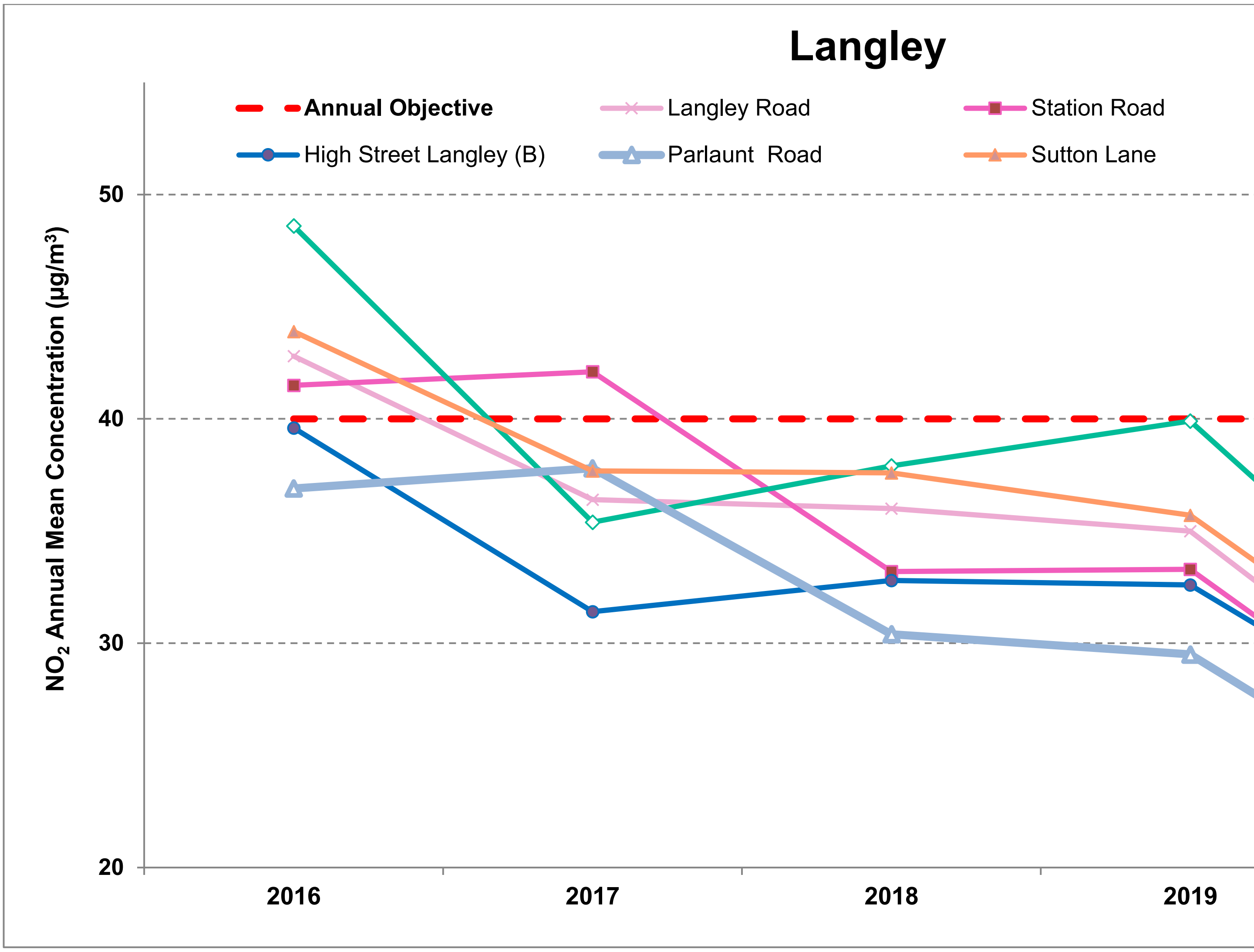


Figure A.9 – Trends in Annual Mean NO_2 Concentrations at Roadside and Kerbside Sites

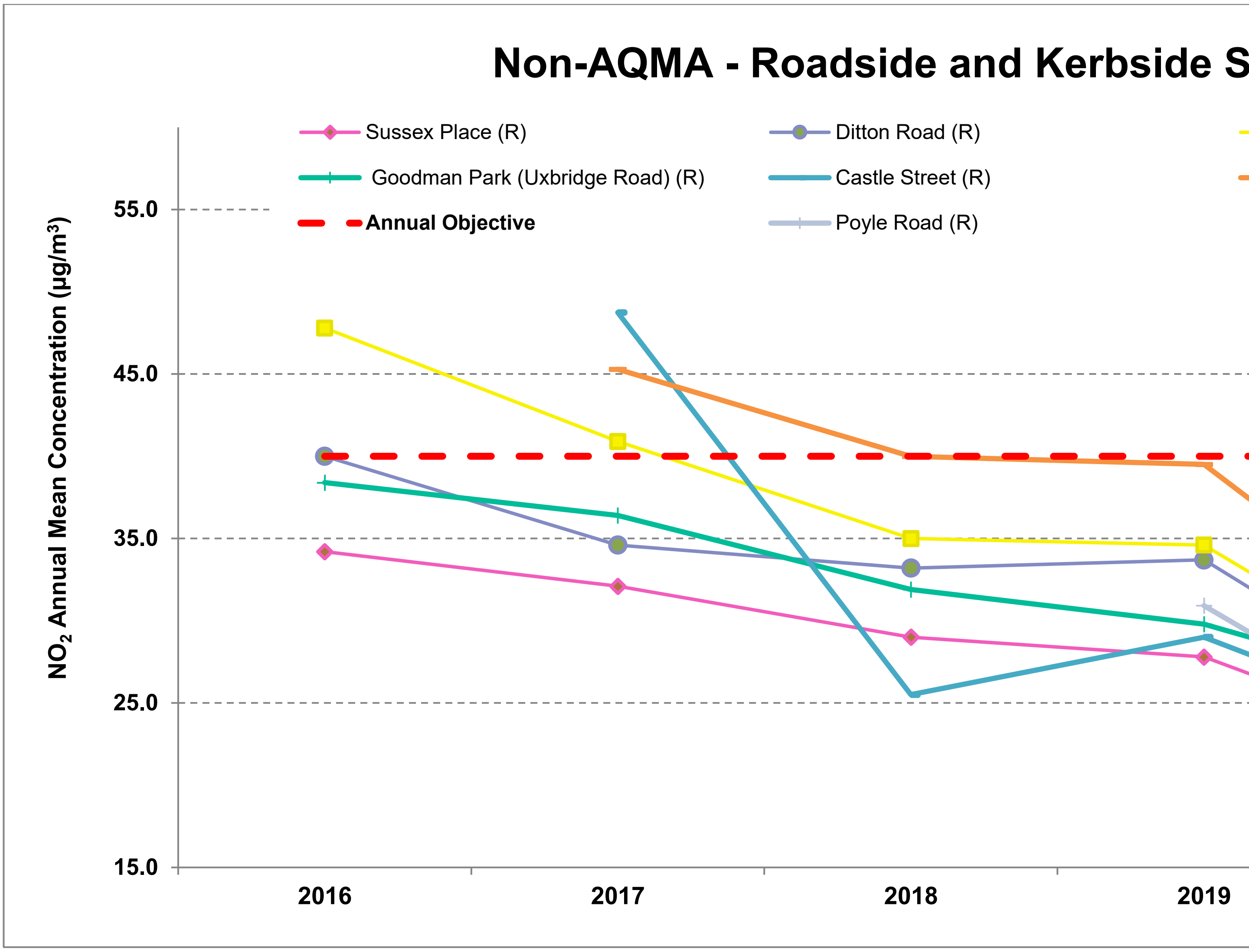


Figure A.10 – Trends in Annual Mean NO_2 Concentrations at Suburban and Urban Background Sites

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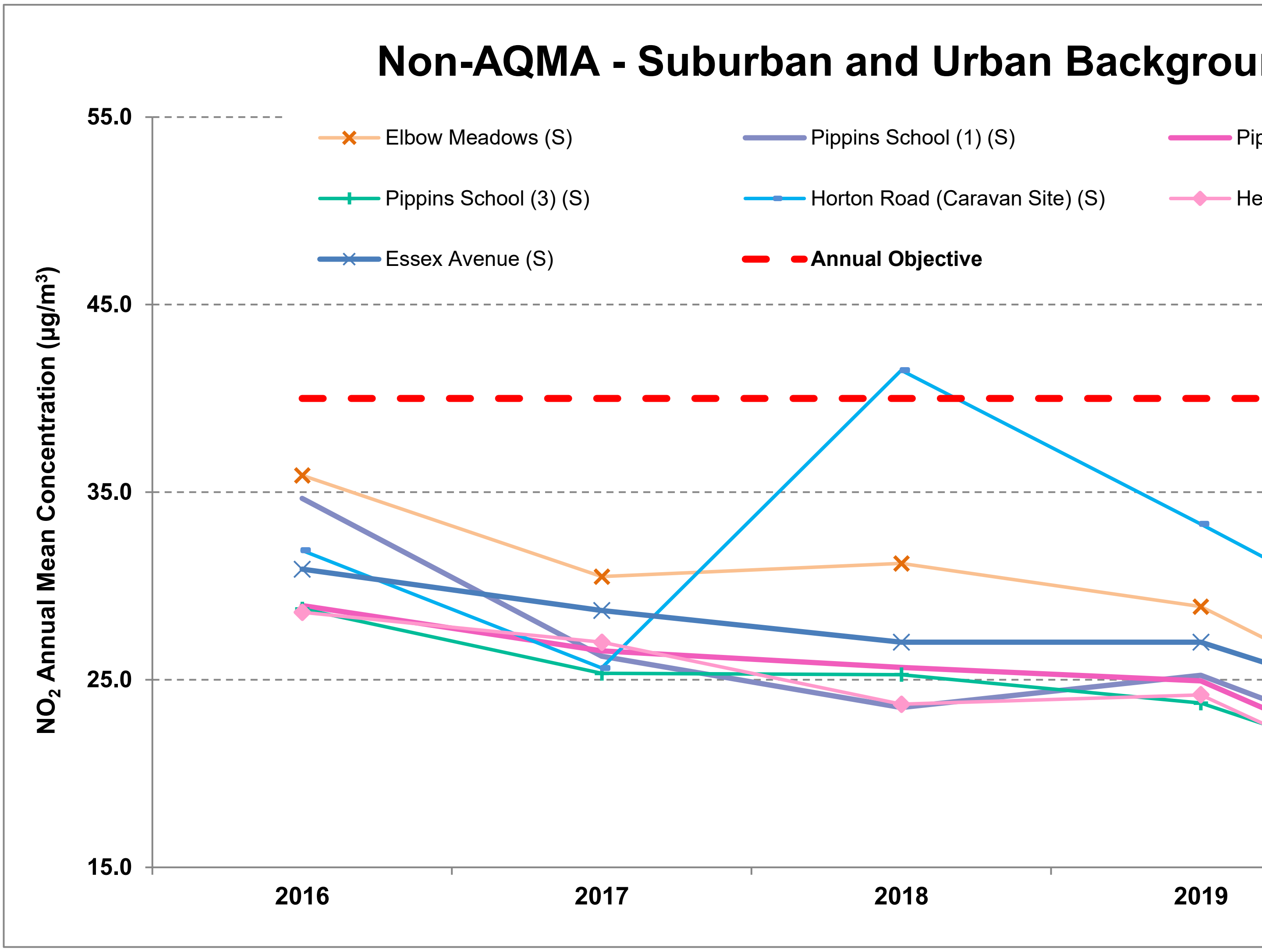


Figure A.11 – Trends in Annual Mean NO_2 Concentrations at Rail and Industrial Sites

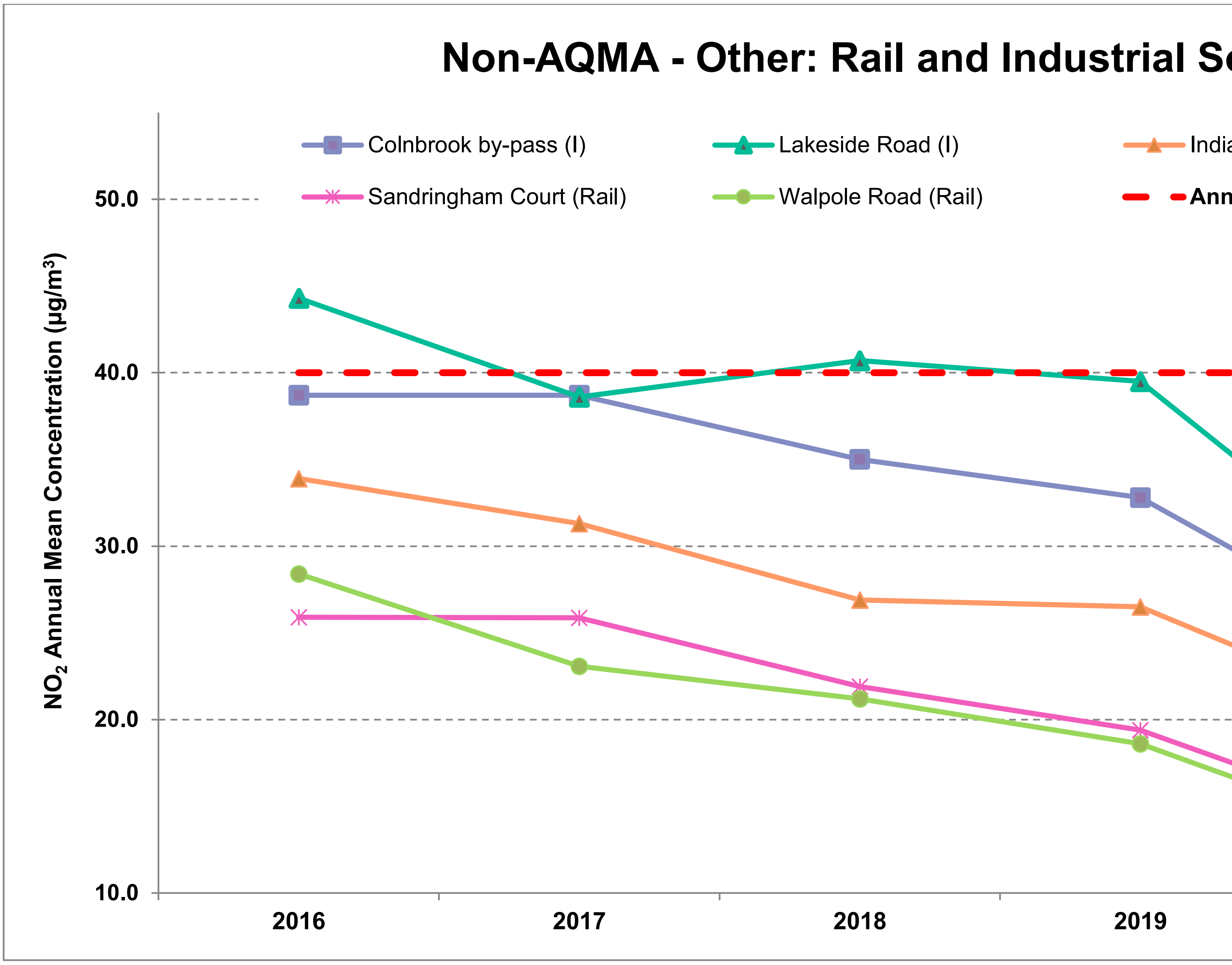


Figure A.12 – Trends in Monthly Mean NO_2 Concentrations at Co-located Sensor Sites

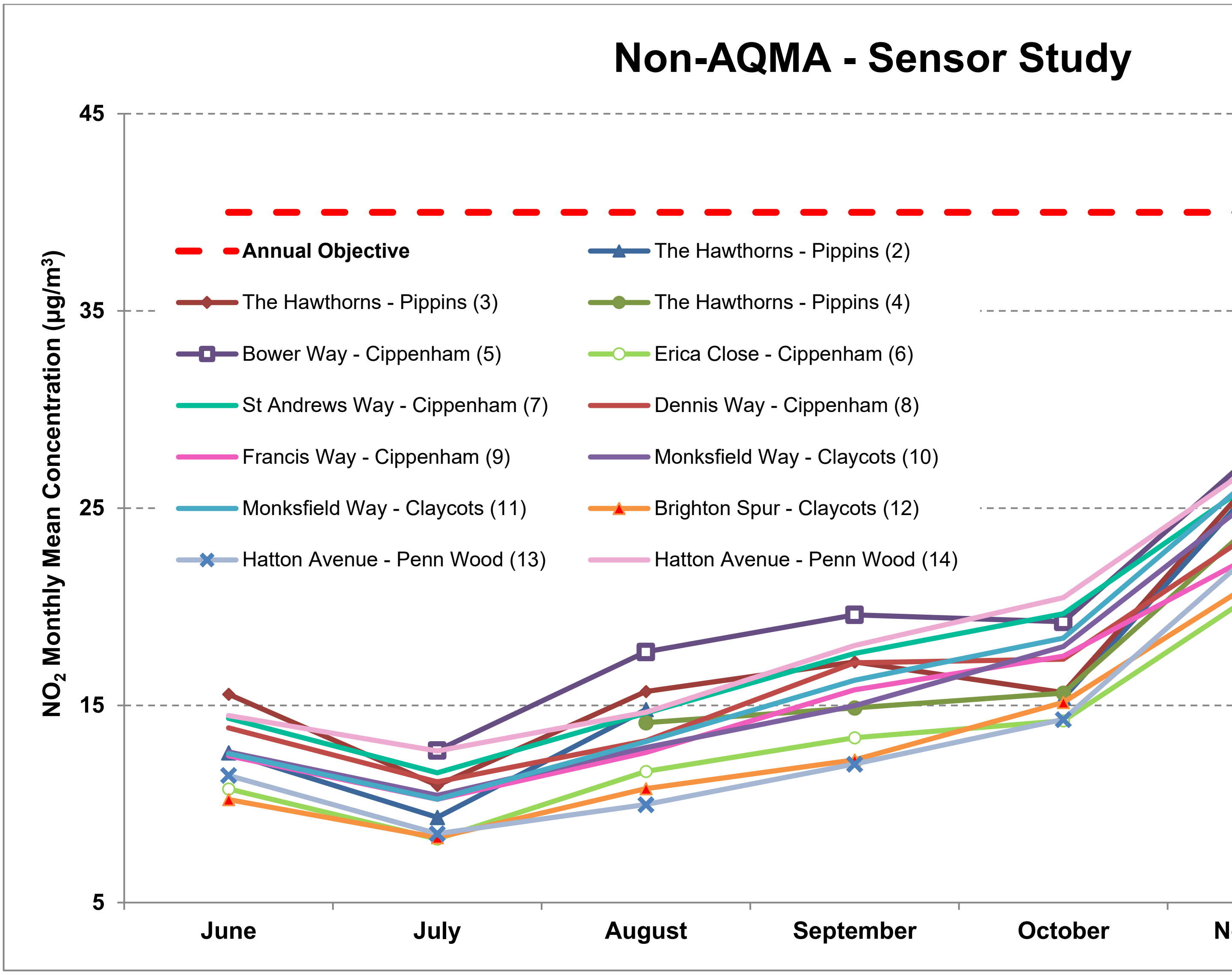


Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the AQO of 200µg/m^3, not to be exceeded more than 18 times per year.

The distance correction concentration to the nearest site for relevant exposure (normally a residential property unless otherwise indicated) is shown in Appendix C.6. The 2018 national background modelled concentrations (adjusted to the monitoring year 2020 for Slough) were used within the DEFRA tool. The distance to ‘relevant exposure’ and nearest main road was obtained through a combination of on-site measurements and GIS map measurements. These had been significantly revised and updated from the ASR 2016 and are considered to be accurate.

The main roads which have the greatest influence on NO_2 concentrations are:

- M4 (experiences >100,000 vehicle movements/day)
- A4 Wellington Street, Bath Road, London Road, Brands Hill (average more than 20,000-30,000 vehicle movements/day)
- Sutton Lane, Windsor Road, High Street Langley (all experience >10,000 vehicle movements/day

3.2.2 2020 NO_2 Results

The 2020 results, unlike previous years, show widespread compliance with the NO_2 AQO, as illustrated in Figures A.1 to A.7. The top three highest concentrations recorded in 2020, prior to distance correction are:

- Brands Hill (A) (SLO 18) – 38.5µg/m^3
- Yew Tree Road (SLO 29) – 33.8µg/m^3
- Tuns Lane (SLO 50) – 30.6µg/m^3

All other diffusion tubes are below 30µg/m^3. This also indicates that the 1-hour NO_2 mean was also not exceeded during 2020. These results are largely due to the decrease in traffic experienced over the reporting year.

The following diffusion tube locations have experienced an NO_2 improvement >10µg/m^3 when comparing 2019 data to 2020. The values presented are the difference in concentrations from 2019 to 2020, grouped by AQMA. Site IDs in bold have been annualised so should be treated with caution.

AQMA 1:

Spackmans Way HE Receptor 8 (SLO 89) - 10.1µg/m^3

Paxton Avenue HE Receptor 1 (SLO 68) – 12.0µg/m^3

Chalvey (co-located) (SLO 36) – 12.3µg/m^3

Spackmans Way (SLO 24) – 10.4µg/m^3

Paxton Avenue (SLO 25) – 11.6µg/m^3

AQMA 2:

Rogans (Colnbrook Bypass) (SLO 28) – 13.0µg/m^3

London Road (SLO 10) – 12.3µg/m^3

Brands Hill (A) (SLO 18) – 10.9µg/m^3

Brands Hill (Co-located) (SLO 65) – 12.1µg/m^3

AQMA 3 & Extension:

Tuns Lane (SLO 50) – 12.2µg/m^3

Windmill (co-located) (SLO 59) – 11.6µg/m^3

AQMA 4:

Lansdowne Avenue (SLO 4) - 10.1µg/m^3

Yew Tree Road (SLO 29) – 14.7µg/m^3

Langley:

Langley Road (SLO 51) – 10.2µg/m^3

High Street, Langley (A) (SLO 53) – 12.0µg/m^3

Outside of AQMAs:

Lakeside Road (SLO 12) - 12.9µg/m^3

Ditton Road (SLO 19) – 11.0µg/m^3

Windsor Road (SLO 21) – 10.6µg/m^3

Windsor Road (B) (SLO 49) – 13.5µg/m^3

In previous years, each AQMA had monitoring locations which showed varying NO_2 concentrations, a portion of which were consistently above the NO_2 AQO. A discussion of 2019 results compared with 2020 within AQMAs is provided below:

- Pre-existing diffusion tubes located in AQMA 1 had been below 10% of the AQO level since 2017. The latest diffusion tube additions deployed in October 2019 are representative of M4 Smart Motorways receptors. Not enough data is available to determine long term trends, however 5 of these receptor sites experienced concentrations within 10% of the AQO in 2019. It should be noted that these sites were annualised as only 25% data capture was achieved during 2019, therefore these results should be treated with caution. As expected, this trend was disrupted by data recorded in 2020, with the highest concentration recorded at Spackmans Way (Highways England Receptor 3, SLO 73) (25.0µg/m^3).
- The monitoring locations at residential receptors within AQMA 2 are typically high, particularly at SLO 18 (Brands Hill (A)). Data from 2019 indicates that 4 sites were above the AQO prior to distance correction, with a further 2 sites within 10% of the AQO. When comparing with 2020 data, only SLO 18 is within 10% of the AQO at 38.5µg/m^3. Once distance corrected, concentrations fall below 10% of the AQO at 33.3µg/m^3. All other sites within this AQMA are below 30µg/m^3 for 2020.

- Only 3 diffusion tubes are present in AQMA 3: Tuns Lane (SLO 23), Farnham Road (2) (SLO 30) and Tuns Lane (B) (SLO 50). Of these, only SLO 50 exceeded the AQO for NO_2 at 42.8µg/m^3 in 2019. The remaining diffusion tubes recorded concentrations below 32.0µg/m^3. When comparing to 2020, the NO_2 concentration at SLO 50 was 30.6µg/m^3.
- The AQMA 3 Extension contains a further 4 diffusion tubes. As mentioned in Section 3.2.1, SLO 1, SLO 2 and SLO 3 were relocated part way through 2020 within Salt Hill Park and are no longer within this AQMA. In 2019, the co-located Windmill diffusion tubes (SLO 57 – 59) averaged at 38.4µg/m^3. Comparatively in 2020, concentrations averaged at 27.3µg/m^3, with concentrations at Windmill (Bath Road) lower at 25.0µg/m^3.
- There are 14 diffusion tube sites located in AQMA 4. Of these, the highest recorded in 2019 was Yew Tree Road (SLO 29) at 48.5µg/m^3 and was the only diffusion tube to exceed the AQO, however a further 3 were within 10%. Comparing to 2020, no diffusion tube concentrations are within 10% of the AQO, although the highest concentration is still experienced at SLO 29, at 33.8µg/m^3.

The distribution of diffusion tubes outside of AQMAs is wide. Often, diffusion tubes were placed on roads with high levels of congestion, to monitor whether NO_2 is close to or exceeding the AQO, and to monitor NO_2 annually to see if air quality is deteriorating in a specific location.

Figures A.8 to A.11 present the diffusion tube results by their location categories, over a 5 year period. The diffusion tubes were grouped in this way to determine the impact of reduced traffic levels on each location type, rather than geographical location, due to the wide distribution.

- The 5 year trend from 2016 to 2020 in Langley is presented in Figure A.8. Previously, there was concern that Langley would soon become an AQMA, due to high concentrations recorded in 2016 and the current and proposed increase in development (particularly large transport infrastructure). The highest concentration in Langley in 2019 was 39.9µg/m^3 at High Street Langley (A) (SLO 53), with other diffusion tube concentrations in Langley <35.0µg/m^3. Comparing to 2020, this has reduced by 12.0µg/m^3 and no diffusion tube concentrations are within 10% of the AQO.
- Roadside and kerbside sites (Figure A.9) show an expected drop in NO_2 concentrations in 2020. Previous to this, there had been a continuous decline in NO_2 concentrations at many sites. Sussex Place (SLO 6) clearly demonstrates this. Other

sites, such as Windsor Road (B) (SLO 49) had a slower rate of improvement prior to 2020. This emphasises the impact of local sources, as this kerbside site on Windsor Road is a busy bus route and is heavily trafficked by private cars.

- As expected, suburban and urban background sites have concentrations much lower than roadside and kerbside sites, particularly in 2020, due to the lack of traffic (see Figure A.10). Although in a suburban location, Horton Road (Caravan site) (SLO 17) is on a road that connects Colnbrook and Poyle with Heathrow and is therefore subject to heavy HGV traffic. This had resulted in a peak in 2018, at 41.5µg/m^3. The impact of the pandemic has brought concentrations to 24.9µg/m^3 (a reduction of 8.4µg/m^3 from 2019), which is only just below concentrations recorded in 2017. However, it should be noted that meteorological effects may have influenced this data.
- Figure A.11 shows concentrations at rail and industrial sites. The 5 year trend shows a very slow decline in NO_2 from 2016 to 2019, with a steeper decline from 2019 to 2020. Similarly to SLO 17, Lakeside Road (SLO 12) experiences heavy HGV traffic which would have been greatly reduced during the pandemic. This has resulted in an NO_2 reduction of 12.9µg/m^3. Other diffusion tubes shown in Figure A.11 show a more gradual decline over the last 5 years, however it is noted that both Sandringham Court (SLO 41) and Walpole Road (SLO 42) consistently have the lowest concentrations, particularly in 2020, at 13.6µg/m^3 and 12.8µg/m^3, respectively.

In summary, 18 diffusion tube monitoring locations were exposed to NO_2 concentrations within 10% under the AQO, and a further 6 exceeded the AQO (inside and outside of AQMAs) during 2019. Comparing to 2020, concentrations across Slough have reduced dramatically, with only one diffusion tube location recording concentrations within 10% of the AQO (SLO 18 at 38.5µg/m^3).

As NO_2 concentrations obtained over 2020 are much lower than usual due to the pandemic, the data should not be considered in the support of revoking any AQMAs. More evidence in future reporting years is required to determine whether any of the AQMAs should be revoked or any new AQMAs declared (such as Langley). Any trend would have to be sustained and show a persistent reduction below 36µg/m^3 for at least 5 years. Currently, this is not the case for any existing AQMAs. It is noted that lockdown restrictions and therefore reduced traffic volumes has continued into mid 2021, therefore it is likely that the conditions will not be typical (i.e. not similar to conditions prior to 2020) until 2022.

The impact of the pandemic has clearly been positive on NO_2 concentrations in Slough. Concentrations recorded in 2020 demonstrate that if traffic levels were reduced and sustained for future years, all AQMAs could potentially be revoked. Increasing mode share targets and encouraging uptake of sustainable transport to reduce car use are therefore key in reducing concentrations, however there must be stronger interventions to accelerate the rate of uptake and reduce car use to the extent of pandemic levels.

3.2.3 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the AQO of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the AQO of 50µg/m^3, not to be exceeded more than 35 times per year.

PM_{10} monitoring was conducted at the following continuous sites in 2020:

- Pippins Colnbrook (A) (SLH 3)
- Lakeside 2 (A) (SLH 8)
- Lakeside 2 (B) (SLH 9)
- Brands Hill, London Road (SLH 11)
- Windmill, Bath Road (SLH 12)

Although traffic in Slough contributes to a proportion of PM_{10} concentrations through brake and tyre ware, the reduction of concentrations shown in Figure A.13 is not as prominent as with the NO_2 concentrations, particularly with Lakeside 2 (B) (SLH 9) and Colnbrook Pippins (A) (SLH 3) which have shown an increase in PM_{10}. This however may be primarily due to meteorological influences. Further comment on the impact of weather fluctuations on PM concentrations is discussed in Appendix F.1**.** No PM_{10} monitoring sites exceed the annual objective, and only two sites have consistently exceeded the WHO recommended objective (Brands Hill London Road and Windmill Bath Road – the latter falling below the WHO objective in 2020).

Figure A.14 presents the number of 24-hour means >50µg/m^3. As with the annual mean for PM_{10}, the 24 hour mean also fluctuates and the impact of the pandemic on the results is not clear cut, as Lakeside 2 (B) (SLH 9) shows an increase of 4 from 2019 to 2020. However, as this is on the Lakeside site, local sources may contribute towards this trend.

Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

$PM_{2.5}$ monitoring has been reduced in 2020, as explained in Section 3.1.1, therefore there is only one remaining site which was in operation in this reporting year (Lakeside 2 – SLH 9). Over the last 5 years, the concentrations of $PM_{2.5}$ have fluctuated marginally and have remained below the WHO objective level. However, $PM_{2.5}$ is the most damaging pollutant to public health and it is not clear if more stringent objectives will be set in future in response to this. In addition, large infrastructure projects such as the Heathrow Expansion may result in higher concentrations of fine particulates, in conjunction with increases in EV usage resulting in greater brake and tyre wear, therefore it is critical that Slough Borough Council look to establish an accredited $PM_{2.5}$ network to monitor trends.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
SLH 4*	Salt Hill (Slough-town-centre, A4)	Urban Background	496599	180156	NOx, NO_2 and PM_{10}	NO	Chemiluminescence TEOM	>30m	12.5m	4m
SLH 3	Slough-Colnbrook-(Pippins)	Suburban	503542	176827	NOx, NO_2, PM_{10}, $PM_{2.5}$ & PM_1	NO	Chemiluminescence TEOM	7m	1.3m	4m
SLH 6*	Slough-Colnbrook-(Pippins)	Suburban	503542	176827	NOx, NO_2, PM_{10}, $PM_{2.5}$ & PM_1	NO	Osiris	7m	1.3m	4m
SLH 7	Slough-Chalvey, M4	Other	496562	179109	NOx and NO_2	YES - AQMA 1	Chemiluminescence	53m	74m	1.5m
SLH 5*	Slough-Colnbrook (Lakeside, Tan House Farm)	Industrial	503551	177258	PM_{10}, $PM_{2.5}$ & PM_1	NO	Osiris	>200m	>50m	10m
SLH 8	Slough-Lakeside-2 (run by Lakeside Energy from Waste Ltd)	Industrial	503569	177385	NOx, NO_2 and PM_{10}	NO	Chemiluminescence BAM (PM_{10})	>200m	10m	4m
SLH 9	Slough-Lakeside-2 (run by Lakeside Energy from Waste Ltd)	Industrial	503569	177385	NOx, NO_2 and PM_{10}	NO	Co-located Osiris (PM_{10}, $PM_{2.5}$ and PM_1)	>200m	10m	4m
SLH 10	Slough Town Centre Wellington Street	Roadside	498413	179804	NOx and NO_2	YES - AQMA 4	Chemiluminescence	8m	5m	1.5m
SLH 11	Brands Hill London Road	Roadside	501643	177753	NOx, NO_2 and PM_{10}	YES - AQMA 2	Chemiluminescence and BAM	12.5m	4m	1.5m
SLH 12	Slough Windmill Bath Road	Roadside	496528	180171	NOx, NO_2 and PM_{10}	YES - AQMA 3 Extension	Chemiluminescence and BAM	12m	7.5m	1.5m

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
TRL*	Farnham Road	Roadside	496392	180344	NOx and NO_2	YES	Chemiluminescence	15m	15m	1.5m

* These sites were not operational in 2020 but are retained in this table as a point of reference in the discussion of five year trends.

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SLO 1, SLO 2, SLO 3	Salt Hill Park *	Urban Background	496599	180156	NO_2	No	30.0	12.5	No	2.5
SLO 1 Alternate	Salt Hill Park tennis courts	Urban Background	496904	180187	NO_2	No	134.7	86.3	No	2.5
SLO 2 Alternate	Salt Hill Park footbridge	Urban Background	496785	180336	NO_2	No	65.7	88.2	No	2.5
SLO 3 Alternate	Salt Hill Park footpath	Urban Background	496665	180236	NO_2	No	48.6	65.2	No	2.0
SLO 4	Lansdowne Avenue	Roadside	497188	180050	NO_2	Yes - AQMA 4	5.5	13.8	No	2.5
SLO 4 Alternate	Lansdowne Avenue - new location	Roadside	497185	180050	NO_2	Yes - AQMA 4	0.0	11.0	No	2.0
SLO 5	Princess Street	Roadside	498541	179815	NO_2	Yes - AQMA 4	12.0	22.0	No	2.0
SLO 6	Sussex Place	Roadside	498784	179560	NO_2	No	4.5	9.6	No	2.0
SLO 7	Colnbrook By-pass	Industrial	503196	177349	NO_2	No	200.0	5.0	No	2.0
SLO 8	Grampian Way	Other	501382	178101	NO_2	Yes - AQMA 1	20.0	35.0	No	2.0
SLO 9	Tweed Road (B) Moved 2012	Other	501501	177879	NO_2	Yes - AQMA 1	12.9	22.0	No	2.0
SLO 10	London Road (A)	Roadside	501733	177725	NO_2	Yes - AQMA 2	12.5	4.0	No	2.0
SLO 11	Torridge Road	Suburban	501637	177999	NO_2	Yes - AQMA 1	30.0	65.0	No	3.0
SLO 12	Lakeside Road	Industrial	503877	177459	NO_2	No	200.0	>100	No	2.0
SLO 13	Elbow Meadows	Suburban	503856	176538	NO_2	No	37.0	50.0	No	2.0
SLO 14, SLO 15, SLO 16	Pippins *	Suburban	503542	176827	NO_2	No	7.0	>50	Yes	2.5
SLO 17	Horton Road (Caravan Park)	Suburban	503136	175654	NO_2	No	28.5	15.0	No	2.0
SLO 18	Brands Hill (A)	Roadside	501798	177659	NO_2	Yes - AQMA 2	10.5	6.0	No	2.5
SLO 19	Ditton Road	Roadside	500851	177890	NO_2	No	21.0	1.8	No	2.0
SLO 20	Hencroft Street	Urban Background	497925	179450	NO_2	No	5.0	>100	No	2.0
SLO 21	Windsor Road	Roadside	497457	179566	NO_2	No	10.5	2.5	No	2.5
SLO 22	Winvale	Other	497488	179090	NO_2	Yes - AQMA 1	20.0	31.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SLO 23	Tuns Lane	Urban Background	496416	180126	NO_2	Yes - AQMA 3	18.0	17.5	No	2.5
SLO 24	Spackmans Way	Other	496272	179187	NO_2	Yes - AQMA 1	53.0	60.5	No	2.5
SLO 25	Paxton Avenue	Other	496050	179258	NO_2	Yes - AQMA 1	34.5	27.0	No	2.0
SLO 26	Yew Tree Rd (Ux Rd) (B)	Roadside	498473	179706	NO_2	Yes - AQMA 4	0.0	9.5	No	2.0
SLO 27	India Road	Other	498681	179972	NO_2	No	0.0	13.0	No	2.0
SLO 28	Rogans (Colnbrook by pass)	Roadside	501941	177633	NO_2	Yes - AQMA 2	8.5	4.5	No	2.5
SLO 29	Yew Tree Road (Uxbridge Rd)	Kerbside	498483	179707	NO_2	Yes - AQMA 4	6.0	1.5	No	2.0
SLO 30	Farnham Road (2)	Roadside	496397	180341	NO_2	Yes - AQMA 3	17.5	12.0	No	2.0
SLO 31	Essex Avenue	Suburban	496200	181900	NO_2	No	3.0	1.4	No	2.0
SLO 32	Brands Hill (B)	Roadside	501853	177620	NO_2	Yes - AQMA 2	0.0	9.0	No	2.0
SLO 33	Wellington Street - Stratfield	Roadside	498168	179907	NO_2	Yes - AQMA 4	8.0	12.0	No	2.5
SLO 34, SLO 35, SLO 36	Chalvey (CAS) *	Other	496562	179109	NO_2	Yes - AQMA 1	> 50	74.0	Yes	1.5
SLO 37	Blair Road- Victoria Court	Roadside	497105	180081	NO_2	Yes - AQMA 4	11.0	11.0	No	2.0
SLO 38	Wellesley Road	Roadside	498071	179949	NO_2	Yes - AQMA 4	13.0	11.5	No	2.5
SLO 39	London Rd (B)	Roadside	501734	177733	NO_2	Yes - AQMA 2	0.0	11.5	No	2.5
SLO 40	Wexham Road	Roadside	498394	179849	NO_2	Yes - AQMA 4	11.5	11.0	No	2.0
SLO 41	Sandringham Court	Other	493960	181355	NO_2	No	0.0	10.5	No	2.5
SLO 42	Walpole Rd	Other	493493	181378	NO_2	No	0.0	16.0	No	2.5
SLO 43	Windmill (Bath Rd)	Roadside	496533	180175	NO_2	Yes - AQMA 3 Extension	0.0	12.0	No	2.0
SLO 44	Goodman Park (Ux Rd)	Roadside	498961	180113	NO_2	No	10.0	9.7	No	2.5
SLO 45	London Rd (C)	Roadside	501658	177781	NO_2	Yes - AQMA 3	0.0	14.0	No	2.0
SLO 46	Cornwall House, Bath Rd	Roadside	497467	179971	NO_2	Yes - AQMA 4	11.0	5.0	No	2.0
SLO 47	Princes House, Bath Road	Roadside	497326	180003	NO_2	Yes - AQMA 4	0.0	4.5	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SLO 48	Castle Street	Other	497960	179243	NO_2	No	15.5	14.0	No	2.0
SLO 49	Windsor Road (B)	Kerbside	497397	179471	NO_2	No	6.0	1.5	No	2.0
SLO 50	Tuns Lane (B)	Kerbside	496377	179929	NO_2	Yes - AQMA 3	13.0	4.0	No	2.0
SLO 51	Langley Road	Roadside	501014	179316	NO_2	No	10.0	2.5	No	2.5
SLO 52	Station Road	Roadside	501161	179538	NO_2	No	10.0	3.5	No	2.5
SLO 53	High Street Langley (A)	Roadside	501208	178799	NO_2	No	5.5	2.0	No	2.5
SLO 54	High Street Langley (B)	Roadside	501256	179067	NO_2	No	6.0	4.0	No	2.5
SLO 55	Parlaunt Road	Roadside	501891	178954	NO_2	No	8.0	2.5	No	2.5
SLO 56	Sutton lane	Roadside	502241	178679	NO_2	No	7.5	4.0	No	2.5
SLO 57, SLO 58, SLO 59	Windmill	Kerbside	469528	180171	NO_2	Yes - AQMA 3 Extension	12.0	7.5	Yes	1.5
SLO 60, SLO 61, SLO 62	Wellington Street	Kerbside	498413	179804	NO_2	Yes - AQMA 4	8.0	5.0	Yes	1.5
SLO 63, SLO 64, SLO 65	Brands Hill	Kerbside	501643	177753	NO_2	Yes - AQMA 2	12.5	4.0	Yes	1.5
SLO 66, SLO 67, SLO 68	Paxton Avenue HE Receptor 1	Other	496146	179259	NO_2	Yes - AQMA 1	22.1	20.4	No	2.0
SLO 69, SLO 70, SLO 71	Spackmans Way HE Receptor 2	Other	496223	179217	NO_2	Yes - AQMA 1	0.0	34.1	No	1.5
SLO 72, SLO 73, SLO 74	Spackmans Way HE Receptor 3	Other	496225	179213	NO_2	Yes - AQMA 1	0.0	34.9	No	1.5
SLO 75, SLO 76, SLO 77	Spackmans Way HE Receptor 4	Other	496227	179207	NO_2	Yes - AQMA 1	0.0	34.7	No	1.5
SLO 78, SLO 79, SLO 80	Spackmans Way HE Receptor 5	Other	496229	179204	NO_2	Yes - AQMA 1	0.0	34.3	No	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SLO 81, SLO 82, SLO 83	Spackmans Way HE Receptor 6	Other	496232	179199	NO_2	Yes - AQMA 1	0.0	34.1	No	1.5
SLO 84, SLO 85, SLO 86	Spackmans Way HE Receptor 7	Other	496234	179195	NO_2	Yes - AQMA 1	0.0	33.9	No	1.5
SLO 87, SLO 88, SLO 89	Spackmans Way HE Receptor 8	Other	496236	179191	NO_2	Yes - AQMA 1	0.0	33.7	No	1.5
SLO 90, SLO 91, SLO 92	Spackmans Way HE Receptor 9	Other	496238	179186	NO_2	Yes - AQMA 1	0.0	33.8	No	1.5
SLO 93, SLO 94, SLO 95	Winvale HE Receptor 10	Other	497433	179092	NO_2	Yes - AQMA 1	17.2	25.3	No	2.0
SLO 96	Poyle Rd	Roadside	503272	176597	NO_2	No	0.0	7.0	No	1.5
SLO 97	Albert Street/Upton Court Park Road	Roadside	497725	179360	NO_2	No	12.8	2.9	No	1.5
SLO 98	The Hawthorns - Pippins (2)	Suburban	503527	176823	NO_2	No	14.6	1.2	No	2.5
SLO 99	The Hawthorns - Pippins (3)	Suburban	503510	176806	NO_2	No	8.9	2.2	No	2.5
SLO 100	The Hawthorns - Pippins (4)	Suburban	503613	176912	NO_2	No	2.0	28.4	No	1.5
SLO 101	Bower Way - Cippenham (5)	Kerbside	494101	180708	NO_2	No	2.0	1.0	No	2.5
SLO 102	Erica Close - Cippenham (6)	Urban Background	494199	180637	NO_2	No	7.2	0.7	No	2.5
SLO 103	St Andrews Way - Cippenham (7)	Kerbside	493784	180662	NO_2	No	3.8	0.6	No	2.5
SLO 104	Dennis Way - Cippenham (8)	Suburban	493812	180572	NO_2	No	5.1	1.9	No	2.5
SLO 105	Francis Way - Cippenham (9)	Urban Background	493592	180737	NO_2	No	19.1	1.3	No	2.5
SLO 106	Monksfield Way - Claycots (10)	Kerbside	495488	182538	NO_2	No	35.1	0.7	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SLO 107	Monksfield Way - Claycots (11)	Roadside	495457	182550	NO_2	No	6.1	2.0	No	2.0
SLO 108	Brighton Spur - Claycots (12)	Urban Background	495668	182430	NO_2	No	6.2	0.7	No	2.5
SLO 109	Hatton Avenue - Penn Wood (13)	Suburban	496526	182276	NO_2	No	5.1	1.1	No	2.5
SLO 110	Hatton Avenue - Penn Wood (14)	Suburban	496529	182243	NO_2	No	5.9	0.7	No	2.5
SLO 111	Cumberland Av. Footpath - Penn Wood (15)	Urban Background	496489	182270	NO_2	No	61.5	4.0	No	2.5
SLO 112	Oatlands Drive (a)	Roadside	497070	181108	NO_2	No	10.7	2.2	No	1.5
SLO 113	Oatlands Drive (b)	Roadside	497079	181088	NO_2	No	10.5	2.5	No	1.5
SLO 114	Elliman Avenue (a)	Roadside	497677	180876	NO_2	No	6.1	1.8	No	1.5
SLO 115	Elliman Avenue (b)	Roadside	497671	180866	NO_2	No	4.9	2.1	No	1.5
SLO 116	Shaggy Calf Lane (a)	Roadside	498103	180842	NO_2	No	12.8	1.7	No	1.5
SLO 117	Shaggy Calf Lane (b)	Roadside	498112	180857	NO_2	No	11.6	1.8	No	1.5
SLO 118	Chalvey Road East (a)	Kerbside	497097	179521	NO_2	No	4.1	0.6	No	1.5
SLO 119	Chalvey Road East (b)	Roadside	497104	179511	NO_2	No	2.1	1.4	No	1.5
SLO 120	Ledgers Road (a)	Kerbside	497013	179870	NO_2	No	1.4	0.4	No	1.5
SLO 121	Ledgers Road (b)	Kerbside	497004	179874	NO_2	No	3.8	1.1	No	1.5
SLO 122	Cippenham Lane (a)	Kerbside	496167	179975	NO_2	No	8.8	0.9	No	1.5
SLO 123	Cippenham Lane (b)	Roadside	496184	179950	NO_2	No	7.8	8.3	No	1.5

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.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (μg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLH 3	503542	176827	Suburban	97.6	97.6	29	25	22	26.1	16.2
SLH 4	496599	180156	Urban Background	-	-	30	33	31	26.4	-
SLH 7	496562	179109	Other	99.8	99.8	41	35	32	32.7	21.3
SLH 8	503569	77385	Industrial	99.4	99.4	32.4	26	26	27.6	19.1
SLH 10	498413	179804	Roadside	99.5	99.5	-	36.6	36	34.7	24.6
SLH 11	501643	177753	Roadside	99.8	99.8	-	37.5	42	39.2	27.3
SLH 12	496528	180171	Roadside	97.4	97.4	-	41.5	42	39.2	26.9
TRL	496392	180344	Roadside	-	-	32.9	-	-	-	

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

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

Notes:

The annual mean concentrations are presented as μg/m³.

Exceedances of the NO_2 annual mean objective of 40μg/m³ are shown in **bold**.

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%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring ($\mu g/m^3$)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLO 1, SLO 2, SLO 3	496599	180156	Urban Background	100	23.2	31.7	31.5	27.8	26.7	19.3
SLO 1 Alternate	496904	180187	Urban Background	88.9	68.0	-	-	-	-	19.7
SLO 2 Alternate	496785	180336	Urban Background	88.9	68.0	-	-	-	-	15.4
SLO 3 Alternate	496665	180236	Urban Background	88.9	68.0	-	-	-	-	17.6
SLO 4	497188	180050	Roadside	44.4	40.1	38.6	37.9	33.8	33.6	20.1
SLO 4 Alternate	497185	180050	Roadside	100	27.1	-	-	-	-	19.4
SLO 5	498541	179815	Roadside	91.7	91.2	40.8	40.7	34.4	33.6	27.6
SLO 6	498784	179560	Roadside	91.7	91.2	34.2	32.1	29.0	27.8	21.2
SLO 7	503196	177349	Industrial	91.7	91.2	38.7	38.7	35.0	32.8	23.8
SLO 8	501382	178101	Other	91.7	91.2	41.3	40.4	34.8	35.0	26.3
SLO 9	501501	177879	Other	91.7	91.2	37.4	35.3	32.6	31.8	22.9
SLO 10	501733	177725	Roadside	100	100.0	52.3	45.3	44.4	41.1	28.8
SLO 11	501637	177999	Suburban	91.7	91.2	37.3	32.7	30.0	28.7	20.5
SLO 12	503877	177459	Industrial	91.7	91.2	44.3	38.6	40.7	39.5	26.6
SLO 13	503856	176538	Suburban	91.7	91.2	35.9	30.5	31.2	28.9	20.9
SLO 14, SLO 15, SLO 16	503542	176827	Suburban	91.7	91.2	28.8	25.3	25.3	23.8	18.3
SLO 17	503136	175654	Suburban	100	100.0	31.9	25.6	41.5	33.3	24.9
SLO 18	501798	177659	Roadside	100	100.0	63.7	55.2	53.2	49.4	38.5
SLO 19	500851	177890	Roadside	91.7	91.2	40.0	34.6	33.2	33.7	22.7
SLO 20	497925	179450	Urban Background	91.7	91.2	28.6	27.0	23.7	24.2	16.8
SLO 21	497457	179566	Roadside	83.3	84.0	47.8	40.9	35.0	34.6	24.0
SLO 22	497488	179090	Other	91.7	91.2	39.8	41.8	33.8	32.7	23.1
SLO 23	496416	180126	Urban Background	83.3	83.4	36.4	33.6	29.5	30.8	22.0
SLO 24	496272	179187	Other	91.7	91.2	39.0	37.9	32.7	33.0	22.6
SLO 25	496050	179258	Other	91.7	91.2	38.4	36.5	33.2	31.8	20.3
SLO 26	498473	179706	Roadside	75	74.3	61.1	48.1	31.5	35.2	26.7
SLO 27	498681	179972	Other	91.7	91.2	33.9	31.3	26.9	26.5	19.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLO 28	501941	177633	Roadside	100	100.0	58.1	45.3	44.0	38.5	25.5
SLO 29	498483	179707	Kerbside	100	100.0	38.5	42.9	52.7	48.5	33.8
SLO 30	496397	180341	Roadside	83.3	83.4	34.1	32.6	29.0	32.0	23.2
SLO 31	496200	181900	Suburban	91.7	91.2	30.9	28.7	27.0	27.0	21.9
SLO 32	501853	177620	Roadside	100	100.0	39.3	36.3	36.2	32.8	23.9
SLO 33	498168	179907	Roadside	83.3	82.6	36.9	33.9	28.7	30.1	23.1
SLO 34, SLO 35, SLO 36	496562	179109	Other	66.7	67.1	36.1	35.5	30.6	30.6	18.4
SLO 37	497105	180081	Roadside	91.7	91.2	47.6	45.3	39.9	37.8	28.2
SLO 38	498071	179949	Roadside	91.7	91.2	38.3	37.4	32.3	33.0	25.0
SLO 39	501734	177733	Roadside	91.7	91.2	37.0	33.1	31.6	30.1	21.8
SLO 40	498394	179849	Roadside	91.7	91.2	44.8	42.3	38.6	37.9	29.7
SLO 41	493960	181355	Other	91.7	91.2	25.9	25.9	21.9	19.4	13.6
SLO 42	493493	181378	Other	91.7	91.2	28.4	23.1	21.2	18.6	12.8
SLO 43	496533	180175	Roadside	91.7	91.2	42.0	37.2	34.0	33.1	25.0
SLO 44	498961	180113	Roadside	83.3	83.4	38.4	36.4	31.9	29.8	24.7
SLO 45	501658	177781	Roadside	91.7	92.3	32.7	31.4	28.6	28.1	19.8
SLO 46	497467	179971	Roadside	100	100.0	53.3	46.2	40.1	39.0	29.3
SLO 47	497326	180003	Roadside	83.3	84.0	44.6	36.9	35.2	31.0	22.5
SLO 48	497960	179243	Other	91.7	91.2	-	29.4	28.1	29.0	22.2
SLO 49	497397	179471	Kerbside	100	100.0	-	48.7	40.0	39.5	26.0
SLO 50	496377	179929	Kerbside	100	100.0	-	45.3	45.8	42.8	30.6
SLO 51	501014	179316	Roadside	100	100.0	42.8	37.8	36.0	35.0	24.8
SLO 52	501161	179538	Roadside	83.3	84.0	41.5	36.4	33.2	33.3	23.7
SLO 53	501208	178799	Roadside	100	100.0	48.6	42.1	37.9	39.9	27.9
SLO 54	501256	179067	Roadside	91.7	91.2	39.6	35.4	32.8	32.6	24.6
SLO 55	501891	178954	Roadside	91.7	91.2	36.9	31.4	30.4	29.5	21.3
SLO 56	502241	178679	Roadside	91.7	91.2	43.9	37.8	37.6	35.7	26.3
SLO 57, SLO 58, SLO 59	469528	180171	Kerbside	100	100.0	-	44.2	41.5	38.9	27.3
SLO 60, SLO 61, SLO 62	498413	179804	Kerbside	100	100.0	-	37.3	33.9	33.6	24.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLO 63, SLO 64, SLO 65	501643	177753	Kerbside	100	100.0	-	36.9	43.3	41.2	29.1
SLO 66, SLO 67, SLO 68	496146	179259	Other	66.7	81.5	-	-	-	34.6	22.6
SLO 69, SLO 70, SLO 71	496223	179217	Other	91.7	92.3	-	-	-	32.7	23.1
SLO 72, SLO 73, SLO 74	496225	179213	Other	83.3	83.4	-	-	-	32.0	24.7
SLO 75, SLO 76, SLO 77	496227	179207	Other	83.3	83.4	-	-	-	29.3	22.6
SLO 78, SLO 79, SLO 80	496229	179204	Other	75	74.3	-	-	-	31.5	24.1
SLO 81, SLO 82, SLO 83	496232	179199	Other	83.3	83.4	-	-	-	-	24.1
SLO 84, SLO 85, SLO 86	496234	179195	Other	83.3	83.4	-	-	-	32.9	23.3
SLO 87, SLO 88, SLO 89	496236	179191	Other	83.3	83.4	-	-	-	33.2	23.1
SLO 90, SLO 91, SLO 92	496238	179186	Other	91.7	92.3	-	-	-	28.7	23.1
SLO 93, SLO 94, SLO 95	497433	179092	Other	91.7	91.2	-	-	-	33.5	23.8
SLO 96	503272	176597	Roadside	91.7	91.2	-	-	-	28.4	20.5
SLO 97	497725	179360	Roadside	91.7	91.2	-	-	-	-	28.2
SLO 98	503527	176823	Suburban	85.7	52.5	-	-	-	-	17.1
SLO 99	503510	176806	Suburban	100	60.2	-	-	-	-	18.0
SLO 100	503613	176912	Suburban	71.4	43.9	-	-	-	-	16.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLO 101	494101	180708	Kerbside	85.7	51.7	-	-	-	-	20.4
SLO 102	494199	180637	Urban Background	100	60.2	-	-	-	-	14.4
SLO 103	493784	180662	Kerbside	100	60.2	-	-	-	-	18.8
SLO 104	493812	180572	Suburban	100	60.2	-	-	-	-	17.7
SLO 105	493592	180737	Urban Background	100	60.2	-	-	-	-	16.4
SLO 106	495488	182538	Kerbside	100	60.2	-	-	-	-	17.1
SLO 107	495457	182550	Roadside	100	60.2	-	-	-	-	17.8
SLO 108	495668	182430	Urban Background	100	60.2	-	-	-	-	14.3
SLO 109	496526	182276	Suburban	100	60.2	-	-	-	-	14.7
SLO 110	496529	182243	Suburban	100	60.2	-	-	-	-	19.3
SLO 111	496489	182270	Urban Background	100	60.2	-	-	-	-	14.8
SLO 112	497070	181108	Roadside	100	9.7	-	-	-	-	-
SLO 113	497079	181088	Roadside	100	9.7	-	-	-	-	-
SLO 114	497677	180876	Roadside			-	-	-	-	-
SLO 115	497671	180866	Roadside	100	9.7	-	-	-	-	-
SLO 116	498103	180842	Roadside	100	9.7	-	-	-	-	-
SLO 117	498112	180857	Roadside	100	9.7	-	-	-	-	-
SLO 118	497097	179521	Kerbside			-	-	-	-	-
SLO 119	497104	179511	Roadside	100	9.7	-	-	-	-	-
SLO 120	497013	179870	Kerbside			-	-	-	-	-
SLO 121	497004	179874	Kerbside	100	9.7	-	-	-	-	-
SLO 122	496167	179975	Kerbside	100	9.7	-	-	-	-	-
SLO 123	496184	179950	Roadside	100	9.7	-	-	-	-	-

☒ **Annualisation has been conducted where data capture is <75% and >25% 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:

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 Across the Borough

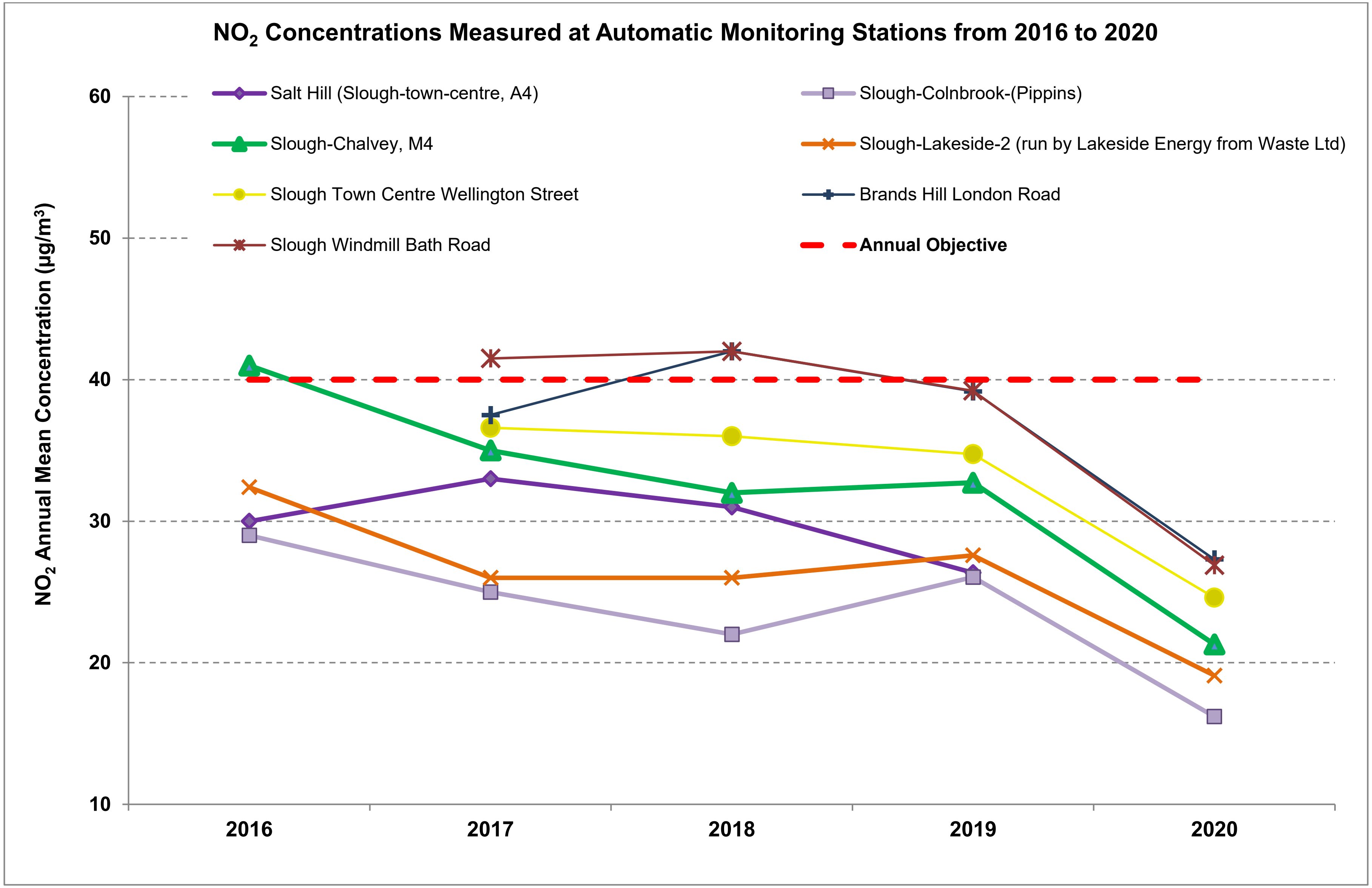


Figure A.2 – Trends in Annual Mean NO_2 Concentrations, Grouped by Location

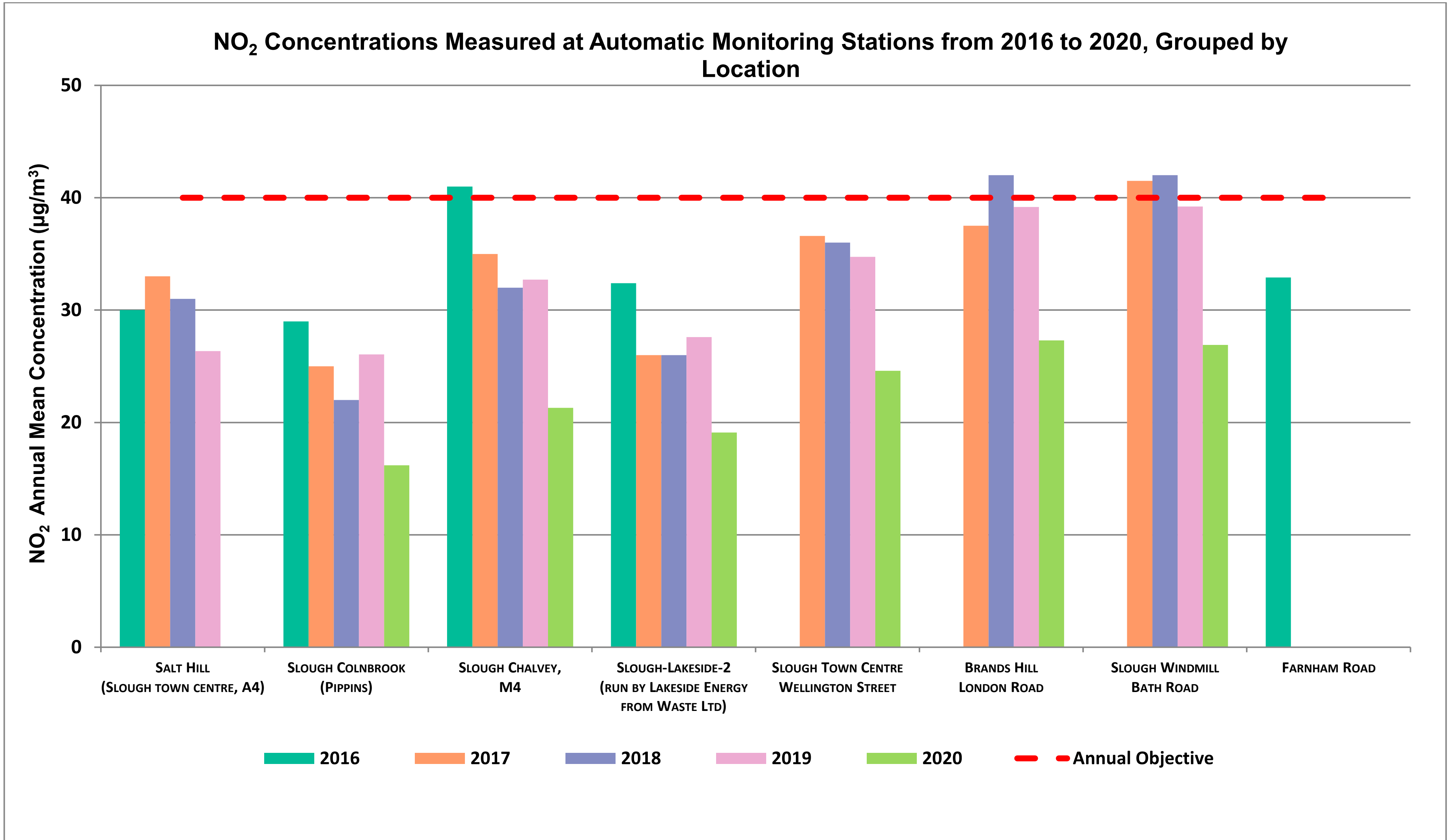


Figure A.3 – Trends in Annual Mean NO_2 Concentrations at AQMA 1

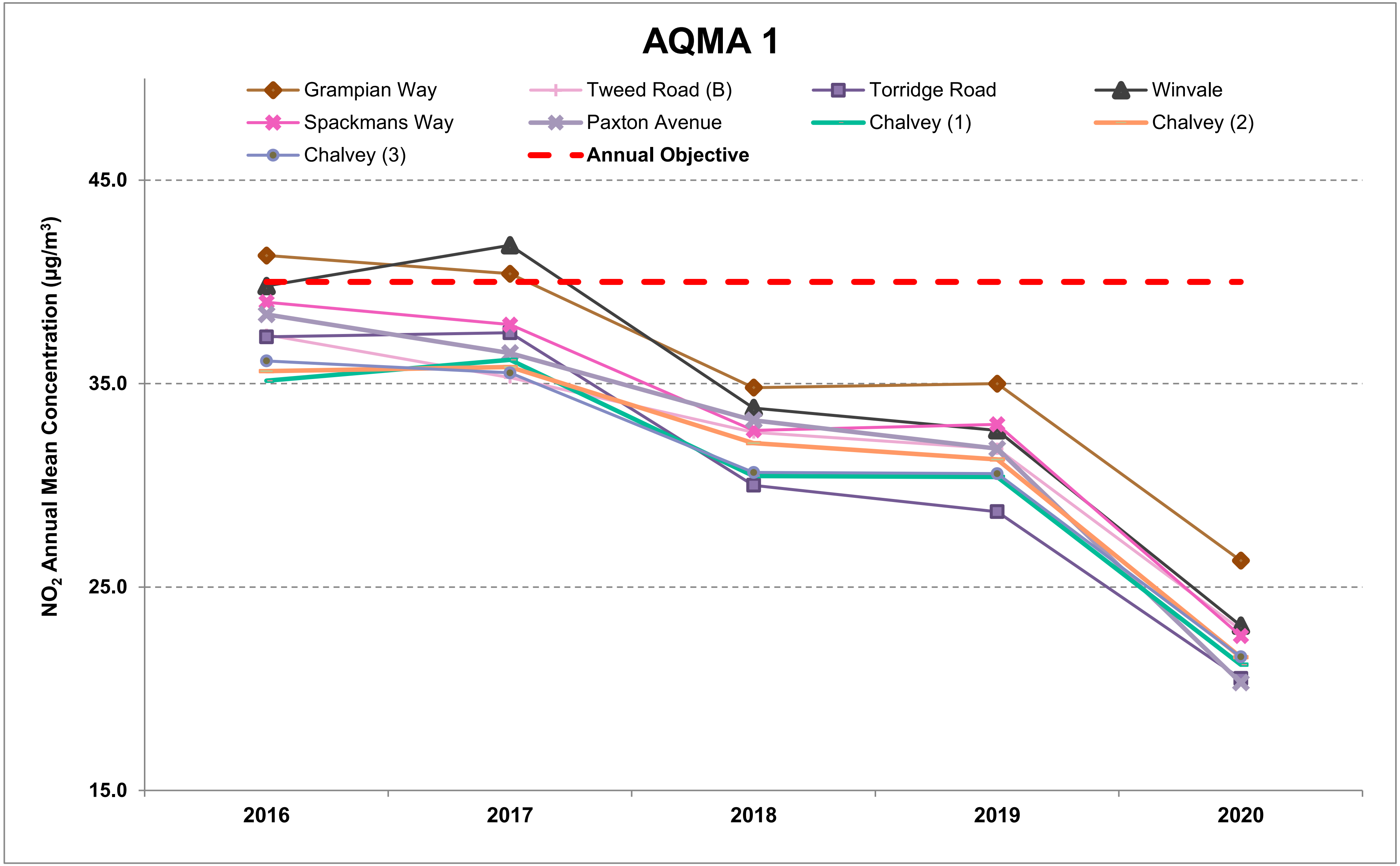


Figure A.4 – Trends in Annual Mean NO_2 Concentrations at AQMA 2

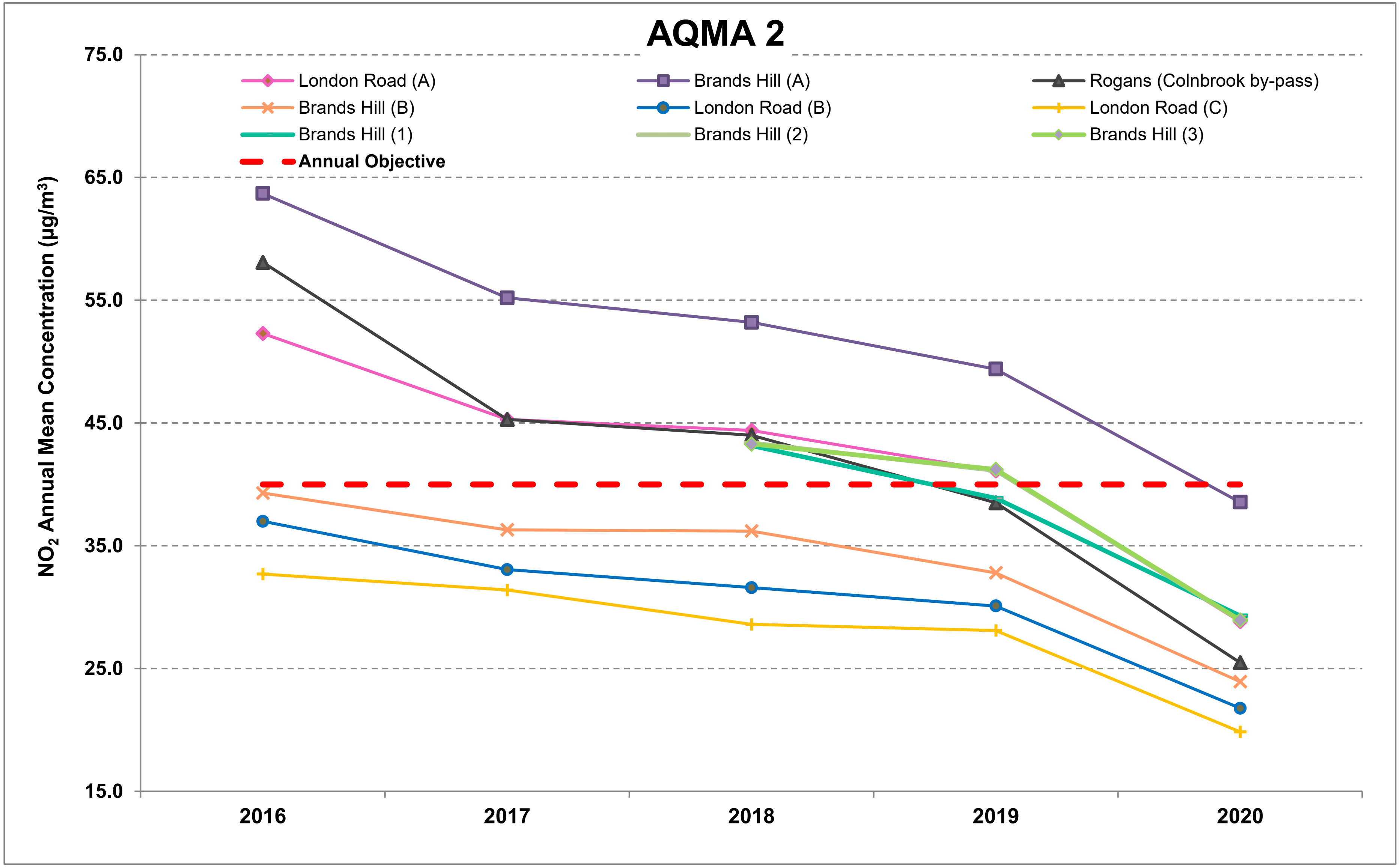


Figure A.5 – Trends in Annual Mean NO_2 Concentrations at AQMA 3

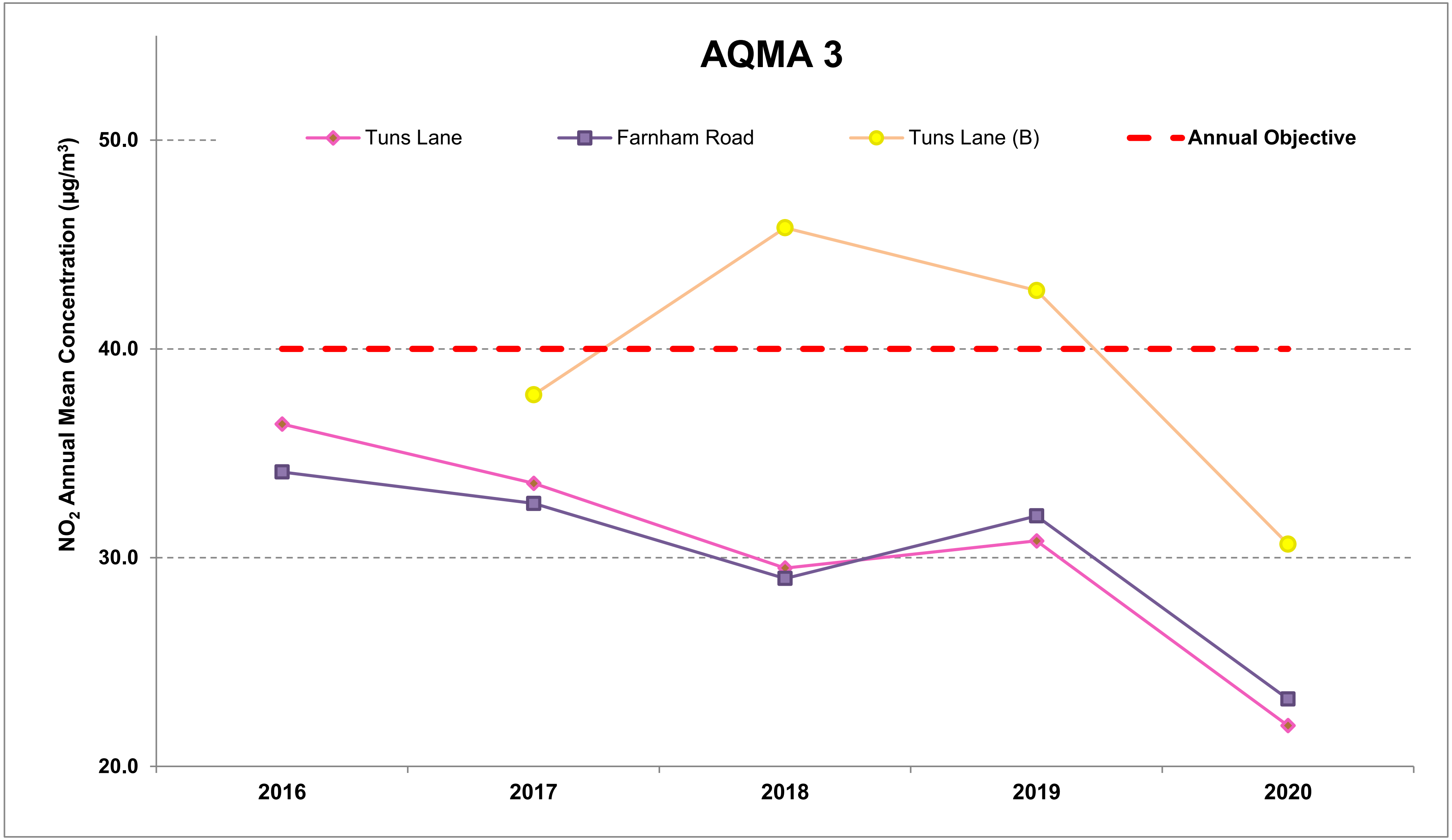


Figure A.6 – Trends in Annual Mean NO_2 Concentrations at AQMA 3 Extension

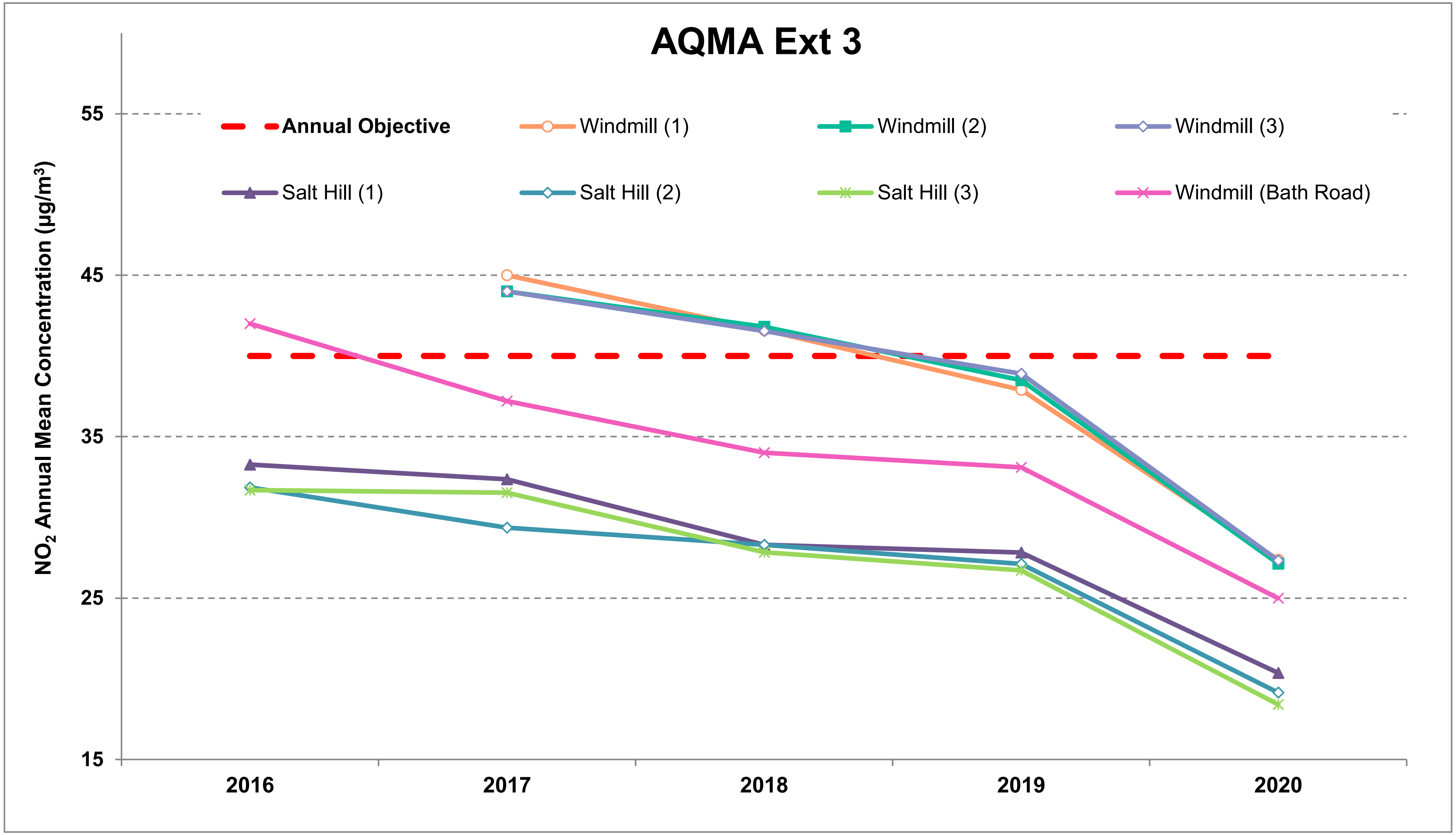


Figure A.7 – Trends in Annual Mean NO_2 Concentrations at AQMA 4

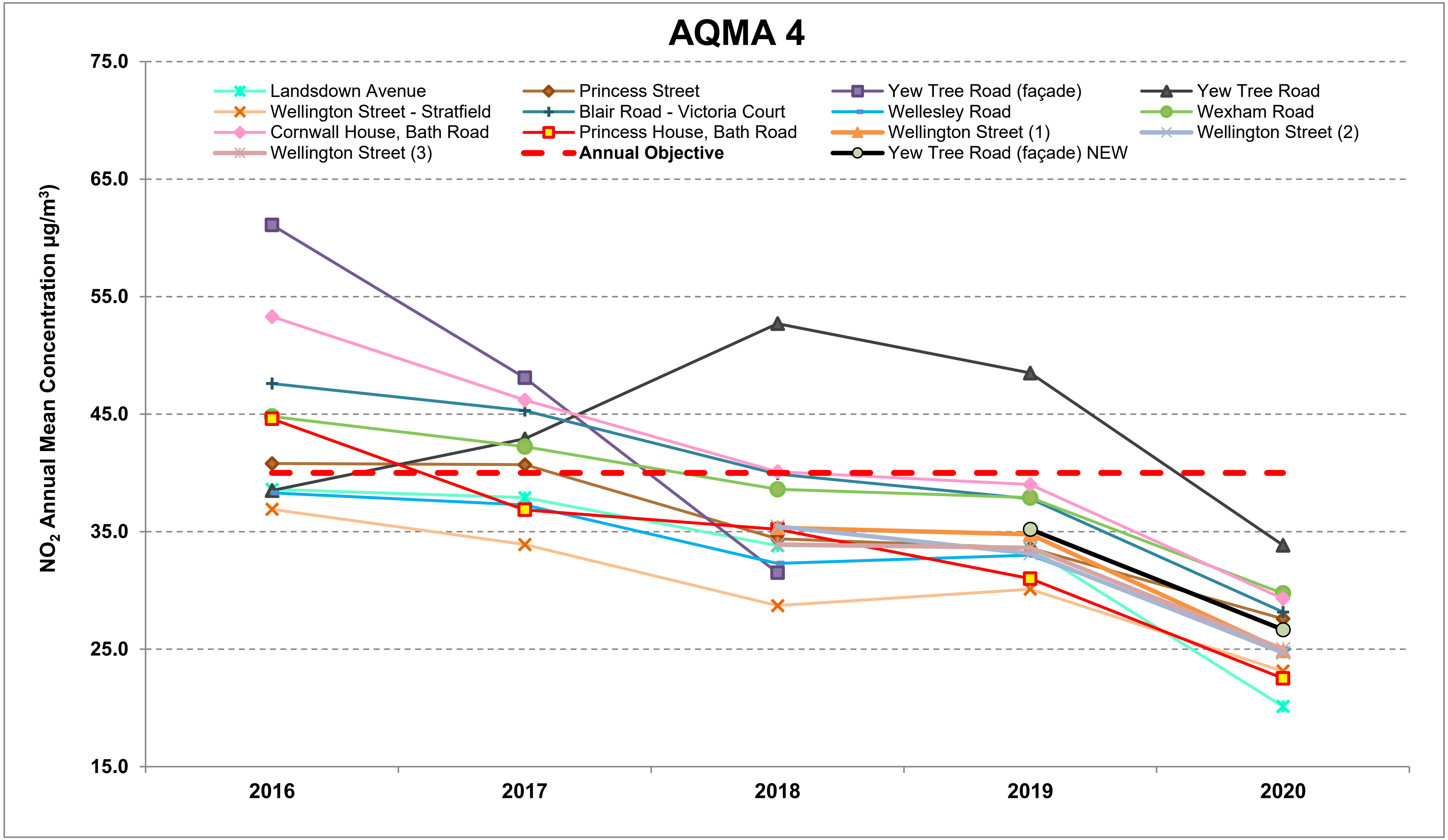


Figure A.8 – Trends in Annual Mean NO_2 Concentrations in Langley

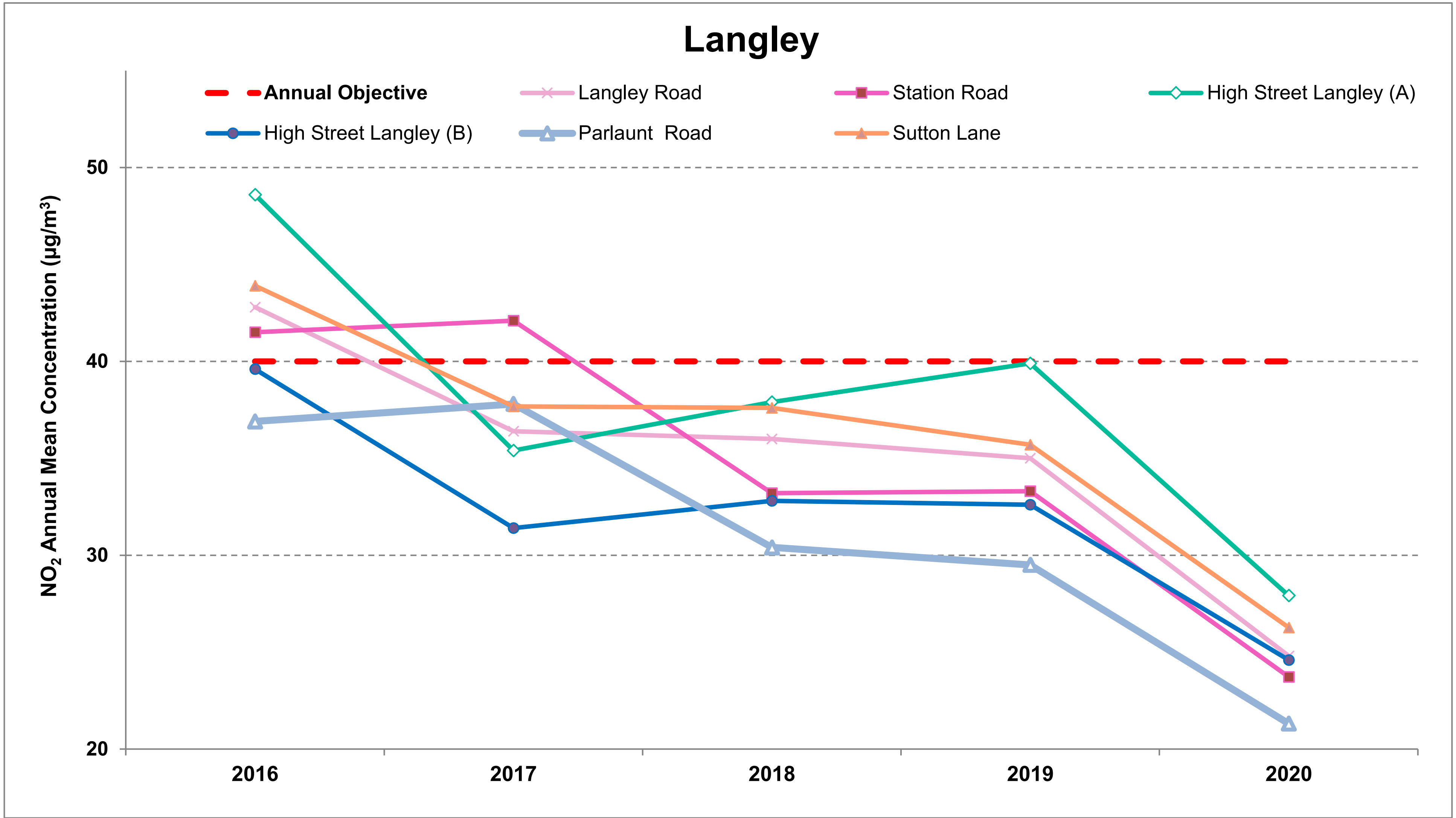


Figure A.9 – Trends in Annual Mean NO_2 Concentrations at Roadside and Kerbside Sites

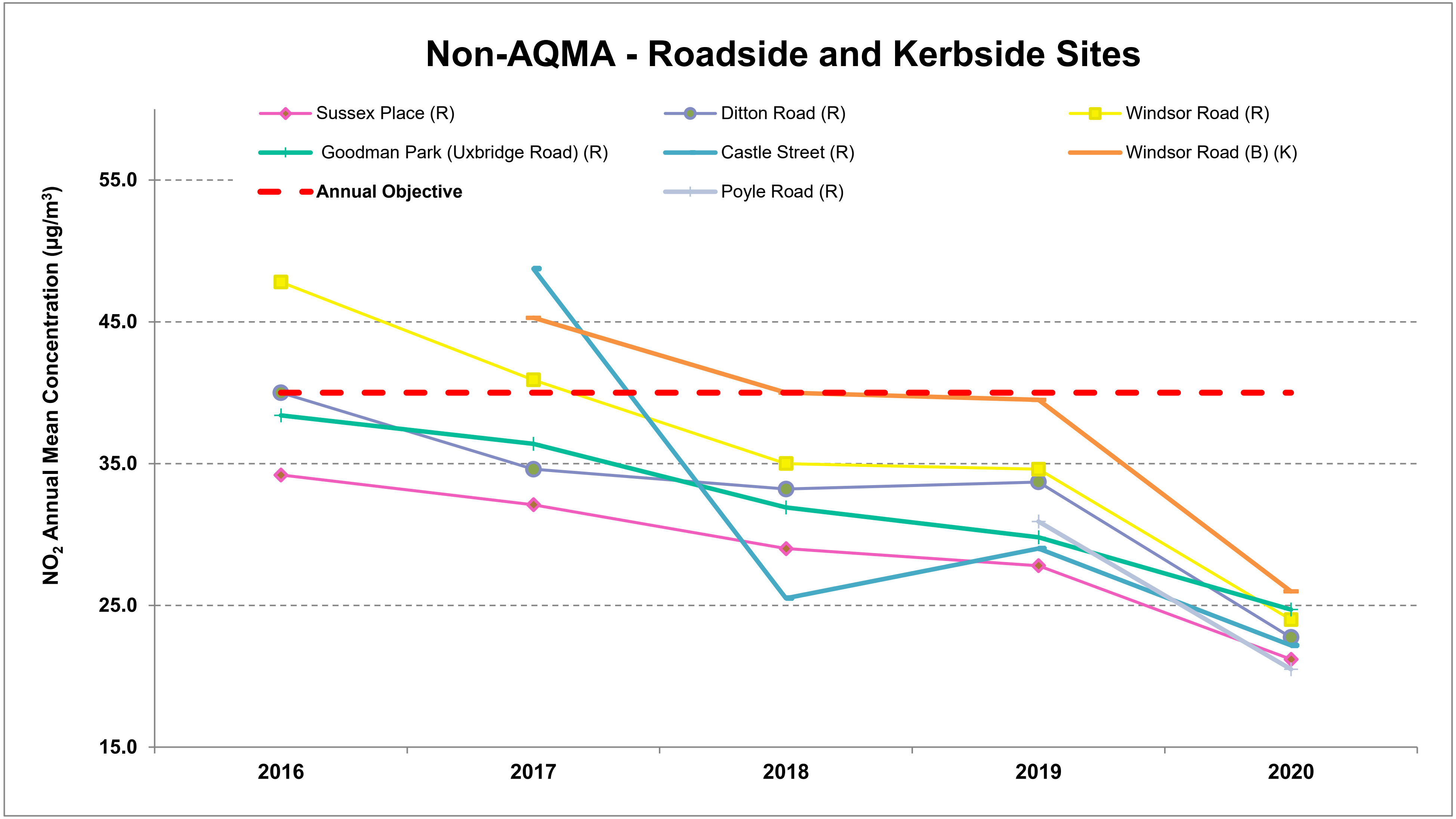


Figure A.10 – Trends in Annual Mean NO_2 Concentrations at Suburban and Urban Background Sites

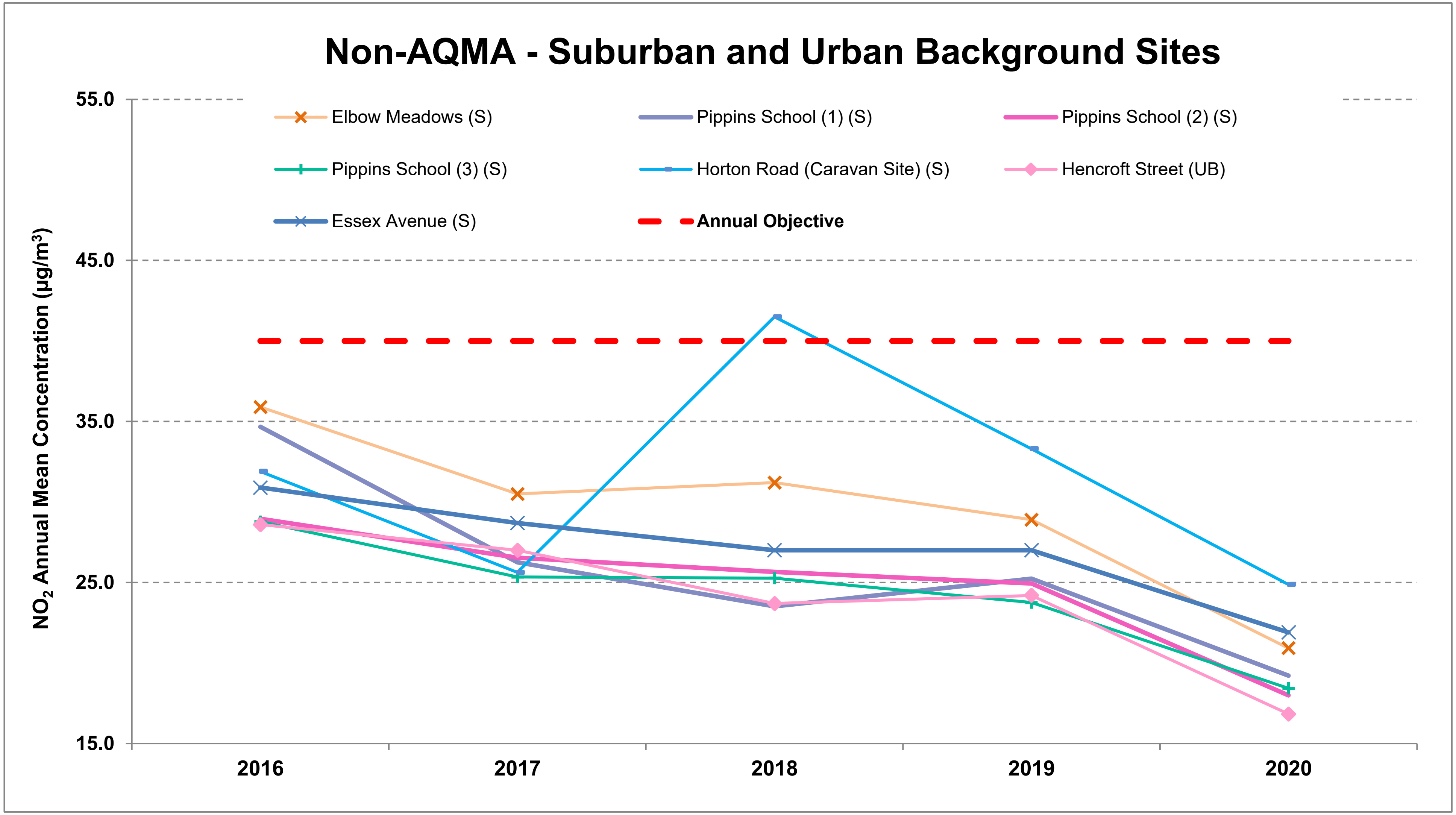


Figure A.11 – Trends in Annual Mean NO_2 Concentrations at Rail and Industrial Sites

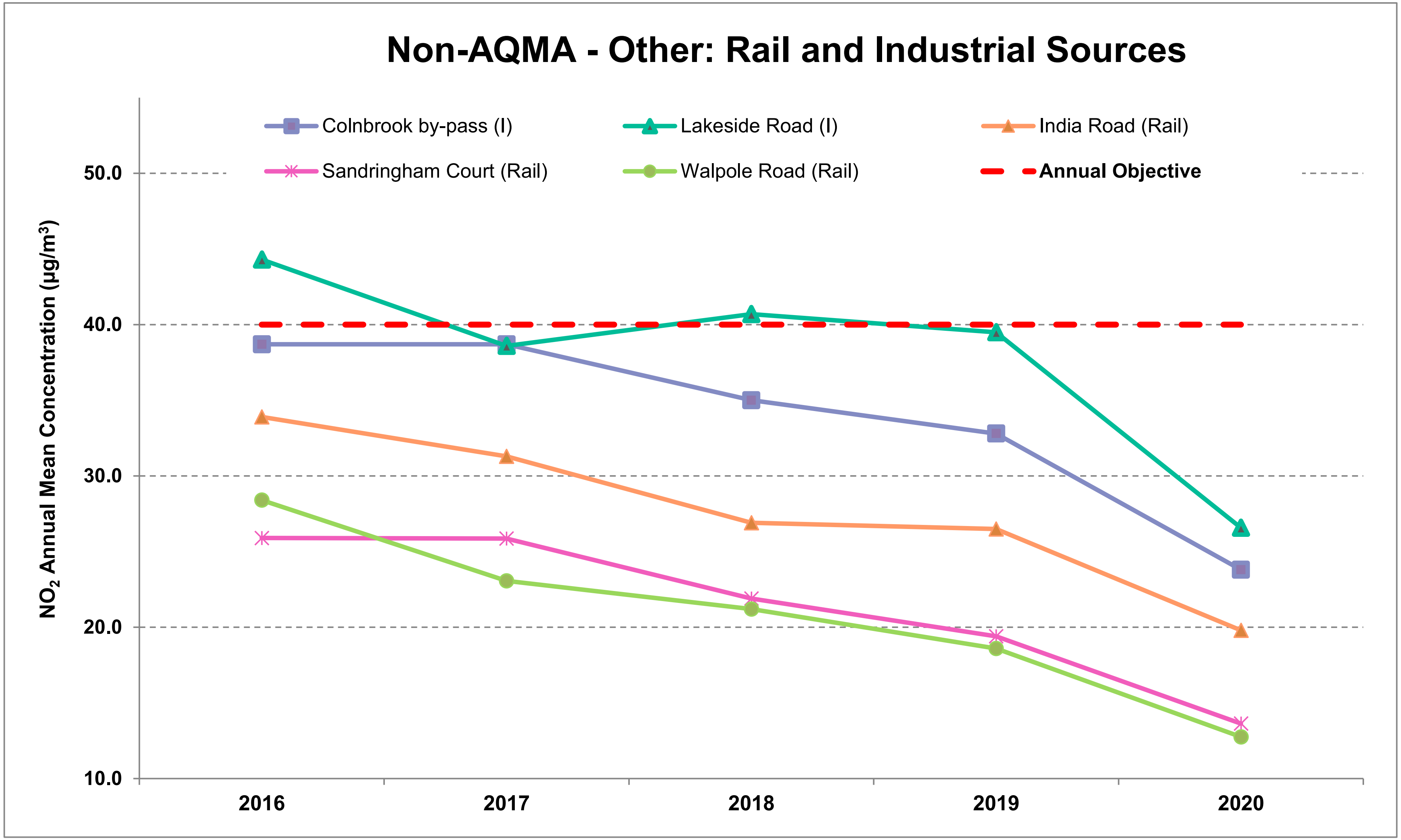


Figure A.12 – Trends in Monthly Mean NO_2 Concentrations at Co-located Sensor Sites

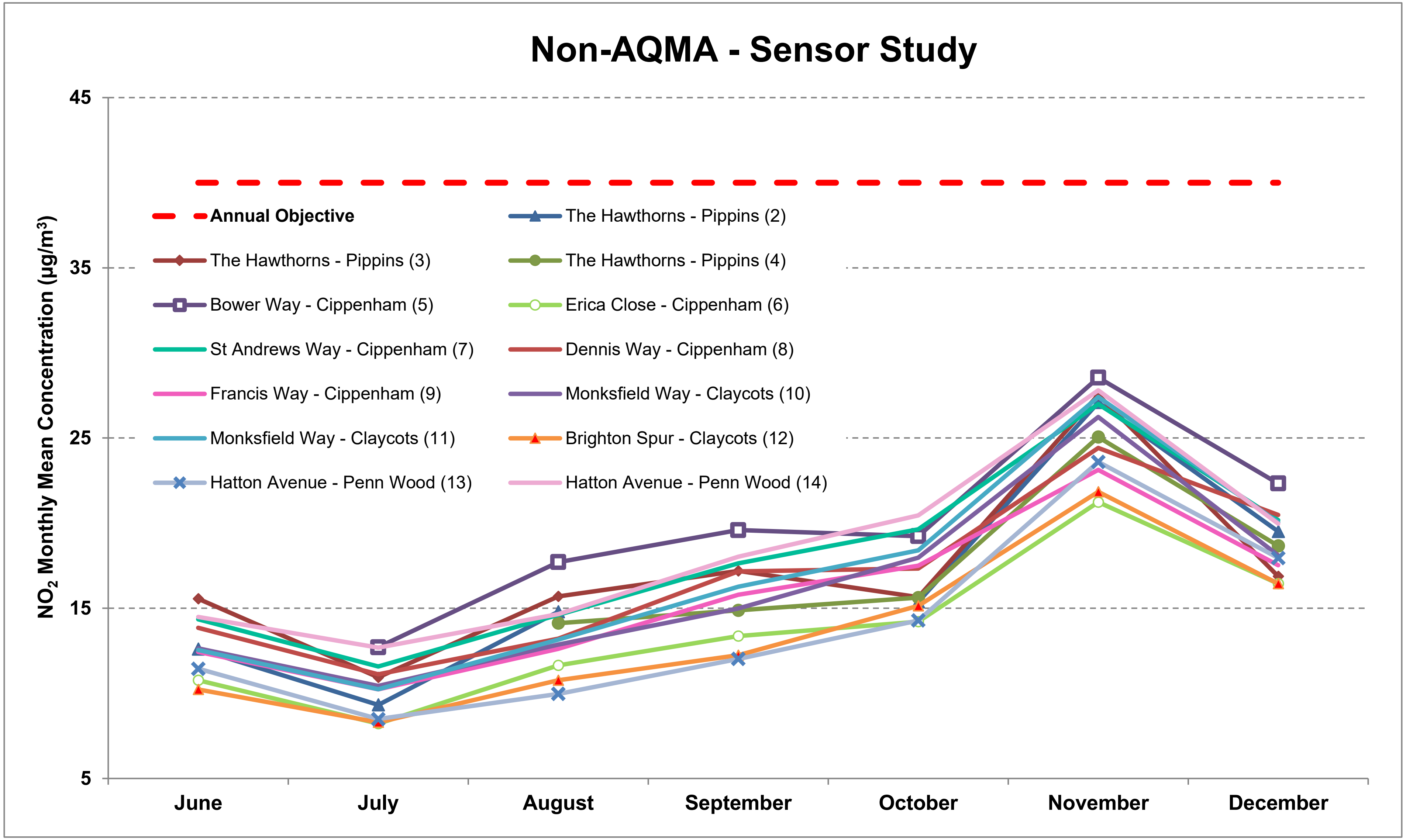


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLH 3	503542	176827	Suburban	97.6	97.6	0	0	0	0	0
SLH 4	496599	180156	Urban Background	-	-	0	0	0	0 (88)	-
SLH 7	496562	179109	Other	99.8	99.8	0	0	0	0	0
SLH 8	503569	77385	Industrial	99.4	99.4	0	0	0	0	0
SLH 10	498413	179804	Roadside	99.5	99.5	-	0 (114)	0	0	0
SLH 11	501643	177753	Roadside	99.8	99.8	-	0 (121)	0	0	0
SLH 12	496528	180171	Roadside	97.4	97.4	-	0 (117)	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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%).

Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLH 3	503542	176827	Suburban	98.45	98.45	18	16	18	16.4	
SLH 4	496599	180156	Urban Background	-	-	19	18	16.9	18.3	-
SLH 5	503551	177258	Industrial	-	-	14	14	14.4	12	-
SLH 6	503542	176827	Urban Background	-	-	15	16	10.3	15	-
SLH 8	503569	77385	Industrial	98.25	98.25	15	14	13.7	15	14
SLH 9	503569	77385	Urban Background	98.17	98.17	11	17	14.8	14	16.7
SLH 11	501643	177753	Roadside	98.98	98.98	-	27.9	28.8	28	25.4
SLH 12	496528	180171	Roadside	93.25	93.25	-	24.4	23.9	23.4	18.9

Notes:

The annual mean concentrations are presented as $\mu g/m^3$.

Exceedances of the PM_{10} annual mean objective of $40\mu g/m^3$ are shown in **bold**.

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.

(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.13 – Trends in Annual Mean PM_{10} Concentrations

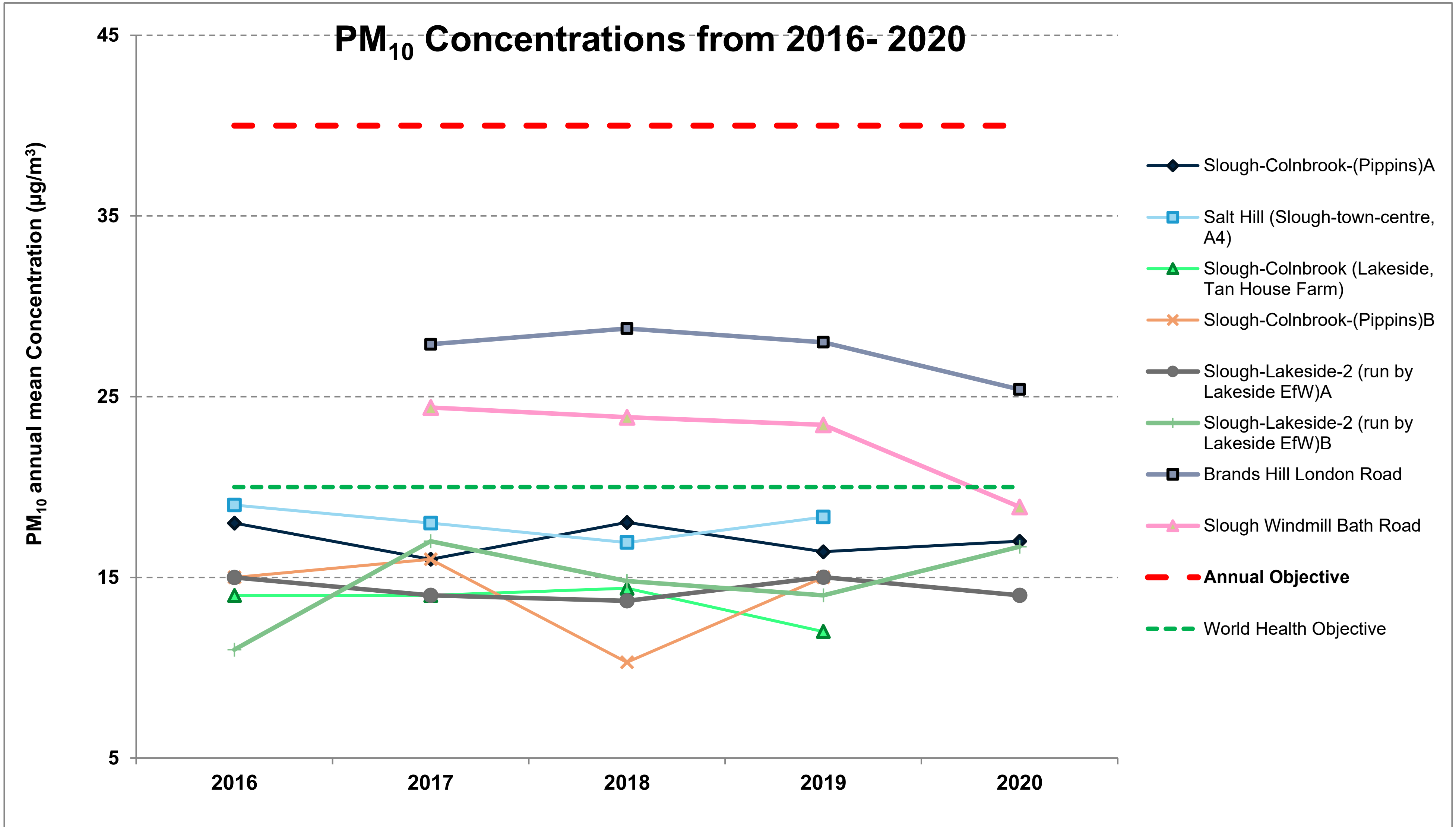


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLH 3	503542	176827	Suburban	98.45	98.45	5	5	1	3	0
SLH 4	496599	180156	Urban Background	-	-	4	3	1	3 (32)	-
SLH 5	503551	177258	Industrial	-	-	1	1	1	0 (19)	-
SLH 6	503542	176827	Urban Background	-	-	1	5	0	0 (24)	-
SLH 8	503569	77385	Industrial	98.25	98.25	1	3	1	3	0
SLH 9	503569	77385	Urban Background	98.17	98.17	3	9	1	0 (24)	4
SLH 11	501643	177753	Roadside	98.98	98.98	-	5 (36)	25	23	19
SLH 12	496528	180171	Roadside	93.25	93.25	-	5 (36)	11	15	7

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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.14 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m³

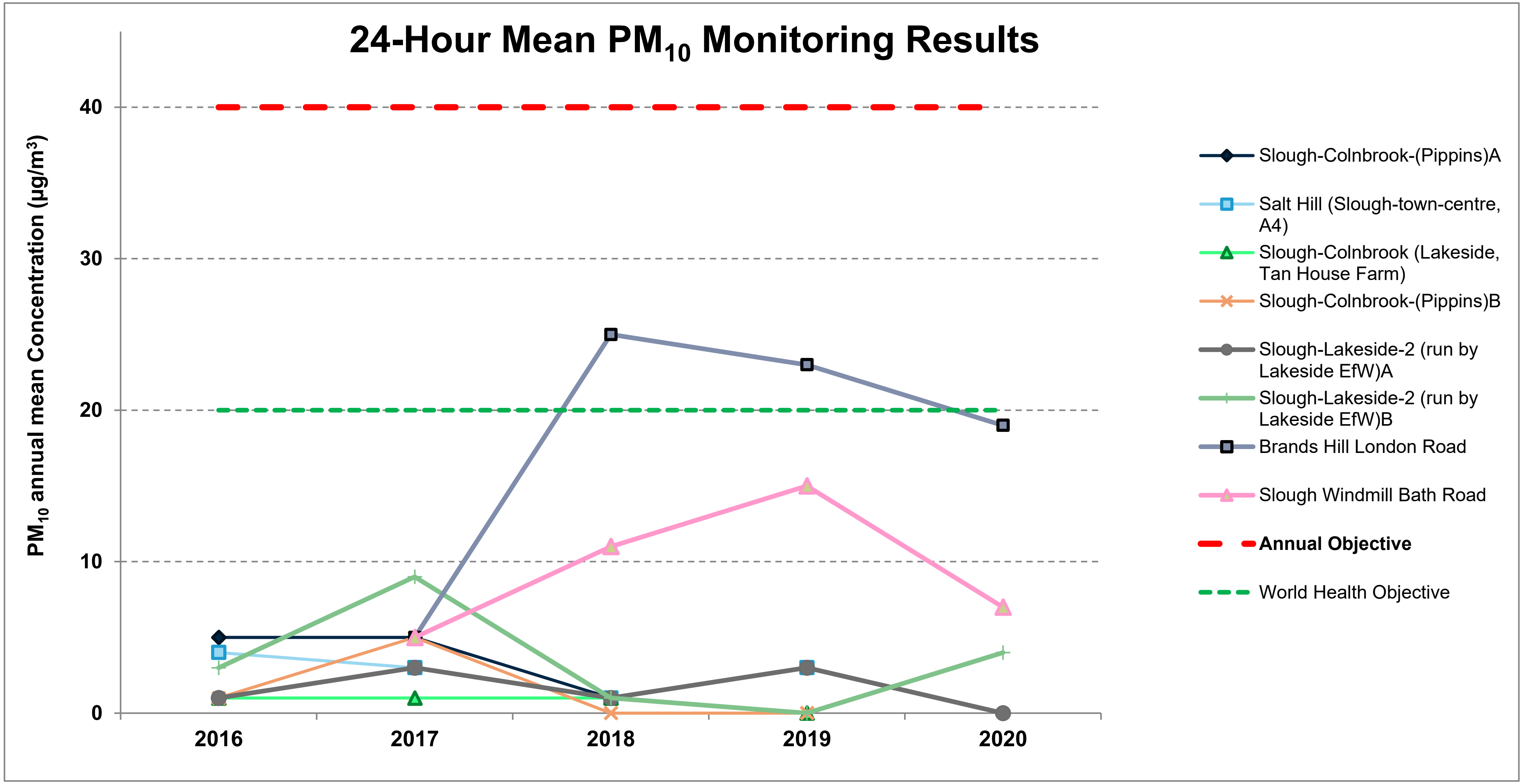


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
SLH 5	503551	177258	Industrial	-	-	6	6	6.2	6	-
SLH 6	503542	176827	Suburban	-	-	6	7	6.1	7	-
SLH 9	503569	77385	Industrial	98.26	98.26	5	7	6.9	7	5.5

Notes:

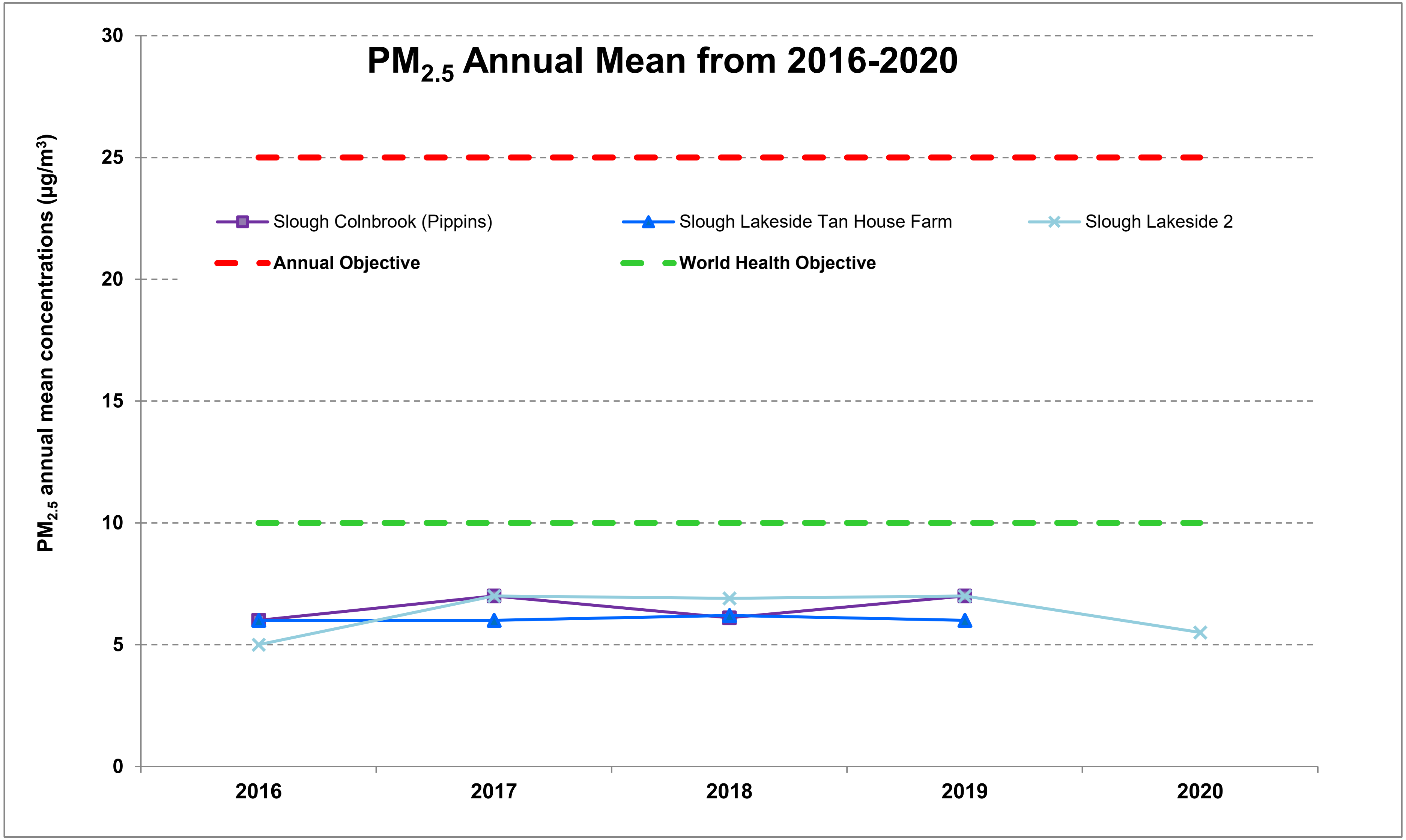
The annual mean concentrations are presented as µg/m^3.

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.

(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.15 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SLO 1	496599	180156	35.8	29.7	23.0										-	-		Triplicate Site with SLO 1, SLO 2 and SLO 3 - Annual data provided for SLO 3 only
SLO 2	496599	180156	34.0	28.6	20.6										-	-		Triplicate Site with SLO 1, SLO 2 and SLO 3 - Annual data provided for SLO 3 only
SLO 3	496599	180156	31.5	25.5	23.0										28.0	19.3		Triplicate Site with SLO 1, SLO 2 and SLO 3 - Annual data provided for SLO 3 only
SLO 1 Alternate	496904	180187				19.9		18.5	14.2	17.8	21.3	23.7	33.0	26.4	21.9	19.7		
SLO 2 Alternate	496785	180336				16.8		14.0	11.0	15.3	16.3	16.4	23.5	23.1	17.1	15.4		
SLO 3 Alternate	496665	180236				14.2		15.8	13.3	16.4	19.4	21.2	30.4	25.1	19.5	17.6		
SLO 4	497188	180050	39.9	33.7	31.1	25.0									32.4	23.5		
SLO 4 Alternate	497185	180050										24.6	30.9	25.0	26.8	19.4		
SLO 5	498541	179815	38.3	33.9	27.7	25.8	-	29.4	22.8	33.0	28.9	34.0	44.6	36.1	32.2	27.6		
SLO 6	498784	179560	34.5	27.4	22.3	18.1		20.5	18.4	20.2	24.9	23.1	33.7	29.1	24.8	21.2		
SLO 7	503196	177349	35.2	30.8	26.0	26.6		22.6	20.3	23.1	26.9	27.6	40.0	26.8	27.8	23.8		
SLO 8	501382	178101	45.0	32.1	29.8	26.0		27.2	18.9	27.8	27.1	30.0	38.2	35.2	30.7	26.3		
SLO 9	501501	177879	33.8	28.2	23.1	26.1		22.4	20.9	23.5	25.4	23.6	38.0	29.2	26.7	22.9		
SLO 10	501733	177725	40.3	32.5	32.6	42.2	27.3	33.1	24.8	33.7	31.2	31.1	40.1	35.2	33.7	28.8		
SLO 11	501637	177999	33.4	24.4	23.9	25.1		18.1	16.3	19.6	21.0	22.1	33.5	26.5	24.0	20.5		
SLO 12	503877	177459	36.2	35.6	35.0	31.1		24.5	23.9	32.6	29.5	30.1	35.3	27.8	31.0	26.6		
SLO 13	503856	176538	30.6	22.9	25.9	25.1		18.1	16.4	23.0	24.5	24.1	33.5	24.6	24.4	20.9		
SLO 14	503542	176827	26.9		22.2	23.1		-	11.9	18.0	17.8	22.4	34.4	25.3	-	-		Triplicate Site with SLO 14, SLO 15 and SLO 16 - Annual data provided for SLO 16 only
SLO 15	503542	176827	28.1	21.1	19.6	22.8		14.7	12.1	18.6	18.5	20.4	28.8	26.4	-	-		Triplicate Site with SLO 14, SLO 15 and SLO 16 - Annual data provided for SLO 16 only
SLO 16	503542	176827	30.4	18.8	22.0	22.1		17.4	12.6	18.5	19.4	19.8	31.4	24.4	21.4	18.3		Triplicate Site with SLO 14, SLO 15 and SLO 16 - Annual data provided for SLO 16 only
SLO 17	503136	175654	31.7	24.8	27.0	34.5	26.8	27.4	20.0	30.4	32.0	26.4	38.1	29.7	29.1	24.9		
SLO 18	501798	177659	53.9	42.5	43.8	49.9	35.0	44.7	40.1	49.8	45.3	40.5	53.6	41.1	45.0	38.5	33.3	
SLO 19	500851	177890	38.3	26.7	27.4	27.5		23.9	17.0	25.1	25.6	21.1	32.6	27.0	26.6	22.7		
SLO 20	497925	179450	30.2	20.2	17.5	18.1		12.6	12.6	15.3	19.5	19.0	28.7	22.5	19.7	16.8		
SLO 21	497457	179566	36.0	28.3	26.2	24.2		25.0	20.1	30.8	29.0	30.2		30.4	28.0	24.0		
SLO 22	497488	179090	41.0	32.2	25.4	18.5		22.5	20.6	23.5	25.1	26.5	34.6	26.9	27.0	23.1		
SLO 23	496416	180126	31.5	-	23.1	24.5		22.7	20.2	26.1	25.9	25.1	32.6	24.7	25.6	22.0		
SLO 24	496272	179187	40.3	28.2	24.8	21.2		22.5	18.5	22.9	26.6	26.3	34.1	25.4	26.4	22.6		
SLO 25	496050	179258	32.4	28.2	23.4	21.5		20.8	14.2	24.5	19.4	21.0	30.6	24.1	23.7	20.3		
SLO 26	498473	179706	32.0	25.7	28.7	30.4		25.9			35.7	29.6	41.8	30.3	31.1	26.7		
SLO 27	498681	179972	32.4	24.5	22.6	19.9		18.6	14.7	19.1	19.8	24.6	32.7	25.5	23.1	19.8		
SLO 28	501941	177633	35.4	24.0	31.0	28.7	23.9	26.2	23.6	28.6	34.6	31.0	40.5	29.8	29.8	25.5		
SLO 29	498483	179707	52.6	35.5	36.8	32.3	28.5	34.2	35.9	43.8	46.4	40.9	48.2	39.4	39.5	33.8		
SLO 30	496397	180341	39.6		25.0	20.5		22.3	20.5	24.0	25.2	28.1	38.1	27.9	27.1	23.2		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SLO 31	496200	181900	35.7	26.8	22.8	21.6		20.8	18.1	20.7	23.9	27.8	35.5	27.7	25.6	21.9		
SLO 32	501853	177620	29.2	21.2	34.0	33.7	23.9	25.4	22.7	27.9	32.2	24.4	34.3	26.6	28.0	23.9		
SLO 33	498168	179907	35.1	28.8	25.4	22.3			22.2	22.4	25.8	27.6	34.8	25.8	27.0	23.1		
SLO 34	496562	179109	28.0	29.3	11.6					22.7	20.4	23.4	29.8	25.2	-	-		Triplicate Site with SLO 34, SLO 35 and SLO 36 - Annual data provided for SLO 36 only
SLO 35	496562	179109	31.7	25.9	15.3					20.3	22.5	22.2	32.6	23.4	-	-		Triplicate Site with SLO 34, SLO 35 and SLO 36 - Annual data provided for SLO 36 only
SLO 36	496562	179109	30.1	22.8	16.8					21.4	22.6	24.1	31.3	24.8	24.1	18.4		Triplicate Site with SLO 34, SLO 35 and SLO 36 - Annual data provided for SLO 36 only
SLO 37	497105	180081	43.6	39.1	32.7	29.1		29.9	25.9	30.8	30.8	32.8	36.7	30.3	32.9	28.2		
SLO 38	498071	179949	37.3	34.2	28.5	25.1		23.3	22.5	26.5	28.0	28.2	37.8	29.9	29.2	25.0		
SLO 39	501734	177733	29.9	25.0	26.7	31.3		23.0	18.3	22.4	25.8	24.8	30.3	22.3	25.4	21.8		
SLO 40	498394	179849	44.5	38.4	32.3	29.1		26.9	25.8	34.8	35.6	34.4	43.9	36.4	34.7	29.7		
SLO 41	493960	181355	22.9	15.8	14.1	14.2		11.8	10.0	14.4	14.2	14.8	24.0	18.9	15.9	13.6		
SLO 42	493493	181378	20.7	16.7	12.0	14.2		11.6	8.6	12.0	15.0	14.7	21.3	17.1	14.9	12.8		
SLO 43	496533	180175	32.9	29.7	28.4	26.2		26.7	22.8	29.6	31.3	29.8	34.5	29.0	29.2	25.0		
SLO 44	498961	180113	37.6	29.2	26.4			22.9	22.2	25.0	25.6	30.0	39.3	30.2	28.9	24.7		
SLO 45	501658	177781	32.4	23.2	23.2		19.1	20.9	17.4	20.0	22.6	23.3	27.4	25.6	23.2	19.8		
SLO 46	497467	179971	44.3	39.4	32.1	32.3	26.1	34.2	27.5	33.2	32.9	34.2	42.0	32.4	34.2	29.3		
SLO 47	497326	180003	-	27.9	22.7	24.8		23.0	21.2	24.7	30.5	27.6	34.1	26.5	26.3	22.5		
SLO 48	497960	179243	33.9	27.3	22.2	21.1		18.4	17.9	22.4	26.0	32.6	35.2	27.9	25.9	22.2		
SLO 49	497397	179471	40.0	31.2	30.8	24.3	21.7	25.5	27.0	32.3	34.9	26.8	36.6	33.1	30.3	26.0		
SLO 50	496377	179929	46.4	35.0	34.8	32.0	26.3	30.8	28.7	35.5	38.9	36.8	45.7	38.5	35.8	30.6		
SLO 51	501014	179316	35.7	30.2	29.7	28.5	22.5	24.9	21.5	26.7	29.4	29.9	38.7	30.1	29.0	24.8		
SLO 52	501161	179538	34.7			27.1	17.8	25.0	17.2	27.2	29.4	30.3	38.8	29.5	27.7	23.7		
SLO 53	501208	178799	42.6	31.4	30.2	28.9	23.3	27.2	23.3	32.9	34.4	33.8	46.2	37.1	32.6	27.9		
SLO 54	501256	179067	40.6	25.5	26.9	23.4		24.1	20.4	27.3	28.1	27.7	40.1	32.0	28.7	24.6		
SLO 55	501891	178954	33.7	27.8	22.2	22.7		17.6	15.6	21.6	27.9	25.3	34.0	25.4	24.9	21.3		
SLO 56	502241	178679	38.1	34.4	29.4	26.9		23.9	16.9	28.1	29.0	33.9	43.6	33.5	30.7	26.3		
SLO 57	496528	180171	38.9	34.0	33.3	27.3	24.7	28.3	27.7	30.6	36.6	33.8	35.2	33.2	-	-		Triplicate Site with SLO 57, SLO 58 and SLO 59 - Annual data provided for SLO 59 only
SLO 58	496528	180171	40.2	34.2	30.0	29.8	25.7	26.3	25.6	31.9	34.1	33.2	37.8	31.7	-	-		Triplicate Site with SLO 57, SLO 58 and SLO 59 - Annual data provided for SLO 59 only
SLO 59	469528	180171	37.2	32.2	27.0	29.4	29.8	29.6	27.0	30.9	36.4	34.4	38.6	30.3	31.9	27.3		Triplicate Site with SLO 57, SLO 58 and SLO 59 - Annual data provided for SLO 59 only
SLO 60	498413	179804	37.7	28.4	28.0	31.3	23.4	26.3	23.2	28.2	27.6	31.0	35.9	27.8	-	-		Triplicate Site with SLO 60, SLO 61 and SLO 62 - Annual data provided for SLO 62 only
SLO 61	498413	179804	35.8	29.0	24.7	30.0	23.6	26.6	22.1	27.4	25.6	30.8	38.3	32.2	-	-		Triplicate Site with SLO 60, SLO 61 and SLO 62 - Annual data provided for SLO 62 only
SLO 62	498413	179804	36.9	28.7	26.1	30.8	24.4	26.6	22.5	27.8	27.1	30.3	37.3	31.8	29.0	24.9		Triplicate Site with SLO 60, SLO 61 and SLO 62 - Annual data provided for SLO 62 only
SLO 63	501643	177753	36.8	26.0	35.3	42.4	31.5	33.5	25.1	34.8	34.8	32.5	44.2	33.8	-	-		Triplicate Site with SLO 63, SLO 64 and SLO 65 - Annual data provided for SLO 65 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SLO 64	501643	177753	38.5	29.4	32.9	39.1	28.1	33.2	26.4	34.9	33.2	33.6	42.5	33.7	-	-		Triplicate Site with SLO 63, SLO 64 and SLO 65 - Annual data provided for SLO 65 only
SLO 65	501643	177753	37.9	29.4	34.6	39.1	29.0	33.8	25.7	34.5	32.9	35.4	41.3	32.4	33.9	29.1		Triplicate Site with SLO 63, SLO 64 and SLO 65 - Annual data provided for SLO 65 only
SLO 66	496146	179259	34.6	26.8	21.5	24.9		24.0	15.3	26.7	25.6	26.7	35.1		-	-		Triplicate Site with SLO 66, SLO 67 and SLO 68 - Annual data provided for SLO 68 only
SLO 67	496146	179259	36.4	28.3	26.4	23.5		23.2	15.2	26.3	24.4	25.9			-	-		Triplicate Site with SLO 66, SLO 67 and SLO 68 - Annual data provided for SLO 68 only
SLO 68	496146	179259	34.6	28.0	26.6			24.1	14.8	27.0	26.8	25.4			26.4	22.6		Triplicate Site with SLO 66, SLO 67 and SLO 68 - Annual data provided for SLO 68 only
SLO 69	496223	179217	38.3	28.7	22.8		19.1	24.4	24.5	28.1	29.3	30.6	35.2	27.4	-	-		Triplicate Site with SLO 69, SLO 70 and SLO 71 - Annual data provided for SLO 71 only
SLO 70	496223	179217	22.3	31.3	21.7		19.1	23.7	25.2	28.2	22.3	29.1	32.8	26.8	-	-		Triplicate Site with SLO 69, SLO 70 and SLO 71 - Annual data provided for SLO 71 only
SLO 71	496223	179217	34.0	31.2	21.5		19.9	23.1	25.6	28.5	27.4	27.4	34.8	26.1	27.0	23.1		Triplicate Site with SLO 69, SLO 70 and SLO 71 - Annual data provided for SLO 71 only
SLO 72	496225	179213	39.1	32.3	22.5			22.9	25.4	26.9	28.1	27.8	33.7	28.7	-	-		Triplicate Site with SLO 72, SLO 73 and SLO 74 - Annual data provided for SLO 74 only
SLO 73	496225	179213	35.7	32.8	23.0			24.8	25.0	26.4	29.7	31.3	35.7	27.2	-	-		Triplicate Site with SLO 72, SLO 73 and SLO 74 - Annual data provided for SLO 74 only
SLO 74	496225	179213	35.4	34.9	22.3			23.2	25.2	27.8	25.1	31.2	32.2	27.5	28.8	24.7		Triplicate Site with SLO 72, SLO 73 and SLO 74 - Annual data provided for SLO 74 only
SLO 75	496227	179207	32.0	26.5	19.9			22.0	23.2	26.3	27.0	27.9	31.1	25.0	-	-		Triplicate Site with SLO 75, SLO 76 and SLO 77 - Annual data provided for SLO 77 only
SLO 76	496227	179207	35.0	29.5	19.9			20.8	23.9	26.3	27.2	28.2	31.7	23.4	-	-		Triplicate Site with SLO 75, SLO 76 and SLO 77 - Annual data provided for SLO 77 only
SLO 77	496227	179207	31.3	30.8	21.0			21.9	23.8	25.7	27.2	25.9	31.8	23.9	26.3	22.6		Triplicate Site with SLO 75, SLO 76 and SLO 77 - Annual data provided for SLO 77 only
SLO 78	496229	179204	33.4	33.2	17.6			24.4	24.4		29.8	30.8	37.0	27.5	-	-		Triplicate Site with SLO 78, SLO 79 and SLO 80 - Annual data provided for SLO 80 only
SLO 79	496229	179204	34.7	34.1	21.9			23.0	24.0		25.0	28.0	35.0	27.2	-	-		Triplicate Site with SLO 78, SLO 79 and SLO 80 - Annual data provided for SLO 80 only
SLO 80	496229	179204	34.1	32.9	19.9			23.8	24.1		27.8	26.5	34.9	25.8	28.2	24.1		Triplicate Site with SLO 78, SLO 79 and SLO 80 - Annual data provided for SLO 80 only
SLO 81	496232	179199	37.5	31.6	21.3			22.9	22.9	27.9	28.1	27.3	35.2	27.7	-	-		Triplicate Site with SLO 81, SLO 82 and SLO 83 - Annual data provided for SLO 83 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SLO 82	496232	179199	36.1	29.1	18.7			22.9	24.1	26.8	29.1	28.8	36.6	27.8	-	-		Triplicate Site with SLO 81, SLO 82 and SLO 83 - Annual data provided for SLO 83 only
SLO 83	496232	179199	36.1	32.0	21.2			23.0	22.6	26.6	28.8	27.5	34.6	29.1	28.1	24.1		Triplicate Site with SLO 81, SLO 82 and SLO 83 - Annual data provided for SLO 83 only
SLO 84	496234	179195	36.6	31.6	21.0			23.9	25.2	29.1	28.7	30.3	31.6	29.5	-	-		Triplicate Site with SLO 84, SLO 85 and SLO 86 - Annual data provided for SLO 86 only
SLO 85	496234	179195	41.4	2.2	20.6			23.4	25.9	27.5	28.5	29.6		27.7	-	-		Triplicate Site with SLO 84, SLO 85 and SLO 86 - Annual data provided for SLO 86 only
SLO 86	496234	179195	37.5	14.4	19.6			24.0	26.5	28.2	28.4	26.1	37.6	26.2	27.2	23.3		Triplicate Site with SLO 84, SLO 85 and SLO 86 - Annual data provided for SLO 86 only
SLO 87	496236	179191	37.0	30.0	20.2			24.9	24.4	27.2	26.9	28.6	37.7	24.2	-	-		Triplicate Site with SLO 87, SLO 88 and SLO 89 - Annual data provided for SLO 89 only
SLO 88	496236	179191	20.6	24.5	21.1			24.5	26.3	27.4	29.3	28.3	32.5	27.1	-	-		Triplicate Site with SLO 87, SLO 88 and SLO 89 - Annual data provided for SLO 89 only
SLO 89	496236	179191	15.5	31.3	19.1			25.4	26.0	27.0	28.2	29.8	36.7	28.5	27.0	23.1		Triplicate Site with SLO 87, SLO 88 and SLO 89 - Annual data provided for SLO 89 only
SLO 90	496238	179186	39.7	31.9	20.8		18.5	23.0	25.2	26.6	26.8	23.0	32.5	25.0	-	-		Triplicate Site with SLO 90, SLO 91 and SLO 92 - Annual data provided for SLO 92 only
SLO 91	496238	179186	40.2	33.7	21.5		18.4	24.9	26.3	27.9	30.5		34.0	27.9	-	-		Triplicate Site with SLO 90, SLO 91 and SLO 92 - Annual data provided for SLO 92 only
SLO 92	496238	179186	37.3	32.7	20.0		18.0	23.8	26.0	28.1	28.2	15.7	35.2	26.3	26.9	23.1		Triplicate Site with SLO 90, SLO 91 and SLO 92 - Annual data provided for SLO 92 only
SLO 93	497433	179092	38.3	31.8	24.8	19.1		25.2	21.4	24.1	26.4	27.2	35.8	31.0	-	-		Triplicate Site with SLO 93, SLO 94 and SLO 95 - Annual data provided for SLO 95 only
SLO 94	497433	179092	39.3	30.7	25.9	19.4		24.9	20.8	25.9	24.7	28.7	33.9	29.7	-	-		Triplicate Site with SLO 93, SLO 94 and SLO 95 - Annual data provided for SLO 95 only
SLO 95	497433	179092	41.2	28.1	25.2	17.8		26.8	21.3	25.6	25.5	29.3	36.1	32.8	27.8	23.8		Triplicate Site with SLO 93, SLO 94 and SLO 95 - Annual data provided for SLO 95 only
SLO 96	503272	176597	28.9	19.4	22.2	22.6		21.6	18.7	23.1	25.2	23.2	33.7	24.7	23.9	20.5		
SLO 97	497725	179360	42.8	30.3	26.8	28.1		28.4	23.2	30.4	34.7	34.4	44.5	38.4	32.9	28.2		
SLO 98	503527	176823						14.7	10.8	17.2		17.9	31.5	22.7	19.1	17.1		
SLO 99	503510	176806						18.1	12.7	18.3	20.0	18.2	32.0	19.6	19.8	18.0		
SLO 100	503613	176912								16.4	17.3	18.2	29.1	21.7	20.5	16.7		
SLO 101	494101	180708							14.8	20.6	22.8	22.4	33.2	26.0	23.3	20.4		
SLO 102	494199	180637						12.5	9.6	13.5	15.5	16.5	24.7	19.1	15.9	14.4		
SLO 103	493784	180662						16.7	13.5	17.0	20.5	22.8	31.4	23.5	20.8	18.8		
SLO 104	493812	180572						16.1	12.9	15.4	20.0	20.2	28.4	23.8	19.5	17.7		
SLO 105	493592	180737						14.5	11.9	14.7	18.4	20.3	26.9	20.4	18.1	16.4		
SLO 106	495488	182538						14.7	12.1	15.0	17.4	20.9	30.5	21.1	18.8	17.1		
SLO 107	495457	182550						14.6	11.9	15.3	18.9	21.4	31.9	23.3	19.6	17.8		
SLO 108	495668	182430						11.9	9.6	12.5	14.2	17.6	25.4	19.1	15.8	14.3		
SLO 109	496526	182276						13.3	9.9	11.6	14.0	16.6	27.4	20.9	16.2	14.7		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SLO 110	496529	182243						16.8	14.8	17.0	21.0	23.8	32.3	23.2	21.3	19.3		
SLO 111	496489	182270						12.4	8.8	12.9	14.1	18.9	26.0	20.9	16.3	14.8		
SLO 112	497070	181108												34.3	-	-		
SLO 113	497079	181088												31.9	-	-		
SLO 114	497677	180876														-		
SLO 115	497671	180866												47.1	-	-		
SLO 116	498103	180842												33.0	-	-		
SLO 117	498112	180857												26.9	-	-		
SLO 118	497097	179521														-		
SLO 119	497104	179511												35.4	-	-		
SLO 120	497013	179870														-		
SLO 121	497004	179874												39.4	-	-		
SLO 122	496167	179975												34.2	-	-		
SLO 123	496184	179950												30.8	-	-		

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

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **Local bias adjustment factor used.**

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

☒ **Slough Borough 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 **<u>bold and underlined</u>**.

See Appendix C for details on bias adjustment and annualisation.

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

C.1 New or Changed Sources Identified Within Slough Borough Council During 2020

Slough Borough Council has not identified any new sources relating to air quality within the reporting year of 2020.

C.2 Additional Air Quality Works Undertaken by Slough Borough Council During 2020

C.2.1 Sensor Study

During 2020, the Council continued to progress with the Defra funded Sensor Study. Results from the co-located diffusion tubes with the Vaisala sensors over 2020 is provided in Figure A.12.

The main objectives of the study were to:

- Develop a QA/QC methodology including a local correction factor via comparison of sensor measurements with automatic analysers; with diffusion tube results; and a review of inter-comparability between the 15 sensors.
- Analyse nitrogen dioxide (NO_2) and particulate matter (PM_{10}/$PM_{2.5}$) concentrations associated with emissions from school activities including: The contribution of school activities to ambient NO_2 and PM concentrations; and the impact of efforts to reduce these emissions such as walk-to-school days, school travel plans etc.
- Assess the fitness-for-purpose of Vaisala sensor systems and the deployment technique in terms of wider application in the UK and roll out across Smart Cities infrastructure.
- Carry out a cost-benefit analysis to assess a low-cost sensor network versus an NO_2 diffusion tube network taking into account materials, analysis and personnel costs.

Initial results indicate that measurements of NO, O_3 and $PM_{2.5}$ from the Vaisala AQT 410 and AQT 420 were unreliable, however both NO_2 and PM_{10} performed well. Figure A.12 demonstrates that with a reduction of nearby influences (as traffic was reduced during the pandemic), background sources of NO_2 were dominant and all sites track each other well.

A full detailed report will be released in August 2021 where the pollutant trends and comparison of air quality before and after lockdown periods will be presented.

C.2.2 Air Quality Action Plan (AQAP)

As stated in Section 2.1.1, the AQAP is being developed over 2020/21. Early results have indicated that road transport is the greatest contributor to poor air quality in Slough. The specific sources were modelled in a source apportionment exercise, which indicates that source contributions vary across the borough, with buses and taxis greatest in the town centre, and HGV emission sources greatest in areas where industry is concentrated, such as the Slough Trading Estate and Poyle area. These results are expected.

The future year projections include 2022 and 2026, in conjunction with scenario modelling, will be completed to determine the effectiveness of measures at reducing NO_2 concentrations. The results from these modelling exercises will be presented within the AQAP, planned for consultation late 2021.

C.3 QA/QC of Diffusion Tube Monitoring

All tubes used by Slough Borough Council are prepared using 50% TEA in acetone, and are supplied and analysed by Gradko International. In the past (up to the end of 2018) Slough used 50% TEA in acetone tubes supplied and analysed by Environmental Services Group (now SOCOTEC).

Both laboratories participate in the AIR Proficiency Testing (PT) external proficiency testing scheme run by the Government. Four spiked diffusion tubes are distributed to participating laboratories on a quarterly basis to assess the analytical performance of those laboratories supplying diffusion tubes to local authorities for use in the context of LAQM.

Table C.1 shows the results of the most recent 8 rounds of proficiency testing under AIR-PT for three laboratories: Gradko International, SOCOTEC (formerly Environmental Services Group) and Edinburgh Scientific Services. The table gives the % of samples where results returned by the laboratory were considered satisfactory – i.e. 1 out of 4 = 25%, and 4 out of 4 = 100%. The guidance directs that a single round is a snap-shot in time, and thus it is more informative to consider performance over a number of rounds. It is further stated that over a rolling five round AIR-PT window, 95% of results (i.e. 19 out of 20 samples) should be considered to be satisfactory.

From April 2017 to October 2018, all three laboratories achieved a 100% in each AIR-PT round. From January 2019 (AR030) to October 2020 (AR040), Gradko International mostly scored 100% except for AR030, AR036 and AR040, where a score of 75% was achieved. Comparing with SOCOTEC, only one score below 100% occurred at 87.5% at AR030. The rolling average indicates that performance at SOCOTEC is satisfactory (<95%) however Gradko are slightly below at 90%. Comparing to an alternative laboratory, Edinburgh Scientific Services, who experiences variable performance testing results, the impact of a poor scoring round on the rolling average can be observed.

Slough Borough Council will be coming to the end of their diffusion tube contract at the end of this year. The rolling average scores of the AIR-PT rounds will be considered when inviting suppliers to tender for the contract.

Table C.1 – Results of Laboratories Which Participated in the Latest AIR-PT Rounds

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

AIR PT Round	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040
Round conducted in the period	January – February 2019	April – May 2019	July – August 2019	September – November 2019	January – February 2020	May – June 2020	July – August 2020	September – October 2020
Aberdeen Scientific Services	75 %	100 %	100 %	100 %	100 %	NR [4]	NR [4]	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Edinburgh Scientific Services	100 %	NR [2]	100 %	25 %	50 %	NR [4]	NR [4]	100 %
SOCOTEC	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	NR [4]	NR [4]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Glasgow Scientific Services	100 %	100 %	100 %	50 %	100 %	NR [4]	NR [4]	100 %
Gradko International	75 %	100 %	100 %	100 %	75 %	NR [4]	NR [4]	75 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Lambeth Scientific Services	50 %	100 %	50 %	100 %	100 %	NR [4]	NR [4]	100 %
Milton Keynes Council	100 %	100 %	50 %	100 %	100 %	NR [4]	NR [4]	25 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [4]	NR [4]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [4]	NR [4]	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	75 %	100 %	NR [4]	NR [4]	100 %
Staffordshire County Council	100 %	75 %	75 %	75 %	100 %	NR [4]	NR [4]	50 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [4]	NR [4]	100 %
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	100 %	NR [4]	NR [4]	NR [2]

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.
[2] NR, No results reported.
[3] Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC and Northampton Borough Council; no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.
[4] Round was cancelled due to pandemic.

Table C.2 – Rolling Average AIR-PT Scores for Three Chosen Laboratories

Laboratory	AR030	AR031	AR033	AR034	AR036	AR037	AR039	AR040
Gradko	95	95	95	95	90	90	90	90
SOCOTEC	97.5	97.5	97.5	97.5	97.5	97.5	97.5	100
Edinburgh Scientific Services	100	100	100	81.25	68.75	68.75	68.75	68.75

AIR-PT AR037 & AR039 - round was cancelled due to the pandemic therefore rolling average from previous period applies
Edinburgh Scientific Services – none report for AR031 therefore rolling average from previous period applies
All three laboratories scored 100% from AR019 to AR028

C.3.1 Diffusion Tube Annualisation

Annualisation was completed in line with LAQM.TG16, by producing an annualisation factor using Slough's background site (SLH 3, Pippins Colnbrook) and two other sites within a 50 mile radius of the sites to be annualised (London Hillingdon and Hillingdon Sipsom). This created an average annualisation factor which was applied to diffusion tubes which had a data capture less than 75% but greater than 25%. Annualisation was undertaken for the following diffusion tube sites, also presented in Appendix C.4:

- SLO 1, SLO 2, SLO 3 – co-location with a continuous monitor was no longer required as the site has been decommissioned.
- SLO 1 Alternate, SLO 2 Alternate, SLO 3 Alternate – new locations for previously co-located diffusion tubes, in nearby background locations.
- SLO 4 – site had low capture rate due to frequent thefts, therefore site was relocated.
- SLO 4 Alternate – new relocated residential site for SLO 4.
- SLO 34, SLO 35, SLO 36 – due to access restrictions resulting from the pandemic.
- SLO 98 – SLO 111 – co-located sensor study tubes, installed part way through 2020.

The following diffusion tubes were not able to be annualised as there was less than 25% data capture for 2020:

- SLO 112 – 123 – these diffusion tubes were installed December 2020. Results will be reported in the next ASR (ASR 2022).

C.3.2 Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within this 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.

Slough Borough Council have applied a local bias adjustment factor of 0.86 to the 2020 monitoring data. A summary of bias adjustment factors used by Slough Borough Council over the past five years is presented in Table C.3 (page 79).

The national bias adjustment factor was 0.82, taken from the LAQM national bias adjustment spreadsheet. The local bias adjustment factor (0.86) was derived from the average of the local co-location studies within Slough using the method prescribed in LAQM.TG16:

- Chalvey = 0.99 (M4 Air Quality Monitoring Station)
- Pippins Colnbrook = 0.78 (Suburban Air Quality Monitoring Station)
- Windmill = 0.87 (Kerbside Air Quality Monitoring Station)
- Brands Hill = 0.81 (Kerbside Air Quality Monitoring Station)
- Wellington = 0.85 (Kerbside Air Quality Monitoring Station)

Local Bias Adjustment Factor (average of above) = 0.86.

In last years' ASR, a decision was made to remove the Chalvey local bias adjustment result from the bias average due to the influences of the industrial sources. However, as the site was not operational for all of 2020, it is expected that the local influence was lower than the previous year therefore the Chalvey local bias adjustment factor was retained.

The local bias adjustment factor was used because its application to the 2020 data resulted in more conservative concentrations therefore this was used to adjust the data rather than the national bias adjustment factor.

Table C.3 – Bias Adjustment Factors from 2020 and Previous Years

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.86
2019	Local	-	0.93
2018	Local	-	0.78
2017	Local	-	0.80
2016	Local	-	0.84

C.3.3 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.

A fall-off-with-distance calculation was required for only one diffusion tube (SLO 18 at 38.5µg/m^3, corrected to residential façade at 33.3µg/m^3). This tube has consistently high results over the last 5 years but it is noted that despite the reduction of traffic over 2020, this location continues to be within 10% of the AQO, suggesting that further NO_2 reduction measures are required at Brands Hill.

C.4 QA/QC of Automatic Monitoring

Slough Borough Council's automatic sites are part of the National Automatic Monitoring Calibration Club, whereby monitoring data are managed to the same procedures and standards as AURN sites by Ricardo Energy and Environment. Ricardo also provide Local Site Operator (LSO) duties to calibrate monitors every two weeks and are responsible for conducting six monthly independent ISO 17025 UKAS accredited audits of all air quality monitoring stations and six monthly service and maintenance of each air quality monitoring station within 4 weeks of the UKAS accredited audits.

Raw data collected by the monitoring stations is collated on the Air Quality England website. This data is provisional and later ratified. This ratification process occurs quarterly. All data presented in this ASR has been through this ratification process.

C.4.1 PM_{10} and $PM_{2.5}$ Monitoring Adjustment

Daily mean TEOM measurements were adjusted to account for the volatile fraction of particulate matter using data download from the Kings College VCM Portal Website.

C.4.2 Automatic Monitoring Annualisation

All automatic monitoring locations within Slough Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any automatic monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

C.4.3 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 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 automatic NO_2 monitoring locations within Slough Borough Council required distance correction during 2020.

Table C.4 – Annualisation Summary (Concentrations Presented in µg/m³)

Site ID	Annualisation Factor Slough Colnbrook (SLH 3)	Annualisation Factor London Hillingdon (HIL)	Annualisation Factor Hillingdon Sipsom (SIPS)	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
SLO 1	0.8814	0.7942	0.7431	0.8062	-	-	Triplicate Site with SLO 1, SLO 2 and SLO 3 - Annual data provided for SLO 3 only
SLO 2	0.8814	0.7942	0.7431	0.8062	-	-	Triplicate Site with SLO 1, SLO 2 and SLO 3 - Annual data provided for SLO 3 only
SLO 3	0.8814	0.7942	0.7431	0.8062	28.0	22.5	Triplicate Site with SLO 1, SLO 2 and SLO 3 - Annual data provided for SLO 3 only
SLO 1 Alternate	1.0236	1.0502	1.0854	1.0531	21.9	23.0	
SLO 2 Alternate	1.0236	1.0502	1.0854	1.0531	17.1	18.0	
SLO 3 Alternate	1.0236	1.0502	1.0854	1.0531	19.5	20.5	
SLO 4	0.8601	0.8561	0.8221	0.8461	32.4	27.4	
SLO 4 Alternate	0.8320	0.8597	0.8428	0.8448	26.8	22.7	
SLO 34	0.9215	0.8964	0.8521	0.8900	-	-	Triplicate Site with SLO 34, SLO 35 and SLO 36 - Annual data provided for SLO 36 only
SLO 35	0.9215	0.8964	0.8521	0.8900	-	-	Triplicate Site with SLO 34, SLO 35 and SLO 36 - Annual data provided for SLO 36 only

Site ID	Annualisation Factor Slough Colnbrook (SLH 3)	Annualisation Factor London Hillingdon (HIL)	Annualisation Factor Hillingdon Sipsom (SIPS)	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
SLO 36	0.9215	0.8964	0.8521	0.8900	24.1	21.4	Triplicate Site with SLO 34, SLO 35 and SLO 36 - Annual data provided for SLO 36 only
SLO 98	1.0522	1.0332	1.0430	1.0428	19.1	19.9	
SLO 99	1.0637	1.0435	1.0691	1.0588	19.8	21.0	
SLO 100	0.9464	0.9623	0.9399	0.9495	20.5	19.5	
SLO 101	1.0316	1.0255	1.0066	1.0213	23.3	23.8	
SLO 102	1.0637	1.0435	1.0691	1.0588	15.9	16.9	
SLO 103	1.0637	1.0435	1.0691	1.0588	20.8	22.0	
SLO 104	1.0637	1.0435	1.0691	1.0588	19.5	20.7	
SLO 105	1.0637	1.0435	1.0691	1.0588	18.1	19.2	
SLO 106	1.0637	1.0435	1.0691	1.0588	18.8	19.9	
SLO 107	1.0637	1.0435	1.0691	1.0588	19.6	20.8	
SLO 108	1.0637	1.0435	1.0691	1.0588	15.8	16.7	
SLO 109	1.0637	1.0435	1.0691	1.0588	16.2	17.2	
SLO 110	1.0637	1.0435	1.0691	1.0588	21.3	22.5	
SLO 111	1.0637	1.0435	1.0691	1.0588	16.3	17.2	

Table C.5 – Local Bias Adjustment Calculation

Adjustment Parameters	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	11	8	12	12	11
Bias Factor A	0.78 (0.73 - 0.83)	0.99 (0.87 - 1.15)	0.85 (0.78 - 0.94)	0.81 (0.77 - 0.86)	0.87 (0.81 - 0.94)
Bias Factor B	28% (20% - 37%)	1% (-13% - 15%)	17% (7% - 27%)	23% (17% - 29%)	15% (7% - 24%)
Diffusion Tube Mean (µg/m^3)	21.4	24.1	29.0	33.9	31.5
Mean CV (Precision)	5.8%	7.5%	2.9%	3.4%	5.1%
Automatic Mean (µg/m^3)	16.7	23.8	24.8	27.6	27.3
Data Capture	96%	98%	98%	98%	98%
Adjusted Tube Mean (µg/m^3)	17 (16 - 18)	24 (21 - 28)	25 (23 - 27)	27 (26 - 29)	27 (26 - 30)

Notes:

A combined local bias adjustment factor of 0.86 has been used to bias adjust the 2020 diffusion tube results.

Table C.6 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
SLO 18	6.0	16.5	38.5	22.1	33.3	

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

Figure D.1 – Map of Non-Automatic Monitoring Sites in AQMA 1a

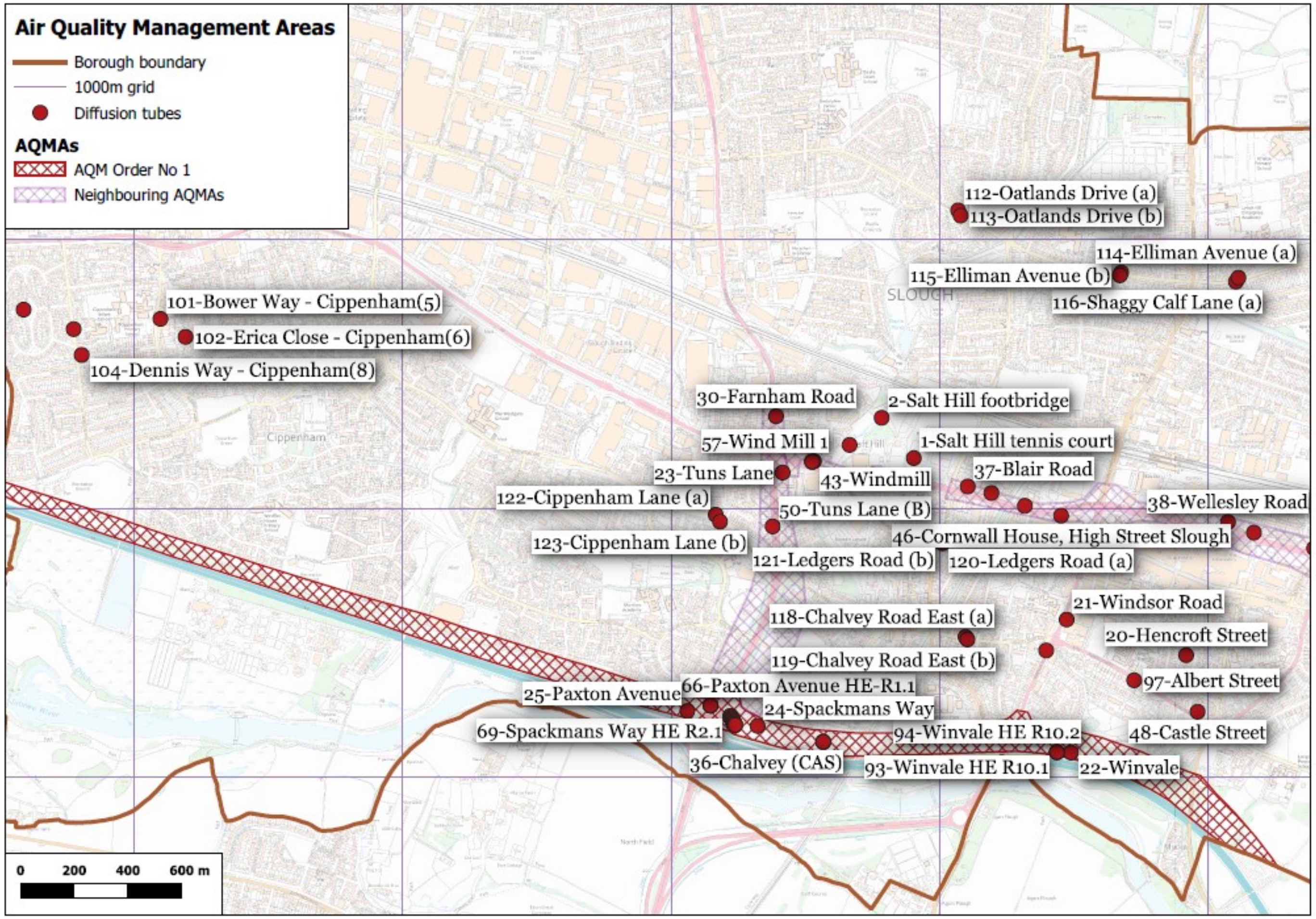


Figure D.2 – Map of Non-Automatic Monitoring Sites in AQMA 1b

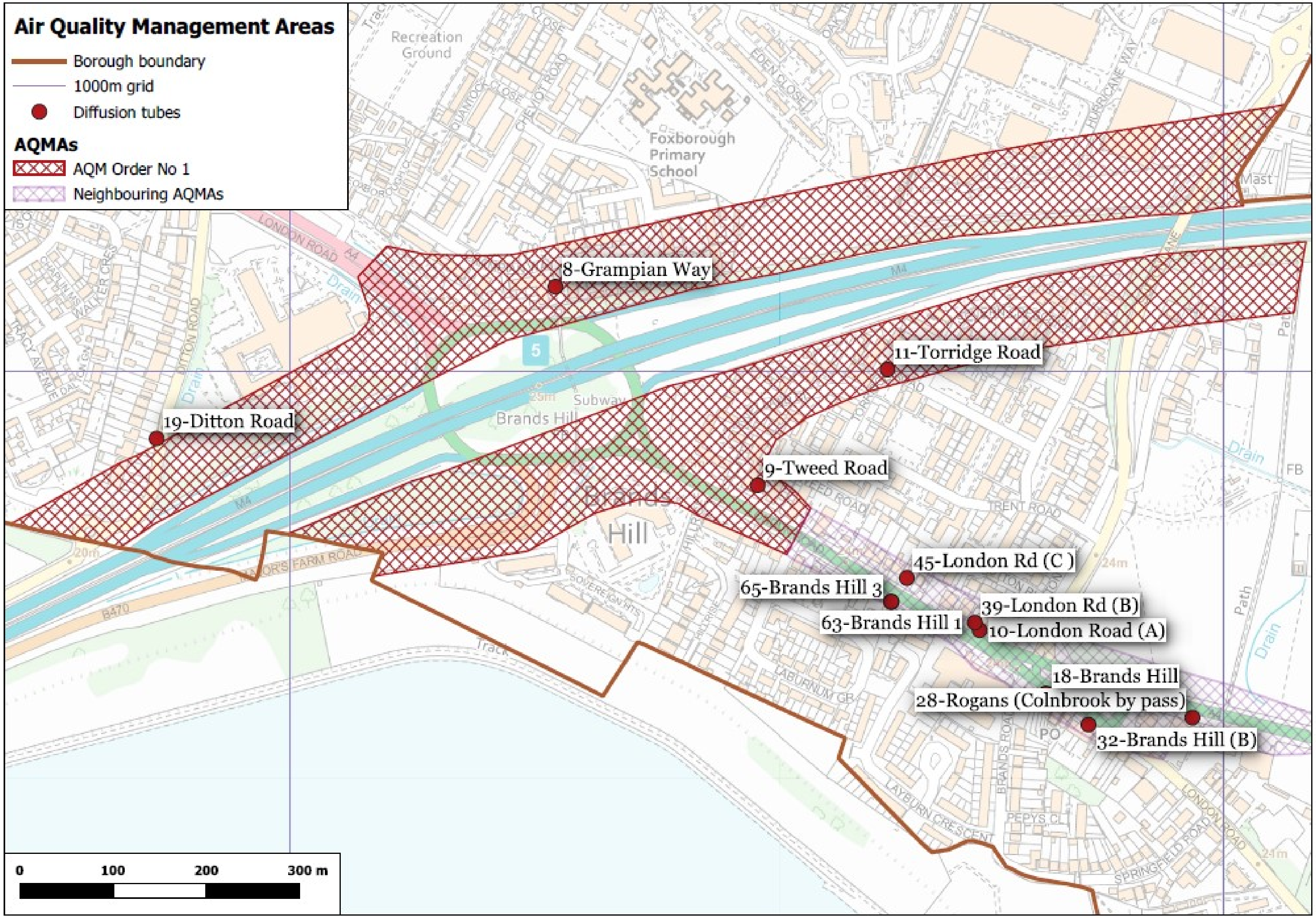


Figure D.3 – Map of Non-Automatic Monitoring Sites in AQMA 2

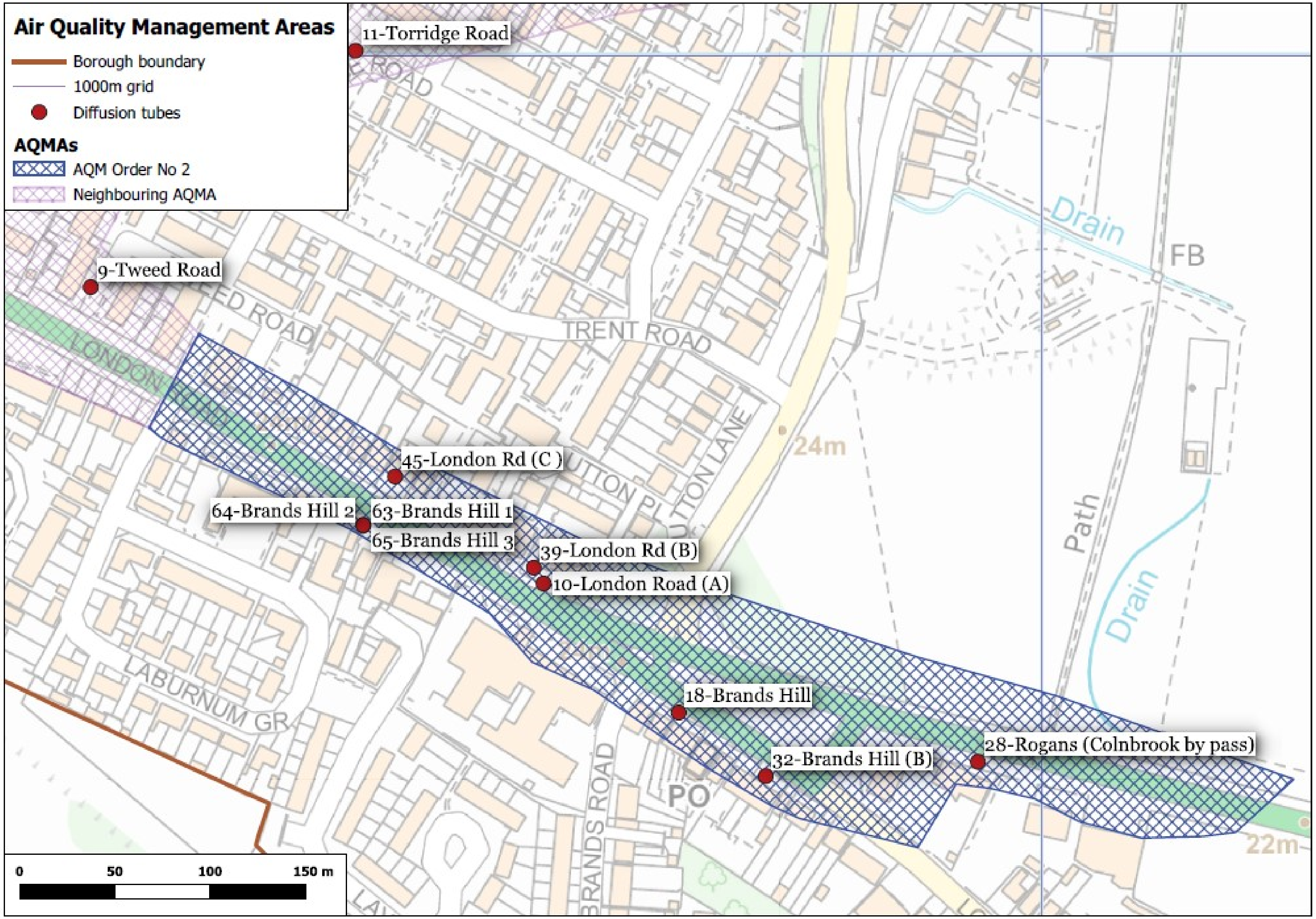


Figure D.4 – Map of Non-Automatic Monitoring Sites in AQMA 3

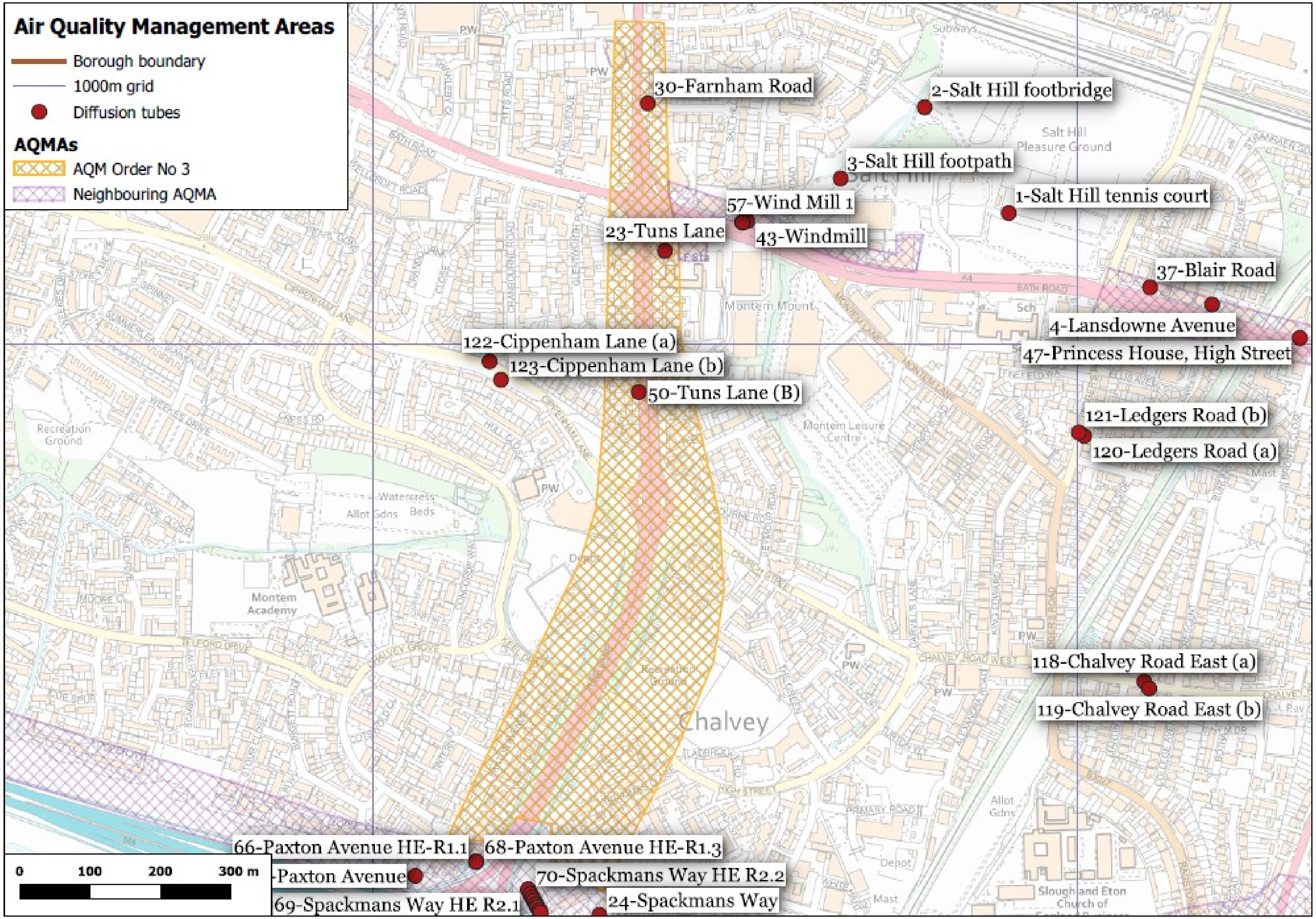


Figure D.5 – Map of Non-Automatic Monitoring Sites in AQMA 3 Extension

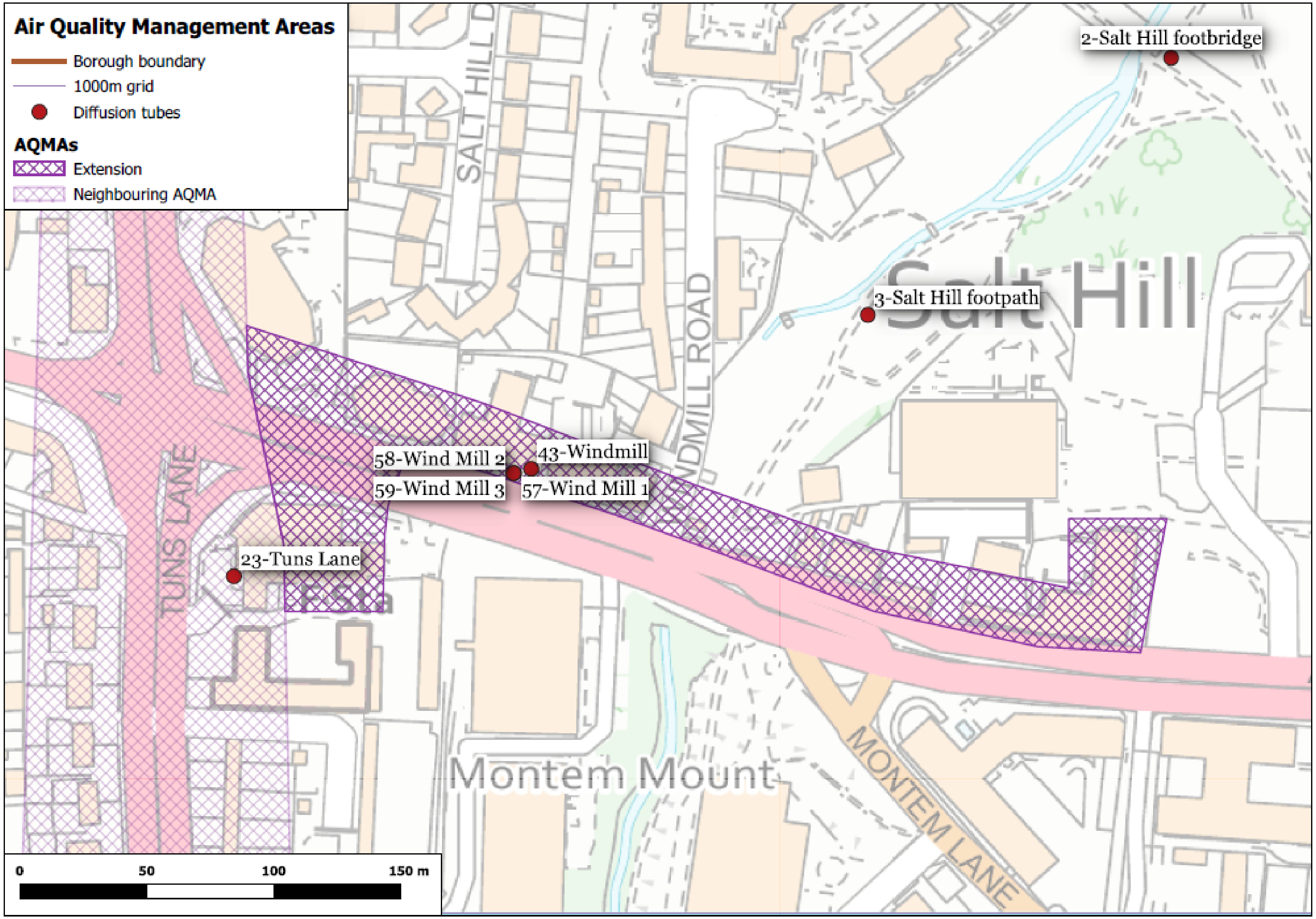


Figure D.6 – Map of Non-Automatic Monitoring Sites in AQMA 4

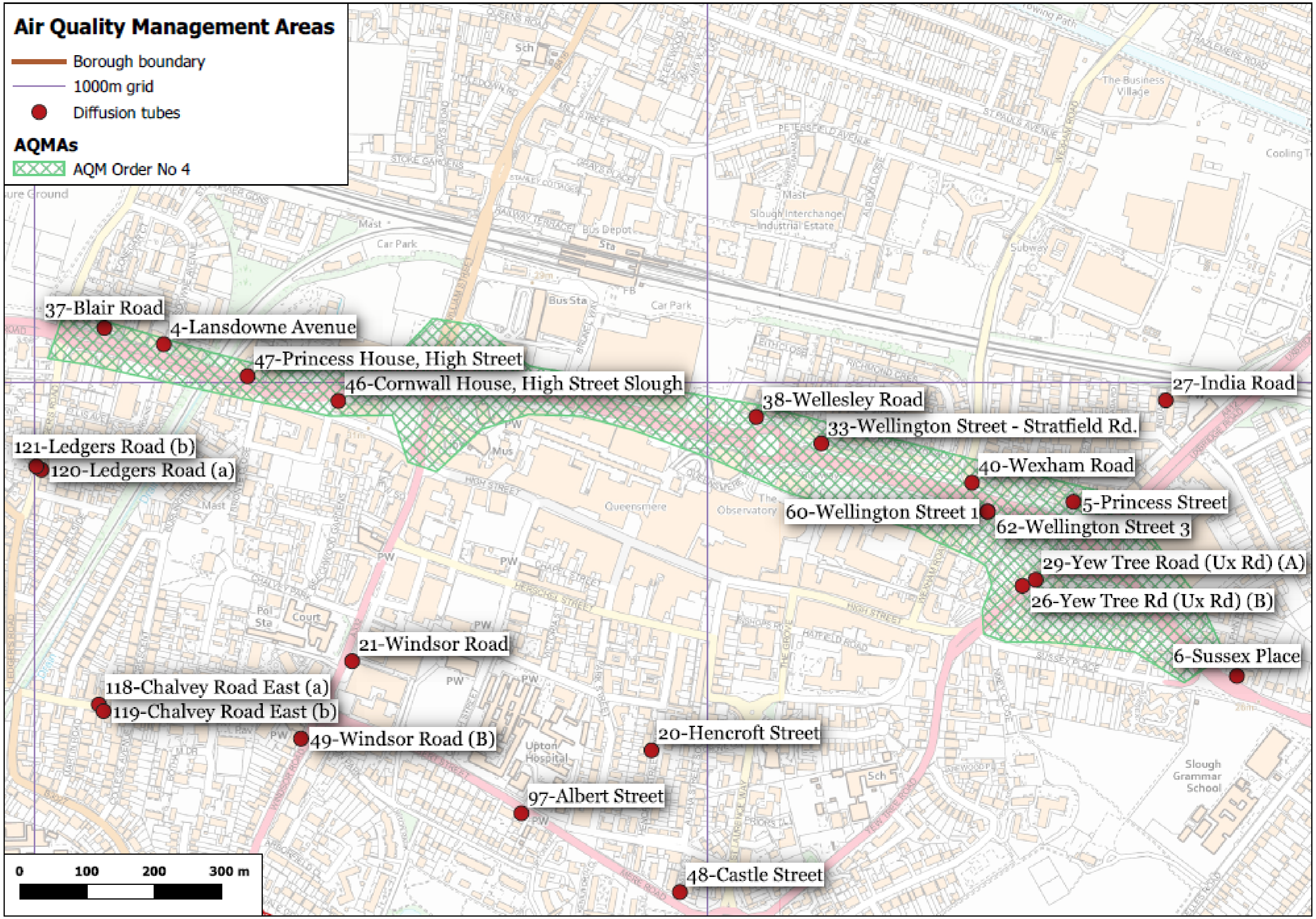


Figure D.7– Map of All Non-Automatic Monitoring Sites

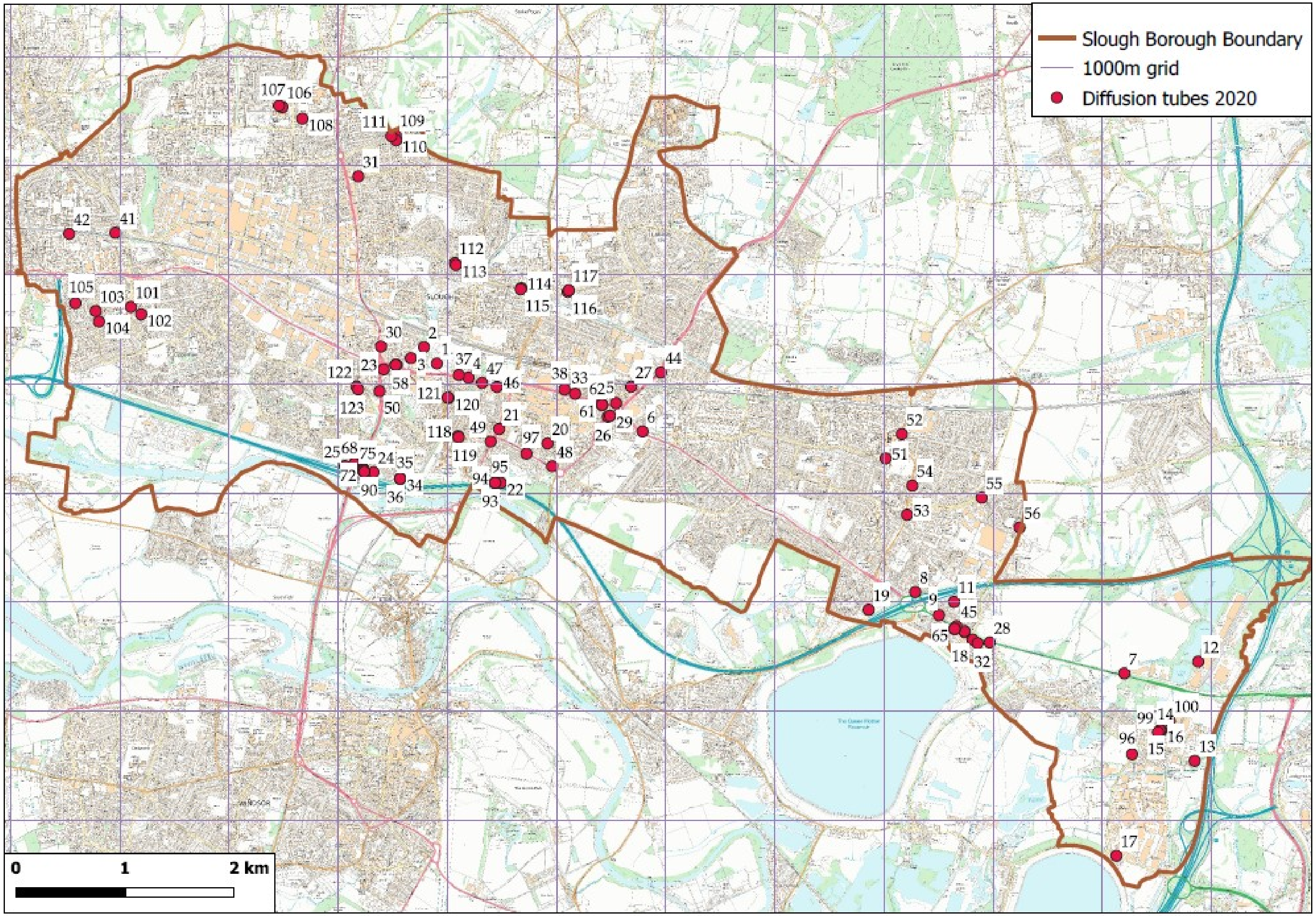


Figure D.8 – Map of All Automatic Continuous Monitors in Slough

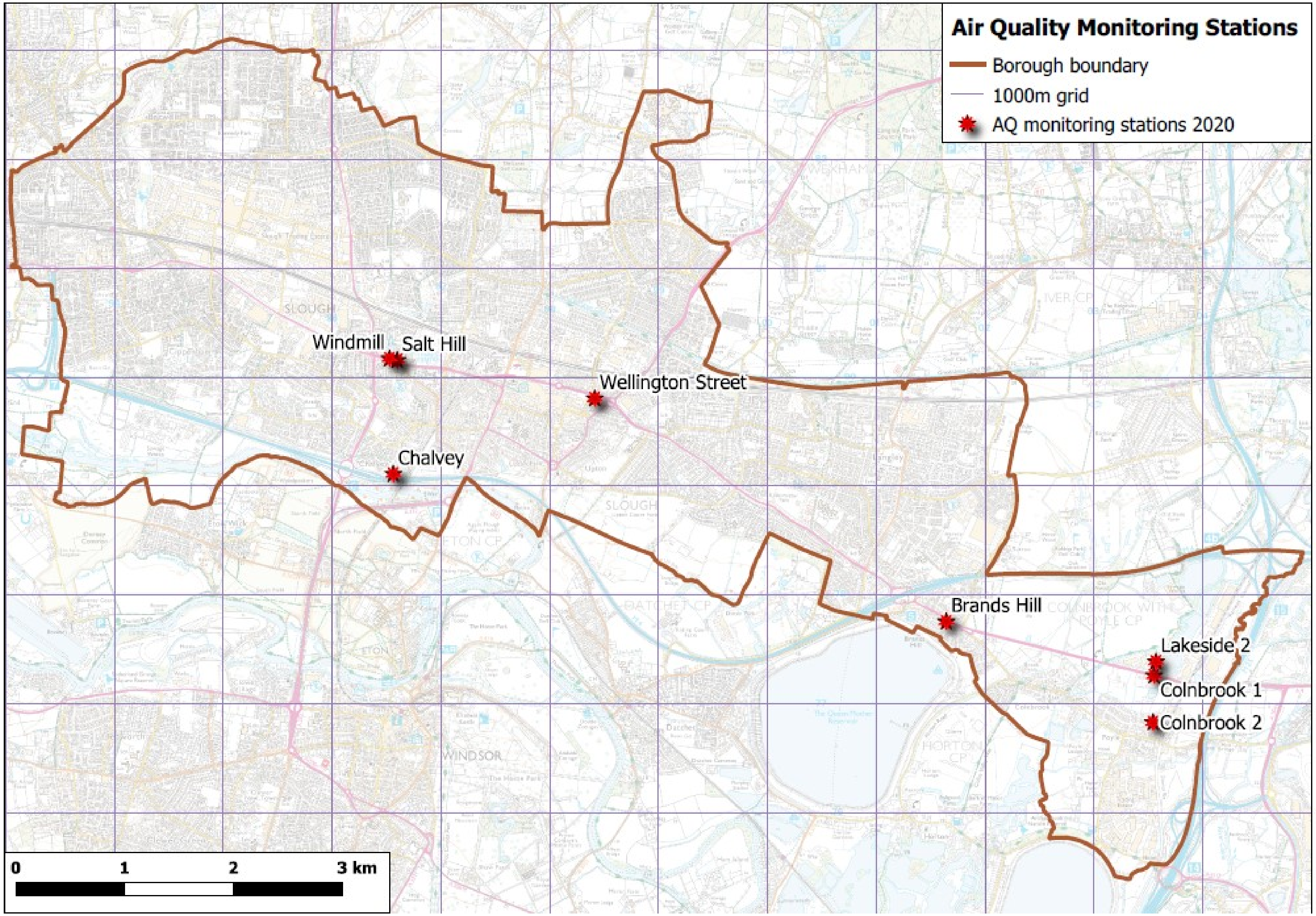


Figure D.9 – Map of All AQMAs in Slough

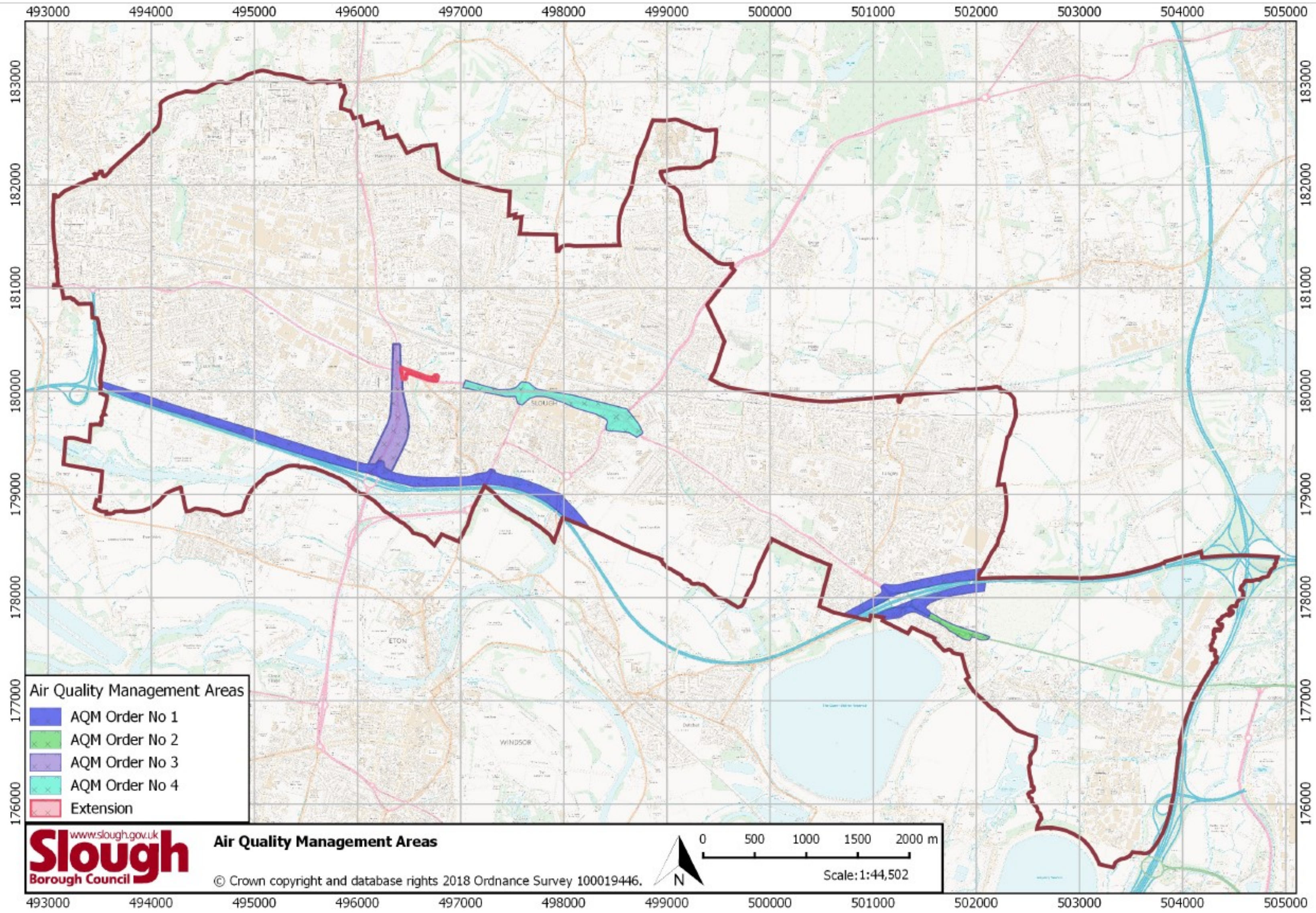
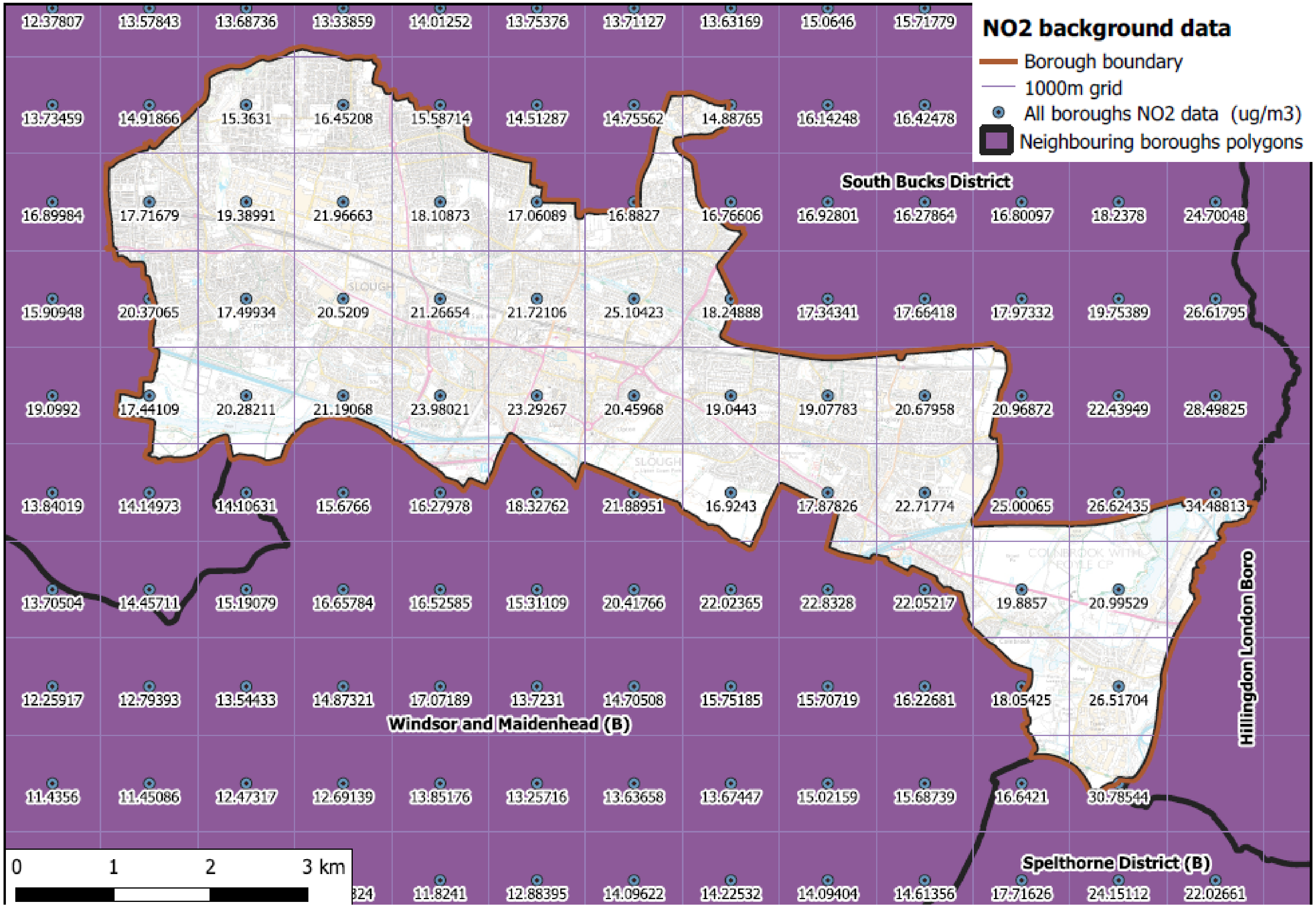


Figure D.10 – Map of Defra Background NO_2 Concentrations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[12]

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

[12] 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 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[13] 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)[14] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK, reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

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

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

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.

F.1 Impacts of COVID-19 on Air Quality within Slough Borough Council

F.1.1 Traffic Impact

The impact of COVID-19 on traffic levels on the A4, one of Slough's most heavily trafficked roads, is presented in Figure F.1. The graph shows a gradual decrease from February to April 2020, which coincides with when COVID-19 cases in the UK started to accelerate and lockdown was first introduced. Over April, vehicle flow volumes were at their lowest, where the public were instructed to only leave their homes for very limited purposes. Changes to lockdown rules post April 2020 resulted in a steady increase in traffic levels, however vehicle flow volumes did not return to levels seen at the start of the year over 2020 and did not reduce back to April 2020 levels despite additional national lockdowns implemented in November and December 2020, however the restrictions were less stringent in these subsequent lockdown events.

F.1.2 NO_2 Impact

The reductions in vehicle volumes discussed above had an impact on air quality in Slough across 2020, shown in Figure F.2. Despite the reduction in traffic levels during April, many sites show an increase in NO_2, likely to be attributable to weather influences. Only one site experiences a decrease in NO_2 in April, which is Chalvey. As this site is situated within the waste depot, site activity during April would have been very reduced, in addition to the traffic reduction using the nearby M4, hence the drop in NO_2 concentrations.

As demonstrated in the graph, NO_2 is typically lowest over the summer. This was exacerbated by the reduction in traffic levels over the summer, however NO_2 concentrations mirror the growth in traffic from summer into autumn. It is expected that

NO_2 concentrations increase month on month through autumn into winter due to natural seasonal variation.

Figures A.3 to A.7 show the NO_2 measured concentrations at each continuous monitoring station at Slough, representative of each AQMA. It can be seen from these graphs that 2020 NO_2 concentrations are consistently lower than previous years. This is also the case for all diffusion tube locations both inside and outside of AQMAs, as shown in Appendix A.4.

However, weather has impacted the measured NO_2 concentrations and due to variable weather over 2020, the pandemic cannot be the sole contributor to the reduction of NO_2 concentrations. Most notable weather impacts across 2020 are noted below:

- Two named storms, Ciara and Dennis, helped push February to the top of the records as the wettest ever in the UK. This is likely to have been a factor in February 2020 air quality NO_2 levels being very low compared to past years before the pandemic even struck the UK.
- This was followed by a very dry and bright spring that saw May break the record for the sunniest calendar month. During this time the UK was still in lockdown, so traffic and economic activity was significantly depressed.
- Since easing of restrictions we have experienced a middling summer and thus far a drenching autumn which will have contributed to keeping air quality levels below past seasonal ‘norms’.
- October 2020 had been very wet and windy including the wettest day for UK-wide rainfall since records began in the late 19th century.

F.1.3 Modelled Impact

A detailed analysis of the likely impacts that lockdown has had on ambient NO_2 concentrations in Slough is provided on the Air Quality England website. Due to the influence meteorological impacts can have on NO_2 results, this analysis uses modelling techniques to remove the influence weather has on ambient air pollution concentrations. The modelling was used to estimate “business as usual” (BAU) NO_2 concentrations e.g. what might NO_2 concentration have been if lockdown was not in place. Actual measured NO_2 concentrations were then compared to BAU to provide an estimate of reduction in ambient NO_2 concentrations in Slough.

Figure F.4 – F.8 presents the estimated decrease in measured monthly NO_2 concentrations at continuous monitoring stations from January 2020 to January 2021, compared to BAU concentrations. As with Figure F.1, the greatest reduction is observed in April 2020 at all sites (excluding Brands Hill), with an estimated decrease of 16µg/m^3. The difference in concentrations between measured and BAU reduces from April to November 2020, with an additional increase observed in December to January 2021 where further restrictions were introduced.

A comparison between measured concentrations and BAU concentrations from 2018 to 2020 is shown in Figure F.3 for each continuous monitoring station. Average NO_2 concentrations are lower in 2020 than in previous years and is consistently lower than the modelled BAU concentration at all sites.

F.1.4 PM_{10} Impact

Figures F.14 to F.16 shows PM_{10} concentrations over 2020 at 3 continuous monitoring stations: Brands Hill, Windmill and Pippins. Brands Hill and Windmill are representative of AQMA 2 and AQMA 3, respectively.

As particulate matter is a transboundary pollutant, it can travel long distances on air currents. Depending on wind strength and direction, a very high proportion of the particulate matter monitored in Slough could originate from London, the South East of England or even industrial areas of Northern Europe, therefore these trends cannot be solely attributed to the pandemic.

Shortly after the COVID-19 pandemic struck the UK, easterly winds actually led to higher levels of particulates during some of the first lockdown than preceding it. Analysis of monthly mean levels of PM_{10} at the background monitor at Pippins, Colnbrook in 2020 compared to average levels of past years (2013-19) indicates that PM_{10} was only lower than past years in July and October 2020. At a roadside monitoring site such as Brands Hill on the A4, monthly mean particulate levels in 2020 were slightly lower than past years in most months since April – though data is only available since late 2017 for this site and there is currently no business as usual comparison. This could be partly reflective of a lower local contribution from vehicle exhausts and tyre and brake wear. The annual mean at Brands Hill for 2020 is 3-4µg/m^3 lower than 2019 and 2018, respectively. The peak that is observed in November data is likely attributable to fireworks celebrations.

F.2 Opportunities Presented by COVID-19 upon LAQM within Slough Borough Council

As highlighted in Table 2.2, some measures have been introduced during 2020 as a result of the pandemic, utilising the EATF provided by DfT. This includes:

- Introduction of the A4 bus lane. This is an experimental scheme, first introduced in August 2020 between Huntercombe Roundabout and Sussex Place. The scheme is partially funded by the EATF, with additional funding provided by Slough Borough Council. The aim of the bus lane was to encourage the public to travel actively and sustainably, support social distancing measures for cyclists and pedestrians and to prepare for the borough's recovery. After the initial consultation from August to December 2020, changes were made to the bus lane restrictions including the operation of the bus lane in peak times only (previously 24/7) and allowing more vehicles to use the bus lane, including motorcycles, taxis, private hire vehicles and zero emission vehicles (previously bus and cycles only).
- Leading on from the bus lane trial, the Council will be soon to action the implementation of the A4 cycle way scheme, which currently is partially funded. The scheme is planned to run from the Huntercombe roundabout to Uxbridge Road roundabout of the A4. However, barriers including infrastructure constraints, route continuity and scale of measures will need to be addressed to ensure successful implementation.
- Borough wide eScooter trial. This programme was introduced in November 2020, fully funded by the EATF. Implementation and uptake of eScooters has increased over the pandemic across many local authorities and has been particularly successful in Slough with high levels of participation. A recent survey of eScooter users in Slough indicated that 48.9% of trips displaced car journeys, which would help alleviate congestion and air quality issues in Slough. The Council will be looking at options to have a permanent eScooter hire programme in Slough to encourage and continue this growth in sustainable transport.

F.3 Challenges and Constraints Imposed by COVID-19 upon LAQM within Slough Borough Council

F.3.1 Air Quality Monitoring

Minor disruption was experienced for the collection of diffusion tubes during 2020. Slough Borough Council were able to collect most of the diffusion tubes in April 2020 but were only able to collect those co-located with continuous monitors and hotspot areas such as Brands Hill during May 2020. Some tubes were unable to be collected after this point due to safety issues, however despite this, a high data capture rate was maintained across diffusion tube sites at an average of 90.6% (excluding sites introduced part way through the year). The Council were able to comply with the Defra diffusion tube calendar throughout 2020. Largely over 2020, diffusion tube collection and analysis continued as normal which was also the case with the continuous analyser monitoring, with limited reduction in calibration activity. In line with the LAQM Impact Matrix, this is described as 'impact rating: none'.

The Council's diffusion tube and analysis provider, Gradko International Ltd, experienced a temporary closure which affected diffusion tube analysis, however this did not affect the results as exposed diffusion tubes were stored in accordance with laboratory guidance until processing recommenced. In line with the LAQM Impact Matrix, this is described as a 'small' impact.

As with previous years, local air quality monitoring data was used to obtain a local bias adjustment factor, which has not been affected by the pandemic. In line with the LAQM Impact Matrix, this impact is described as none.

F.3.2 Air Quality Measures

During 2020, the new AQAP was due to be produced and released for consultation. There were a number of delays to the development of the AQAP, which are listed below:

- Establishment of steering group – the development of the AQAP coincided with the pandemic therefore certain stakeholders, such as healthcare professionals, were not able to participate and engagement with steering group members was challenging due to ongoing officer resource constraints.
- Transport modelling – completion of baseline transport modelling was particularly challenging as traffic levels were and still are impacted by the pandemic, and therefore automatic number place recognition (ANPR) could not be used to determine vehicle fleets. To overcome this issue, national fleet data and comparative data from other local authorities had been used, however this initially had delayed the project.
- Air quality scenario modelling – This aspect of the AQAP is currently in progress (as of June 2021). Delays to obtaining a baseline of low emission vehicles in the borough has resulted in delays to the modelling. A decision was made to postpone the modelling exercise until the data was available, to ensure a greater degree of confidence in the

future projection modelling results. It is anticipated that the modelling scenario results will be processed and incorporated into the AQAP ready for consultation at the end of 2021.

In line with the LAQM Impact Matrix, this is defined as a ‘medium’ impact.

The LES, which forms the basis of the new AQAP, has experienced delays to some project elements, primarily due to the delay to recruitment. This includes:

- Implementation of the OLEV funded Rapid Charger Project. This is one of the projects that was to be delivered by the Low Emission Programme Manager and Project Officer posts approved by CMT at the end of 2019. Recruitment has not been possible in 2020 due to COVID-19 and the Council restructure process has not accommodated these roles. This additional delay to resource the project means that the project, originally to be delivered by end of 2019, is running at least two years behind. This project is currently being supported by the DCO team Principal Environmental Officer to initiate planning and procurement.
- Implementation of the Fleet Challenge. This programme has been running on a trial phase for 3 years. In January 2019, approval was given to expand the programme, which was to be overseen by two new dedicated staff members to oversee and manage the Fleet Challenge Programme. Due to COVID-19 impact, recruitment has been placed on hold.
  Additionally, most staff have been working from home and business travel has significantly reduced. The procurement of additional EV fleet was placed on hold and delayed until 2021 due to COVID-19 in line with a recovery plan and phasing of staff returning to the office.
  A new Fleet Challenge phasing plan will be developed as part of the zero-emission fleet plan, this will be developed jointly by the Environment Manager and Fleet Operations Manager.
- EV Workplace Charging Project. This objective has been majorly disrupted by delay to recruit (due to COVID-19 and recent restructure results) to the new Low Emission Programme Manager and Project Officer posts.

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

The Defra funded Sensor Study experienced significant disruption caused by the pandemic. As the project was centred around idling vehicles outside of schools, the closure of schools during the course of the pandemic meant that a key aim of the project was no longer achievable. Even after initial lockdown restrictions had been lifted, the implementation of Government guidance around self-isolation resulted in much reduced capacity within schools. As a result, the means of achieving the project aims were adjusted. Initially, the impact of a short term air quality campaign was to be analysed, to demonstrate the effects this would have on sensor monitoring results (implementation of a short term school street as an example). As school participation in the project was reduced, this was not a feasible option, therefore a comparison has been made in the final report of pollutant concentrations before and after lockdown restrictions were implemented. Although it would be difficult to achieve a similar reduction in vehicle volumes through air quality campaign measures, this provides a unique opportunity to observe the air quality impacts if traffic was significantly reduced. The full report to Defra is due in August 2021 and will subsequently be published on the Slough Borough Council air quality webpage.

Table F.1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
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

Figure F.1 – Monthly Average Daily Traffic Flow Numbers on the A4, Slough

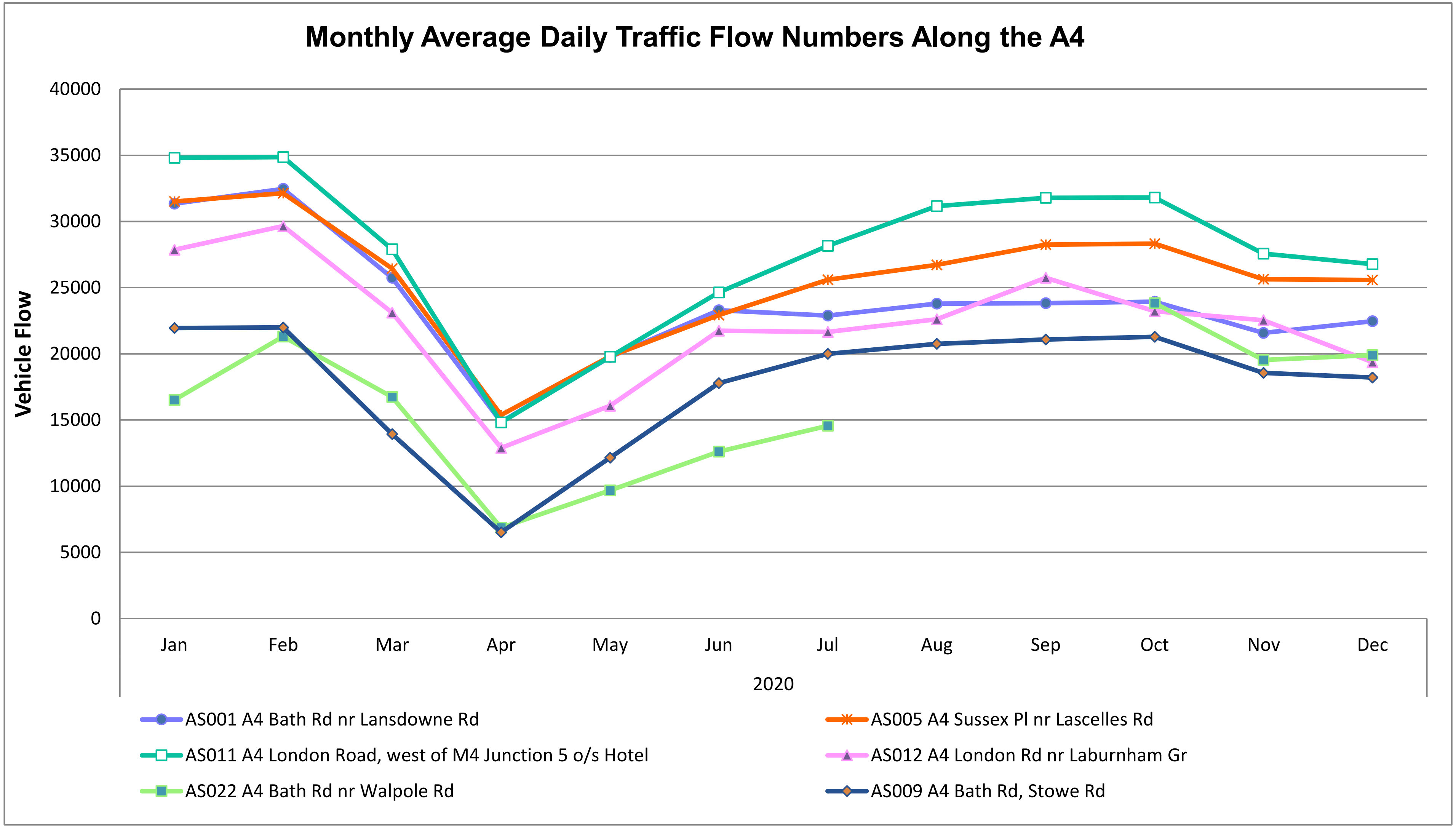


Figure F.2 – Monthly Mean NO_2 Concentrations Over 2020 at All Continuous Monitoring Sites

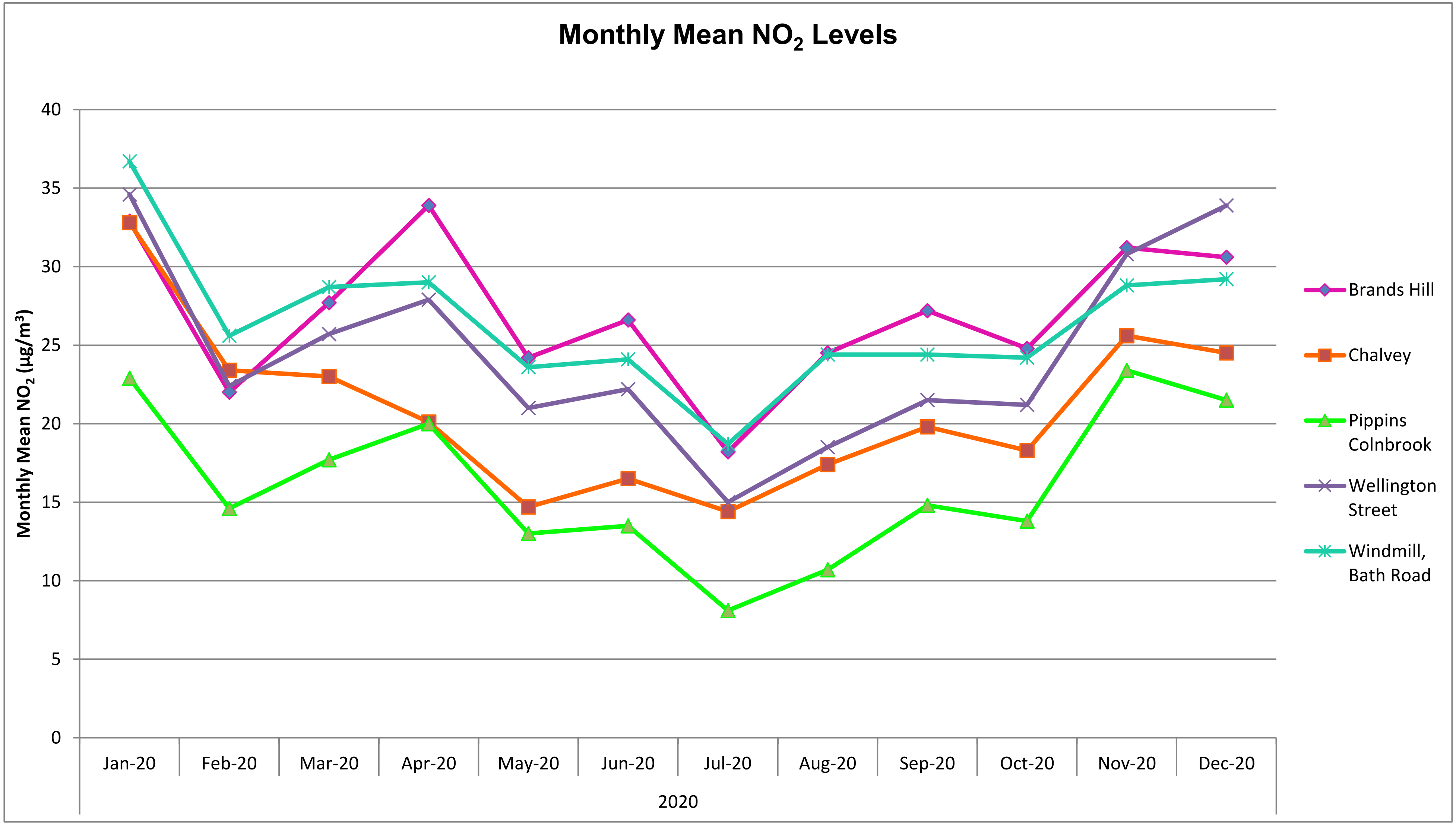


Figure F.3 – NO_2 Concentrations Compared Across Continuous Monitoring Sites, from 2018 to 2020

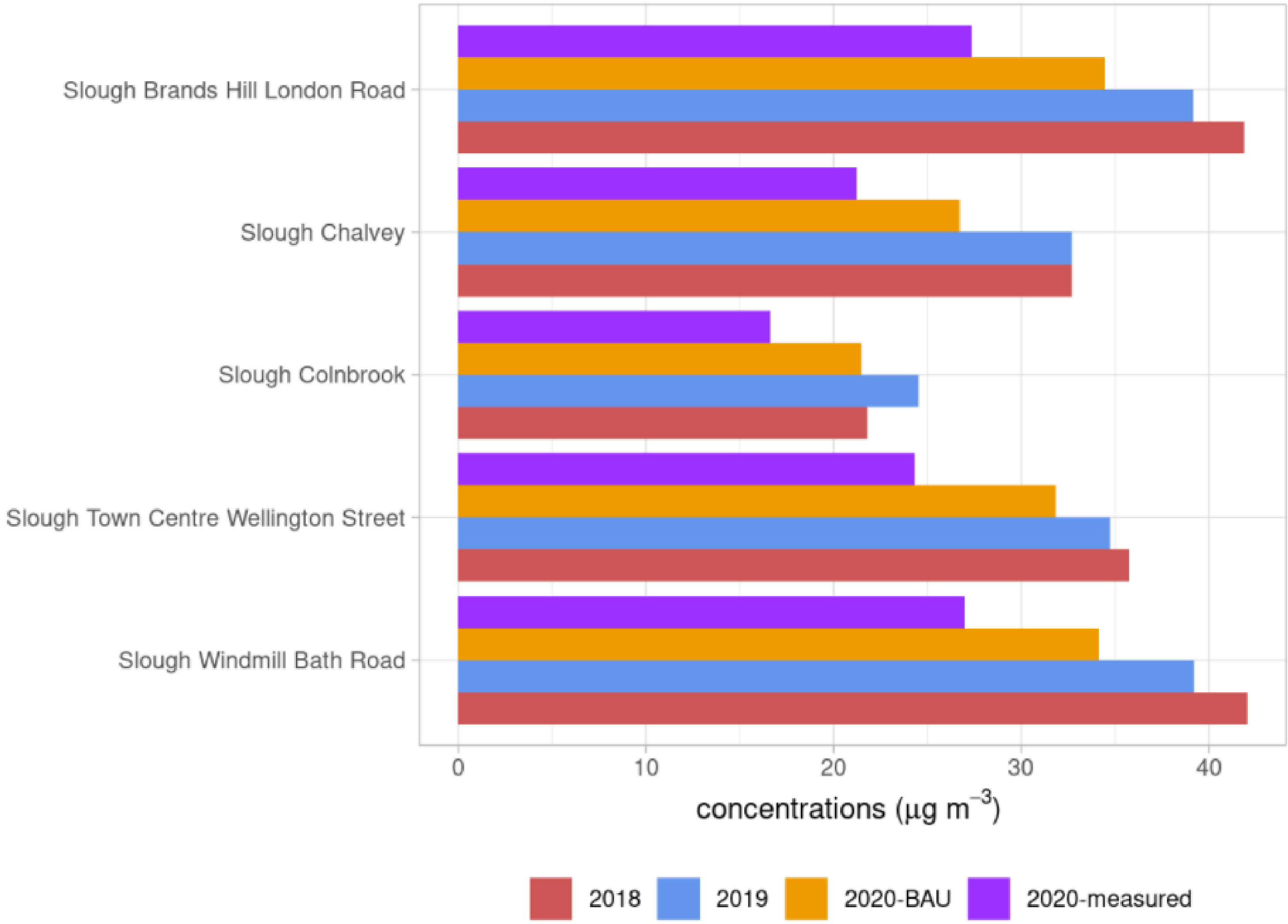


Figure F.4 – Estimated Decrease in Measured Monthly NO_2 Concentrations at Colnbrook Pippins Compared to BAU Concentrations

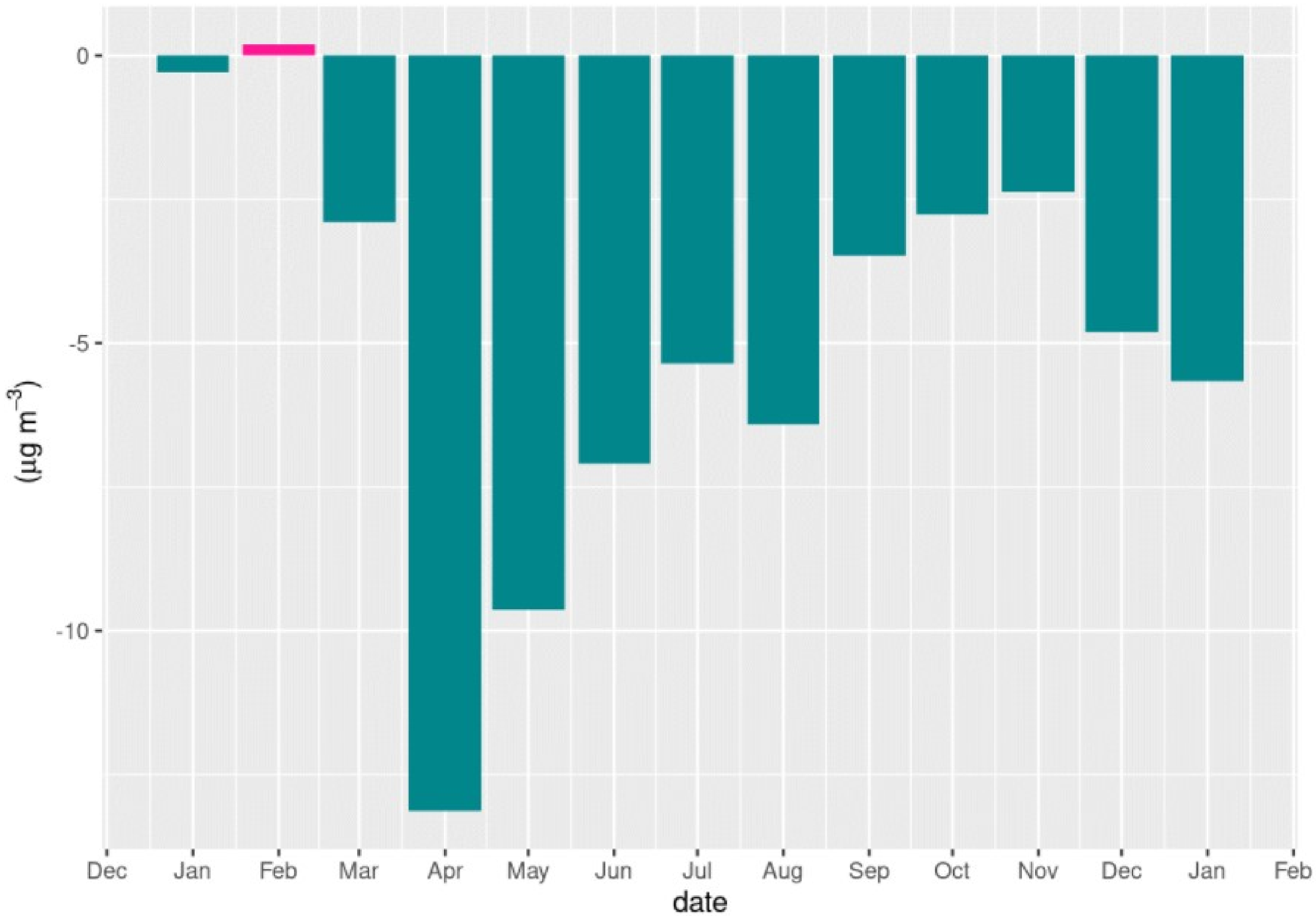


Figure F.5 – Estimated Decrease in Measured Monthly NO_2 Concentrations at Brands Hill Compared to BAU Concentrations

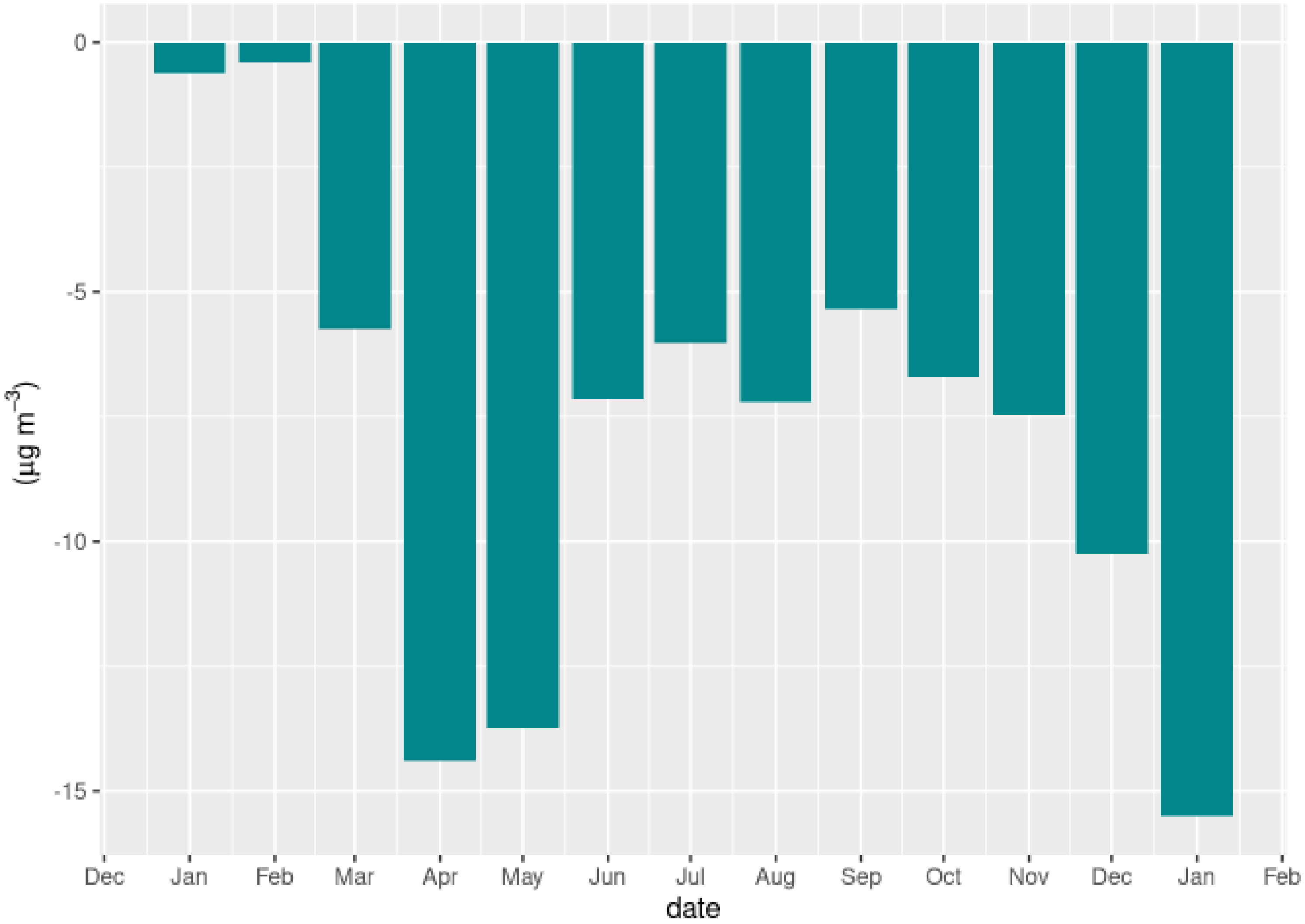


Figure F.6 – Estimated Decrease in Measured Monthly NO_2 Concentrations at Chalvey Compared to BAU Concentrations

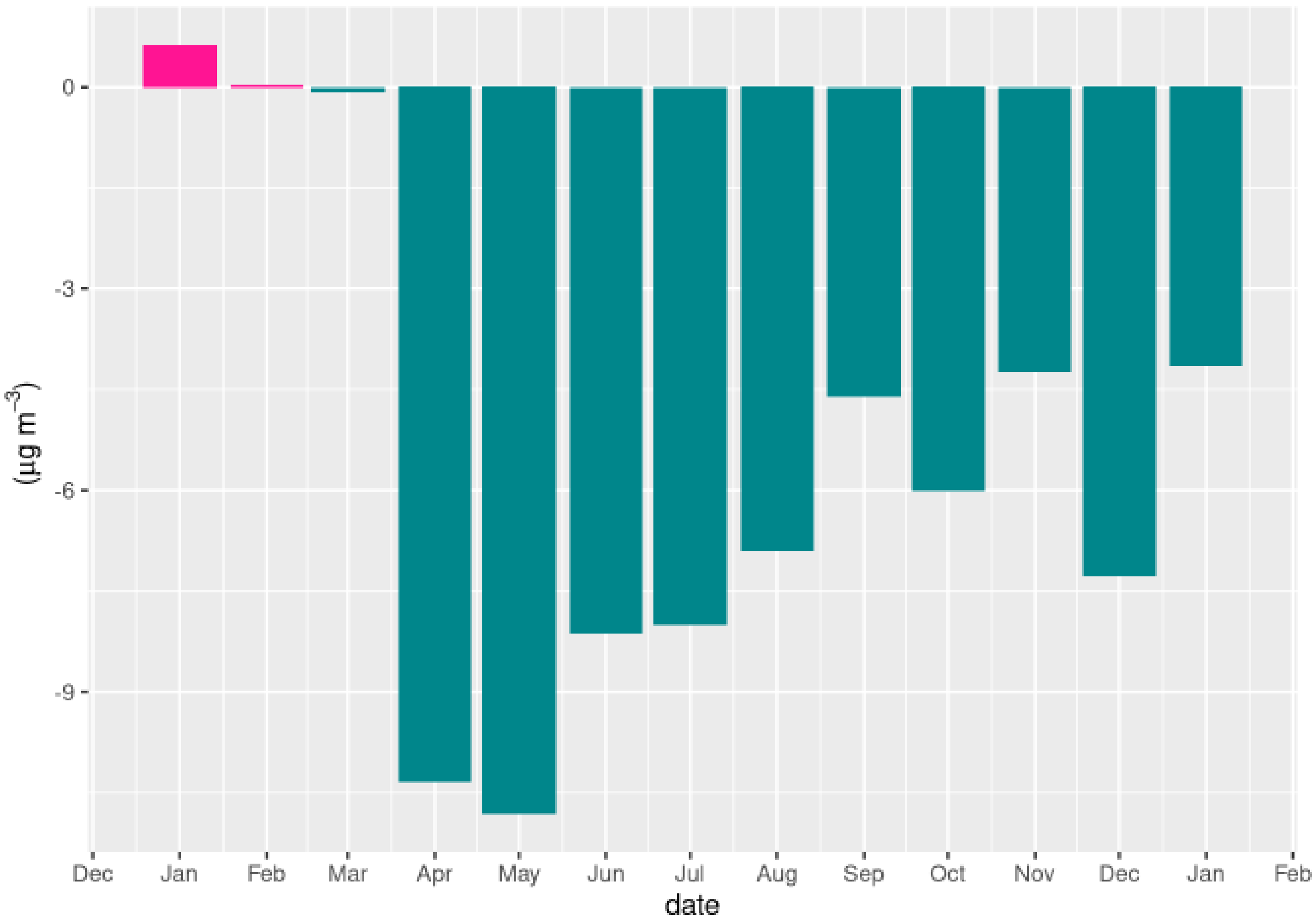


Figure F.7 – Estimated Decrease in Measured Monthly NO_2 Concentrations at Wellington Street Compared to BAU Concentrations

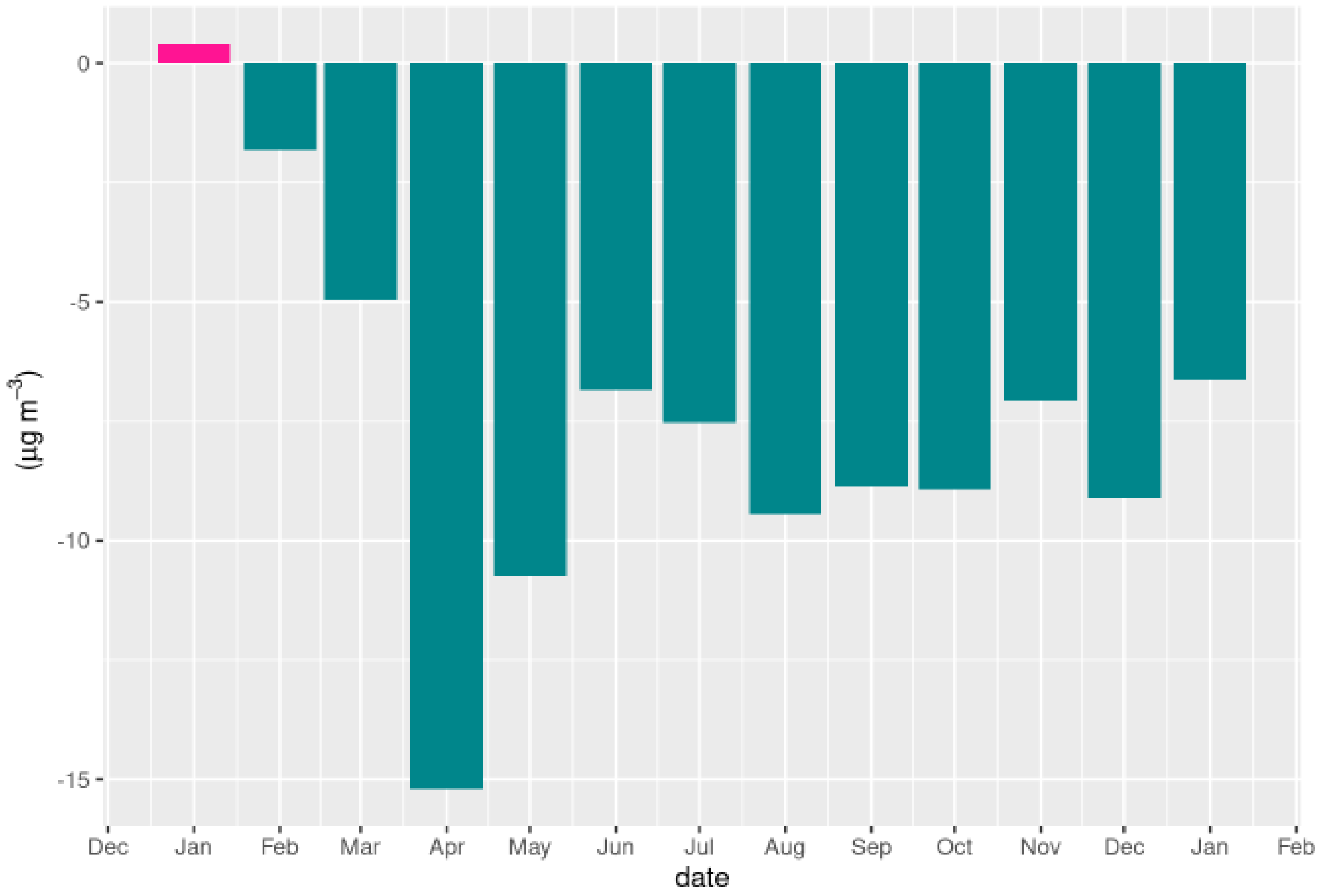


Figure F.8 – Estimated Decrease in Measured Monthly NO_2 Concentrations at Windmill Compared to BAU Concentrations

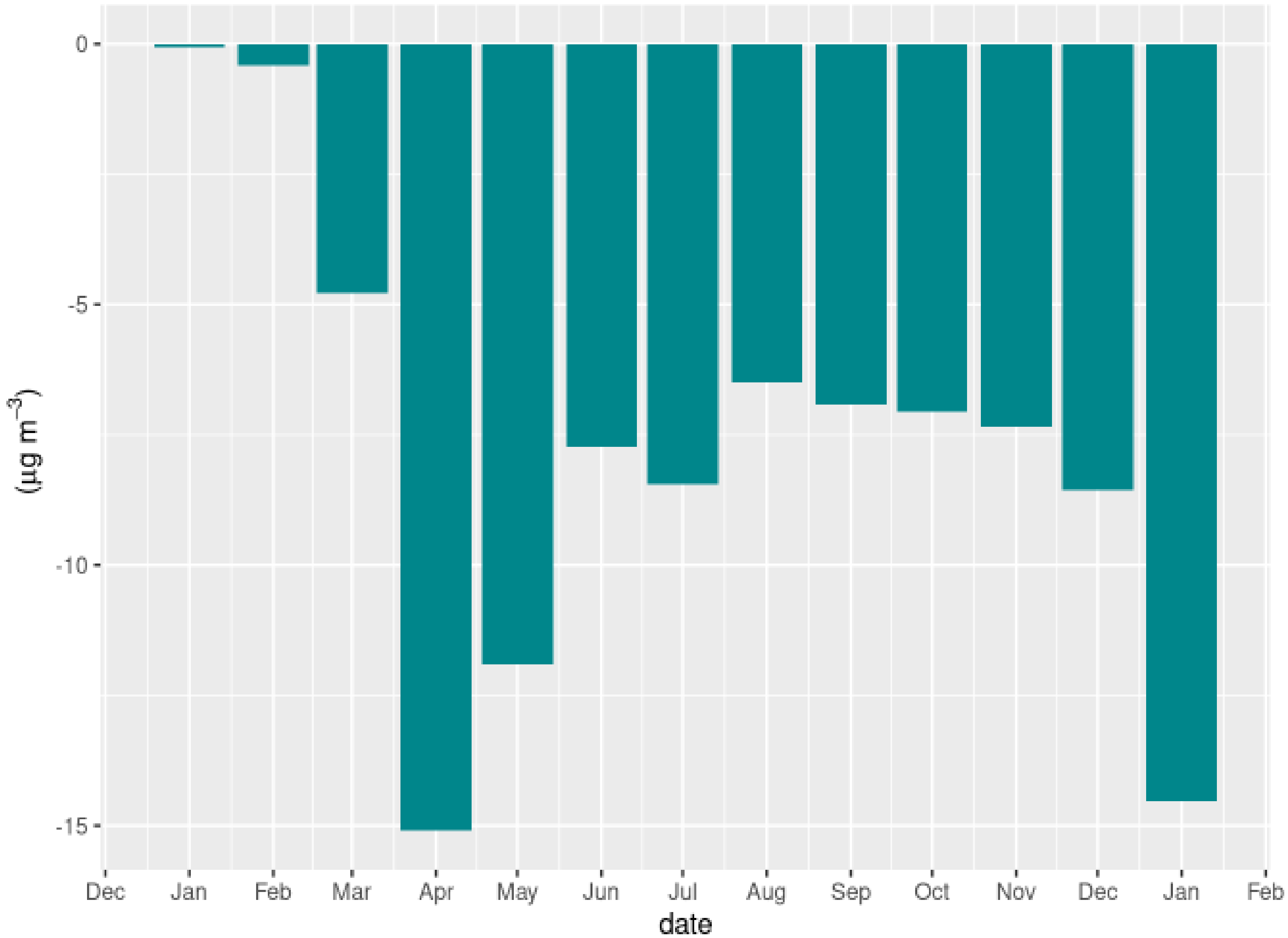


Figure F.9 – Monthly Mean NO_2 Concentrations Compared by Year at Chalvey

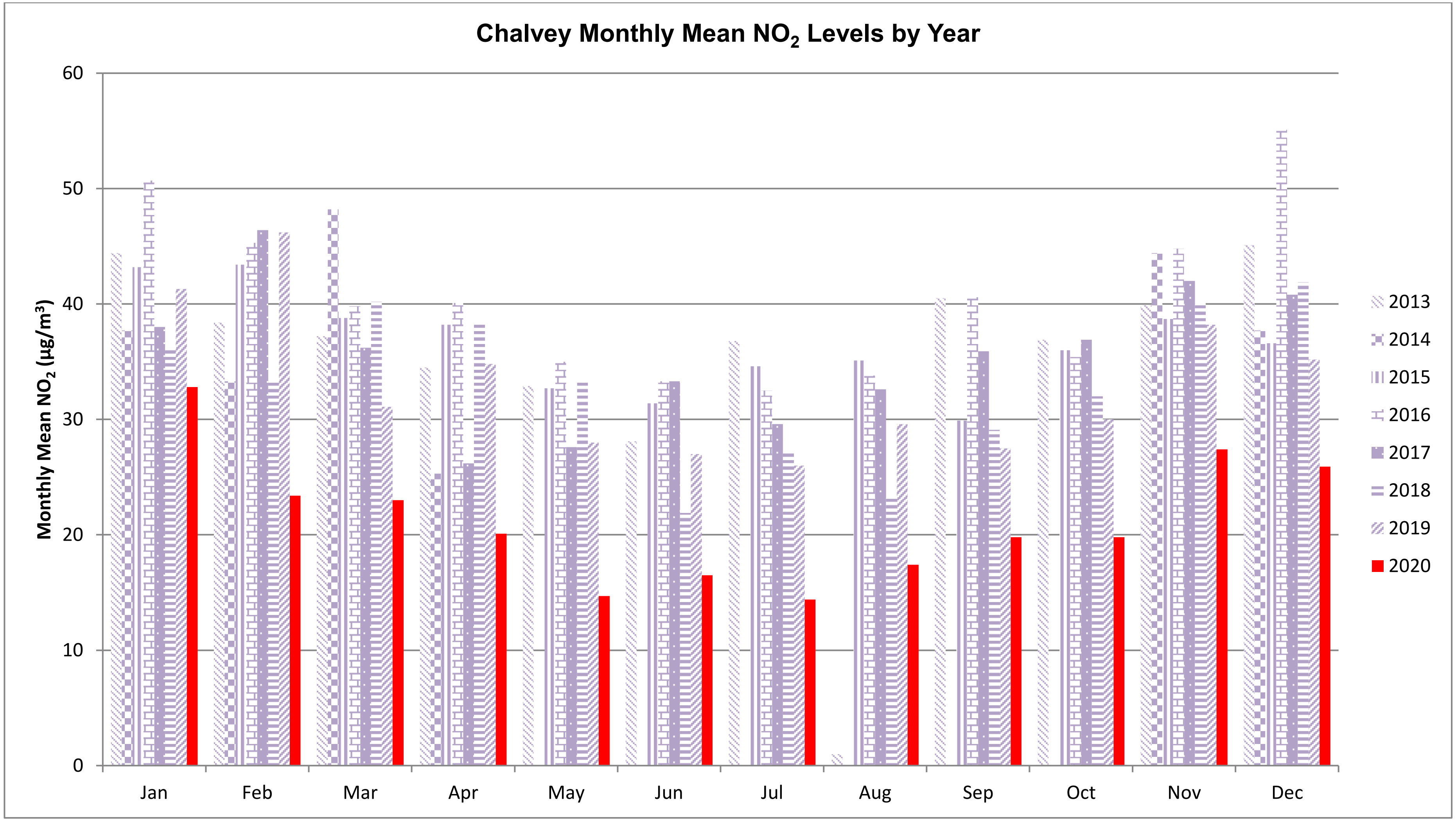


Figure F.10 – Monthly Mean NO_2 Concentrations Compared by Year at Brands Hill

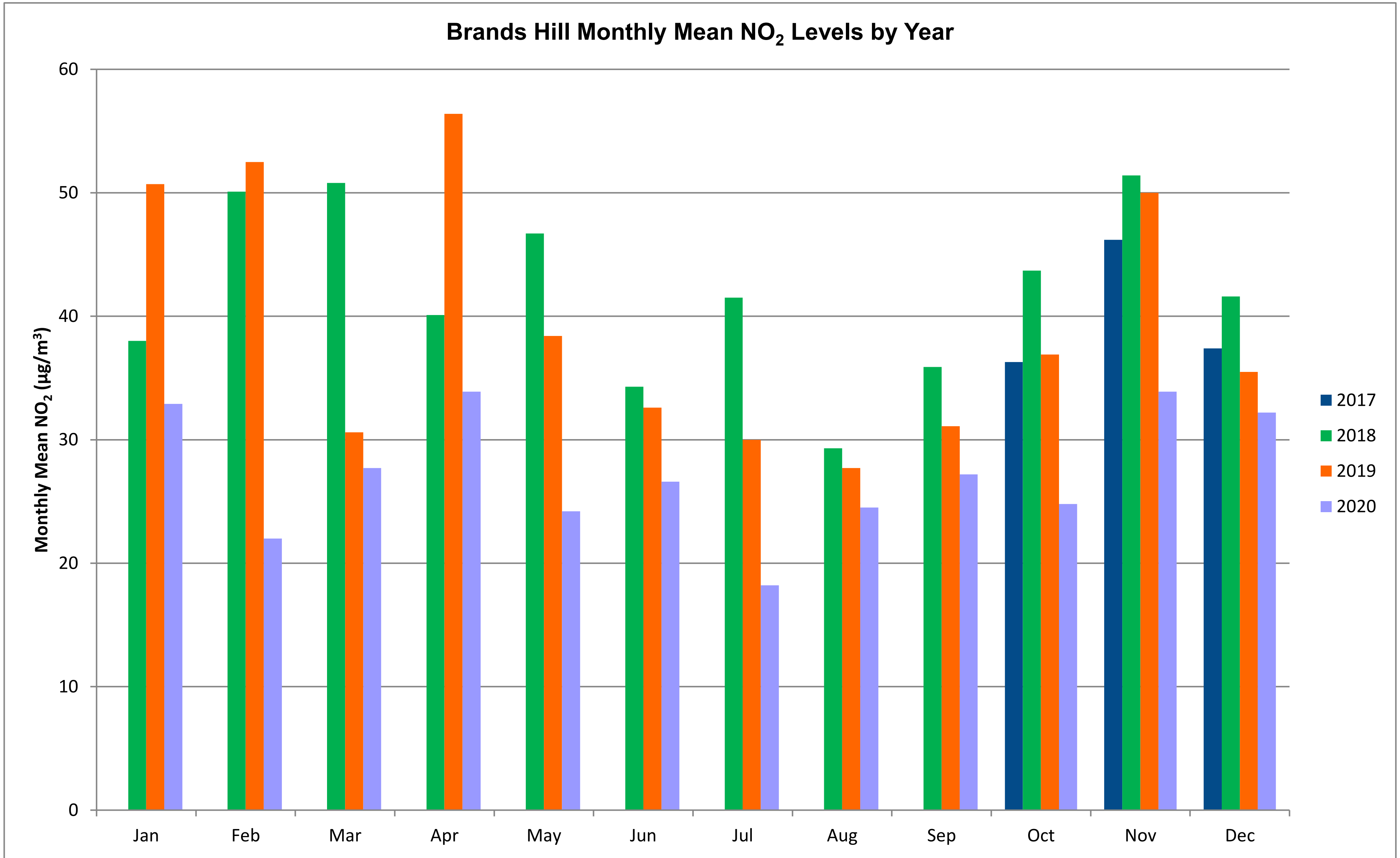


Figure F.11 – Monthly Mean NO_2 Concentrations Compared by Year at Windmill, Bath Road

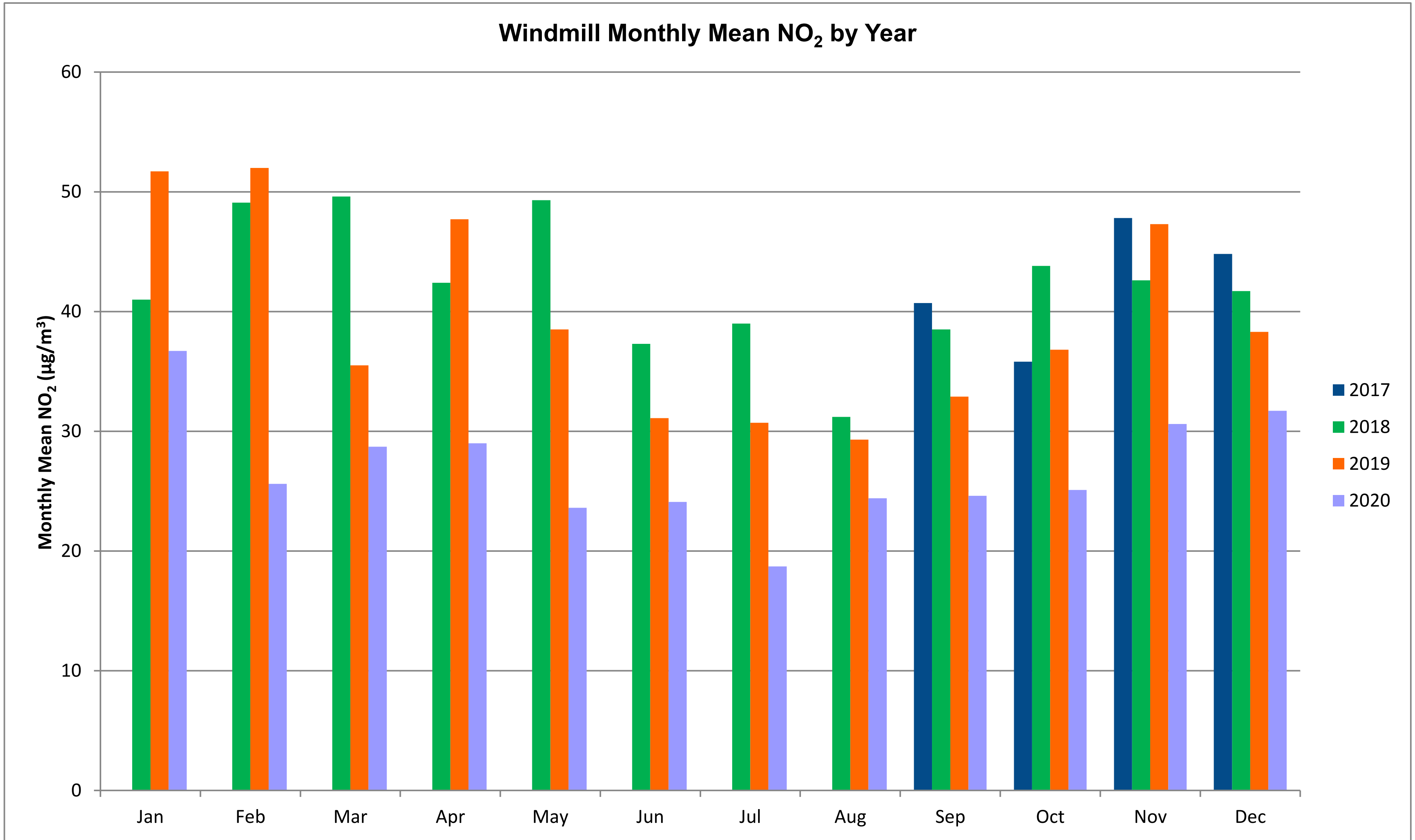


Figure F.12 – Monthly Mean NO_2 Concentrations Compared by Year at Wellington Street

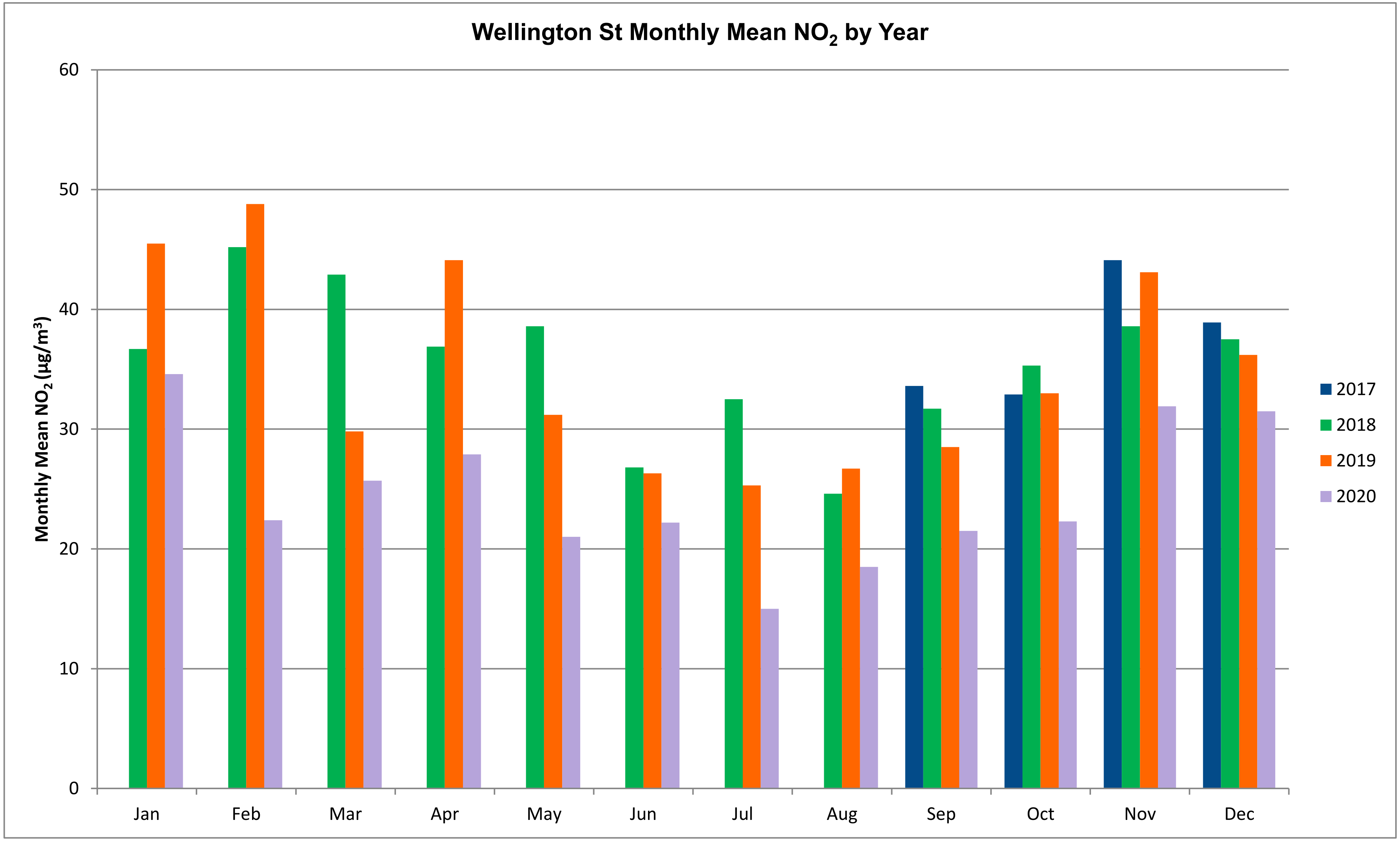


Figure F.13 – Monthly Mean NO_2 Concentrations Compared by Year at Colnbrook, Pippins

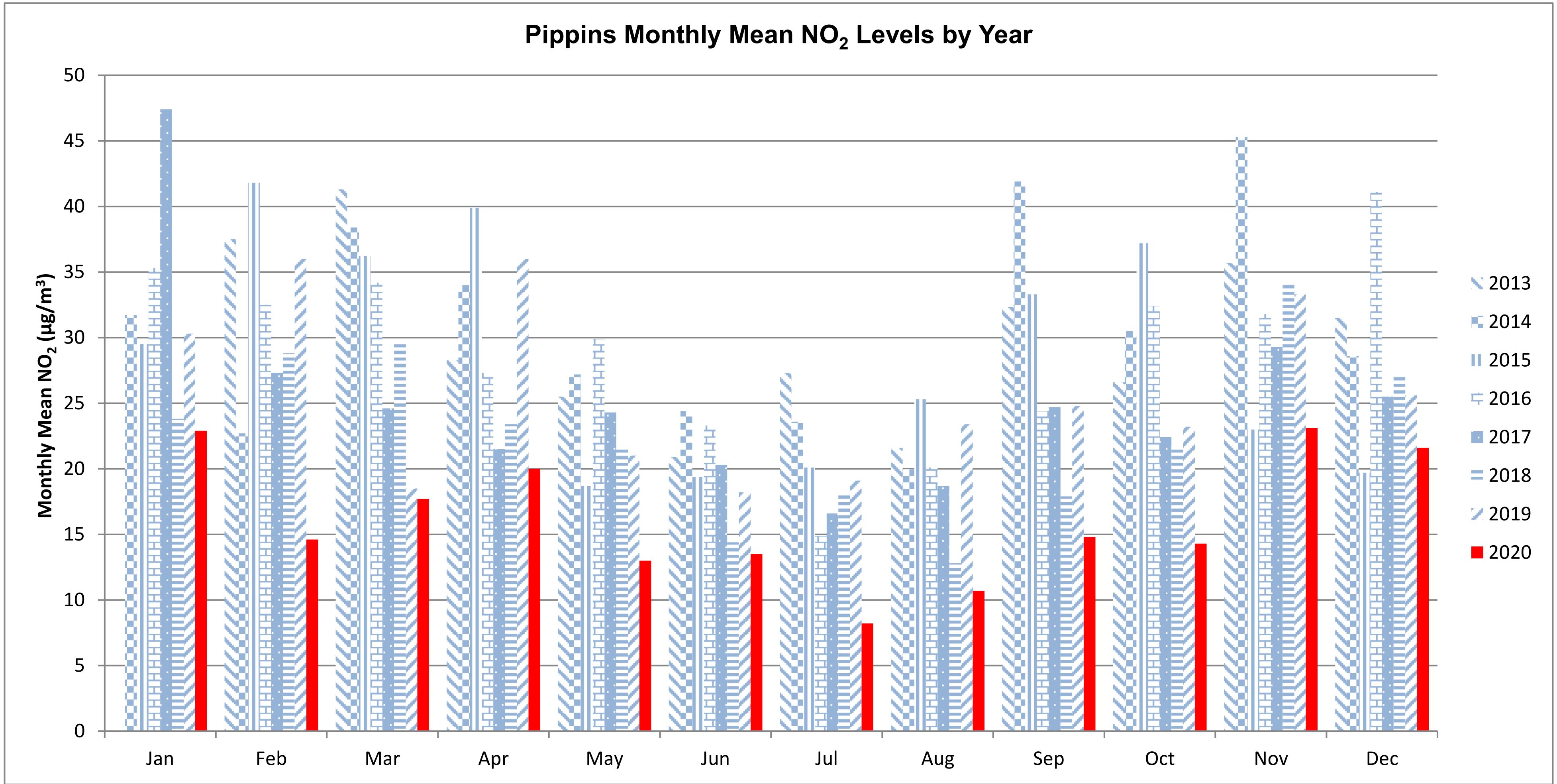


Figure F.14 – Monthly Mean PM_{10} Concentrations Compared by Year at Brands Hill

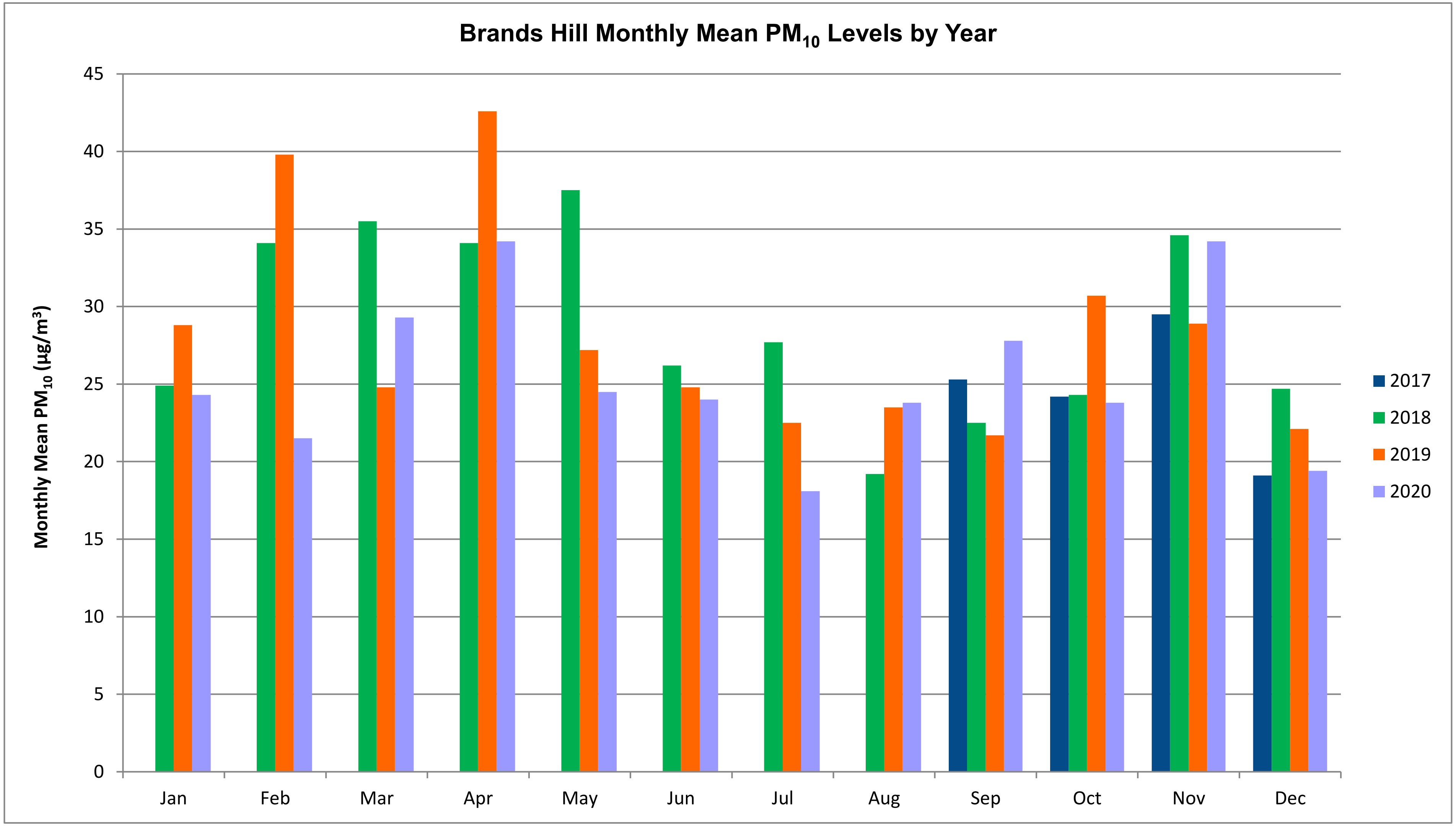


Figure F.15 – Monthly Mean PM_{10} Concentrations Compared by Year at Windmill, Bath Road

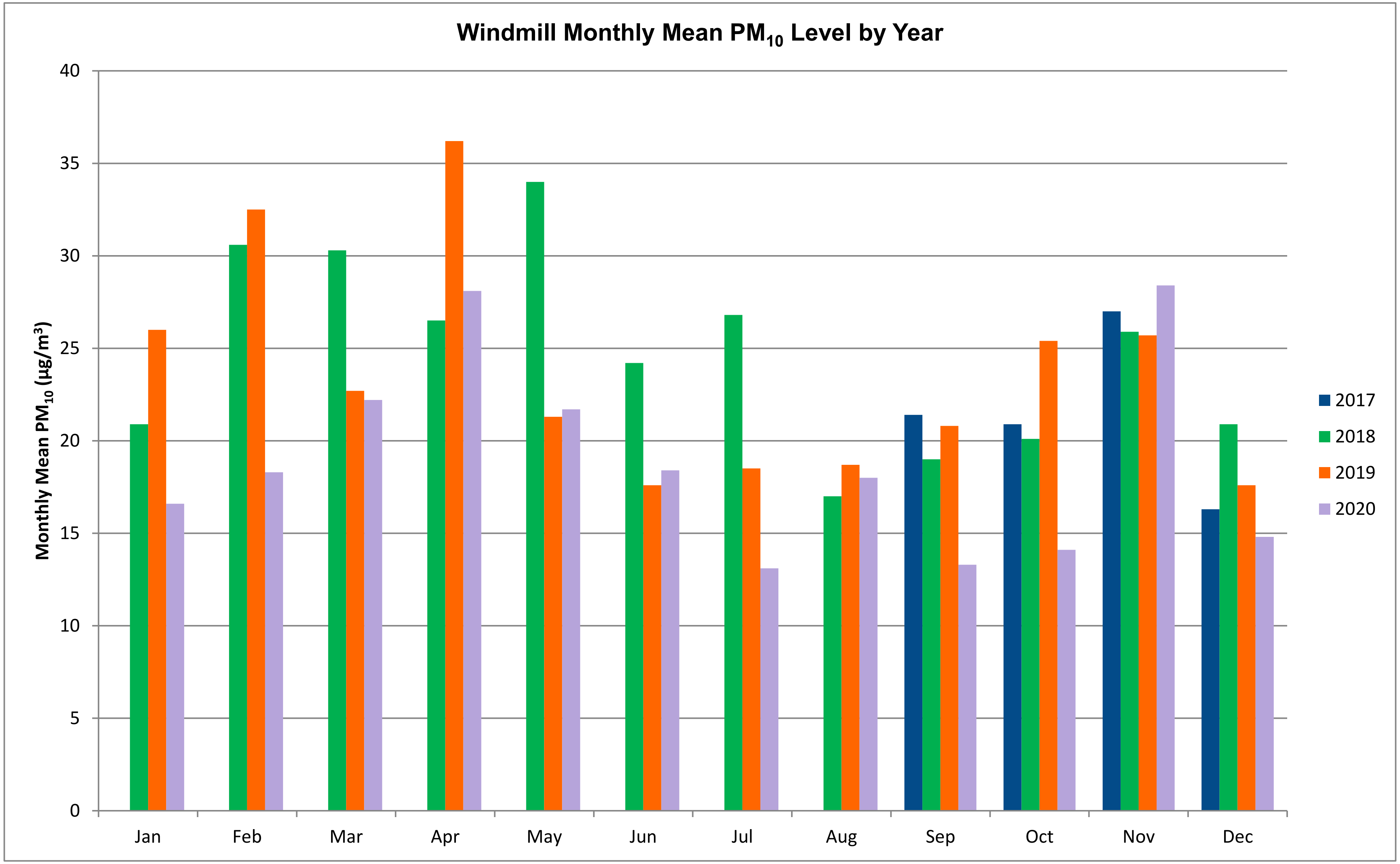
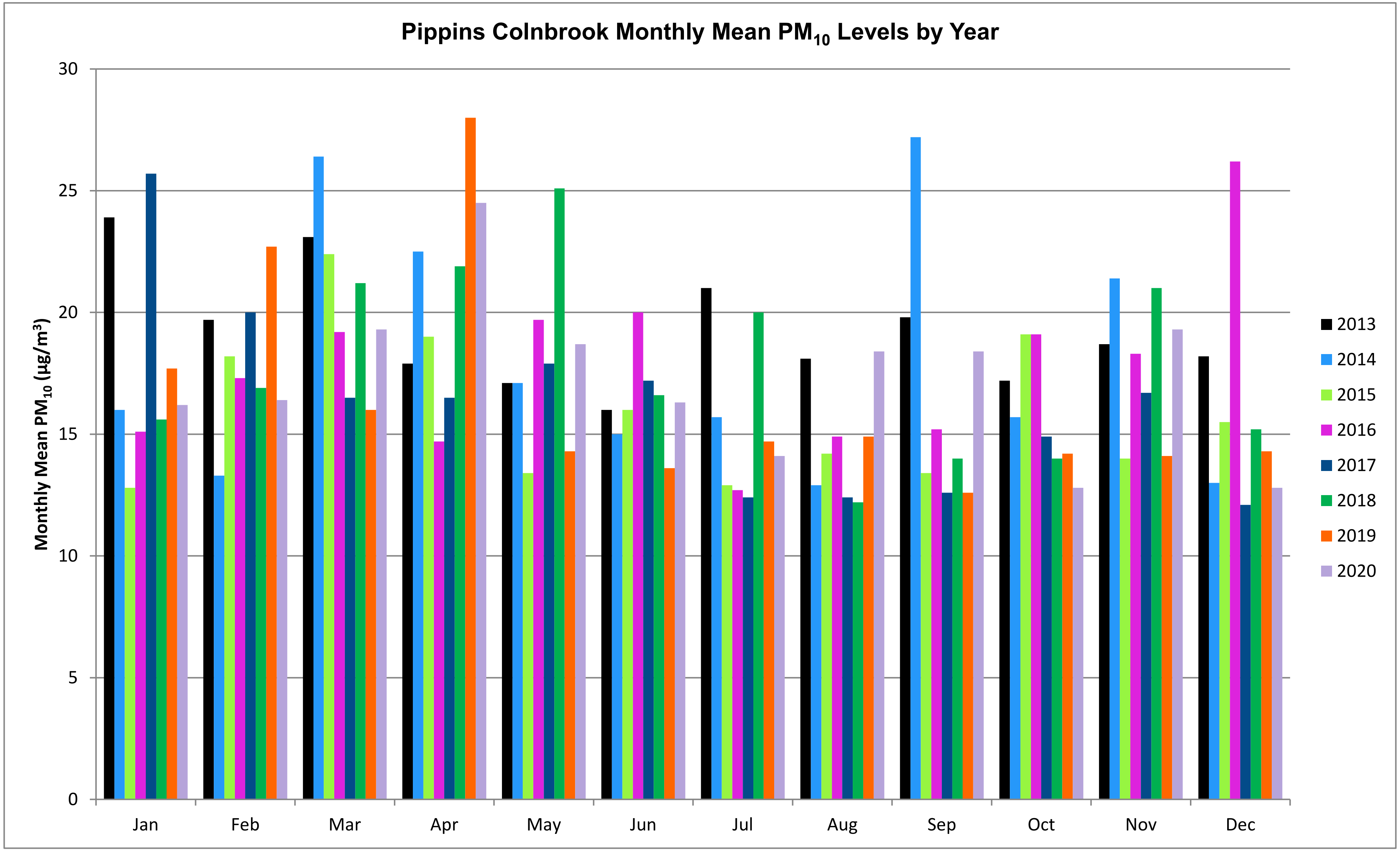


Figure F.16 – Monthly Mean PM_{10} Concentrations Compared by Year at Colnbrook, Pippins



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
AQO	Air Quality Objective
ASR	Annual Status Report
CAP	Clean Air Plan
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EATF	Emergency Active Travel Fund
EU	European Union
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LES	Low Emission Strategy
LTP	Local Transport Plan
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
STIP	Strategic Transport Infrastructure Plan
ULEV	Ultra-Low Emission Vehicle

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