London Borough of Barking and Dagenham Air Quality Annual Status Report for 2021

Date of publication: May 2022

This report provides a detailed overview of air quality in the London Borough of Barking and Dagenham during 2021. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

Contact details:

Kenny Abere

Environmental Protection Team,

Town Hall Square, 1 Clockhouse Ave,

Barking IG11 7LU

E: mail: environmentalprotection@lbbd.gov.uk

[1] LLAQM Policy and Technical Guidance 2019 (LLAQM.TG (19))

Contents

Tables

Abbreviations

Abbreviation	Description
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
EV	Electric Vehicle
GLA	Greater London Authority
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
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
TEB	Transport Emissions Benchmark
TfL	Transport for London

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	Standard / 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
Nitrogen dioxide (NO_2)	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
Particles (PM_{10})	40 µg m^{-3}	Annual mean	31 Dec 2004
Particles ($PM_{2.5}$)	25 µg m^{-3}	Annual mean	2021
Particles ($PM_{2.5}$)	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
Sulphur dioxide (SO_2)	266 µg m^{-3} not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
Sulphur dioxide (SO_2)	350 µg m^{-3} not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
Sulphur dioxide (SO_2)	125 µg m^{-3} not to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004

Notes:

(1) Date by which to be achieved by and maintained thereafter

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2021

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
(BG1)	Rush Green Primary School	551053	187233	Suburban Background	Y	28	50	4	NO2, SO2	Chemiluminescent, UV Florescence
(BG2)	Scrattons Farm	548043	183320	Suburban Background	Y	24	24	3.5	NO2, PM10	Chemiluminescent, Teom

Table C. Details of Non-Automatic Monitoring Sites for 2021

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance 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)
DT1	Ripple Road Primary School	544793	183783	Roadside	Y	17	2	2.5	NO2	N
DT2	1A Westminster Gardens	545032	183193	Roadside	Y	3	1	2.5	NO2	N
DT3	6/7 Scrattons Terrace	547806	183543	Roadside	Y	5	1	2.5	NO2	N
DT4	291 Dagenham Heathway	549035	184813	Roadside	Y	6	1	2.5	NO2	N
DT5	Wood Lane/Valence Avenue Junction	547789	185792	Roadside	Y	5	2	2.5	NO2	N
DT6a	Rush Green Primary School	551057	187231	Background	Y	28	N/A	1.5	NO2	Y
DT6b	Rush Green Primary School	551057	187231	Background	Y	28	N/A	1.5	NO2	Y
DT6c	Rush Green Primary School	551057	187231	Background	Y	28	N/A	1.5	NO2	Y
DT7	Whalebone Lane South/Whalebone North/High Road Junction	548544	188125	Roadside	Y	2	2	2.5	NO2	N
DT8	Outside No. 31 Eastern Avenue West (the A12)	548359	189057	Roadside	Y	3	12	2.5	NO2	N
DT9	St Pauls Way (Beside Abbey Green Play Area)	544128	183662	Roadside	Y	3	2	2.5	NO2	N
DT10	Glenny Road	544385	184565	Roadside	Y	3	2	2.5	NO2	N

DT11	209 New Road (A1306)	549832	183208	Roadside	Y	5	2	2.5	NO2	N
DT12	40 – 38 Thames Road	546501	182713	Roadside	Y	5	2	2.5	NO2	N
DT13	2 Choats Road	547081	183053	Roadside	Y	5	2	2.5	NO2	N
DT14	High Road (Chadwell Health) A118	548065	187998	Roadside	Y	5	2	2.5	NO2	N
DT15	102 Renwick Road	546935	183135	Roadside	Y	6	2	2.5	NO2	N
DT16	1 River Road	545296	183204	Roadside	Y	5	2	2.5	NO2	N
DT17	95 Bastable Avenue	545842	183144	Roadside	Y	5	2	2.5	NO2	N
DT18	463 Lodge Avenue	546415	183717	Roadside	Y	5	2	2.5	NO2	N
DT19	835a Longbridge Road (A124)	546744	185774	Roadside	Y	5	2	2.5	NO2	N
DT20	1 Althorne Way/ Wood Lane (A124)	549173	186755	Roadside	Y	3	1	2.5	NO2	N
DT21	217 Whalebone Lane South (A1112)	548733	187586	Roadside	Y	6	2	2.5	NO2	N
DT22	1249 Chequers Lane	549078	183327	Roadside	Y	6	1	2.5	NO2	N
DT23	623 Rainham Road South	550263	184902	Roadside	Y	5	2	2.5	NO2	N
DT24	Cook Road	548487	183557	Roadside	Y	20	2	2.5	NO2	N
DT25	61 King Edward's Road (Adjacent to A13)	544699	183650	Roadside	Y	6	1	2.5	NO2	N
DT26	251 Valence Avenue	547762	186888	Roadside	Y	5	1	2.5	NO2	N
DT27	145 Fanshawe Avenue	544339	184702	Roadside	Y	5	1	2.5	NO2	N
DT28	102 Maplestead Road	546731	183684	Roadside	Y	5	1	2.5	NO2	N

1.2 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for “annualisation” and for distance to a location of relevant public exposure (if required), the details of which are described in Appendix A.

Table Di. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2021 %[(b)]	2015	2016	2017	2018	2019	2020	2021
(BG1)	Automatic	-	90	-	-	-	-	-	-	17
(BG2)	Automatic	-	94	-	-	-	-	-	-	20

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the NO_2 annual mean AQO of 40 µg m^{-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**.

Means for diffusion tubes have been corrected for bias.

All means have been “annualised” in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

Results have been distance corrected where applicable.

(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%).

Neither of the two automatic monitoring stations exceeds the annual AQ objectives of 40 µg m-3. Therefore, the annual objective has been achieved. The hourly NO_2 objective was also achieved at both monitoring locations.

Table Dii. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2021 %[(b)]	2015	2016	2017	2018	2019	2020	2021
DT1	Diffusion tube	-	75	-	-	-	-	-	28.5	30.05
DT2	Diffusion tube	-	75	-	-	-	-	-	26.7	28.88
DT3	Diffusion tube	-	75	-	-	-	-	-	29.0	30.88
DT4	Diffusion tube	-	75	-	-	-	-	-	37.3	**41.65**
DT5	Diffusion tube	-	75	-	-	-	-	-	31.1	38.94
DT6a	Diffusion tube	-	75	-	-	-	-	-	19.8	17.11
DT6b	Diffusion tube	-	75	-	-	-	-	-	19.8	18.01
DT6c	Diffusion tube	-	66.7	-	-	-	-	-	19.8	15.18
DT7	Diffusion tube	-	75	-	-	-	-	-	29.8	34.35
DT8	Diffusion tube	-	75	-	-	-	-	-	26.8	31.68
DT9	Diffusion tube	25	-	-	-	-	-	-	-	28.88
DT10	Diffusion tube	25	-	-	-	-	-	-	-	25.91
DT11	Diffusion tube	25	-	-	-	-	-	-	-	31.34
DT12	Diffusion tube	25	-	-	-	-	-	-	-	26.51
DT13	Diffusion tube	16.7	-	-	-	-	-	-	-	28.66

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2021 %[(b)]	2015	2016	2017	2018	2019	2020	2021
DT14	Diffusion tube	25	-	-	-	-	-	-	-	32.02
DT15	Diffusion tube	16.7	-	-	-	-	-	-	-	28.25
DT16	Diffusion tube	25	-	-	-	-	-	-	-	34.63
DT17	Diffusion tube	25	-	-	-	-	-	-	-	25.63
DT18	Diffusion tube	25	-	-	-	-	-	-	-	39.09
DT19	Diffusion tube	25	-	-	-	-	-	-	-	38.98
DT20	Diffusion tube	25	-	-	-	-	-	-	-	27.02
DT21	Diffusion tube	25	-	-	-	-	-	-	-	37.00
DT22	Diffusion tube	25	-	-	-	-	-	-	-	20.59
DT23	Diffusion tube	25	-	-	-	-	-	-	-	35.18
DT24	Diffusion tube	25	-	-	-	-	-	-	-	31.46
DT25	Diffusion tube	25	-	-	-	-	-	-	-	39.66
DT26	Diffusion tube	25	-	-	-	-	-	-	-	32.76
DT27	Diffusion tube	25	-	-	-	-	-	-	-	32.61
DT28	Diffusion tube	25	-	-	-	-	-	-	-	31.91

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the NO_2 annual mean AQO of 40 µg m^{-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**.

Means for diffusion tubes have been corrected for bias.

All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

Results have been distance corrected where applicable.

(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%).

All the diffusion tube results have been appropriately bias adjusted, using the Gradko Environmental national adjustment factors. Exceedances of the annual AQ objective of 40 µg m-3 is highlighted in bold. Only Dagenham Heathway (DT4) exceed the air quality objective. There is no exceedance of the annual AQ objective at any of the new additional monitoring locations.

Most of the data presented represents monitoring results for a 12-month period (January – December) and tubes are exposed in accordance with the UK Defra guidance LAQM TG (16).

Table E. NO_2 Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m^{-3}

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2021 %([b])	2015	2016	2017	2018	2019	2020	2021
(BG1)	-	90	0	0	0	0	0	0	0
(BG2)	-	94	0	0	0	0	0	0	0

Notes

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

Exceedance of the NO_2 short term AQO of 200 µg m^{-3} over the permitted 18 hours per 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.

(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%)

Table E shows that there have been no exceedances of the hourly NO_2 objective in 2021.

The 2021 annual Mean NO_2 Concentration in the London Borough of Barking and Dagenham is attached to this report (Appendix B).

Table F. Annual Mean PM_{10} Automatic Monitoring Results (µg m^{-3})

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2021 %([b])	2015	2016	2017	2018	2019	2020	2021
(BG2)	-	99	21	20	20	19	18	18	18

Notes

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the PM_{10} annual mean AQO of 40 µg m^{-3} are shown in **bold**.

All means have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 25%.

(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%).

There is no exceedance of the annual PM_{10} objective in 2021.

Table G. PM_{10} Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM_{10} 24-Hour Means > 50 µg m^{-3}

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2021 %[b]	2015	2016	2017	2018	2019	2020	2021
(BG2)	-	99	4	4	4	0	6	3	2

Notes

Exceedances of the PM_{10} 24-hour mean objective (50 µg m^{-3} over the permitted 35 days per year) are shown in **bold.**

Where the period of valid data is less than 85% of a full year, the 90.4th percentile is provided in brackets.

(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%).

The 24-hour mean objective was not exceeded either.

Table I. 2021 SO_2 Automatic Monitoring Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2021 %[b]	Number of 15-minute means > 266 µg m^{-3}	Number of 1-hour mean > 350 µg m^{-3}	Number 24-hour mean > 125 µg m^{-3}
(BG1)	-	94	0	0	0

Notes

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

(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%).

None of the SO_2 objectives were exceeded for the year 2021.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of London Borough of Barking and Dagenham progress against the Air Quality Action Plan, showing progress made this year.

Table J. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
1	Monitoring and core statutory duties	Maintain the borough's monitoring network, and add an additional 20 diffusion tubes	In addition to 10 NOx Diffusion Tubes deployed July 2020, 20 additional NOx tubes were added from October 2021.
2	Monitoring and core statutory duties	Work with and support relative emerging A.Q monitoring projects to integrate new/modern monitoring techniques, including the £1m C40 project delivered in partnership with the GLA.	LBBD working with the GLA and 'Breathe London' monitoring network to install another (3rd) AQ sensors which was installed in June 2021 with additional 4 earmarked for 2022. Details of this will be provided onto the Council website for public data dissemination and communication.
3	Monitoring and core statutory duties	IPPC duties and inspections under the Environmental Permitting Regulations 2010	The council continue to deliver its statutory obligations regarding this action.
4	Emissions from developments and buildings	Raising awareness of and enforce the borough's Smoke Control Zone (SCZ). To include: an awareness campaign using Communications Team media platforms and active enforcement	No recent update beyond the one reported in the last report for this action below. Comms on SCZ not undertaken however Comms on Clean Air Day undertaken. O (zero) complaints of dark smoke investigated within 48hours.
5	Emissions from developments and buildings	Ensuring emissions from construction are minimised. All major developments must carry out an Air Quality Assessment in accordance with the GLA's guidance	100% of major planning applications adjoined with AQ assessments, or conditioned. Gained through local policy mechanism.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
6	Emissions from developments and buildings	Include Greater London Authority (GLA) guidance on environmental and construction best practices into BeFirst/LBBD and other major developments	All major planning applications conditioned with GLA best practice guidance in 2021.
7	Emissions from development and building	Ensuring enforcement of non-road mobile machinery (NRMM) air quality policies. Include NRMM requirements within local planning guidance. Planning conditions imposed asking for NRMM compliance for all relevant major developments.	NRMM is part of the Local Plan included into Regulation 19. All relevant planning applications in 2021 include NRMM conditions with 21 of the sites in the borough also registered on GLA NRMM website for the year.
8	Emissions from development and building	Reducing emissions from CHP by ensuring that air quality as well as carbon emissions are considered when assessing planning applications or where existing schemes require new or upgraded heat sources	We continue to maintain the register of CHPs plant within the borough.
9	Emissions from development and building	Enforce the GLA 'Air Quality Neutral' (AQN) policy or any preceding changes to this regional measure to all major developments	100% target met - major planning applications meeting GLA policy on AQN.
10	Emissions from development and building	Ensuring adequate appropriate, and well-located green space and infrastructure is included in new large-scale developments	No recent update beyond the one reported in the last report for this action that we have received no further update from when AQAP was adopted, Feb 2021.
11	Emissions from developments and buildings	Ensure that planning and development teams implement policies on Healthy Streets at an early stage for larger developments (as defined by the GLA)	Healthy Streets included into Local Plan Regulation 19.
12	Emissions from developments and buildings	Promoting and delivering energy efficiency and energy supply retrofitting projects in workplaces and homes through retrofit programmes such as Retrofit Accelerator and Cosy Homes. LBBD to be zero carbon from Council operations (e.g., housing and fleet) by 2030, and zero carbon Borough wide by 2050	No recent update beyond the one reported in the last report for this action.
13	Emissions from developments and buildings	Improve air quality in the Borough by delivering improvements to reduce building emissions and increase uptake of Decentralised Energy Networks	No recent update beyond the one reported in the last report for this action.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
14	Emissions from developments and buildings	Participate in the Pan-London Non-Road Mobile Machinery registration campaign in conjunction with lead Borough (London Borough of Merton), to reduce emissions from construction vehicles in line with GLA guidance.	We continue to maintain our membership of Pan-London Non-Road Mobile Machinery registration campaign. Of the 21sites audited in 2021, 12 were compliant, 4 were non-compliant, 1 site had no NRMM within scope (37-560kW) presently deployed whilst 4 site(s) upon arrival/engagement were already completed. 3 of the sites audited were cold engaged whilst 18 sites were not.
15	Public health and awareness raising	Public Health department taking shared responsibility for borough air quality issues and implementation of Air Quality Action Plan. 11a, Directors of Public Health (DPHs) regularly briefed on the scale of the problem in their area. 11b, DPHs incorporate up to date air quality information in their Joint Strategic Needs Assessment 11c, Air Quality Action Plans are formally signed off by the DPH 11d, At least one Consultant grade public health specialist with air quality responsibilities in their job profile	For the Public Health areas, due to the demands of managing the COVID-19 pandemic, there have not been any new initiatives in the past year.
16	Public health and awareness raising	Engage with local businesses and support access to business-specific funding schemes which promote sustainable transport, collaborative delivery and low emission procurement practices through business forums and newsletters distribution.	1 business forum held between AQAP adoption (February 2021) and present.
17	Public health and awareness raising	Develop and implement a communications strategy to disseminate air quality information to raise awareness and encourage behaviour change – may include messages to residents with heart and lung diseases (working in partnership with local NHS services). E.g., re publicising the Mayor's pollution alerts, promotion of	Clean Air Day disseminated via Comms in 2021. Anti-idling message sent out via Comm's (March 2021), see link Drivers urged to turn engines off to save the environment in LBBD.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		active travel/sustainable transport, green home grants and anti-idling messages etc.	We have also sent a number of press releases out regarding air quality: https://www.lbbd.gov.uk/news/50-new-trees-will-be-a-tree-mendous-boost-for-the-borough-0 https://www.lbbd.gov.uk/news/largest-miyawaki-forest-in-europe-planted-by-volunteers-at-boroughs-forest-of-thanks-for-nhs https://www.lbbd.gov.uk/news/council-commits-to-multi-million-pound-investment-boost https://www.lbbd.gov.uk/news/barking-and-dagenham-council-backs-the-engine-off-every-stop-campaign https://www.lbbd.gov.uk/news/barking-and-dagenham-businesses-encouraged-to-turn-off-their-engines https://www.lbbd.gov.uk/news/east-london-council-continues-fight-against-air-pollution https://www.lbbd.gov.uk/news/council-encourages-residents-to-take-part-in-clean-air-day https://www.lbbd.gov.uk/news/drivers-urged-to-turn-engines-off-to-save-the-environment We've also pushed messaging out via social media, video with lead member, resident newsletter, which goes out to around 16,000 people and through the council's Neighbourhood Watch scheme.
18	Public health and awareness raising	Encourage schools to join the TfL STARS accredited travel planning programme. Promotes sustainable approach to active travel therefore reducing vehicle emissions and increasing physical activity.	School travel plans, 30 schools currently registered in programme, 3 gold, 5 bronze.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
19	Public health and awareness raising	Air quality in and around schools: Apply to the funding made available through TfL for LIPs to deliver the recommendations from the 'school streets.	5 school streets delivered in 2020-2021 (https://oneboroughvoice.lbbd.gov.uk/school-streets) Further 7 School Streets being explored for adoption. funding to deliver 7 this year, subject to delivery. Throughout June and July 2021, Be First carried out a programme of consultation which sought feedback on the proposed plans for seven School Streets around the Borough with the intention that if the schemes are approved, the Council will begin issuing the Traffic Management Orders (TMOs) on 6 September, publishing them in the Barking & Dagenham Post (Online and print) and on lamppost banners. The School Streets will be implemented on an experimental basis, and residents will have six months to respond. https://oneboroughvoice.lbbd.gov.uk/hub-page/school-streets-safe-streets
20	Public Health and awareness raising	Use council lobbying power to increase/encourage local and regional action. Lobbying within the BHR and NEL partnerships (including NHS and LA) to encourage other partners to consider measures to improve air quality – including their staff, residents, in their procurements and their in-house services. Lobby and work with TFL to reduce NO2 & PM emissions from buses in LBBD, and to reduce air quality concentrations from TfL regulated roads.	Environmental Health contributed to, and supported, the lobbying work undertaken by the East London AQ Cluster Group in response to the proposed changes consulted on within the Environment Bill, 2020.
21	Public Health and Awareness Raising	Submit responses to relevant government and regional	Environmental Health contributed to, and continue to support, the lobbying work undertaken by the East

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		consultations – ensure responses focus on reducing emissions of local air pollutants and CO2.	London AQ Cluster Group in response to the proposed changes consulted on within the Environment Bill, 2020.
22	Public Health and Awareness Raising	Continued implementation of the Barking Riverside Travel Plan, to accelerate uptake of cycling walking and sustainable transport.	No update since AQAP was adopted Feb 2021.
23	Public Health and Awareness Raising	Prepare and deliver Council-wide (LBBD) and BeFirst Travel Plans encouraging sustainable transport modes for staff and visitors	No update since AQAP was adopted Feb 2021.
24	Public Health and Awareness Raising	Deliver the 'Ways of Working' (LBBD Staff) Travel to Work Plan and implement deliverables for staff to travel more sustainably and safely (in response to Covid19)	Ways of Working Travel plan now in place.
25	Delivery servicing and freight	Review of the process documentation templates (procurement strategy document, delegated authority documents and award contract documents) to include air quality requirements for reducing vehicle emissions	No update since AQAP was adopted Feb 2021.
26	Delivery servicing and freight	Review, implementation and approval of the 'contract rules' in tandem with Council legal department with a view to adding air quality requirements for reducing vehicle emissions	No update since AQAP was adopted Feb 2021.
27	Delivery servicing and freight	Reducing emissions from deliveries to local businesses and residents. Work with and support TfL to install rapid electric vehicle charging points to encourage low emission vehicles.	Three Rapid electric vehicle Charge Points installed under TfL's scheme: - Gale Street - Rainham Road South - Rose Lane
28	Borough Fleet	Reducing emissions from council fleet. Undertake 'Grey' Fleet review with Energy Saving Trust to inform future vehicle choice and infrastructure	Following the Grey fleet review undertaken by EST end of 2020. Review outcomes provided by EST with recommendations to cabinet where necessary to action and deliver. Review being used to provide evidence to Council that it is viable that a significant number of

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			Internal Combustion Engines vehicles can switch to E.V.
29	Borough Fleet	Investigate the feasibility of, and implement the best environmentally performing, alternative fleet vehicle fuel (e.g., Hydrogen, Electric, Gas-to Liquid)	Currently looking at EV for majority of fleet however further research/feasibility studies required looking at larger vehicle power source.
30	Borough Fleet	Undertake an infrastructure and operational review for the Council fleet depot land space charging in the Borough to incentivise EV charging uptake at the workplace	Infrastructure and operational review due to be undertaken from approximately mid 2021 but still waiting for the outcome.
31	Borough Fleet	Undertake annual fleet audits with a vehicle replacement programme to show continued progress in phasing out older and more polluting vehicles by 2030	7 new EV vehicles being reviewed for pest control services. Initial analysis of vehicles undertaken; infrastructure analysis being undertaken in parallel.
32	Borough Fleet	Complete an industry-recognised fleet driver training programme (e.g., Freight Transport Association) to improve driver/vehicle operations and reduce fleet emissions	In January 2021 Fleet services undertook anti-idling training in conjunction with the pan-London (anti idling) scheme led by Camden.
33	Borough Fleet	25% of total fleet vehicles to be fully electrified (Battery Electric Vehicle) by 2025. Long term target to have Council operations zero carbon by 2030 including fleet vehicles being zero tailpipe emission or as close as possible to zero tailpipe emissions using Best Available Technology.	7 new Electric Vehicles likely to be purchased for internal departmental use within 2021. Further procurement to be undertaken shortly.
34	Localised Solutions	19a) Implement the published Green Infrastructure Strategy. 19b) Apply for Green Space Grants / Community Tree Planting 19c) Develop and implement a tree planting delivery programme which strategically targets high pollution areas (roads) where feasible	For progress on Green Infrastructure and Biodiversity Strategy 2019 see: https://www.lbbd.gov.uk/regulation-19-evidence-base-and-supporting-documents On Applying for Green Space Grants / Community Tree Planting, the following grants were applied for: •The Chase Local Nature Reserve - Rewild London Grant (Groundwork London) £34,000 Successful

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			•Parsloe's Park Living Landscape Project - The Green Resilience Fund THE GREATER LONDON AUTHORITY £40,000 Successful Regarding Developing and implementing a tree planting delivery programme which strategically targets high pollution areas (roads) where feasible; Tree planting schemes (2021-22) delivered by Parks Commissioning in the Borough's parks and open spaces (note: presumably, Public Realm (Parks and Environment) will be providing similar data for tree planting in the wider public realm). •Barking Park - 8 Standard trees planted (compensatory planting for Barking District Heating Scheme works). •Castle Green Park – 2,400 Miyawaki native trees planted. •Eastbrookend Country Park – 1,900 native trees planted •Old Dagenham Park – 1,500 whips planted (through grant obtained by Thames Chase). •Parsloes Park - 8,000 native trees planted •Thames View Junior School – 1,400 Miyawaki native Trees planted. •With total trees planted equals 15,208 We also now have a further Miyawaki Outdoor Classroom planted at Eastbrook School in March which is a total of 1,400 native trees.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
35	Localised Solutions	Continue to embed green infrastructure into LIP schemes.	No update from when AQAP was adopted, Feb 2021.
36	Localised Solutions	Low Emission Neighbourhood (LEN): Continue to implement and project manage the TfL-funded 'Greening the Fiddlers' LEN in Becontree Heath, Dagenham, in one of the GLA's Air Quality Focus Areas.	LEN continuing to operate, implementing the City of London anti-idling projects and initiatives at Grafton and William Bellamy Schools. Sustrans working within the LEN and produce the Becontree Low Emission Neighbourhood Active Travel Plan Updates, engaging with over 40 businesses in the local area and, helped to launch the school street at Grafton School ran 10 'Learn to Ride' sessions with schools, launched a community bike club and walking group. The AQ monitoring for the LEN also continue in 2021.
37	Cleaner Transport	Ensuring that Transport and Air Quality policies and projects are integrated. 37a) Head of Transport should sign off AQAP. 37b) Transport officers to attend air quality steering groups.	Transport Officers attend the air quality steering group meetings and are a key stakeholder in delivering the AQAP.
38	Cleaner Transport	Use parking policy to reduce private use vehicle emissions by reviewing borough parking permit fee banding and implement a policy to incentivise lower emission vehicles/ dis-incentivise higher emitting vehicles	No update from when AQAP was adopted, Feb 2021.
39	Cleaner Transport	Review parking policy to reduce the overall number of parking permits to single household/residential tenancy (de-incentivise higher number of cars p/house)	No update from when AQAP was adopted, Feb 2021.
40	Cleaner Transport	Introduce a policy to charge commercial vehicles parking overnight and at weekends in borough roads to reduce congestion and discourage commercial vehicles.	No update from when AQAP was adopted, Feb 2021.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
41	Cleaner Transport	Review staff parking permits and implement a policy or management process to significantly reduce overall numbers, with the aim to reduce 'grey fleet' impacts	No update from when AQAP was adopted, Feb 2021.
42	Cleaner Transport	Installation of Ultra-low Emission Vehicle (ULEV) infrastructure to encourage low emission vehicles. e.g. On-street Electric Vehicle Charging Points	Be First are supporting the development of the Council's Low Emissions Vehicle Strategy, commissioning Project Centre to produce a demand forecast model and identify 150-200 possible locations for EV charge points. This will enable LBBD to have an accurate understanding of the growing demands for EV charge points, as well as significantly speed-up the process of installing ULEV infrastructure to meet Council targets by installing approximately 200 charge points by December 2022.
43	Cleaner Transport	Require private developers to install Ultra-Low Emission Vehicle (ULEV) infrastructure as per the GLA London Plan for major residential and non-residential developments. E.g., electric vehicle charging points	ULEV infrastructure required as per the emerging Local Plan and as per existing planning policy. New developments have to install the required GLA London Plan EV charging points for any new on-site residential parking.
44	Cleaner Transport	Provision of infrastructure to support walking and cycling e.g., the development of key strategic cycle routes including Barking Station to Chadwell Heath Station, cycle route CFR10 Barking Riverside to Ilford (via Barking Town Centre) and Heathway to Becontree Heath. Potentially 'Liveable Neighbourhoods' ambition for the Becontree Estates subject to TfL funding.	• CFR10 Quietway from Barking Town Centre to Barking Riverside completed. • Developed a new LBBD Cycling & Walking Strategy, which includes an indicative programme for infrastructure investment over the next 10 years to improve cycling & walking provision. • Applied for TfL funding from the Cycling Network Development (CND) Fund to undertake in-depth studies/ designs of three new cycling routes and three programmes of route upgrades. • Commissioned a Healthy Street study of Valance Avenue, which will include significant interventions to improve provisions for cycling & walking.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
45	Cleaner Transport	Discourage unnecessary idling by road vehicles. Participate in the Pan-London Anti-Idling campaign/project in conjunction with the London Borough of Camden and proactively enforce regulations to reduce idling vehicles. Focus anti-idling at school sites/roads	- Anti idling project being undertaken at Grafton and William Bellamy Schools. - Anti idling messages put onto council website during the week of Clean Air Day 2021. - Active participation in the Pan-London Anti-Idling campaign/project in conjunction with the London Borough of Camden.
46	Cleaner Transport	Encourage behaviour change in transport modes to increase sustainable transport and decrease private car use: a) Campaigns to promote walking to school b) Campaigns to promote workplace travel plans	Sustrans, in collaboration with LBBD, planning promotion of Car Free Day around school streets and other residential areas for 2021. Sustrans Healthy Streets Officer undertaking work with LBBD's Regeneration Division 'BeFirst' to promote sustainable travel modes.
47	Cleaner Transport	Develop a long-term strategy for the A13 to help improve traffic congestion, improve air quality and enable sustainable growth. Require full Environmental Impacts Assessments (EIA's) for A13 development proposals including replacement of the Lodge Avenue flyover by TfL.	No update from when AQAP was adopted, Feb 2021.
48	Cleaner Transport	Work with the River Roding Trust (RRT), the Canal and River Trust or relevant bodies to raise awareness of local air pollution emissions from waterways. Engage with canal boat owners to promote sustainability, cleaner fuel burning and anti-idling to reduce emissions from boats. Two Boat Mooring sites in LBBD. 1) near Hertford Road and Gurney Close IG11 8JY (narrow boat moorings only) and, 2) (static) barge mooring only, near Barking Creek	No update from when AQAP was adopted, Feb 2021.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		IG11 7BW (all electrically powered only).	
49	Cleaner Transport	1) Promote World Car-Free day (22nd September) through Communications Department 2) Explore gaining funding though the Greater London Authority Mayor's Air Quality Fund (or other funding source) to promote car free days in LBBD streets Explore allowing residents to apply for 'Play Streets' or similar that allow streets/roads to be closed from traffic and encourage community engagement	Work undertaken between March to present between Sustrans, LBBD and BeFirst to implement Car Free Day, including pursuing routes to allow residents to have car-free streets via Traffic Management Orders or similar. Provisional plans to have 12 Car Free Days in LBBD on 22nd September.

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in London Borough of Barking and Dagenham in 2021

Condition	Number (Indicative)
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	14
Number of planning applications required to monitor for construction dust	26
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	0
Number of developments required to install Ultra-Low NO_x boilers	2
Number of developments where an AQ Neutral building and/or transport assessments undertaken	10
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	10
Number of planning applications with S106 agreements including other requirements to improve air quality	26
Number of planning applications with CIL payments that include a contribution to improve air quality	0
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 with the GLA through the relevant NRMM website 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.	26 All the 21sites audited were registered out of which, 12 were compliant, 4 were non-compliant, 1 site had no NRMM whilst 4 site(s) upon arrival/engagement were already completed.

Records of the above information on planning applications are kept in the London Borough of Barking and Dagenham internal database called Flare. This is also duplicated in the Environmental Protection Team planning folder for officers' comments and recommendations.

The council received 14 major planning applications that required AQ assessment in 2021. The NRMM record is from the annual audit report submitted to the council through its membership of Pan London NRMM as well as from the registered information on the nrmm.london website for the council.

3.1 New or significantly changed industrial or other sources

No new sources identified.

4. Additional Activities to Improve Air Quality

4.1 London Borough of Barking and Dagenham Fleet

We cannot provide details of how many a) zero emission and b) zero emission capable vehicles that are within our borough's fleet, and what percentage of the fleet these represent. However, from our 2020 AQ Annual Status Report, 7 new Electric Vehicles was said likely to be purchased for internal departmental use in 2021 whilst further procurement was to be undertaken shortly.

4.2 NRMM Enforcement Project

We can confirm that London Borough of Barking and Dagenham will continue to support the NRMM Enforcement project in 2022 – 23.

4.2 Air Quality Alerts

We can confirm that London Borough of Barking and Dagenham did not sign for *air*TEXT, but its AQ direct alerts service can be accessed through the UK-AIR available through the link below on our website.

https://uk-air.defra.gov.uk/forecasting/locations?q=barking%20and%20dagenham

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

In 2021, The automatic monitoring sites routine calibrations were partly undertaken ESU1 Ltd up until March 2021 and by Enviro Technology from April 2021 on monthly basis whilst LSO duties, Audits and service/upkeep/maintenance was also contracted to Enviro Technology.

However, from April 2021, all calibrations, routine maintenance, audits, LSO duties etc. are now with Enviro Technology only.

PM_{10} Monitoring Adjustment

No PM_{10} monitoring adjustment was done in 2021.

A.2 Diffusion Tubes

• Gradko is responsible for supplying and analysing the tubes.

• TEA 50/50

• Confirmation is given that Gradko follows the procedures set out in the Practical Guidance.

• National Bias adjustment factor of 0.83 of the spreadsheet versions issued 03/2022 was used.

Discussion of Choice of Factor to Use

For the Bias adjustment factor, the national figure was used as the survey consists of tubes exposed over a range of settings, which differ from the co-location site, (see TG16 Box 7.11).

Table L. Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.83
2020	National	06/21	0.82

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

The data for each of the monitoring sites was adjusted in line with Box 7.10 of the Local Air Quality Management Technical Guidance (TG16) using the co-located Rush Green School automatic monitoring station as the background site because the data capture rate for most of the monitoring sites i.e., DT6c, DT9, DT10, DT11, DT12, DT14, DT16, DT17, DT18, DT19, DT20, DT21, DT22, DT23, DT24, DT25, DT26, DT27 and DT28 were below 75% for a full calendar year required. No data adjustment was done for DT13 and DT15 because the percentage of monitoring data for both sites were less than 25% required for such to have happened.

A second automatic site was not used for annualization calculation based on the recommendation in the technical guidance in section 7.198 that, if there are many sites to be corrected as in this case, local authorities are advised to use the technique described in Box 7.10 rather the technique discussed in Box 7.9. Moreover, whilst the Scrattons Farm is a suburban background site, we were a little bit cautious of the likely local effects of the nearest industrial and major road such as A13 which is under 200m from the site as advised in section 7.129 of the guidance.

Diffusion Tube Data Annualisation DT6c Rush Green Primary School.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2	28.01	25.2
February	03/02/21	03/03/21	24.5	19.91	24.5
March	03/03/21	31/03/21	18.9	18.77	18.9
April	31/03/21	05/05/21	15.3	14.74	15
May	05/05/21	02/06/21	12.0	12.01	11.6
June	02/06/21	30/06/21	9.5	12.25	9.4
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2		
November	03/11/21	01/12/21	25.6	28.09	22.6
December	01/12/21	05/01/22	21.2	20.37	18
		Average	17.23	19.26	18.15

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 18.15

Ratio of Am/Pm = 17.23/18.15 = 0.95

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 19.26 X 0.95 = 18.30µg/m3

Diffusion Tube Data Annualisation DT9 St Pauls Way (Beside Abbey Green Play Area).

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	43.01	17.5
November	03/11/21	01/12/21	25.6	44.88	22.6
December	01/12/21	05/01/22	21.2	29.41	18
		Average	17.23	39.1	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 39.1 X 0.89 = 34.79µg/m3

Diffusion Tube Data Annualisation DT10 Glenny Road.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	32.0	17.5
November	03/11/21	01/12/21	25.6	40.50	22.6
December	01/12/21	05/01/22	21.2	32.75	18
		Average	17.23	35.08	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 35.08 X 0.89 = 31.22µg/m3

Diffusion Tube Data Annualisation DT11 209 New Rd (A1306).

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	40.11	17.5
November	03/11/21	01/12/21	25.6	49.10	22.6
December	01/12/21	05/01/22	21.2	38.08	18
		Average	17.23	42.43	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 42.43 X 0.89 = 37.76µg/m3

Diffusion Tube Data Annualisation DT12 Thames Rd.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	32.41	17.5
November	03/11/21	01/12/21	25.6	41.63	22.6
December	01/12/21	05/01/22	21.2	33.65	18
		Average	17.23	35.89	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 35.89 X 0.89 = 31.94µg/m3

Diffusion Tube Data Annualisation DT14 High Road (Chadwell Heath) A118.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	41.88	17.5
November	03/11/21	01/12/21	25.6	46.79	22.6
December	01/12/21	05/01/22	21.2	41.38	18
		Average	17.23	43.35	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 43.35 X 0.89 = 38.58µg/m3

Diffusion Tube Data Annualisation DT16 River Road.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	44.70	17.5
November	03/11/21	01/12/21	25.6	54.65	22.6
December	01/12/21	05/01/22	21.2	41.33	18
		Average	17.23	46.89	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 46.89 X 0.89 = 41.73µg/m3

Diffusion Tube Data Annualisation DT17 Bastable Avenue.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	30.42	17.5
November	03/11/21	01/12/21	25.6	37.99	22.6
December	01/12/21	05/01/22	21.2	35.69	18
		Average	17.23	34.70	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 34.70 X 0.89 = 30.88µg/m3

Diffusion Tube Data Annualisation DT18 Lodge Avenue.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	51.08	17.5
November	03/11/21	01/12/21	25.6	59.87	22.6
December	01/12/21	05/01/22	21.2	47.85	18
		Average	17.23	52.93	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 52.93 X 0.89 = 47.10µg/m3

Diffusion Tube Data Annualisation DT19 Longbridge Road (A124).

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	59.78	17.5
November	03/11/21	01/12/21	25.6	54.08	22.6
December	01/12/21	05/01/22	21.2	44.46	18
		Average	17.23	52.77	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 52.77 X 0.89 = 46.96µg/m3

Diffusion Tube Data Annualisation DT20 Althorne Way / Wood Lane (A124).

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	36.61	17.5
November	03/11/21	01/12/21	25.6	39.79	22.6
December	01/12/21	05/01/22	21.2	33.37	18
		Average	17.23	36.59	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 36.59 X 0.89 = 32.56µg/m3

Diffusion Tube Data Annualisation DT21 Whalebone Lane South (A1112).

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	48.40	17.5
November	03/11/21	01/12/21	25.6	56.63	22.6
December	01/12/21	05/01/22	21.2	45.26	18
		Average	17.23	50.09	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 50.09 X 0.89 = 44.58µg/m3

Diffusion Tube Data Annualisation DT22 Chequers Lane.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	28.51	17.5
November	03/11/21	01/12/21	25.6	28.54	22.6
December	01/12/21	05/01/22	21.2	26.60	18
		Average	17.23	27.88	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 27.88 X 0.89 = 24.81µg/m3

Diffusion Tube Data Annualisation DT23 Rainham Road South.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	43.23	17.5
November	03/11/21	01/12/21	25.6	56.98	22.6
December	01/12/21	05/01/22	21.2	42.68	18
		Average	17.23	47.63	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 47.63 X 0.89 = 42.39µg/m3

Diffusion Tube Data Annualisation DT24 Cook Road.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	37.87	17.5
November	03/11/21	01/12/21	25.6	48.10	22.6
December	01/12/21	05/01/22	21.2	41.81	18
		Average	17.23	42.59	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 42.59 X 0.89 = 37.90µg/m3

Diffusion Tube Data Annualisation DT25 King Edward's Road (adjacent to A13).

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	57.31	17.5
November	03/11/21	01/12/21	25.6	56.17	22.6
December	01/12/21	05/01/22	21.2	47.59	18
		Average	17.23	53.69	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 53.69 X 0.89 = 47.78µg/m3

Diffusion Tube Data Annualisation DT26 Valance Avenue.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	41.99	17.5
November	03/11/21	01/12/21	25.6	50.40	22.6
December	01/12/21	05/01/22	21.2	40.65	18
		Average	17.23	44.35	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 44.35 X 0.89 = 39.47µg/m3

Diffusion Tube Data Annualisation DT27 Fanshawe Avenue.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	41.91	17.5
November	03/11/21	01/12/21	25.6	52.22	22.6
December	01/12/21	05/01/22	21.2	38.31	18
		Average	17.23	44.15	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 44.15 X 0.89 = 39.29µg/m3

Diffusion Tube Data Annualisation DT28 Maplestead Rd.

Months	Start Date	End Date	B1	D1	B1 when D1 is available
January	06/01/21	03/02/21	25.2		
February	03/02/21	03/03/21	24.5		
March	03/03/21	31/03/21	18.9		
April	31/03/21	05/05/21	15.3		
May	05/05/21	02/06/21	12.0		
June	02/06/21	30/06/21	9.5		
July	30/06/21	04/08/21	9.2		
August	04/08/21	01/09/21	8.8		
September	01/09/21	29/09/21	16.3		
October	29/09/21	03/11/21	20.2	44.41	17.5
November	03/11/21	01/12/21	25.6	45.82	22.6
December	01/12/21	05/01/22	21.2	39.37	18
		Average	17.23	43.20	19.36

Annual Mean (Am) = 17.23

Period Mean (Pm) of B1 = 19.36

Ratio of Am/Pm = 17.23/19.36 = 0.89

Therefore, the annualised average (D1) = Measured Period Mean Concentrations (M) x Annualisation Factor (Ra)

Thus, D1 = M × Ra

= 43.20 X 0.89 = 38.44µg/m3

Distance Adjustment

All monitoring locations are representative of public exposure and no distance adjustment is required apart from DT4 at 291 Dagenham Heathway.

Table M. Short-Term to Long-Term Monitoring Data Adjustment

Site ID	Annualisation Factor Rush Green School	Annualisation Factor	Annualisation Factor	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean (µg m^{-3})	Annualised Annual Mean (µg m^{-3})	Comments
DT6c	0.95					19.26	18.30	Annualised with only one background site
DT9	0.89					39.10	34.79	Annualised with only one background site
DT10	0.89					35.08	31.22	Annualised with only one background site
DT11	0.89					42.43	37.76	Annualised with only one background site
DT12	0.89					35.89	31.94	Annualised with only one background site
DT14	0.89					43.35	38.58	Annualised with only one background site
DT16	0.89					46.89	41.73	Annualised with only one background site
DT17	0.89					34.70	30.88	Annualised with only one background site
DT18	0.89					52.93	47.10	Annualised with only one background site
DT19	0.89					52.77	46.96	Annualised with only one background site
DT20	0.89					36.59	32.56	Annualised with only one background site
DT21	0.89					50.09	44.58	Annualised with only one background site
DT22	0.89					27.88	24.81	Annualised with only one background site
DT23	0.89					47.63	42.39	Annualised with only one background site
DT24	0.89					42.59	37.90	Annualised with only one background site
DT25	0.89					53.69	47.78	Annualised with only one background site
DT26	0.89					44.35	39.47	Annualised with only one background site
DT27	0.89					44.15	39.29	Annualised with only one background site
DT28	0.89					43.20	38.44	Annualised with only one background site

Table N. NO2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
DT4	1	6	41.65	19	33.5	

Appendix B Full Monthly Diffusion Tube Results for 2021

Table O. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2021 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annualised Annual mean – bias adjusted (0.83)
DT1	-	75	44.54	39.82	39.95	32.60	30.04	31.11	-	-	-	30.94	42.81	34.05	36.20	30.05
DT2	-	75	45.42	37.62	38.47	32.46	25.20	27.58	-	-	-	33.76	39.61	32.98	34.79	28.88
DT3	-	75	39.70	38.27	41.05	30.31	33.04	29.85	-	-	-	35.99	49.97	36.68	37.20	30.88
DT4	-	75	50.52	52.51	49.96	41.95	52.16	42.33	-	-	-	55.28	64.24	42.73	50.18	**41.65**
DT5	-	75	48.06	44.04	45.83	39.30	45.90	37.98	-	-	-	53.14	60.78	47.23	46.92	38.94
DT6a	-	75	24.00	20.46	19.09	14.01	13.92	12.23	-	-	-	36.85	23.35	21.63	20.62	17.11
DT6b	-	75	25.57	18.50	19.54	11.62	13.26	11.80	-	-	-	46.85	26.25	21.92	21.70	18.01
DT6c	-	66.7	28.01	19.91	18.77	14.74	12.01	12.25	-	-	-	-	28.09	20.37	19.26	15.18
DT7	-	75	44.89	44.72	42.49	42.87	39.04	38.87	-	-	-	38.28	45.50	35.90	41.39	34.35
DT8	-	75	42.05	38.42	43.33	39.24	33.20	27.59	-	-	-	35.38	47.35	36.99	38.17	31.68
DT9	25	-	-	-	-	-	-	-	-	-	-	43.01	44.88	29.41	39.10	28.88
DT10	25	-	-	-	-	-	-	-	-	-	-	32.00	40.50	32.75	35.08	25.91
DT11	25	-	-	-	-	-	-	-	-	-	-	40.11	49.10	38.08	42.43	31.34
DT12	25	-	-	-	-	-	-	-	-	-	-	32.41	41.63	33.65	35.90	26.51
DT13	16.7	-	-	-	-	-	-	-	-	-	-	-	35.89	33.17	34.53	28.66
DT14	25	-	-	-	-	-	-	-	-	-	-	41.88	46.79	41.38	43.35	32.02
DT15	16.7	-	-	-	-	-	-	-	-	-	-	-	39.20	28.88	34.04	28.25
DT16	25	-	-	-	-	-	-	-	-	-	-	44.70	54.65	41.33	46.89	34.63
DT17	25	-	-	-	-	-	-	-	-	-	-	30.42	37.99	35.69	34.70	25.63
DT18	25	-	-	-	-	-	-	-	-	-	-	51.08	59.87	47.85	52.93	39.09
DT19	25	-	-	-	-	-	-	-	-	-	-	59.78	54.08	44.46	52.77	38.98
DT20	25	-	-	-	-	-	-	-	-	-	-	36.61	39.79	33.37	36.59	27.02

DT21	25	-	-	-	-	-	-	-	-	-	-	48.40	56.63	45.26	50.09	37.00
DT22	25	-	-	-	-	-	-	-	-	-	-	28.51	28.54	26.60	27.88	20.59
DT23	25	-	-	-	-	-	-	-	-	-	-	43.23	56.98	42.68	47.63	35.18
DT24	25	-	-	-	-	-	-	-	-	-	-	37.87	48.10	41.81	42.59	31.46
DT25	25	-	-	-	-	-	-	-	-	-	-	57.31	56.17	47.59	53.69	39.66
DT26	25	-	-	-	-	-	-	-	-	-	-	41.99	50.40	40.65	44.35	32.76
DT27	25	-	-	-	-	-	-	-	-	-	-	41.91	52.22	38.31	44.15	32.61
DT28	25	-	-	-	-	-	-	-	-	-	-	44.41	45.82	39.37	43.20	31.91

Notes

Concentrations are presented as µg m^{-3}.

Exceedances of the NO_2 annual mean AQO of 40 µg m^{-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**.

All means have been “annualised” in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

(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%).