Bromley Air Quality Annual Status Report for 2019
Date of publication: July 2020

This report provides a detailed overview of air quality in Bromley during 2019. It has been produced to meet the requirements of the London Local Air Quality Management statutory process (Defra, 2018).

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Abbreviations

AIR-PT	Air Proficiency Testing
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
BAM	Beta Attenuation Monitor
CAZ	Central Activity Zone
EV	Electric Vehicle
GLA	Greater London Authority
HSL	Health and Safety Laboratory
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LGC	Laboratory of Government Chemists
LLAQM	London Local Air Quality Management
NRMM	Non-Road Mobile Machinery
PM_{10}	Particulate matter less than 10 micron in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micron in diameter
STACKS-PT	Stack emission proficiency testing
TEB	Transport Emissions Benchmark
TfL	Transport for London
WASP	Workplace Analysis Scheme for Proficiency

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	**Objective (UK)**	**Averaging Period**	**Date[1]**
Nitrogen dioxide - NO_2	200 μg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 μg m^{-3}	Annual mean	31 Dec 2005
Particles - PM_{10}	50 μg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 μg m^{-3}	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 μg m^{-3}	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020
Sulphur Dioxide (SO_2)	266 μg m^{-3} not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
	350 μg m^{-3} not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 μg m^{-3} mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

Note: [1]by which to be achieved by and maintained thereafter (Council of European Communities, 2008)

1. Air Quality Monitoring

1.1 Locations

The Council has historically monitored at six continuous monitoring sites within the Borough, five of which are now closed. The one operational monitoring station is located in Harwood Avenue. Figure 1 and Table B provide details of this monitoring site. The station was operated by the Environmental Research Group (ERG) as part of the London Air Quality Network (LAQN) from July 1998 to July 2010. Monitoring at the site was suspended until July 2011 when it was recommissioned and has since been operated by the London Borough of Bromley. Details of the relevant Quality Assurance / Quality Control (QA/QC) procedures that have been followed throughout the monitoring period are provided in Appendix A.

Table B. Details of Automatic Monitoring Sites for 2019

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
BRY-CM3	Harwood Avenue	540523	169326	Roadside	Y (NO_2)	0	3	3.5	NO_2, PM_{10} and $PM_{2.5}$	Chemiluminescence, Beta attenuation monitoring (BAM)

The London Borough of Bromley carries out passive monitoring using NO_2 diffusion tubes at 10 locations within the AQMA in the north western part of the Borough. All the diffusion tube sites are either at roadside or kerbside locations, and all sites are triplicate tube sites. The Harwood Avenue diffusion tube site is co-located with the automatic monitor. In April 2017 a new diffusion tube site was installed on Beckenham Lane close to a previous diffusion tube location formerly known as Shortlands. Figure 1 and Table C provide details of the operational diffusion tube sites within the Borough during 2019.

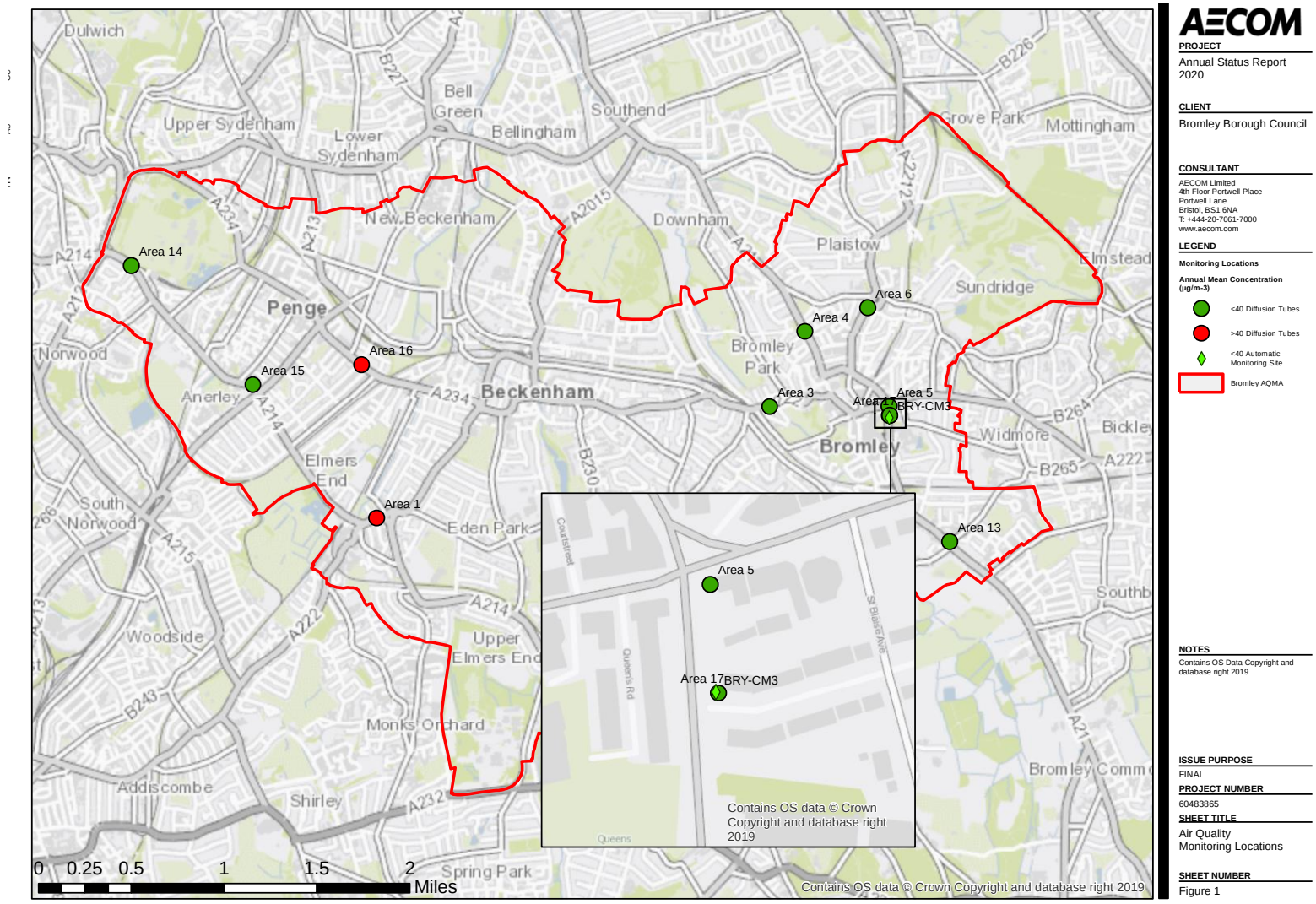
Table C. Details of Non-Automatic Monitoring Sites for 2019

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
Area 1	Elmers End Road	536076	168434	Roadside	Y	4	1	2	NO_2	N
Area 3	Beckenham Lane	539486	169399	Roadside	Y	5.3	1.2	2	NO_2	N
Area 4	London Road	539790	170050	Roadside	Y	4	2	2	NO_2	N
Area 5	Widmore Road	540519	169403	Roadside	Y	0*	3	2	NO_2	N
Area 6	College Road	540336	170258	Roadside	Y	3	3	2	NO_2	N
Area 13	Homesdale Road	541047	168231	Roadside	Y	2	2	2	NO_2	N
Area 14	Anerley Hill	533949	170624	Kerbside	Y	13**	0.5	2	NO_2	N
Area 15	Anerley Road	535006	169590	Kerbside	Y	3	0.5	2	NO_2	N
Area 16	Beckenham Road	535947	169765	Kerbside	Y	10**	0.5	2	NO_2	N
Area 17	Harwood Avenue	540525	169325	Roadside	Y	0*	3	2	NO_2	Y

* not directly on a facade, but representative of adjacent facade road distance.

** monitoring site closer to the road source than the nearest façade.

Figure 1. Map of Automatic and Non-Automatic Monitoring Sites



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PROJECT
Annual Status Report 2020

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LEGEND
Monitoring Locations
Annual Mean Concentration (µg/m-3)
<40 Diffusion Tubes
>40 Diffusion Tubes
<40 Automatic Monitoring Site
Bromley AQMA

NOTES
Contains OS Data Copyright and database right 2019

ISSUE PURPOSE
FINAL

PROJECT NUMBER
60483865

SHEET TITLE
Air Quality Monitoring Locations

SHEET NUMBER
Figure 1

1.2 Comparison of Monitoring Results with AQOs

The NO_2 monitoring results from the automatic monitoring stations and diffusion tube locations for the last seven years are shown in Table D and Table E.

All data have been ratified, and details of the data ratification process are provided in Appendix A.

Diffusion tube monitoring results have been adjusted for bias using the national bias adjustment factor. The derivation of the bias adjustment factor is described in Appendix A. The diffusion tubes are prepared and analysed by Gradko (using the 20% triethanolamine (TEA) in water preparation method). Details of the QA/QC procedures applied to the diffusion tube results are summarised in Appendix A. Façade distance correction calculations have been carried out for those monitoring locations that are not representative of relevant public exposure (see Appendix A). All diffusion tube sites achieved greater than 75% data capture for 2019 (i.e. more than 9 months), and therefore no "annualisation" was required for any diffusion tube site.

The annual mean NO_2 objective of 40 µg/m^3 was exceeded at two of the ten NO_2 monitoring locations in 2019, which are Elmers End Road and Anerley Hill sites. This is the joint lowest number of annual mean NO_2 exceedances along with 2018 in all years since 2010. The lowest annual mean NO_2 concentration of 28.3 µg/m^3 was monitored at Harwood Avenue in 2019. The highest annual mean NO_2 concentration in 2019 was monitored at Elmers End Road with a value of 48.1 µg/m^3. This site has reported the highest NO_2 concentrations in all years since 2010. However, the 2019 annual mean NO_2 concentration at Elmers End Road is the lowest measured at this site since 2011 with a consistent drop in concertation over the last 4 years towards the AQ objective of 40 µg/m^3.

For those monitoring sites not located at points of relevant exposure, Defra's façade distance correction tool has been used to estimate the annual mean NO_2 concentrations at the nearest location of relevant exposure. These results are not shown in the main report in order to maintain time series consistency with previous reports; however, the distance-corrected concentrations can be found in Appendix B. After correction for bias and façade distance (where applicable), annual mean NO_2 concentrations at all sites are below the annual mean NO_2 objective.

Table D. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results (µg/m^3)

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µgm^{-3})						
					2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019
BRY-CM3	Harwood Avenue	Automatic	97.7	97.7	38.4	28.6	30.7	31.9	28.6	25.7	24.7
Area 1	Elmers End Road	Diffusion tube	100	100	**71.8**	**69.9**	**64.2**	**68.8**	**59.5**	**51.3**	**48.1**
Area 3	Beckenham Lane	Diffusion tube	100	100	**N/A**				37.3	35.3	36.0
Area 4	London Road	Diffusion tube	100	100	**51.7**	**51.7**	**46.1**	**52.4**	**43.3**	37.6	37.6
Area 5	Widmore Road	Diffusion tube	97.2	97.2	**67.3**	**54.4**	**50.5**	**50.9**	**43.4**	39.1	38.4
Area 6	College Road	Diffusion tube	100	100	**N/A**			**46.8**	36.4	35.6	33.1
Area 13	Homesdale Road	Diffusion tube	88.9	88.9	**57.3**	**59.9**	**57.2**	**63.3**	**54.3**	**43.5**	39.4
Area 14	Anerley Hill	Diffusion tube	94.4	94.4	**54.7**	**51.1**	**43.7**	**49.6**	**41.6**	39.0	**42.5**
Area 15	Anerley Road	Diffusion tube	100	100	**49.9**	**51.3**	**46.4**	**47.9**	38.2	35.2	36.4
Area 16	Beckenham Road	Diffusion tube	100	100	**52.8**	**49.6**	**44.8**	**47.9**	38.0	38.2	36.0
Area 17	Harwood Avenue	Diffusion tube	94.4	94.4	38.9	36.7	34.0	31.3	30.3	27.3	28.3

Notes: Exceedance of the NO_2 annual mean AQO of 40 µgm^{-3} are shown in **bold**.

NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in **bold and underlined**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Figure 2 shows the trend in annual mean NO_2 concentrations at Harwood Avenue automatic monitoring station from 1999 to 2019. The graph shows that the high concentrations of NO_2 were recorded before 2002, before dropping sharply in 2002. Concentrations were then observed to increase year on year from 2003 to 2005 with concentrations rising from 40 µg/m^3 to almost 50 µg/m^3. Between 2007 and 2009 levels of NO_2 were observed to decrease again but remained above the annual mean NO_2 objective. No monitoring was undertaken in 2010 but following the recommencement of monitoring in 2011 annual mean NO_2 concentrations have remained below 40 µg/m^3 since and have, therefore, achieved the annual mean NO_2 air quality objective.

Figure 3 presents the trends in annual mean NO_2 concentrations at the diffusion tube sites. During the 2011 to 2019 period there has been no consistent upward or downward trend in annual mean NO_2 concentration at any of the diffusion tube monitoring locations. In general, higher concentrations were measured in 2013, 2014 and 2016, and lower values in 2015, 2018 and 2019. At the Beckenham Road and Harwood Avenue sites, there is evidence of a downward trend in annual mean NO_2 concentrations between 2012 and 2019. The downward trend that had been apparent at many of the diffusion tube sites between 2013 and 2015 came to an end in 2016. In 2018, NO_2 concentrations at all of the diffusion tube sites decreased compared to 2016. When considering the all years from 2011 to 2019, the Harwood Avenue, Anerley Road, Widmore Road, Beckenham Road, Anerley Hill and London Road sites show an overall decrease, while Elmers End Road and Homesdale Road show a smaller decrease. The annual mean NO_2 concentration recorded at the Homesdale Road (formerly named Bromley Common) site has not changed significantly over the 7 year period. Due to a historic labelling error, data from previous years at the Area 6 (College Road) site has not been presented and so no comparison can be drawn. Similarly , no historical data are available for the new Beckenham Lane (Previously Shortlands) site so no comparisons can be drawn.

Figure 2. Annual mean NO_2 concentrations at the Harwood Avenue Automatic Monitoring Site

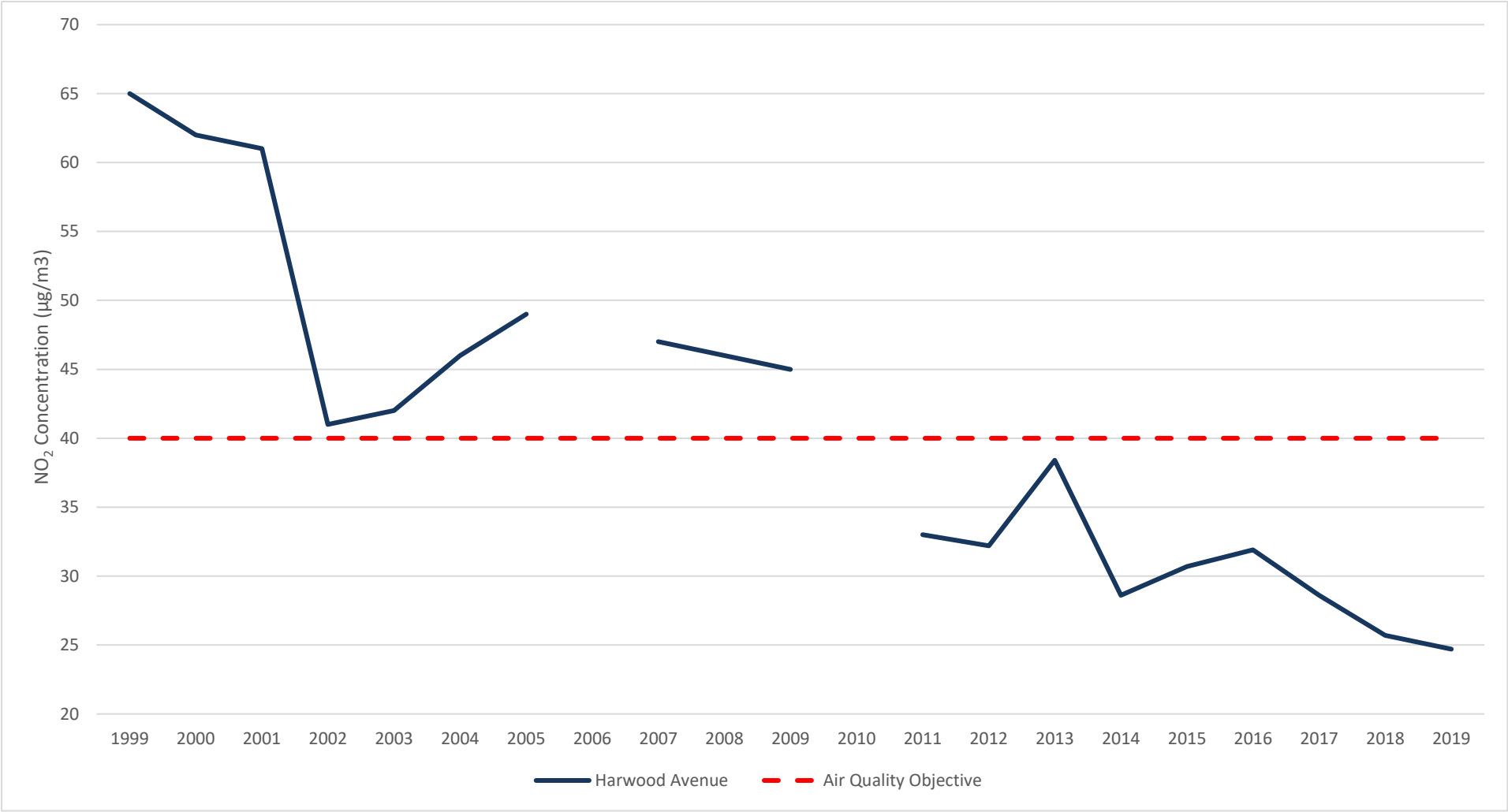

Figure 3. Annual mean NO_2 concentrations at Non-Automatic Monitoring Sites

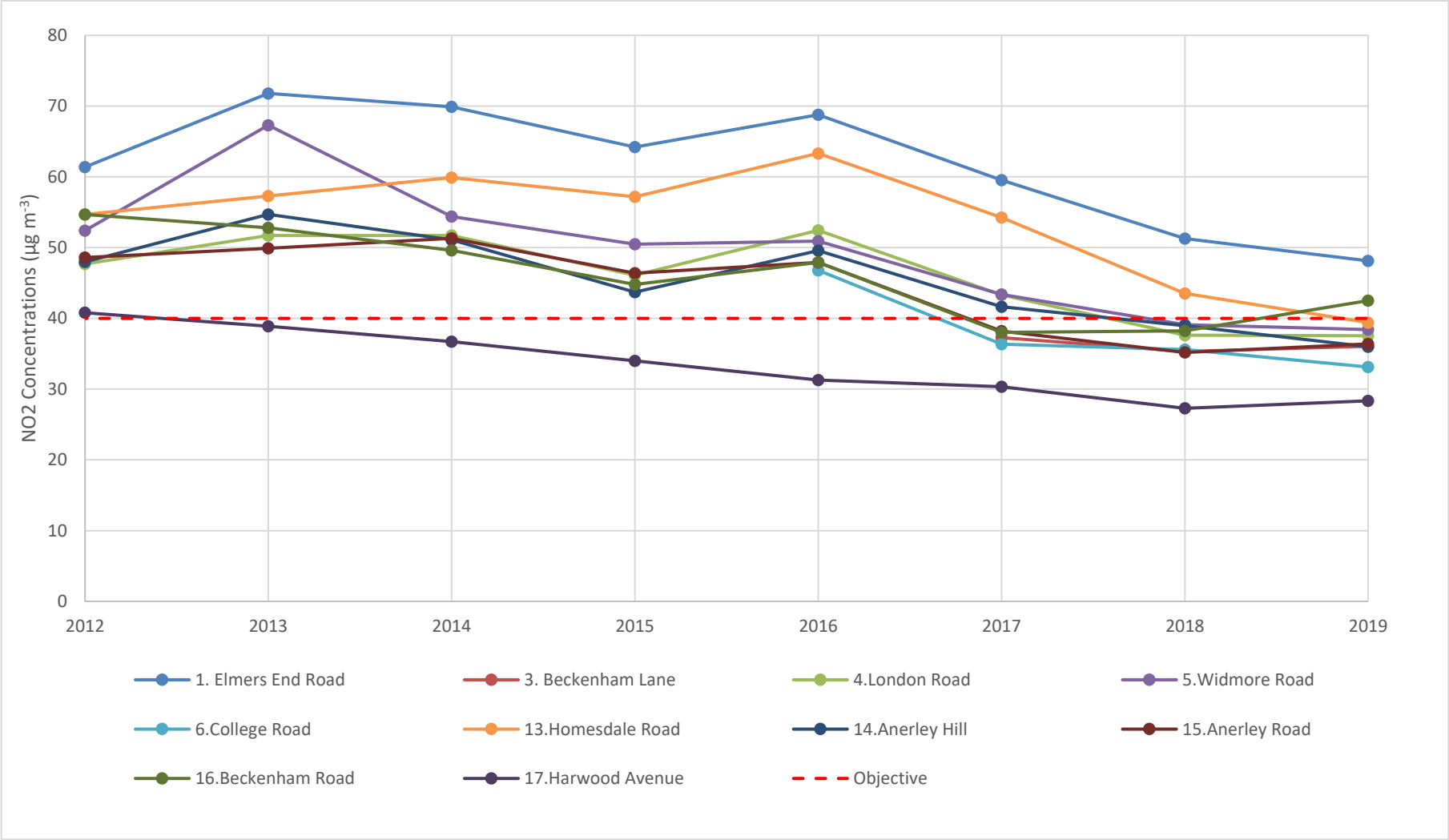

Table E. NO_2 Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of Hourly Means > 200 µgm^{-3}							
			2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]	2019 [c]
Harwood Avenue	97.7	97.7	0 (84)[d]	0 (113)[d]	4 (102)[d]	0 (90.6)[d]	0 (98.3)[d]	0	0	0

Notes: Exceedance of the NO_2 short term AQO of 200 µgm^{-3} over the permitted 18 days per year are shown in **bold**.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%
[d] Data capture is less than 90%, and so 99.8th percentiles of hourly means (in µg.m^{-3}) are shown in brackets.

Table E shows the 1-hour NO_2 monitoring results for 2012 to 2019. During the 2012 to 2019 period there were no monitored exceedances of the 1-hour NO_2 standard of 200 µg/m^3, except for 4 hours in 2014. This is well within the permitted 18 hours of exceedance in order to achieve the 1-hour NO_2 objective. Where data capture rates were lower than 90%, the 99.8th percentiles of hourly mean NO_2 concentrations have been calculated and are shown in brackets alongside the number of exceedances in Table E. Between 2011 and 2016 the 99.8th percentiles of hourly mean NO_2 concentrations were lower than 200 µg/m^3; it is therefore likely that the 1-hour NO_2 objective was achieved in all years during this period.

The Council has been monitoring PM_{10} within the Borough since October 1999. The only currently operational monitoring station is Harwood Avenue. The annual mean PM_{10} results are shown in Table F and the 24-hour mean PM_{10} results are presented in Table G. Data capture at the site in 2019 was 93.0%. The annual mean PM_{10} concentration at Harwood Avenue in 2019 was 18.8 µg/m^3, which is below the annual mean objective of 40 µg/m^3. This is consistent with all years since 1999 (see Figure 4). It should be noted that the annual mean PM_{10} concentration for 2015 in this report (16.8 µg/m^3) differs from that reported in the 2016 ASR; this is due to an error in the 2015 dataset that has subsequently been corrected.

The 24-hour mean PM_{10} monitoring results are shown in Table G. There were 8 exceedances of the 24-hour mean air quality objective value of 50 µg/m^3 in 2019. This result is well within the 35 permitted days of exceedance to achieve the 24-hour mean PM_{10} air quality objective. This result also indicates that the 24-hour mean PM_{10} objective is likely to have been achieved in 2019. Between 2012 and 2016 the 24-hour mean PM_{10} objective has been achieved at

Harwood Avenue in all years. It should be noted that the exceedance statistics for PM_{10} concentrations for 2015 in this report differ from those reported in the 2016 ASR; this is due to an error in the 2015 dataset that has subsequently been corrected.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (μgm^{-3})							
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]	2019 [c]
Harwood Avenue	93.0	93.0	36.3	22.1	33.3	30.1	29.5	16.8	16.5	18.8

Notes: Exceedance of the PM_{10} annual mean AQO of 40 μgm^{-3} are shown in **bold**.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Table G. PM_{10} Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of Daily Means > 50 μgm^{-3}							
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]	2019 [c]
Harwood Avenue	92.6	92.6	21 (49)	9	12 (43)	10 (39)	4 (45)	2 (30)	0(26)	8

Notes: Exceedance of the PM_{10} short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 90% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Figure 4 shows that PM_{10} concentrations at Harwood Avenue between 2000 and 2009 were consistently between 20 µg/m^3 and 25 µg/m^3. New monitoring equipment was installed in 2011, which coincided with an increase in monitored PM_{10} concentrations. The change of equipment may explain in part the elevated PM_{10} concentrations observed since 2011, although poor data capture may be a more significant factor. It is worthy of note that annual mean PM_{10} concentrations at Harwood Avenue between 2011 and 2019 show evidence of an overall decreasing trend.

Figure 4. Annual mean PM_{10} concentrations at the Harwood Automatic Monitoring Site

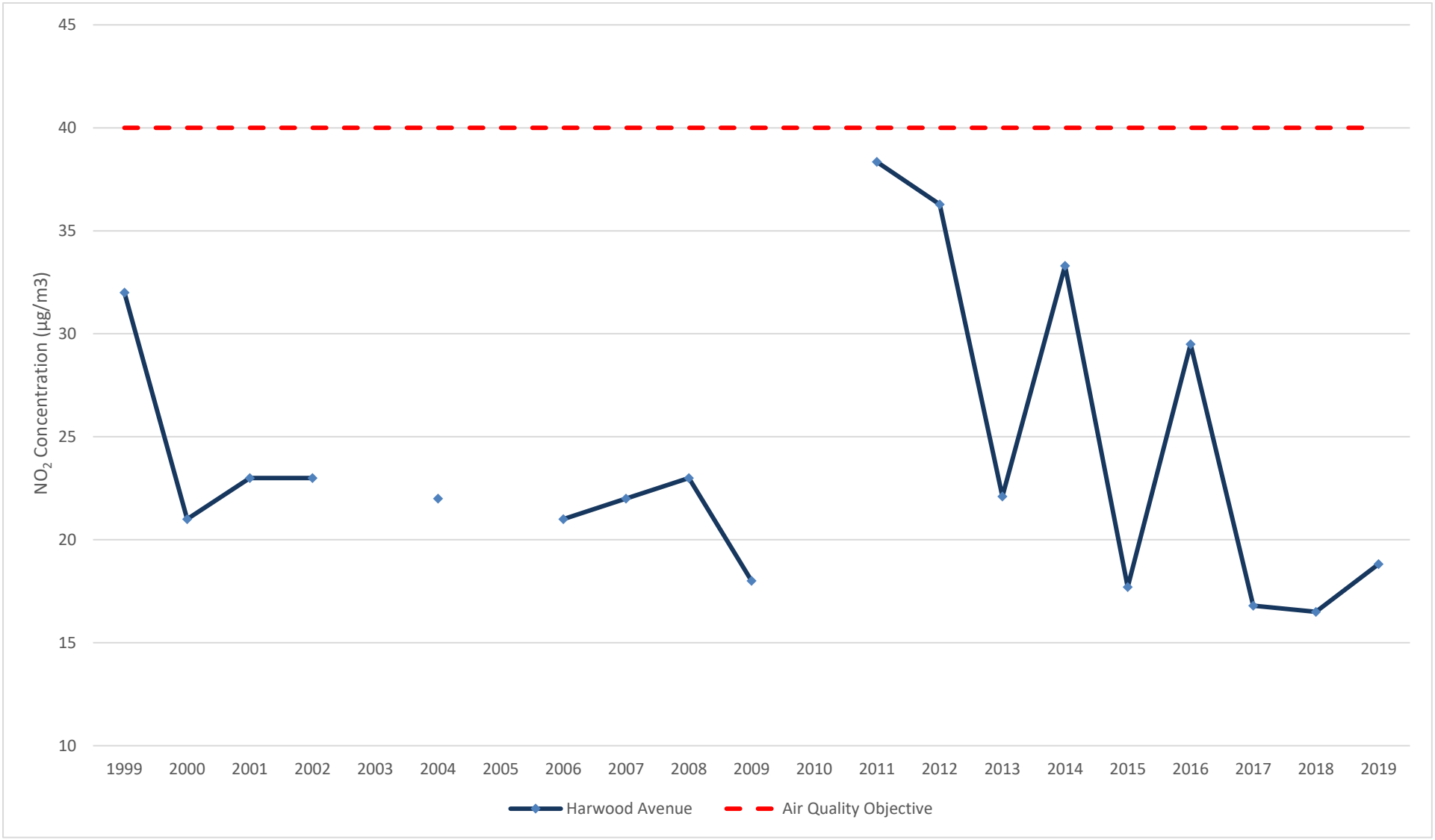

Table H. Annual Mean $PM_{2.5}$ Automatic Monitoring Results (µg m^{-3})

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µgm^{-3})								
			2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018	2019
Harwood Avenue	-	-	-	-	-	-	-	15.5	-	-	-

Notes: Exceedance of the $PM_{2.5}$ annual mean AQO of 25 µgm^{-3} are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

In 2015, an inlet particle sensor was attached to the PM_{10} monitor to monitor $PM_{2.5}$. This monitoring technique is not reference equivalent and the results should be viewed as indicative. Due to technical issues with the inlet particle sensor during 2015 there was no valid $PM_{2.5}$ data collected. The $PM_{2.5}$ data capture rate for 2016 was 19.6% due to data collection only being possible during the first 3 months of the year. The data capture rate for the 3 month period was 78.9%. The "annualised" mean $PM_{2.5}$ concentration at Harwood Avenue was 15.5 µg/m^3, which is below the annual mean air quality objective value of 25 µg/m^3 (see Table H). Due to continued technical difficulties with the equipment, no $PM_{2.5}$ data is available for 2019. Note that this will be looked to be remedied in the 2021 annual status report.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

The current AQAP for Bromley was published in 2010. Table I provides a brief summary of Bromley progress against the 2010 AQAP. The key actions that have been achieved in 2019 include formation of an air quality steering group with initial meeting taking place in October and November 2019.

The Council has been working on developing a new Air Quality Action Plan 2020-2025 (AQAP) commencing August 2019 (Bromley Borough Council, 2020). The new version is intended to make the AQAP align better with the latest Defra and GLA guidance and templates. A draft AQAP has been submitted to the Cabinet and subsequently approved to proceed to a two-stage public consultation during June - July 2020. This is delayed slightly due to the current situation, but the Council is looking to adopt the policies of the new AQAP in September 2020 once the GLA provide approval. The draft AQAP will look to include a proposed extension of the current AQMA and provides updates to the current plan through incorporating the GLA derived air quality matrix containing 25 action points for improving air quality.

All measures detailed below that aim to reduce NO_x and PM_{10} will also have an impact on $PM_{2.5}$. Further actions will be included in the upcoming AQAP when completed. Although there are no specific measures targeting the reduction of PM currently, it is expected that the combination of actions and that are currently in force or coming into force will help to bring about a reduction of $PM_{2.5}$. However, discussions are being held with Public Health to devise policies that will specifically target the reduction of $PM_{2.5}$. Indicative $PM_{2.5}$ monitoring capability has been installed at Harwood Avenue, but data capture has been limited to date by a number of technical difficulties, so no data is available for 2019. This will be looked to be remedy by the purchase of a $PM_{2.5}$ analyser in 2020.

Table I. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Construction and demolition activities	The Council will mitigate against or resist development that is likely to cause air quality objectives to be breached, particularly within designated Air Quality Management Areas.	Construction dust management plans required from constructors to include air quality monitoring for all major developments.	NRMM compliance project commenced in 2016 and ongoing with funding support from the GLA confirmed until 2022.
Bonfires	The Council will support and investigate the case for promoting a restriction on bonfires based on area and time.	Bonfire leaflets published in 2014 with recommendations for residents not to have bonfires at weekends or on Bank Holidays. Reports of nuisance caused by bonfires continue to be investigated by the Public Health team. Trade waste burning controlled to enforce Clean Air Act.	
Planning and mitigation	Investigate the use of Section 106 agreements for future developments within the AQMA.	No relevant Section 106 agreements in place at the moment.	Air Quality Supplementary Planning Document to be reviewed

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Planning and mitigation	Encourage the use of the Mayor of London's sustainable design and construction supplementary planning guidance to mitigate against inappropriate design, layout, orientation and construction to avoid increased exposure.	Charging point opportunities identified for developments built on Council land. Travel plans required for all new developments (highways and planning teams responsible).	Compliance with the MoL SPG, Institute of Air Quality Management (IAQM) and other relevant guidance documents to be agreed at pre-application discussions and/or written into planning conditions to ensure no negative impact on air quality either during construction or occupation of development with all major developments meeting GLA Air Quality Neutral standards as a minimum.
Industry	The Council will ensure all new installations are bought into the relevant regime and existing installations are kept informed of new legislative requirements under the Pollution Prevention and Control Act 1999 and the Environmental Permitting (England and Wales) Regulations 2016 (as amended).	Environmental permits are required for specified industrial installations. These permits are available to view on request.	
Smoke control	The Council will continue to inform residents of the smoke control areas and where necessary take enforcement action if unauthorised fuels are burned or unauthorised appliances used.	Residents and developers informed of wood burning stove requirements either on request or via a link to the Defra web page from the Bromley Council web site.	Smoke Control Area website information updated for better clarity and ease of use

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Oil and gas heating	Where possible the Council will encourage, through the planning process, developers or new business premises to use low NOx burners or other cleaner fuels including the Sulphur Content of Liquid Fuels (England and Wales) Regulations 2007 (as amended).	Installation of ultra-low NOx gas boilers encouraged in line with the MoL London Plan policy.	
Oil and gas heating	The Council will promote energy efficiency and sustainability on new developments by supporting the Council sustainability and energy efficiency policy through the planning process.	Not yet implemented.	
Oil and gas heating	The Council will encourage efficient local energy generating schemes, particularly combined heat and power and community heating schemes through the Mayor's Energy Strategy and the Mayor's London Plan (Spatial Development Strategy).	Where CHPs are planned to be installed, emissions standards will be required to meet those specified in the Defra/EPUK 2012 Combined Heat and Power: Air Quality Guidance for Local Authorities.	A CHP Information Request Form is required to be submitted and approved by the local planning authority prior to installation and commencement of use of any plant.
Oil and gas heating	The Council will encourage energy efficiency measures and insulation of domestic dwellings to reduce energy use.	Housing team through HHSRS where relevant.	
Holistic approach to air quality	Improve links with the energy and housing officers in order to adopt a more holistic approach to air quality.	Not yet implemented.	

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Air quality monitoring	Continue to monitor air quality in Bromley, particularly for pollutants of concern such as Nitrogen Dioxide and PM_{10}.	Harwood Avenue monitoring station maintained in-house. Monthly reports required from service contractor (ET).	
Air quality monitoring	The Council will seek ways to improve publicity of pollution data and its availability to the public, including updating the website.	Council staff available to answer queries and modelled air quality data is available through the LAQN.	
Public awareness and education	Develop the London Borough of Bromley website to include real time air quality monitoring data.	Air quality information is provided through the South London Cluster Group 'Love Clean Air' website - https://lovecleanair.org/	Love Clean Air provides a substantial amount of information however the Council is aware that work is required on the site to bring it up-to-date.

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Movement of traffic	Provide data and monitoring services to target problematic junctions in order to improve the movement of traffic.	Air Quality focus of traffic monitoring is being prioritised through collaboration between the Council Transport and Environmental Health teams.	Environmental Health and Transport teams work together where resources permit to ensure air quality monitoring is undertaken at problem areas prior to any improvement works so the cost benefit analysis for improved AQ can be determined. AQ monitoring post works can then be utilised to support further prioritisation (and potential funding bids) based on health impacts for traffic improvement works in the borough.
Real time traffic information	Introduction of real time traffic monitoring with variable messages for Bromley town centre.	Not yet implemented.	
Council owned fleet	Provide data or monitoring services to target problematic junctions in order to improve the movement of council vehicles.	Not yet implemented.	

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Council owned fleet	New drivers will be trained in fuel efficient driving.	In house driving training (Advanced motoring) provided to Council officers. The Council continues to educate staff driving on Council business about fuel efficient driving to minimise emissions and costs through its driver induction process, following the Driver's Code of Practice (LIP3).	Council contractor waste and street sweeping fleet to be updated in 2019, with integration of lower emission vehicles meeting 2020 LEZ heavy vehicle standards. (LIP3) The pool car fleet will be hybrid by 2019/20 and non-ULEZ compliant vans will be withdrawn from service by 2021.
Vehicle emission testing	Ensure the Council's fleet complies with relevant vehicle standard requirements.	Emissions testing is not currently undertaken.	
Compliance with European emission standards for vehicles	Continue to ensure that the Council's fleet vehicles comply with European emission standards.	Emissions testing is undertaken during the annual MoT test.	
City Car Clubs	The Council will encourage and support employers and other organisations wishing to establish Car Clubs and investigate the possibility of providing on road spaces available for car club vehicles where suitable off-road provision cannot be made.	Several private Car clubs are operating successfully in the Borough. The Council continues to work to identify suitable locations for further car club expansion and add vehicles to locations that are currently performing above their usage target. (LIP3)	Further work to be undertaken to help establish EV car clubs with suitable EV charging and parking spaces.
Car Sharing Schemes	The Council will promote workplace car sharing schemes.	This action is currently under consideration.	Further work to liaise with colleagues working on LIP

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
South London Freight Quality Partnership	The Council will play an active role in the further development and adoption of the SLFQP including among other initiative trailing of night time deliveries, loading bay optimization and feasibility studies of consolidation centres.	Ongoing in collaboration with TFL. Main focus on Noise impacts, but Air Quality benefits follow.	
Idling vehicles	The Council will reduce pollution from unnecessarily idling vehicles through an awareness campaign and enforcement.	Council officers given powers to enforce idling restrictions. The MAQF anti-idling campaign is being rolled out during 2019.	
London Bromley Council Workplace Travel Plans	The Pollution Team will continue to support the LBBWTP and as appropriate provide air quality data and expertise to maximize the potential improvements to air quality.	Cycle to work scheme (financial support, bicycles provided to Council officers, showers provided in the workplace).	Bikeability cycle training and bike maintenance courses offered to all Bromley Council employees (and residents of the borough).
School travel plans	The Council will develop strong links with the school travel plan coordinator to help identify and target those schools that due to their proximity to the more congested junctions have a proportionally greater impact on the quality of air.	Project ongoing in line with other council projects aiming to raise awareness of air quality issues at schools and in the local community.	
School travel plans	The Council will continue to provide and collect additional air quality data to assist in the identification of problematic junctions adjacent to large employers and schools.	Not yet implemented.	

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
School travel plans	The Council will support and help promote the numerous initiatives as outlined in Bromley LIPS 2017 such as Bike Week, Walk to School Weeks, EU mobility week and the London Wide "Good going" campaign.	Projects & initiatives supported as appropriate. Bromley LIP3 subsequently published in 2019 with action taken to promote the initiatives outlined in the LIP3 documents.	Bromley Schools STP (STARS) Accreditations Primary / Secondary Gold 27% 19% Silver 29% 11% Bronze 25% 11% Not accredited 19% 58%
School travel plans	The Council will seek funding to implement an air quality awareness campaign at local schools that will dovetail with current schemes such as WOW (Walk on Wednesdays, Bike week, Don't stop to drop).	Not yet implemented.	
$PM_{2.5}$ Monitoring	$PM_{2.5}$ monitoring equipment in place at Harwood Avenue station.	Currently not operating due to technical issues.	Intend to purchase a $PM_{2.5}$ monitor at the Harwood Avenue monitoring station during 2020.
Reducing $PM_{2.5}$	Estimate of impacts on $PM_{2.5}$ of current and planned measures for reducing NO_x and PM_{10}.	To be implemented as part of new AQAP.	$PM_{2.5}$ is a pollutant of concern as increasing evidence confirms the relationship between health issues and exposure to these particles. The council will continue to lobby for funding to further monitor this pollutant.

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
Procurement and Supply Chain Emissions	Measure, monitor and seek to influence air quality issues through procurement process. Develop toolkit to appraise environmental and health concerns, including air quality.	Toolkit able to provide monitoring metrics, contract specification and award criteria. – Ease of embedding in air quality issues into contracts without needing to know about air quality issues. Might be too burdensome for some contractors due to reporting obligations.	Toolkit developed by Carbon Management team – primarily concerned with sustainability issues but air quality is included as an environmental outcome that should be considered when procuring services and assets.

3. Planning Update and Other New Sources of Emissions

Table J gives a summary of planning requirements relating to air quality in LB Bromley in 2019.

Table J. Planning requirements met by planning applications in LB Bromley in 2019

Condition	Number
a) Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	46
b) Number of planning applications required to monitor for construction dust	39
c) Number of CHPs/Biomass boilers refused on air quality grounds	0
d) Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	0
e) Number of developments required to install Ultra-Low NO_x boilers	38
f) Number of developments where an AQ Neutral building and/or transport assessment undertaken	15
g) Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	4
h) Number of planning applications with S106 agreements including other requirements to improve air quality	16 (0 for air quality)

Condition	Number
Number of planning applications with CIL payments that include a contribution to improve air quality	0
i) NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	N/A
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.	0 sites specifically conditioned for NRMM owing to NRMM being included in the Council's adopted construction Code of Practice. 0 registered & compliant 4 sites found un-registered Note: LBB subscribes to the Merton and GLA led NRMM project. There are no details available currently to the council explaining why LBB sites are not 100% registered and compliant.

3.1 New or significantly changed industrial or other sources

There are no new or significantly changed sources of pollution in the Borough since the publication of the 2019 Annual Status Report.

References

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Defra. (2017). *NOx to NO2 Calculator.* Retrieved from https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

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Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

During 2019, the Harwood Avenue station was operated by the London Borough of Bromley. QA/QC procedures involve monthly maintenance and calibration visits by LB Bromley's local site operator, and regular service checks by instrument supplier EnviroTechnology. All data have been ratified according to Defra LAQM Technical Guidance standards.

PM_{10} Monitoring Adjustment

All PM_{10} monitoring data has been fully ratified. Prior to ratification, a fixed zero offset of 15 $\mu g/m^3$ is removed from the raw PM_{10} concentration. The PM_{10} concentrations are then divided by 1.21 to make them equivalent to the reference method, following Defra guidance (Defra, 2018).

A.2 Diffusion Tube Quality Assurance / Quality Control

Air proficiency testing (AIR-PT) is an independent analytical proficiency-testing scheme, operated by Laboratory of Government Chemists (LGC) Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards Stack emission proficiency testing (STACKS-PT) scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme.

AIR NO_2 PT forms an integral part of the UK NO_2 Network's QA/QC, and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme.

The results for Gradko International were overall satisfactory as stated here. Gradko International scored 100% satisfactory results for all relevant AIR-PT rounds unless stated otherwise:

- AR030 (January-February 2019)
- AR031 (April-May 2019) – 75% satisfactory results
- AR033 (July-August 2019)
- AR033 (September-November 2019)

Bias Adjustment

Bias adjustment is effectively a calculated factor which shows whether diffusion tubes are over-reading or under-reading ambient concentrations, and therefore allows for a correction to be made.

Factor from National Bias Adjustment

The national bias adjustment factor spreadsheet for 2019 is available from the Defra website. The results of multiple co-location studies are collated, and the average bias adjustment factor is taken for studies using the 20% TEA/water preparation method, analysed by Gradko. The national bias

adjustment factor for 2019 is 0.93, based on 27 studies, details of which are shown in Figure A - 1 below.

Figure A - 1 National Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2020
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List
If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List
If a year is not shown, we have no data

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2019	R	Blackburn with darwen Borough Council	10	29	21	36.9%	G	**0.73**
Gradko	20% TEA in water	2019	R	Cheshire West and Chester	12	39	38	2.0%	G	**0.98**
Gradko	20% TEA in water	2019	R	Cheshire West and Chester	11	34	34	-2.1%	G	**1.02**
Gradko	20% TEA in water	2019	R	Gedling Borough Council	12	32	30	7.3%	G	**0.93**
Gradko	20% TEA in water	2019	R	NOTTINGHAM CITY COUNCIL	10	37	40	-7.0%	G	**1.07**
Gradko	20% TEA in water	2019	R	Bedford Borough Council	11	29	29	-1.0%	G	**1.01**
Gradko	20% TEA in water	2019	R	Bedford Borough Council	12	37	32	13.0%	G	**0.89**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	**0.85**
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	**1.08**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	**0.81**
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	**1.12**
Gradko	20% TEA in water	2019	KS	Marylebone Road Intercomparison	12	85	65	30.1%	G	**0.77**
Gradko	20% TEA in water	2019	R	Borough Council of King's Lynn and West Norfolk	9	27	21	28.4%	G	**0.78**
Gradko	20% TEA in water	2019	R	Lancaster City Council	13	40	34	16.4%	G	**0.86**
Gradko	20% TEA in water	2019	R	Lancaster City Council	12	31	31	1.6%	G	**0.98**
Gradko	20% TEA in Water	2019	R	Monmouthshire County Council	12	39	39	1.3%	G	**0.99**
Gradko	20% TEA in water	2019	UC	Belfast City Council	10	29	24	21.8%	G	**0.82**
Gradko	20% TEA in water	2019	R	Dudley MBC	12	33	32	4.5%	G	**0.96**
Gradko	20% TEA in water	2019	R	Dudley MBC	12	44	42	3.9%	G	**0.96**
Gradko	20% TEA in water	2019	UB	Dudley MBC	12	23	19	19.8%	G	**0.83**
Gradko	20% TEA in water	2019	UB	Eastleigh Borough Council	12	24	26	-7.1%	G	**1.08**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	**0.81**
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	**1.12**
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	**1.08**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	**0.85**
Gradko	20% TEA in water	2019	R	Thurrock Borough Council	12	29	24	21.6%	G	**0.82**
Gradko	20% TEA in water	2019	R	Brighton & Hove City Council	11	45	50	-9.3%	G	**1.10**
Gradko	20% TEA in water	2019		**Overall Factor[3] (27 studies)**				**Use**		**0.93**

Factor from Local Co-location Studies

LB Bromley carries out a co-location study at the Harwood Avenue continuous monitor. In 2019, this co-location site was used to derive a local bias adjustment factor for diffusion tubes of 0.92, as detailed in Figure A - 2.

The calculation of local bias adjustment factors takes into account both data capture from diffusion tubes and continuous monitors, and also the coefficient of variation (CV) of the triplicate diffusion tubes. If the CV is too high for a particular period, that period is not taken into account when calculating the local bias adjustment factor.

Figure A – 2 Local Bias Adjustment Factor Spreadsheet

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	20/12/2018	29/01/2019		37.4	37.4	37	0.0	0	0.1
2	29/01/2019	21/02/2019	105.9	38.8	37.7	61	39.1	64	97.0
3	21/02/2019	21/03/2019	31.9	35.1	34.3	34	1.7	5	4.1
4	21/03/2019	29/04/2019	28.8	30.0	23.0	27	3.8	14	9.3
5	29/04/2019	30/05/2019	26.2	25.2	26.9	26	0.8	3	2.1
6	30/05/2019	27/06/2019	21.6	25.0	23.6	23	1.7	7	4.3
7	27/06/2019	25/07/2019	23.5	24.5	22.9	24	0.8	3	2.0
8	29/08/2019	23/09/2019	20.3		19.4	20	0.7	3	6.0
9	23/09/2019	21/10/2019	25.6	18.6	22.6	22	3.5	16	8.7
10	21/10/2019	25/11/2019	25.8	23.2	25.7	25	1.5	6	3.7
11	25/11/2019	19/12/2019	26.2	31.9	30.1	29	2.9	10	7.2
12	19/12/2019	07/01/2020	33.1	37.1	34.2	35	2.1	6	5.1
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
32.65517	100	Good	Good
27.1	83.3333333	Poor Precision	Good
25.55172	100	Good	Good
26.58333	90	Good	Good
27	90	Good	Good
19	100	Good	Good
20	100	Good	Good
21	96.1538462	Good	Good
21	96.5517241	Good	Good
29	94.4444444	Good	Good
30.375	96	Good	Good
27	100	Good	Good
Overall survey -->		Good precision	Good Overall DC

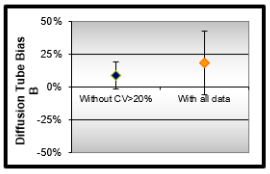
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Harwood Avenue

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.92 (0.84 - 1.02)
Bias B: 8% (-2% - 19%)
Diffusion Tubes Mean: 28 μgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 25 μgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 25 (23 - 28) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.84 (0.7 - 1.06)
Bias B: 18% (-5% - 42%)
Diffusion Tubes Mean: 30 μgm^{-3}
Mean CV (Precision): 11 caution
Automatic Mean: 26 μgm^{-3}
Data Capture for periods used: 96%
Adjusted Tubes Mean: 25 (21 - 32) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

In 2019, it was decided to use the national bias adjustment factor (0.93) rather than the local bias adjustment factor (0.92), because the local factor was potentially affected by slightly low data capture at the Harwood Avenue continuous monitor. The national bias adjustment factor is slightly higher than the local factor and therefore represents a more conservative choice.

The national bias adjustment factor for 2019 is in close agreement with bias adjustment factors used by LB Bromley in recent years. The bias adjustment factors used for LAQM for the last five years are as follows:

2015 – 0.88

2016 – 0.94

2017 – 0.87

2018 – 0.93

2019 – 0.93

A.3 Adjustments to the Ratified Monitoring Data

Distance Adjustment

The monitoring sites that have been bias adjusted and shown to be with 10% of the NO_2 annual objective of 40 µg/m^3 (i.e. above 36 µg/m^3) or above should be accounted for the inherent uncertainty in diffusion tube monitoring concentration data as advised in the LAQM technical guidance produce by Defra (Defra, 2018).

All sites above the threshold including Anerley Hill and Beckenham Road (seen in previous reports) are considered not representative of relevant exposure, and for reference, the distance-corrected annual mean NO_2 concentrations are shown below. It has been decided not to present these concentrations in the main report in order to maintain consistency with previous LAQM reports. The distance-corrected values are shown below.

The local annual mean background concentrations in 2019 from the Defra 2017-based background maps (Defra, 2017) have been used for the calculation.

Figure A - 2 Façade distance correction calculator for single tubes

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration (µg/m			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
1	1.0	5.0	18.8	52.4	**41.5**	Predicted concentration at Receptor above AQS objective.
2	1.0	5.0	18.8	52.9	**41.8**	Predicted concentration at Receptor above AQS objective.
3	1.0	5.0	18.8	50.0	*38.9*	Predicted concentration at Receptor within 10% the AQS objective.
4	1.2	6.5	17.5	40.1	32.1	
5	1.2	6.5	17.5	38.5	31.1	
6	1.2	6.5	17.5	37.7	30.5	
7	2.0	6.0	17.9	40.8	34.9	

8	2.0	6.0	17.9	40.4	34.6	
9	2.0	6.0	17.9	39.9	34.2	
13	3.0	6.0	17.6	37.2	33.7	
14	3.0	6.0	17.6	35.8	32.5	
15	3.0	6.0	17.6	33.9	30.9	
16	2.0	4.0	19.4	41.3	*37.8*	Predicted concentration at Receptor within 10% the AQS objective.
17	2.0	4.0	19.4	40.0	*36.6*	Predicted concentration at Receptor within 10% the AQS objective.
18	2.0	4.0	20.2	45.3	**41.7**	Predicted concentration at Receptor above AQS objective.
19	0.5	10.5	19.4	36.6	27.3	
20	0.5	10.5	19.4	40.4	29.1	
21	0.5	13.5	19.4	48.6	31.6	
22	0.5	3.5	20.2	39.2	32.6	
23	0.5	3.5	20.2	39.0	32.6	
24	0.5	3.5	19.4	39.2	32.4	

25	0.5	13.5	20.0	42.4	29.3	
26	0.5	13.5	20.0	46.2	30.9	
27	0.5	10.5	20.0	33.1	28.8	
28	3.0	17.0	20.0	33.5	27.4	
29	3.0	17.0	20.0	29.7	25.3	
30	3.0	17.0	20.0	28.1	24.5	

Figure A - 3 Façade distance correction calculator for all Areas

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
Area 1	1.0	5.0	18.8	48.1	*38.6*	Predicted concentration at Receptor within 10% the AQS objective.
Area 3	1.2	6.5	17.5	36.0	29.5	
Area 4	2.0	6.0	17.9	37.6	32.5	
Area 6	3.0	6.0	20.0	33.1	30.8	
Area 13	2.0	4.0	17.9	39.4	35.9	
Area 14	0.5	13.5	17.6	36.0	25.2	
Area 15	0.5	3.5	20.2	36.4	30.8	
Area 16	0.5	10.5	19.4	42.5	30.1	
Area 17	3.0	17.0	19.4	28.3	24.3	

Appendix B Full Monthly Diffusion Tube Results for 2019

Table N.1. NO_2 Diffusion Tube Results (Triplicate Averages)

Site ID	*Site Name*	*Valid data capture for monitoring period %* [a]	*Valid data capture 2019 %* [b]	*Annual Mean NO_2*													
				Jan	*Feb*	*Mar*	*Apr*	*May*	*June*	*Jul*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Annual mean – raw data* [c]	*Annual mean – bias adjusted* [c]	*Annual mean – bias adjusted and distance corrected*
Area 1	Elmers End Road	**100.00**	100.00	**56.7**	**71.2**	**60.4**	**46.0**	**47.6**	**44.7**	**49.8**	35.2	**47.2**	**47.7**	**51.6**	**63.0**	**51.8**	**48.1**	38.6
Area 3	Beckenham Lane	**100.00**	100.00	**44.0**	**48.8**	**43.4**	34.2	35.1	33.8	34.0	32.8	35.2	38.0	39.3	**46.5**	38.8	36.0	29.5
Area 4	London Road	**100.00**	100.00	**49.0**	**47.9**	**43.5**	38.8	37.5	34.9	**40.4**	38.0	36.7	33.8	39.9	**44.2**	**40.4**	37.6	32.5
Area 5	Widmore Road	**97.22**	97.22	**52.5**	**44.8**	**45.5**	**41.2**	39.8	**42.6**	35.7	33.5	39.5	34.3	**40.2**	**45.2**	**41.3**	38.4	-
Area 6	College Road	**100.00**	100.00	38.3	**45.6**	39.0	39.7	32.9	27.7	33.1	29.2	30.7	30.8	36.5	**43.8**	35.6	33.1	30.8
Area 13	Homesdale Road	**88.89**	88.89	**49.0**	**45.7**	**43.4**	**40.8**	**57.3**	33.3	39.6	34.7	**No data**	35.5	39.1	**46.1**	**42.4**	39.4	35.9
Area 14	Anerley Hill	**94.44**	94.44	**46.3**	**54.0**	**49.7**	**42.8**	**41.5**	36.9	37.9	37.7	36.4	**55.9**	**55.4**	**53.4**	**45.7**	**42.5**	25.2
Area 15	Anerley Road	**100.00**	100.00	**42.9**	**47.9**	**42.9**	**43.1**	36.1	31.1	36.7	34.3	33.1	32.0	**41.2**	**48.4**	39.1	36.4	30.8
Area 16	Beckenham Road	**100.00**	100.00	**43.0**	**46.3**	**44.6**	**42.6**	37.6	29.2	35.2	33.5	35.1	32.7	**41.4**	**43.1**	38.7	36.0	30.1
Area 17	Harwood Avenue	**94.44**	94.44	37.4	**60.8**	33.8	27.3	26.1	23.4	23.6	19.8	22.3	24.9	29.4	34.8	30.5	28.3	24.3

Exceedance of the NO_2 annual mean AQO of 40 µgm^{-3} are shown in **bold**.
NO_2 monthly means in excess of 60 µg.m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in **bold and underlined**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%
[d] Widmore Road does not require any distance correction

Table N.2. NO_2 Diffusion Tube Results (Single Tubes)

Site ID	*Valid data capture for monitoring period %* [a]	*Valid data capture 2019 %* [b]	*Annual Mean NO_2*													
			Jan	*Feb*	*Mar*	*Apr*	*May*	*June*	*Jul*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Annual mean – raw data* [c]	*Annual mean – bias adjusted* [c]	*Annual mean – bias adjusted and distance corrected*
1-Elmers End Road	**100.00**	**100.00**	**54.6**	**70.5**	**59.4**	**43.4**	**47.7**	**44.0**	**53.8**	38.1	**51.2**	**48.8**	**57.2**	**59.5**	**52.4**	**48.7**	**41.5**
2-Elmers End Road	**100.00**	**100.00**	**55.7**	**70.9**	**61.3**	**47.6**	**48.1**	**45.4**	**47.6**	35.8	**50.1**	**49.1**	**54.7**	**68.4**	**52.9**	**49.2**	**41.8**
3-Elmers End Road	**100.00**	**100.00**	**59.9**	**72.2**	**60.4**	**46.9**	**47.0**	**44.6**	**48.2**	31.7	**40.4**	**45.2**	**42.8**	**61.1**	**50.0**	**46.5**	39.9
4-Shortlands	**100.00**	**100.00**	**45.0**	**50.3**	**44.0**	39.3	35.4	35.5	35.6	34.8	35.6	39.2	39.5	**46.7**	**40.1**	37.3	32.1
5-Shortlands	**100.00**	**100.00**	**44.5**	**49.2**	**44.7**	27.7	34.3	34.0	32.8	33.2	35.7	38.6	**40.6**	**47.1**	38.5	35.8	31.1
6-Shortlands	**100.00**	**100.00**	**42.4**	**46.9**	**41.4**	35.5	35.6	32.0	33.6	30.4	34.5	36.2	37.9	**45.5**	37.7	35.0	30.5
7-London Road	**100.00**	**100.00**	**54.6**	**47.8**	**43.7**	35.8	38.6	37.0	**40.3**	38.4	36.9	35.4	**40.7**	**40.6**	**40.8**	38.0	34.9
8-London Road	**100.00**	**100.00**	**47.1**	**48.2**	**44.7**	**43.5**	37.3	31.9	**40.4**	37.5	35.8	33.5	**41.5**	**43.7**	**40.4**	37.6	34.6

9-London Road	**100.00**	**100.00**	**45.3**	**47.5**	**42.2**	37.0	36.8	35.8	**40.6**	38.0	37.4	32.5	37.4	**48.3**	39.9	37.1	34.2
10-Widmore Road	**100.00**	**100.00**	**53.9**	**41.3**	**44.8**	38.2	**41.0**	31.7	35.5	33.5	37.9	34.3	37.7	**43.7**	39.5	36.7	39.5
11-Widmore Road	**100.00**	**100.00**	**51.1**	**51.8**	**47.8**	**44.3**	38.5	30.6	35.7	34.7	**40.7**	35.4	**42.7**	**51.2**	**42.1**	39.1	**42.1**
12-Widmore Road	**91.67**	**91.67**	**52.5**	**41.2**	**43.9**	**41.0**	0.0	**65.4**	36.0	32.2	39.8	33.2	**40.3**	**40.8**	**42.4**	39.4	**42.4**
13-College Road	**100.00**	**100.00**	**41.6**	**46.8**	**41.1**	**46.5**	33.6	28.6	34.0	29.3	32.4	32.5	37.1	**43.4**	37.2	34.6	33.7
14-College Road	**100.00**	**100.00**	35.4	**45.5**	37.9	39.6	33.6	30.7	31.5	29.2	30.2	31.4	37.1	**46.9**	35.8	33.3	32.5
15-College Road	**100.00**	**100.00**	37.8	**44.6**	38.0	33.2	31.6	23.7	33.6	29.2	29.6	28.4	35.3	**41.2**	33.9	31.5	30.9
16-Bromley Common Homesdale Road	**91.67**	**91.67**	**50.3**	**48.5**	**42.3**	**40.1**	**42.8**	35.1	38.3	35.3	0.0	34.5	**41.9**	**45.6**	**41.3**	38.4	37.8
17-Bromley Common Homesdale Road	**91.67**	**91.67**	**44.6**	**44.9**	**42.0**	**41.5**	**42.9**	34.8	**40.8**	33.6	0.0	35.7	35.8	**42.8**	40.0	37.2	36.6
18-Bromley Common Homesdale Road	**83.33**	**83.33**	**52.1**	**43.6**	**45.9**	0.0	**86.3**	29.9	39.8	35.3	0.0	36.2	39.6	**49.9**	**45.9**	**42.6**	**41.7**
19-Beckenham Road	**100.00**	**100.00**	37.8	**46.9**	**40.4**	**41.8**	36.3	29.5	32.6	32.7	37.5	30.5	36.6	36.2	36.6	34.0	27.3
20-Beckenham Road	**100.00**	**100.00**	**45.6**	**48.7**	**47.0**	**43.2**	**41.5**	27.3	37.4	32.8	34.2	33.4	**45.5**	**48.5**	**40.4**	37.6	29.1

27-Beckenham Road	**100.00**	**100.00**	**45.6**	**43.4**	**46.4**	**42.8**	34.8	30.7	35.5	35.0	33.7	34.3	**42.1**	**44.6**	39.1	36.3	31.6
22-Anerley Road	**100.00**	**100.00**	**44.0**	**45.9**	**45.3**	**43.3**	38.9	28.8	36.6	33.7	36.4	25.0	**40.6**	**51.4**	39.2	36.4	32.6
23-Anerley Road	**100.00**	**100.00**	**42.7**	**50.6**	**42.7**	**42.8**	31.3	31.8	37.2	34.3	30.2	34.8	**42.5**	**47.5**	39.0	36.3	32.6
24-Anerley Road	**100.00**	**100.00**	**41.9**	**47.2**	**40.6**	**43.1**	38.2	32.6	36.2	34.8	32.7	36.3	**40.4**	**46.4**	39.2	36.5	32.4
21-Anerley Hill	**91.67**	**91.67**	**47.0**	**54.8**	**50.4**	**43.1**	**41.2**	37.3	**41.4**	**41.6**	0.0	**74.4**	**50.2**	**52.6**	**48.6**	**45.2**	29.3
25-Anerley Hill	**100.00**	**100.00**	**46.0**	**54.4**	**50.7**	**42.2**	**40.4**	36.0	32.7	35.3	34.7	37.4	**49.2**	**50.0**	**42.4**	39.5	30.9
26-Anerley Hill	**91.67**	**91.67**	**45.9**	**52.6**	**48.0**	**43.2**	**42.8**	37.4	39.5	36.3	38.1	0.0	**66.7**	**57.5**	**46.2**	**42.9**	28.8
28-Harwood Avenue	**91.67**	**91.67**	0.0	**105.9**	31.9	28.8	26.2	21.6	23.5	20.3	25.6	25.8	26.2	33.1	33.5	31.2	27.4
29-Harwood Avenue	**91.67**	**91.67**	37.4	38.8	35.1	30.0	25.2	25.0	24.5	0.0	18.6	23.2	31.9	37.1	29.7	27.6	25.3
30-Harwood Avenue	**100.00**	**100.00**	37.4	37.7	34.3	23.0	26.9	23.6	22.9	19.4	22.6	25.7	30.1	34.2	28.1	26.2	24.5
31- Blank	**100.00**	**100.00**	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.2	0.3	0.0	0.1	0.1	0.1	
32- Blank	**100.00**	**100.00**	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.1	0.1	0.1	
33- Blank	**100.00**	**100.00**	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.1	

Exceedance of the NO_2 annual mean AQO of 40 µg.m^{-3} are shown in **bold**.

NO_2 monthly means in excess of 60 µg.m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in **bold and underlined**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means for the single tubes HAVE NOT BEEN "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%.

[d] Widmore Road does not require any distance correction