

London Borough of Waltham Forest
Air Quality Annual Status Report for 2019
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This report provides a detailed overview of air quality in the London Borough of Waltham Forest during 2019. It has been produced to meet the requirements of the London Local Air Quality Management statutory process¹.

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¹ LLAQM Policy and Technical Guidance 2019 (LLAQM.TG(19)). <https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs>

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Abbreviations

AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
CAZ	Central Activity Zone
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	Objective (UK)	Averaging Period	Date¹
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 not 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

1. Air Quality Monitoring

1.1 *Locations*

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
WL1	<i>Dawlish Rd</i>	538380	186717	<i>Urban Background</i>	Y	<i>5.5m</i>	<i>15m</i>	<i>3.5m</i>	<i>NO₂, PM₁₀, PM_{2.5}</i>	<i>Chemiluminescent; NOx analyser</i>
WL4	<i>Crooked Billet Roundabout</i>	537468	191071	<i>Kerbside</i>	Y	<i>11m</i>	<i>0.5m</i>	<i>2m</i>	<i>NO₂, PM₁₀</i>	<i>Chemiluminescent; NOx analyser</i>
WL5	<i>Ruckholt Close</i>	537804	186025	<i>Roadside</i>	Y	<i>8m</i>	<i>1.5m</i>	<i>3.5m</i>	<i>NO₂, PM₁₀</i>	<i>Chemiluminescent; FDMS; NOx analyser</i>

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)
1	<i>Ascham Homes property Near Whipps Cross roundabout</i>	<i>538716.00</i>	<i>188888.00</i>	<i>Roadside</i>	Y	<i>5</i>	<i>5</i>	<i>2</i>	<i>NO₂</i>	<i>N</i>
2	<i>Blackhorse Rd</i>	<i>536048.00</i>	<i>189159.00</i>	<i>Roadside</i>	Y	<i>2</i>	<i>2.2</i>	<i>2</i>	<i>NO₂</i>	<i>N</i>

	<i>in front of St Patricks Catholic School</i>									
3	<i>Boundary Rd & Hoe St</i>	<i>537600.00</i>	<i>188251.00</i>	<i>Roadside</i>	<i>Y</i>	<i>3.5</i>	<i>0.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
4	<i>Chestnuts House on Hoe St</i>	<i>537498.00</i>	<i>188436.00</i>	<i>Roadside</i>	<i>Y</i>	<i>0</i>	<i>9</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
5	<i>Chingford Assembly Hall</i>	<i>538699.00</i>	<i>194426.00</i>	<i>Roadside</i>	<i>Y</i>	<i>4</i>	<i>2.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
6	<i>Connaught School</i>	<i>539024.00</i>	<i>186945.00</i>	<i>Roadside</i>	<i>Y</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
7	<i>Dawlish Rd (playground area next to 195 Dawlish Rd)</i>	<i>538400.00</i>	<i>186734.00</i>	<i>Roadside</i>	<i>Y</i>	<i>0</i>	<i>6</i>	<i>2</i>	<i>NO2</i>	<i>Y</i>
8	<i>Forest Rd and Melville Rd</i>	<i>536938.00</i>	<i>189753.00</i>	<i>Roadside</i>	<i>Y</i>	<i>0.5</i>	<i>4.5</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
9	<i>Francis Rd & High Rd Leyton</i>	<i>538022.00</i>	<i>187162.00</i>	<i>Roadside</i>	<i>Y</i>	<i>13</i>	<i>2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
10	<i>Gloucester Rd & Lea Bridge Rd</i>	<i>537088.00</i>	<i>187632.00</i>	<i>Roadside</i>	<i>Y</i>	<i>3.5</i>	<i>0</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
11	<i>Howard Rd & Church Rd</i>	<i>537583.00</i>	<i>189310.00</i>	<i>Roadside</i>	<i>Y</i>	<i>3.5</i>	<i>2.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
12	<i>Kings Rd & Kingswood Rd</i>	<i>539259.00</i>	<i>187567.00</i>	<i>Roadside</i>	<i>Y</i>	<i>1.8</i>	<i>2.5</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
13	<i>Lea Bridge Rd (entrance of Lea Valley Riding School)</i>	<i>535928.00</i>	<i>186914.00</i>	<i>Roadside</i>	<i>Y</i>	<i>0</i>	<i>2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
14	<i>Lea Bridge Rd and Perth Rd</i>	<i>536457.00</i>	<i>187238.00</i>	<i>Roadside</i>	<i>Y</i>	<i>2</i>	<i>1</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
15	<i>Leyton Library</i>	<i>538243.00</i>	<i>186286.00</i>	<i>Roadside</i>	<i>Y</i>	<i>4.5</i>	<i>3.8</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
16	<i>Oliver Rd and Ruckholt Rd</i>	<i>538022.00</i>	<i>186126.00</i>	<i>Roadside</i>	<i>Y</i>	<i>0.5</i>	<i>2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
17	<i>Pembroke Rd & Grosvenor Park Rd</i>	<i>537719.00</i>	<i>188685.00</i>	<i>Kerbside</i>	<i>Y</i>	<i>1.75</i>	<i>0.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
18	<i>Queens Rd near the Cemetery</i>	<i>536951.00</i>	<i>188436.00</i>	<i>Roadside</i>	<i>Y</i>	<i>10.5</i>	<i>2.7</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
19	<i>Radlix Rd and Church Rd</i>	<i>537251.00</i>	<i>187156.00</i>	<i>Kerbside</i>	<i>Y</i>	<i>5.5</i>	<i>0.2</i>	<i>2.5</i>	<i>NO2</i>	<i>N</i>
20	<i>Ruckholt Close</i>	<i>537937.00</i>	<i>186109.00</i>	<i>Roadside</i>	<i>Y</i>	<i>13</i>	<i>0</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
21	<i>Vicarage Rd near St Josephs Junior</i>	<i>537620.00</i>	<i>187387.00</i>	<i>Roadside</i>	<i>Y</i>	<i>9.8</i>	<i>1</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
22	<i>Winns Ave junct Mersey Rd</i>	<i>536887</i>	<i>189998</i>	<i>Kerbside</i>	<i>Y</i>	<i>8.8</i>	<i>0.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
23	<i>Aymler Rd</i>	<i>539563</i>	<i>187517</i>	<i>Roadside</i>	<i>Y</i>	<i>22</i>	<i>0.5</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
24	<i>Chingford Road junct Loxham Rd</i>	<i>537455.00</i>	<i>191429.00</i>	<i>Roadside</i>	<i>Y</i>	<i>12</i>	<i>0.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
25	<i>Hale End Road (~230-240)</i>	<i>538632.00</i>	<i>191096.00</i>	<i>Roadside</i>	<i>Y</i>	<i>6</i>	<i>0.8</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
26	<i>Hall Lane o/s retail park</i>	<i>536468.00</i>	<i>192261.00</i>	<i>Roadside</i>	<i>Y</i>	<i>6</i>	<i>0.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
27	<i>Winchester Rd (~160-170)</i>	<i>538863.00</i>	<i>191080.00</i>	<i>Roadside</i>	<i>Y</i>	<i>3</i>	<i>0.5</i>	<i>2</i>	<i>NO2</i>	<i>N</i>
28	<i>Addison Road and Wilson Road</i>	<i>538082</i>	<i>188969</i>	<i>Roadside</i>	<i>Y</i>	<i>5</i>	<i>1.2</i>	<i>2</i>	<i>NO2</i>	<i>N</i>

29	<i>Greville Road and Shernall St</i>	538359	188999	Roadside	Y	5	5	2	NO2	N
30	<i>James Lane near Leytonstone School</i>	539034	188244	Roadside	Y	12	2.2	2	NO2	N
31	<i>Coppermill School Edward Road</i>	535942	188731	Roadside	Y	6	2.2	2	NO2	N
32	<i>William Marshall Cl and S. Access Rd</i>	536251	188272	Roadside	Y	3.5	1.2	2	NO2	N
33	<i>Station Rd junct with Buxton Rd E4</i>	538954	194512	Kerbside	Y	12	0.2	2	NO2	N
34	<i>86 Palmerston Road</i>	536619.00	189322	Roadside	Y	4.5	2.5	2.2	NO2	N
35	<i>Chingford Road junct Penhryn Cres</i>	537536	190697	Kerbside	Y	5	0.2	2	NO2	N
36	<i>Forest Rd Bell Corner</i>	537431	189784	Roadside	Y	3	0.2	2	NO2	N
37	<i>Forest Road junct Wood St</i>	538295	189964	Roadside	Y	2	2	1.8	NO2	N
38	<i>Friday Hill junct Normanton Pk</i>	539129	193377	Kerbside	Y	25	0.2	2	NO2	N
39	<i>Fulbourne Rd</i>	538123	190790	Kerbside	Y	5	0.2	2	NO2	N
40	<i>Hale End Road junct The Avenue</i>	538588	191750	Roadside	Y	2.8	0.2	2	NO2	N
41	<i>High Rd E10 junct Buckingham Rd</i>	538072	186479	Roadside	Y	0	3.5	2	NO2	N
42	<i>High Rd E10 junct Etchingam Rd</i>	538386	185800	Roadside	Y	3	2.7	2.2	NO2	N
43	<i>High Rd E11 junct West St</i>	539227	186335	Kerbside	Y	1.8	0.8	2.2	NO2	N
44	<i>Higham Hill junct Forest Road</i>	536547	189641	Kerbside	Y	3	0.2	2	NO2	N
45	<i>Higham Hill Rd junct Claremont Road</i>	536226	190223	Roadside	Y	5.6	2	2	NO2	N
46	<i>Larkshall Rd junct Dale View Cres E4</i>	538627	193361	Roadside	Y	6	2.4	2	NO2	N
47	<i>Lea Bridge Rd Bakers Arms</i>	537792	188144	Roadside	Y	0	2	2.2	NO2	N
48	<i>Old Church Rd junct Chingford Mount Rd</i>	537339	192767	Kerbside	Y	0	0.5	1.8	NO2	N
49	<i>Old Church Rd o/s Mansfield Park</i>	537660	193854	Kerbside	Y	11	0.2	2	NO2	N
50	<i>Selbourne 1 (South Grove)</i>	536732.00	188811.00	Roadside	Y	45	0.4	2	NO2	N
51	<i>Selbourne 2</i>	536791.00	188897.00	Kerbside	Y	49	0	2.2	NO2	N
52	<i>Selbourne 3</i>	536999.00	188939.00	Kerbside	Y	45	0.4	2.5	NO2	N
53	<i>Selbourne 4</i>	537142.00	188976.00	Roadside	Y	55	2.5	2.5	NO2	N
54	<i>Francis Road</i>	538321.00	186872.00	Roadside	Y	4	0.8	2	NO2	N
55	<i>Orford Road</i>	537786.00	188946.00	Roadside	Y	3.5	0.5	2.2	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. The details of the adjustments are described in Appendix A.

Table D. Annual Mean NO₂ Ratified and Bias-adjusted Monitoring Results (µg m⁻³)

Site ID	Site type	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean Concentration (µg m ⁻³)						
				2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
WL1 Dawlish Rd	<i>Automatic</i>		97.4	36	28(data capture 73.22%)	26	30	28	23	24
WL4 Crooked Billet	<i>Automatic</i>		96	68	74	66	62	61	58	58
WL5 Ruckholt Close	<i>Automatic</i>		96.8	28	36	31	35	33	30	31
1	<i>Diffusion</i>		91.7				40.8	38.1	37.4	33.9
2	<i>Diffusion</i>		100				52.6	49.4	44.6	45.2
3	<i>Diffusion</i>		100				46.4	43.1	41.6	41.6
4	<i>Diffusion</i>		75				43.2	40.2	32.7	36.3
5	<i>Diffusion</i>		91.7	26.3	26.9	24.7	27.2	25.3	29.6	29.7
6	<i>Diffusion</i>		50%	41.5	39.3	33.6	42.8	33.5	37	32.8
7	<i>Diffusion</i>			28.4	27.6	25.3	28.9	27.3	22.8	25.1

Site ID	Site type	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean Concentration ($\mu\text{g m}^{-3}$)						
				2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
8	<i>Diffusion</i>		83.3				37	33.6	33.1	31.0
9	<i>Diffusion</i>		91.7				37.8	35.1	30.9	30.2
10	<i>Diffusion</i>		83.3				43.1	40.9	38.6	38.3
11	<i>Diffusion</i>		100				36.5	35.4	31	31.2
12	<i>Diffusion</i>		100				38.5	36.9	32	32.9
13	<i>Diffusion</i>		100				30.6	29.2	27.3	27.1
14	<i>Diffusion</i>		100				38.6	37.8	31.7	31.6
15	<i>Diffusion</i>		83.3	52.4	49.4	46.5	51.7	50.6	37	41.2
16	<i>Diffusion</i>		91.7				53.8	49.3	44.7	43.0
17	<i>Diffusion</i>		91.7				33.8	32.8	28.1	29.6
18	<i>Diffusion</i>		83.3				34.8	31.8	28.4	28.5
19	<i>Diffusion</i>		100				39.1	38.7	39.5	32.5
20	<i>Diffusion</i>		100				41.8	40.6	34.6	35.8
21	<i>Diffusion</i>		100				33.8	30	26.4	26.6
22	<i>Diffusion</i>		100						29.6	28.1
23	<i>Diffusion</i>		100				35.6	32.7	29.8	37.4
24	<i>Diffusion</i>		100						34.2	35.1

Site ID	Site type	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean Concentration ($\mu\text{g m}^{-3}$)						
				2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
25	<i>Diffusion</i>		100						34.2	36.6
26	<i>Diffusion</i>		100						38.5	38.9
27	<i>Diffusion</i>		100						48.7	35.2
28	<i>Diffusion</i>		83.3						44.9	26.3
29	<i>Diffusion</i>		91.7						29.9	27.4
30	<i>Diffusion</i>		100						38.3	37.6
31	<i>Diffusion</i>		91.7						34.6	28.4
32	<i>Diffusion</i>		100						39.3	27.2
33	<i>Diffusion</i>		75						50.3	33.1
34	<i>Diffusion</i>		100						43.7	36.1
35	<i>Diffusion</i>		100						46.4	35.6
36	<i>Diffusion</i>		83.3						30.2	38.1
37	<i>Diffusion</i>		100						27.3	40.8
38	<i>Diffusion</i>		100						50.9	29.4
39	<i>Diffusion</i>		100						43.5	36.0
40	<i>Diffusion</i>		100						39	35.9
41	<i>Diffusion</i>		100		40.9	38	42.9	39.9	40.7	36.6

Site ID	Site type	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean Concentration ($\mu\text{g m}^{-3}$)						
				2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
42	<i>Diffusion</i>		100		52.2	52.8	<u>61.4</u>	57.3	59.6	47.2
43	<i>Diffusion</i>		100		52.4	53.1	<u>61</u>	<u>61</u>	57	40.9
44	<i>Diffusion</i>		100		44.5	38.9	44.3	45.8	43.2	37.0
45	<i>Diffusion</i>		100							31.6
46	<i>Diffusion</i>		100							27.4
47	<i>Diffusion</i>		100							51.5
48	<i>Diffusion</i>		100							46.3
49	<i>Diffusion</i>		91.7							30.2
50	<i>Diffusion</i>		100		40.9^e	38 ^e	42.9^e	39.9 ^e	40.7^e	42.7^e
51	<i>Diffusion</i>		91.7		52.2^e	52.8^e	<u>61.4^e</u>	57.3^e	59.6^e	58.4^e
52	<i>Diffusion</i>		91.7		52.4^e	53.1^e	<u>61^e</u>	<u>61^e</u>	57^e	58.0^e
53	<i>Diffusion</i>		100		44.5^e	38.9 ^e	44.3^e	45.8^e	43.2^e	39.6
54	<i>Diffusion</i>		100							30.7
55	<i>Diffusion</i>		83.3							29.6

Notes: Exceedance of the NO₂ annual mean AQO of 40 $\mu\text{g m}^{-3}$ are shown in **bold**.

NO₂ annual means in excess of 60 $\mu\text{g m}^{-3}$, indicating a potential exceedance of the NO₂ 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 Due to access restriction this location can no longer be monitored. Therefore the valid capture period is only 6 months. A suitable replacement location will be identified and deployed in 2020.

^e Nearest relevant receptors are further than 20m from monitoring site. These locations were deployed to monitor the several council interventions at the roadside and not at a relevant receptor, therefore these results shown are not adjusted for distance to relevant exposure.

Figure 1.1 shows the 7 year trends in nitrogen dioxide concentrations at the seven monitoring locations in the LBWF. It shows that there has been a gradual improvement in air quality, albeit that the concentrations in one of the locations still exceed the annual mean average Air Quality Objective of $40\mu\text{g}/\text{m}^3$. Data from 2018 and 2019 suggests that these improvements in NO₂ may have plateaued. These reasons for this will be explored in the next year but it may be that further significant reductions are unlikely with current traffic volumes, fleet makeup and existing emission limits.

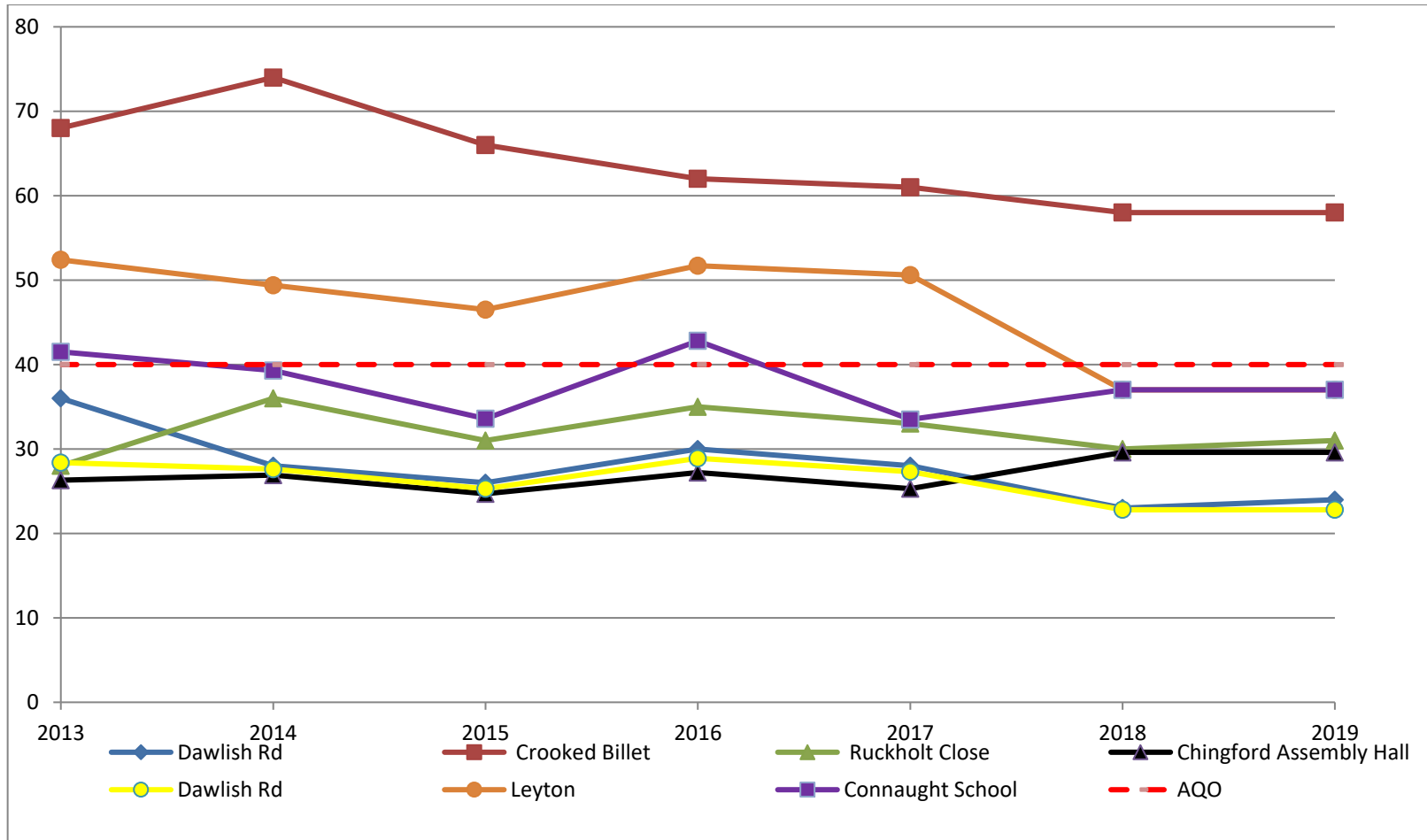


Figure 1.1 Trends in Nitrogen Dioxide Concentrations within the London Borough of Waltham Forest 2013-2019

In summary, of the fifty-five nitrogen dioxide monitoring locations within the London Borough of Waltham Forest, a total of twenty eight recorded concentrations of nitrogen dioxide that exceeded the annual Air Quality Objective for nitrogen dioxide of $40\mu\text{g m}^{-3}$. All these sites are on roads with high traffic volumes. The sites are listed below in table E. Of these twenty eight locations, none were positioned at a point of relevant exposure. The calculated concentration at the nearest relevant receptors at ten of the exceeded the annual air quality objective.

Table E. Summary of Reduction in NO₂ Concentrations between Monitoring Location and Nearest Relevant Receptor Monitoring Location

	Measured Concentration 2019 ($\mu\text{g m}^{-3}$)	Calculated Concentration at Nearest Relevant Receptor 2019 ($\mu\text{g m}^{-3}$)	Breach of annual Air Quality Objective of $40\mu\text{g m}^{-3}$
2	48.7	44.3	YES
3	45.5	36.0	NO
10	42.7	33.4	NO
15	46.1	41.2	YES
16	44.0	43.0	YES
19	41.8	32.5	NO
23	54.3	35.1	NO
24	41.0	34.3	NO
25	55.6	38.9	NO
26	41.3	35.2	NO
27	41.3	35.7	NO
30	40.7	38.3	NO
34	48.6	38.1	NO
36	44.2	40.8	YES
37	40.5	32.2	NO
39	40.4	33.7	NO
40	40.9	32.5	NO
41	52.6	47.2	YES
42	46.0	40.9	YES
43	46.8	37.0	NO

44	51.5	51.5	YES
47	46.3	46.3	YES
48	40.5	30.2	NO
49	42.7	42.7	YES
50	58.4	28.8	NO
51	58.1	58.1	YES
52	43.5	26.9	NO
53	48.7	37.1	NO

Therefore, it has been necessary to carry out 'fall-off in nitrogen dioxide concentrations with distance from the road' calculations in line with Sections 4.81-4.83 of the London Local Air Quality Management Technical Guidance (TG16) and using the nitrogen dioxide fall-off with distance calculator that was obtained from <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>. The application of the calculator to eight of the nine monitoring locations is included in Table M in Appendix A.3 and the outcome is summarised in Table E. As a result of the distance from the Selbourne 4 diffusion tube to the nearest relevant receptor being greater than 50m, it is not appropriate to apply the calculation to that diffusion tube reading.

Table F. NO₂ 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 µg m ⁻³						
			2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
WL1 Dawlish Road	N/A	99.4%	2	1	0 (99.8th percentile is 88; less than 200 therefore unlikely to experience exceedance)	0	0	0	0
WL4 Crooked Billet	N/A	99.7%	11	116	37 (99.8th percentile is 243 suggesting an exceedance of the hourly mean objective)	15	0	0	2
WL5 Ruckholt Close	N/A	99.7%	0	7	0	0	0	0	0

Notes: Exceedance of the NO₂ short term AQO of 200 µg m⁻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%

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Table G. Annual Mean PM₁₀ Automatic Monitoring Results (µg m⁻³)

Site ID	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean Concentration (µg m ⁻³)						
			2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
WL1 Dawlish Road	N/A	98	21	19	16	18	18	17	19
WL4 Crooked Billet	N/A	97	31	40	32	29	29	28	29
WL5 Ruckholt Close	N/A	98	21	20	18	19	19	18	19

Notes: Exceedance of the PM₁₀ annual mean AQO of 40 µg m⁻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%

Figure 1.3 shows the trends in PM₁₀ concentrations over the past 7 years at the three automatic monitoring locations in the LBWF. It shows that there has been a gradual improvement in air quality at these sites and that the annual mean average Air Quality Objective of 40 µg m⁻³ is not being exceeded. Data suggests these improvements may have plateaued.

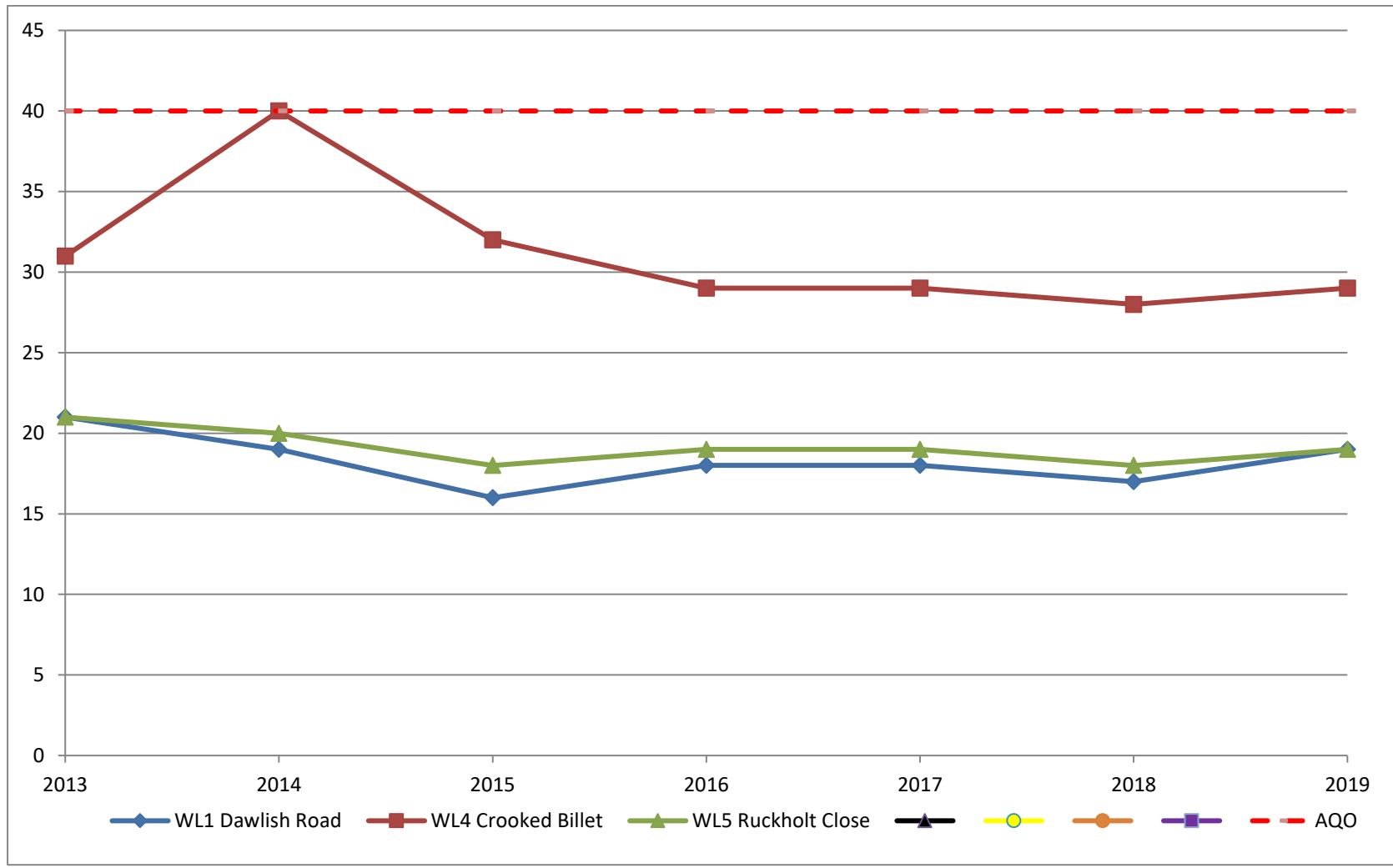


Figure 1.3 Trends in PM₁₀ concentrations within the London Borough of Waltham Forest

Table H. PM₁₀ 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 µg m ⁻³						
			2013 ^c	2014 ^c	2015 ^c	2016 ^c	2017 ^c	2018 ^c	2019 ^c
WL1 Dawlish Road	N/A	98	3	1	0 (90 th percentile is 24)	4	4	1	1
WL4 Crooked Billet	N/A	97	22	60	23 (90 th percentile is 48)	22	17	10	14
WL5 Ruckholt Close	N/A	98	8	9	3 (90 th percentile is 28)	6	6	1	3

Notes: Exceedance of the PM₁₀ 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 85% 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%

Table J. 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 (µg/m ³)
			2019 ^c
WL1 Dawlish Road	N/A	90	12.1

Notes: Exceedance of the PM_{2.5} annual mean AQO of 25 µg m⁻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%

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of Waltham Forest's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2019 are shown at the bottom of the table.

Table K. Delivery of Air Quality Action Plan Measures

Actions have been colour coded to indicate their current status, as follows:

Completed
Ongoing
In progress/not yet started
Proposed new actions

Action	Progress <ul style="list-style-type: none"> • Emissions/Concentration data • Benefits • Negative impacts / Complaints 	Further information
Ensuring emissions from construction are minimised		
Action1: Every major development will have a construction management condition.	<ul style="list-style-type: none"> • Please see planning update (Table X). From 2019 onwards all major developments are required to have discrete conditions for: <ul style="list-style-type: none"> • Air Quality Dust Management Plan (AQDMP) 	

<p>Action 2: Every major development will have a Non Road Mobile Machinery condition, and compliance will be checked via spot checks at development sites.</p>	<ul style="list-style-type: none"> • Non Road Mobile Machinery (NRMM)
<p>Action 3: All developments with CHP and biomass plant will have a condition to ensure that it meets the standards for emissions from the combined heat and power and biomass plants set out in the Sustainable Design and Construction SPG, and use ultra low NOx boilers.</p>	<p>As part of the GLA funded project in partnership with Waltham Forest Barnet, Enfield and Haringey 45 sites in Waltham Forest were audited 2018/2019. All audited sites either had no NRMM on site at the time or all NRMM on site was compliant. This project ended. Waltham Forest are now part of the pan London NRMM project led by Merton. For 2019/2020, 7 sites have been audited and all sites were found to be compliant.</p> <p>From 1st September 2020 NRMM on all sites within Greater London will be required to meet Stage IIIB of EU Directive 97/68/EC as a minimum.</p> <p>In preparation for this all minor developments that involve significant construction and/or demolition works are conditioned for NRMM and required to submit an AQDMPs. This will allow us to monitor ongoing sites once the new requirements are introduced.</p>
<p>Action 4: All developments shall meet the Air Quality Neutral Emissions Benchmarks for Buildings and Transport set out in the Sustainable Design and Construction SPG.</p>	

<p>Action 5: An Informative will be placed on all relevant planning applications for the developer to consider “First Steps in Urban Air Quality”. A Trees and Design Action Group (TDAG) Guidance Document</p>		<p>The implementation of this action is under consideration.</p>
<p>Action 6a: To improve information relating to the Smoke Control Areas on the council’s web site. Action 6b: To prepare an advice leaflet for residents on authorised fuels and exempt appliances, which will be distributed at point of sale locations for fuel and wood burners. Action 6c: To prepare a planning informative for new solid fuel burners.</p>	<p>In December 2018 / January 2019 the council delivered a SCA awareness campaign through regular tweets around indoor burning, DEFRA approved fuels and appliances.</p>	<p>In 2020, it is proposed to develop and deliver an enhanced campaign to promote awareness of and compliance with smoke control area requirements. We will be utilising the PHE comms toolkit for local air quality incidents including from domestic burning and BBQs.</p>
<p>Action 6d: To promote the Waltham Forest waste collection service for garden waste via “Waltham Forest News” in order</p>	<p>In 2019 the council sent out over 68 letters in relation to SCA or bonfire complaints. These letters contained advise and discourage burning and measures that will mitigate smoke pollution if people insist on having a bonfire.</p>	<p>ONGOING As part of the revamping council’s AQ webpage in 2020 we will improve information on the adverse health effects on burning, promote the council’s free garden waste collections and discourage bonfires.</p>

<p>to prevent bonfires. Action 6e: To publicise Information on the adverse health effects of smoke from bonfires Action 6f: An Annual review of number of bonfire enforcement interventions</p>		
<p>Action 7: Promoting and delivering energy efficiency retrofitting projects in workplaces and homes using the GLA RE:NEW and RE-FIT programmes to replace old boilers / top up loft insulation in combination with other energy conservation measures. Action 7a: Annual reporting on HECA and number of boilers updated.</p>	<p>Waltham Forest's efficiency retrofitting projects are now primarily through the Council's Salix fund.</p> <p>Waltham Forest's efficiency retrofitting projects are now primarily through the Council's Salix fund. In 2018/19, SALIX funded 4 corporate projects with a total cost of £420,738 with annual CO2 savings of 205.76 tonnes and cost savings of £43,843. In 2019/2020 SALIX funded two projects completing with total costs of £77k with cost and CO2 savings of £9,900 and 21.53tCo2 pa</p> <p>In our 2019 HECA report Waltham Forest has completed:</p> <p>Fuel Switch from electric heating to communal gas fired heating & hot water - 150 properties .</p> <p>Solar PV for 22 properties</p> <p>Cavity wall insulation for 128 properties</p> <p>A-rated boiler upgrades for 694 properties</p>	<p>ONGOING</p>

	<p>Replacement windows 107 properties</p> <p>Communal solar PV for 3 properties</p> <p>Energy efficiency upgrades for 199 fuel poor households delivered by fuel poverty provider</p> <p>53 Solar PV installations on properties in the able-to-pay sector under the Solar Together scheme.</p>	
<p>Action 8: Work to ensure that Public Health Teams are supporting engagement with local stakeholders (businesses, schools, community groups and healthcare providers). This will include briefing the Director of Public Health each year with the Annual Status Report, and updating them quarterly on the progress of the actions in this plan.</p>	<p>In 2019 the Public Health and Air Quality & Environmental Protection teams worked collaboratively on a number of projects including:</p> <ul style="list-style-type: none"> • The School Super Zone Pilot. • Cleaner Air Hospital Project (Please see action 41 for further details). • Deploying Green Screens. 	<p>The School Super Zone Pilot: Mayville Primary School.</p> <p>This is a public health initiative which involves creating a 400m health and wellbeing radius around the school. As part of the action plan for the super zone pilot we conducted Anti-Idling patrols and a pedometer challenge to encourage children & parents to walk, scoot and cycle to school.</p> <p>As part of Council’s school green screen rollout, public health supported the application for section 106 health funding to fund two green screens. The locations for these were selected on both AQ and public health metrics.</p> <p>ONGOING</p>
<p>Action 9a: Improve the council website with air quality information including the “Living Map”,</p>	<p>The AQ page on the council’s website has a section on Walkit.com. This is a web based urban walking route planner that allows you to plan your journeys via less polluted routes.</p>	<p>Action 9a: COMPLETE Action 9b: ONGOING Action 9c: COMPLETE</p>

<p>developed as part of the “Enjoy Waltham Forest” project. The map suggests alternative, better AQ walking and cycling routes. Action 9b: Improve local communication with at least one post annually in Waltham Forest News, all projects being tweeted, and all major projects show cased on Council TV screens. Action 9c: Joint Anti-idling project on national Clean Air Day 21st June 2018</p>	<p>In June 2019 Waltham Forest News featured a section on clean air day and AQ actions in the borough.</p> <p>The council held a joint anti-idling project focusing around Walthamstow town centre for clean air day 2018.</p>	
<p>Action 10: Refresh the Waltham Forest’s Joint Strategic Needs Assessment which has air quality as a key theme</p>	<p>In December 2018 the council published its Joint Strategic Needs Assessment on Air Quality and Health. This was published by Public Health with input from Air Quality & Environmental Protection. https://www.walthamforest.gov.uk/content/joint-services-need-assessment-jsna</p>	COMPLETE
<p>Action 11: Strengthening coordination with Public Health by</p>	<p>The Public Health team are working collaboratively on several projects including:</p> <ul style="list-style-type: none"> • The School Super Zone Pilot. 	COMPLETE

<p>ensuring that at least one consultant grade public health specialist within the borough has air quality responsibilities outlined in their job profile (as part of a wider role, not a dedicated air quality post)</p>	<ul style="list-style-type: none"> Cleaner Air Hospital Project (Please see action 41 for further details). <p>Officer in post, regularly liaises with AQEP team. Ongoing action with AQEP will be covered by action 8.</p>	
<p>Action 12: Director of Public Health to sign off Statutory Annual Reports and all new Air Quality Action Plans</p>	<p>ONGOING</p>	
<p>Action 13a: The Head of Transport will be fully briefed on Public Health duties and air quality opportunities and risks related to transport in the borough. Action 13b: Prepare a briefing which can be disseminated amongst the Transport Team. Action 13c: All meetings will be minuted and included</p>	<p>Highways and AQEP work very closely teams usually meet every 6 weeks or more frequently. Both teams are briefed on all relevant initiatives.</p>	<p>ONGOING</p>

in the appendix of future AQAP updates.		
Action 14: Air Quality Business Pledge initiative on Clean Air Day 21st June 2018	The AQ business pledge was promoted on CAD 2018. We currently have two businesses who have made AQ business pledge. These businesses have been provided with a toolkit to help businesses include considering AQ as a factor in their businesses building emissions, transportation and supply chain.	COMPLETE
Action 15: Promotion of airTEXT by running a campaign in the week of national "Clean Air Day" 2018.	Complete: for the period 1st September 2018 to 31st March 2019 Waltham Forest had 24 new subscribers bringing the total to 167. 1305 alerts were sent.	
Action 16: To run a campaign to promote the Transport for London STARS programme in Waltham Forest. Action 16a: Working to deliver the recommendations of the audits from the audited schools in this programme	There are now 57 schools in the borough with TfL STARS accredited travel plans including 25 Gold standard schools which have shown the highest commitment to encouraging active and sustainable travel over the past three years. No Schools in WF were audited in The Mayor's school air quality audit programme.	ONGOING

<p>Action 17a: Run “School Streets” trial</p> <p>Action17b: School Air Quality Ambassadors initiative alongside national Clean Air Day</p>	<p>On national Clean Air Day 2018, all schools were invited to contact us if they would like assistance with trialling “School Streets” initiatives.</p> <p>22 schools have expressed an interest in having a School Street.</p> <p>In 2019, two trial locations, Byron Road (George Mitchell School) and Marsh Lane (Willow Brook Primary School, St Joseph’s Catholic Infant School, and Riverley Primary School) were launched on Monday 23 September.</p> <p>Complete</p>	<p>For 2020 we have a further 7 School Streets planned. 2 are confirmed and 5 are in consultation.</p>
<p>Action 18: Require the Council’s waste contractor to have Gold status under the Fleet operator Recognition Scheme.</p>	<p>New waste, street cleansing and ground maintenance contract commenced end of Sept 2019 and runs for 8 years. Includes a requirement for a shift in how vehicles and equipment are powered.</p> <ul style="list-style-type: none"> • Have swapped all of the ground equipment, so leaf blowers etc. from petrol to electric. • Have mandated vehicles under 3.5 tonnes to be electric • Will be having a fully electric dustcart to service the market, as the engines have to be left on to use the lifting and compacting equipment. • Not practical or economically viable for contractors to provide dustcarts using other fuel sources at the time but all are Euro VI diesel 	<p>ONGOING</p>
<p>Action 19: Update Procurement policies to ensure sustainable</p>	<p>Air Quality is included in the Council’s Sustainable Procurement Policy 2015-2019.</p>	<p>ONGOING</p>

<p>logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainability criteria)</p>	<p>The council launched a Sustainable Procurement Working Group in July 2019. The council has commenced consultation for a refreshed / new version of the of the Sustainable Procurement Policy.</p>	
<p>Action 20a: Monitor the use and mileage of the Zero Emission Delivery Service and Cargo Bikes Action 20b: Promote the Zero Emission Delivery Service and Cargo Bikes through the website and Waltham Forest News. Action 20c: The Waltham Forest Construction Consolidation Pilot is being developed by the Asset Management Team Action 20d: Monitor the Waltham Forest Sustainable freight initiative, and convert this to NOx emissions and report annually.</p>	<p>In 2019 ZED:</p> <ul style="list-style-type: none"> • Saved an estimated 9.5 tonnes CO2 emissions • Delivered 49,738 packages • Travelled over 21,000 miles • Delivered for over 50 local businesses. <p>The Council has undertaken significant publicity about this e.g the ZED service has its own Twitter and Instagram accounts @zedwalthamforest</p>	<p>In 2020/21, it is intended to explore options for further projects to promote sustainable freight deliveries.</p>
<p>Action 21: Complete a feasibility study on Virtual Loading Bays in</p>	<p>The Council's Business Low Emission Neighbourhood (BLEN) project, which is due to be delivered in 2020/2021, will</p>	<p>Ongoing</p>

town centres during 2019.	include an investigation of virtual loading bays in Leytonstone.	
Borough fleet actions		
Action 25a: To monitor and report the annual emissions for the staff car club Action 25b: To submit bid to OLEV for workplace EV chargers	In September 2018, electric car charging points were installed at the Town Hall and the vehicles were switched to fully electric. Since that time over 27,500 miles have been driven by the staff and public. The public can book the vehicles out of office hours and at the weekends. We now have 323 members of staff signed up to the scheme, with about 50 staff members booking vehicles each month. Waltham Forest Town Hall now has 6bays. Two for staff / public 4 for e-car rental / pool cars.	Staff Car club: Ongoing Workplace EV Chargers: COMPLETE
Localised solutions		
Action 26: To report the actions from the "Strategy for the Planning and Management of the Borough's Urban Forest" annually in the AQAP	The Trees Strategy is available on the Council's website https://www.walthamforest.gov.uk/content/trees <u>Data for 2019/20</u> Planting Total 1948 Felling Total 497 Net Increase 1451	
Action 27: Complete the implementation of the Lea Bridge Road Cycle Route by Autumn 2018	Lea Bridge Road was officially launched on the 17th October, and includes: <ul style="list-style-type: none"> • Eight kilometres of fully segregated cycle track along the length of the road, • Seven key junction upgrades including Markhouse and Orient Way junction 	Action Complete; So far The Enjoy Waltham Forest programme has: <ul style="list-style-type: none"> - Introduced over 29km of segregated cycle track, - 62 toucan crossings, - 51 modal filters, - 31 pocket parks - 145 blended crossings

	<ul style="list-style-type: none"> • 52 side roads being transformed into new blended crossings • 33 improved bus stops • Nine new pedestrian and cyclist controlled crossings 	<ul style="list-style-type: none"> - Planted more than 700 trees, - 37 public realm improvements
Cleaner transport		
Action 28: To continue to run regular anti-idling campaigns throughout 2018 and 2019	<p>In 2019 we had 18 anti-idling events and 3 school assemblies these focus on education and awareness raising however are attended by our parking / CCTV teams who enforce on inappropriate parking and stopping on yellow lines and our neighbourhood team to provide a uniformed presence and can issue idling fines if needed.</p> <p>In 2019 the Neighbourhoods team held 10 school patrols which include idling enforcement.</p>	COMPLETE
Action 29: Lowering the legal speed limit to 20mph in built up residential areas	Completed in most residential areas	Further work to be done in the north of the borough.
Action 30: 10 new car club bays by March 2019	There are now over 75 car club bays in the borough.	COMPLETE
Action 31: To hold a "Pedestrian Day" on World Car Free Day on 22nd September to promote the improvement of mass transit, cycling, and walking and give communities a chance	<p>To celebrate World Car Free Day, we held Waltham Forest's largest street party!</p> <ul style="list-style-type: none"> • Walk-In-Stow - over 5.5km of road was closed in the borough, over 10,000 visitors attended Walk-In-Stow on Hoe Street. • 77 street parties took place in Waltham Forest in 2019. 	COMPLETE

to see what their town could be like car free		
Action 32: Free or discounted parking charges at existing parking meters for zero emission cars	This actional be considered when the Council's parking charges are next reviewed.	
Action 33: Free or discounted residential parking permits for zero emission cars	All resident permits are charged based on Engine size/CO2 emissions (g/km).	COMPLETE
Action 34: Emission based charges for Residential and Controlled Parking Zone permits		
Action 35: To have the 17 new residential EV charging points fully operational by 2019	Complete: WF now has 67 lamp column sockets. 28 fast charging dual sockets.	COMPLETE The Council has now adopted a comprehensive Electric Vehicle Charging Point Strategy. A new Action is included as Action 51.
Action 36: Installation of rapid chargers to help enable the take up of electric taxis, cabs and commercial vehicles (in partnership with TfL and/or OLEV)	A rapid charger has been installed by TfL at Leytonstone station.	SUPERCEDED The Council has now adopted a comprehensive Electric Vehicle Charging Point Strategy. A new Action is included as Action 51.
Action 37: Install eight bespoke secure cycle hubs at stations	7 cycle hubs have been installed. Installation at the Blackhorse Road cycle hub is underway. To be opened in 2020.	<ul style="list-style-type: none"> • 395 bike hangars were installed in 2019 offering 2,370 spaces to residents. • Two additional secure cycle parking are proposed in Chingford and Higham's Park.

across the borough by the end of 2019		ONGOING
Action 38a: Launch fleet of free to hire modified bikes by Autumn 2018 Action 38b: Run taster sessions	<p>In December 2018 the council launched a pilot project for fleet of electric pool bikes.</p> <p>Staff scheme</p> <ul style="list-style-type: none"> • 14 e-bikes for Council staff to use for journeys during work hours, based at Low Hall Depot and the Town Hall • 189 employees signed up to the scheme • 9,650.52km cycled in 2019 <p>Public scheme</p> <ul style="list-style-type: none"> • 50 e-bikes launched publicly on 22 September 2019 • 1521 rentals in 2019 	COMPLETE
Additional Measures and Actions added since AQAP publication (2018)		
Action 39: Research Project with King's College London to be published in July 2018	<p>In 2018 Waltham Forest Council commissioned King's College London's Environmental Research Group to model the impacts of recent road interventions in the borough, particularly the Enjoy Waltham Forest scheme, on air quality. This report has been published on the council website.</p> <p>The report found that that measures to prioritise pedestrians and cyclists such as segregated cycle lanes, increased pocket parks and timed road closures had made a marked contribution to improving air quality and health in the borough</p>	<p>Featured in several news outlets including the evening standard:</p> <p>https://www.standard.co.uk/news/london/children-will-live-longer-thanks-to-waltham-forests-mini-holland-cycle-scheme-a3903256.html</p> <p>COMPLETE</p>

<p>Action 40: Develop a Clean Air Hospital Framework for Whipps Cross University Hospital, in partnership with Barts Health NHS Trust and Global Action Plan.</p>	<p>Waltham Forest Council and Global Action Plan are working together to help hospitals become Clean Air Hospitals, playing their part in helping to reduce air pollution in London and protecting the health of the most vulnerable.</p> <ul style="list-style-type: none"> • understand what it means to be a Clean Air Hospital • assess progress against 7 elements • develop a Clean Air Action Plan to improve air quality • assign ownership within the hospital to implement the plan • track and report progress towards becoming a Clean Air Hospital <p>Impact:</p> <p>Improve the health of people in Waltham Forest by reducing air pollution levels.</p> <p>Outcomes:</p> <p>We will support hospitals in Waltham Forest to achieve the following outcomes:</p> <ul style="list-style-type: none"> • cut NO2 emissions by 5% and PMs by 5% • protect the health of vulnerable patients in Waltham Forest by encouraging them to change their behaviour to benefit their health and reduce air pollution. 	<p>COMPLETE</p> <p>Whipps Cross University Hospital Clean Air Action plan to be published in 2020.</p>
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Action 41: Identify schools that could benefit from green infrastructure and implement greening projects to improve air quality in suitable schools.	A green screen was installed at Woodside Primary in January 2019. A list of schools that were a priority for green screens was compiled. These have now all been installed: Sybourn Primary School- Willowbrook Primary School - George Thomlinson Primary School South Grove Primary School Green Leaf Nursery - Barclay School Walthamstow Barclay School Leyton	COMPLETE Further school green screen projects have been identified for future green screen rollouts.
Action 42: Start Monitoring PM 2.5 in the borough.	In January 2019 a PM2.5 BAM monitor was installed at the Dawlish Road Air Quality monitoring station.	COMPLETE
Action 43: Launch a pedometer challenge to encourage children to walk to school	To celebrate the start of Waltham Forest's year as the first London Borough of Culture, WF contacted all schools in the borough and distributed over 7000 pedometers to schools so pupils can log their steps.	COMPLETE South Grove Primary won with a total of 12,071,811 steps. Prizes for winning included four road safety bollards and goodie bags with AQ mini games for all pupils.
New actions for 2020.		
Action 44: To deliver a programme of school streets projects across the borough	For 2020/21 we currently have 2 school streets pilots confirmed and a further 5 are in consultation.	
Action 45: To continue to develop area based schemes to promote walking and cycling and enhance local neighbourhoods	<ol style="list-style-type: none"> 1. Implementation of the Coppermill Liveable Neighbourhood project in 2020/21 2. South Leytonstone/Newham joint liveable neighbourhood project (subject to funding approval) 3. Leytonstone BLEN commencing 2020/21 	
Action 46: Explore benefits of low cost pollution monitors	Undertake a trial of low cost pollution monitors to explore the accuracy and value of these monitors during 2020/21	

Action 47: Continue to deliver anti-Idling events and explore enforcement options	Participate in the London wide project. Report on enforcement and events. Explore further enforcement options such as introducing a TMO to increase fines.	
Action 48: Develop an indoor AQ improvement assessment project	Explore indoor air filtration and monitoring options in high relative exposure scenarios such as schools in areas of poor air quality.	
Action 49: To hold annual events and activities around Clean Air Day and World Car Free Day to promote walking cycling and improved air quality.	Waltham Forest is part of the Healthy Streets Everyday programme which focuses on six key workstreams: <ol style="list-style-type: none"> 1. Streetscape improvements 2. New traffic regulations to make streets more pedestrian-friendly 3. Car-free events 4. Guidance on how to create Healthy Streets Everyday 5. Communications 6. Evaluation and monitoring of project interventions 	
Action 50: Improve the availability of information about air pollution in Waltham Forest for residents, businesses and visitors to the borough.	<ol style="list-style-type: none"> 1. Revamp the air quality section of the Council's website during 2020/21. 2. Explore options for improved communications to residents about air quality. 	
Action 51: Monitor air quality in all Focus Areas and report on air quality	There are 13 focus areas in the borough. These are: <ol style="list-style-type: none"> 1. Sewardstone Rd & Kings Head Hill 2. Billet Round About, Chingford Rd, Billet Rd 3. Hall Lane & North Circular 4. Southend Rd, Woodford New Rd 	All deployed diffusion tubes will be reported on in the 2020 ASR once they have a full year of data.

<p>improvement projects in these areas.</p>	<p>5. Forest Rd, Blackhorse Rd, Blackhorse Lane 6. Forest Rd & Wood St 7. Lea Bridge Rd 8. Whipps Cross Rd & Lea Bridge Rd 9. Lea Bridge Rd & Markhouse Rd 10. Hoe St 11. Hoe St & Selborne Rd 12. Green Man Round About, Leytonstone High Rd, Gainsborough Rd 13. Leyton High Rd, Warren Rd, Ruckholt Rd</p> <p>Diffusion tubes have now been deployed in all AQ focus areas except for 5. Forest Rd, Blackhorse Rd, Blackhorse Lane as there are ongoing road improvement projects which include works on lampposts.</p>	
<p>Action 52: To support residents and businesses to take up electric vehicles, in order to reduce air pollution caused by vehicle emissions</p>	<p>The Council has adopted an electric vehicle charging point strategy setting out measures and targets to support electric vehicle recharging through to 2025. The key objectives are:</p> <ul style="list-style-type: none"> • Continue to deliver an electric vehicle charging network that meets the demands of residents, businesses and visitors; • Designing sites that take into consideration other road users, particularly pedestrians; • Suitable coverage of the borough by 2025 (our target is for 80% of residents and businesses to be within 250m of a charging point by 2025); • Ensure the charging network has capacity for further expansion; • Encourage the uptake of electric vehicles through initiatives and public engagement; • Identify income opportunities that will lead to the provision and maintenance of charging points becoming cost neutral to the borough 	

Action 53: To improve energy efficiency in privately rented properties with the aim of achieving a minimum EPC standard of 'C'.	This action will primarily be delivered through the Council's property licensing scheme. Targets for this action are being developed.	
Action 54: Undertake a second school superzone project.	This project will build on the successes of the pilot superzone project covered by Action 8. It is planned to identify the location of the new superzone school during later in 2020 and set out clear objectives for the project.	

3. Planning Update and Other New Sources of Emissions

Table L. Planning requirements met by planning applications in Waltham Forest in 2019

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	21
Number of planning applications required to monitor for construction dust	<u>All Major Developments in AQ focus areas or assessed to be medium risk or higher.</u>
Number of CHPs/Biomass boilers refused on air quality grounds	<u>0</u>
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions Number of developments required to install Ultra-Low NO _x boilers	<u>All Applicable Major Developments</u>
Number of developments where an AQ Neutral building and/or transport assessments undertaken	<u>21</u>
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	<u>1</u>
Number of planning applications with S106 agreements including other requirements to improve air quality	<u>21</u>
Number of planning applications with CIL payments that include a contribution to improve air quality	<u>15% of CIL is allocated to Neighbourhood CIL which includes AQ and Sustainable Transport as broad topic spending areas.</u>
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.	<i>94 conditions included. 45 sited visited by 4 boroughs project. 7 sites visited by Merton project. All sites found to be compliant</i>

Construction dust monitoring requirements:

For developments assessed to be medium risk or greater for any of the steps required in an Air Quality and Dust Risk Assessment (AQDRA) regular or continuous PM10 monitoring should be carried out on site. Baseline monitoring should commence 3 months before the commencement of works and continue throughout all construction phases. Details of the equipment to be used, its positioning, additional mitigation to be employed during high pollution episodes and a proposed alert system should be submitted to the Council for approval.

Boiler / CHP / Biomass requirements:

Prior to installation, details of the boilers shall be forwarded to the Local Planning Authority for approval. The boilers shall have dry NOx emissions not exceeding 40 mg/kWh (0%). Should the development have CHP or biomass, the CHP and or biomass boilers must not exceed the Band B Emission Standards for Solid Biomass Boilers and CHP Plant as listed in Appendix 7 of the London Plan's Sustainable Design and Construction SPG document and must have a discharge stack which is at least 3m above any openable windows or ventilation air inlets within a distance of 5Um. Prior to the development commencing, evidence to demonstrate compliance with these emission limits will be submitted to the Local Planning Authority for approval.

3.1 *New or significantly changed industrial or other sources*

No new sources identified

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

The three automatic monitoring sites in the London Borough of Waltham Forest are currently part of the Air Quality England Network operated by Ricardo Energy & Environment. Ricardo Energy & Environment are the current data management providers. The data has traceability to national standards and operational procedures defined for the AURN network. All the monitoring sites are currently audited by Ricardo Energy & Environment. Data from the Council's automatic monitoring data can be found on the following site: <http://www.airqualityengland.co.uk/>

The sites are serviced every six months and are calibrated every 2 weeks by our current service and maintenance provider, Matts Monitors.

PM₁₀ Monitoring Adjustment

Ricardo Energy & Environment add the Volatile Correction Model (VCM) for correction of conventional TEOM PM10 datasets to the Air Quality England web pages. This function automates the VCM process and enables near real time VCM corrected TEOM datasets and statistics to be generated and downloaded. Annually, when AURN FDMS TEOM datasets on which the model is based are ratified, the provisional VCM corrected data will be replaced by ratified VCM corrected datasets.

Ricardo Energy & Environment version of the VCM model follows best practice as advised by Defra and will use available FDMS data as set out within the guidance. For example the model uses the volatile fraction measured by FDMS analysers within a 130 km range where available. This process will correct conventional TEOM measurement to account for the loss of the volatile component of particulate matter due to the high sampling temperatures generated by the TEOM instrument.

A.2 Diffusion Tube Quality Assurance / Quality Control

The Council currently uses Gradko International for the supply and analysis of its diffusion tubes. The tubes are prepared using a 20%TEA/water solution. Gradko International is UKAS accredited and follows the procedures set out in the Practical Guidance.

Refer to <https://laqm.defra.gov.uk/assets/tubeprecision2019version0319finalreduced.pdf> for the summary of precision results for nitrogen dioxide diffusion tube collocation studies. Table 1 below demonstrates Gradko International's performance summary for WASP/AIR quality scheme from January 2017 to October 2018.

A.3 Adjustments to the Ratified Monitoring Data

Table 1:

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR0024, 25, 27, 28, 30, 31, 33 and 34

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $\leq \pm 2$ as defined above.

AIR PT Round	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034
Round conducted in the period	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019	April – May 2019	July – August 2019	September – November 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [2]	100 %	25 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	100 %	50 %	100 %	100 %	100 %	100 %	50 %
Gradko International [1]	100 % [1]	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [2]	NR [2]	NR [2]	25 %	50 %	100 %	50 %	100 %
Milton Keynes Council	100 %	75 %	100 %	100 %	100 %	100 %	50 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Staffordshire County Council	50 %	100 %	100 %	100 %	100 %	75 %	75 %	75 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	50 %	75 %	100 %	100 %	100 %	100 %	100 %	50 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR No results reported

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

Source: <https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>

A bias adjustment factor of 0.93 was used to bias adjust the 2018 diffusion tubes. This figure was obtained from the National Diffusion Tube Bias Adjustment Factor Spreadsheet (spreadsheet version number 03/19) provided by Defra. Previous adjustment factors were also derived from the National Diffusion Tube Bias Adjustment Factor Spreadsheet found on the Defra website: <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>
Bias adjustment factors used in previous years are as follows:

Bias adjustment factors used for previous annual review and assessment reports are as follows:

Year	Bias adjustment factor used	Lab
2010	.85	Bristol Scientific Services
2011	.82	Bristol Scientific Services
2012	.97	Gradko International
2013	.95	Gradko International
2014	.91	Gradko International
2015	.88	Gradko International
2016	.94	Gradko International
2017	.89	Gradko International
2018	.93	Gradko International
2019	.93	Gradko International

All bias adjustment factors were derived from the National Diffusion Tube Bias Adjustment Factor Spreadsheet on the Defra website.

Factor from Local Co-location Studies / Discussion of Choice of Factor to Use

The Council has decided to use the National diffusion tube bias adjustment factor in line with Box 4.10 of the LLAQM technical guidance. The guidance also states that the national factor is likely to be more reliable which backs our decision to use the national factor.

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Annualisation Factor Calculation for Connaught School Nitrogen Dioxide Diffusion Tube (Monitoring Period: January – April 2019, June

2019 & November - December 2019)

<u>Site</u>	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
London Bloomsbury	31.50	34.55	0.91
London Eltham	17.44	19.05	0.91
		Average	0.91

Source: https://uk-air.defra.gov.uk/data/data_selector?

Therefore: Connaught School annual mean (6 months) of $36.1\mu\text{g}/\text{m}^3$ multiplied by 0.91 produces an annualised mean of $32.8\mu\text{g}/\text{m}^3$.

Appendix B Full Monthly Diffusion Tube Results for 2019

Table M. NO₂ Diffusion Tube Results

Site ID	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean NO ₂													Annual mean – raw data ^c	Annual mean – bias adjusted ^c
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec			
1	N/A	91.66667	45.27	36.85	44.21	28.68	33.89	28.53	32.58	29.33		41.52	40.55	39.68	41.19	38.31	
2	N/A	100	59.91	57.89	47.62	43.01	40.07	49.90	37.63	39.60	38.12	58.49	55.73	55.68	52.33	48.67	
3	N/A	100	51.41	48.88	44.32	52.16	39.99	47.13	37.99	33.04	31.13	47.62	53.59	49.76	48.94	45.51	
4	N/A	75	50.34	46.68	43.99		36.58		28.32	33.02	12.85		45.99	54.00	41.42	38.52	
5	N/A	91.66667	41.22	49.97	37.88	26.08	22.95	28.20	22.61	25.62	28.07	33.52	35.36		36.93	34.34	
6	50	50%	45.34	48.18	35.61	39.75	30.42	33.48	N/A	N/A	N/A	N/A	N/A	N/A	38.8	32.8	
7	N/A	83.33333	37.73	37.57	26.09	24.87	19.07		13.00		17.86	29.99	30.88	32.55	32.04	29.80	
8	N/A	91.66667	42.57	37.12	33.32	32.62	25.61	27.66	22.46		25.20	37.26	43.25	39.79	38.07	35.40	
9	N/A	83.33333			35.22	32.06	29.90	30.45	26.83	26.50	26.39	38.12	41.36	38.41	37.02	34.42	
10	N/A	100	50.47	53.30	43.01	37.15	34.72	37.05	34.55	35.23	31.25	48.70	44.94	44.16	45.87	42.65	
11	N/A	100	43.10	42.41	34.61	32.06	24.67	31.29	24.04	27.15	26.42	39.59	38.75	38.99	38.67	35.97	
12	N/A	100	46.36	46.06	35.00	33.18	30.30	32.38	25.63	25.27	29.56	39.11	42.79	38.52	40.47	37.64	
13	N/A	100	35.95	41.62	31.46	26.46	20.19	25.06	20.23	20.24	21.62	33.56	36.52	36.15	34.41	32.00	
14	N/A	83.33333	40.50	37.72	35.09	35.87	29.69			24.94	25.66	38.54	35.84	36.08	38.72	36.01	
15	N/A	91.66667	58.89	56.52	50.42	39.93	51.12	48.12	44.74	46.39	35.10	54.85		58.68	52.52	48.85	

Site ID	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean NO ₂												Annual mean – raw data ^c	Annual mean – bias adjusted ^c
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec		
16	N/A	91.66667	50.88	56.94	50.99		37.32	44.52	43.57	38.62	36.75	54.92	52.97	53.32	50.83	47.27
17	N/A	83.33333	42.84	40.01	32.58	27.32	26.27	25.50		22.53	24.65	37.57	38.62		36.47	33.92
18	N/A	100	40.37	41.84	32.56	28.02	24.64	25.91	21.21	20.89	24.58	35.18	36.66	35.50	35.99	33.47
19	N/A	100	59.89	55.71	43.66	34.91	40.58	46.94	38.93	33.15	33.22	54.79	47.81	49.66	49.13	45.69
20	N/A	100	44.41	52.37	39.66	37.90	32.28	35.28	30.92	26.67	30.42	38.91	46.63	46.79	42.95	39.95
21	N/A	100	43.70	38.27	31.10	31.85	21.63	21.22	18.29	17.96	21.57	32.01	32.70	32.69	34.19	31.80
22	N/A	100	44.14	39.26	31.13	29.70	21.47	25.15	18.62	21.89	22.58	35.31	39.34	34.00	35.72	33.22
23	N/A	100	49.93	45.76	42.95	38.88	39.44	39.86	32.37	26.19	33.73	37.05	49.37	46.87	44.63	41.50
24	N/A	100	<u>74.88</u>	<u>63.77</u>	<u>72.02</u>	45.81	49.94	52.73	47.27	52.17	51.88	<u>67.67</u>	58.70	<u>63.84</u>	<u>61.40</u>	57.10
25	N/A	100	51.65	50.50	45.77	35.82	31.28	37.42	27.45	32.37	31.25	43.84	41.78	42.82	44.09	41.01
26	N/A	100	<u>76.63</u>	<u>72.83</u>	<u>68.32</u>	59.84	47.89	58.02	50.43	50.90	43.87	63.09	57.03	68.48	62.40	58.04
27	N/A	83.33333	<u>63.24</u>	55.60	56.10	35.88	32.15	36.71	32.66	38.68		51.99	40.63		<u>47.91</u>	44.55
28	N/A	91.66667	43.07	39.62	29.70	27.52	19.37	23.32	17.68	20.20	21.88	33.78		34.68	33.44	31.10
29	N/A	100	38.49	38.22	30.03	27.05	16.08	28.15	19.96	24.53	23.33	34.47	37.13	35.93	34.79	32.35
30	N/A	91.66667	52.57	47.78	42.17	34.08	36.35	38.32	36.64	29.30	31.59	48.21		48.22	44.43	41.32
31	N/A	100	40.86	36.43	27.72	27.56	21.79	21.67	19.66	17.92	22.58	46.28	35.75	48.77	34.85	32.41
32	N/A	75		39.12	25.98	28.94	20.95	20.60		21.84		33.40	36.50	36.25	33.59	31.24
33	N/A	100	49.04	44.02	38.50	37.67	30.97	31.52	24.37	27.07	26.26	34.81	47.81	34.65	41.00	38.13
34	N/A	100	48.35	43.90	38.29	39.45	34.40	36.74	28.25	26.14	33.32	48.84	47.97	40.62	43.80	40.74
35	N/A	83.33333	53.32	43.66	36.84	39.91		37.23	28.93	27.70	27.37	40.60	47.69		42.42	39.45

Site ID	Valid data capture for monitoring period % ^a	Valid data capture 2019 % ^b	Annual Mean NO ₂													Annual mean – raw data ^c	Annual mean – bias adjusted ^c
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec			
36	N/A	100	<u>63.05</u>	57.55	48.63	59.42	45.91	51.91	45.59	43.33	39.80	60.24	55.10	56.76	55.88	51.97	
37	N/A	100	59.07	58.46	53.26	45.70	37.34	44.43	38.09	39.02	42.51	44.25	52.18	55.67	51.19	47.61	
38	N/A	100	40.29	41.56	34.38	26.69	25.52	30.39	21.38	26.59	26.38	34.98	35.92	34.85	37.01	34.42	
39	N/A	100	53.24	51.40	37.51	37.24	33.46	36.05	29.59	31.54	30.16	41.77	40.68	41.37	43.55	40.50	
40	N/A	100	52.17	47.34	42.67	38.70	30.17	35.15	29.09	29.93	29.46	41.74	44.89	41.62	43.44	40.40	
41	N/A	100	48.10	44.09	38.69	45.66	39.30	38.73	33.00	22.16	30.46	39.82	48.22	44.34	44.02	40.94	
42	N/A	100	<u>61.70</u>	<u>65.31</u>	49.18	56.32	54.06	<u>62.87</u>	52.30	41.03	46.53	<u>63.26</u>	<u>63.17</u>	<u>63.24</u>	59.64	55.47	
43	N/A	100	57.79	<u>61.65</u>	49.00	42.70	46.62	52.12	42.19	35.89	38.73	52.05	52.51	<u>62.15</u>	52.60	48.92	
44	N/A	100	60.18	<u>62.99</u>	<u>61.23</u>	44.37	40.70	45.31	40.85	35.71	37.45	<u>63.08</u>	54.68	57.25	53.88	50.11	
45	N/A	100	46.00	46.15	28.21	29.20	24.80	29.98	24.04	25.77	26.21	42.98	43.38	40.99	38.89	36.17	
46	N/A	100	42.97	29.44	33.65	25.49	21.48	27.13	22.55	23.73	21.85	33.63	36.16	35.77	34.84	32.40	
47	N/A	100	<u>66.88</u>	58.20	<u>61.66</u>	47.54	53.18	57.55	53.19	49.18	38.23	60.77	56.49	<u>62.21</u>	58.57	54.47	
48	N/A	91.66667	<u>62.48</u>	<u>62.61</u>	53.24	47.43	46.94	54.08	40.30	41.62	36.90		49.96	52.26	53.38	49.65	
49	N/A	100	55.55	56.02	44.80	41.19	41.54	42.68	36.30	32.83	33.57	44.78	46.71	46.04	48.00	44.64	
50	N/A	91.66667	53.50	55.42	50.56	48.90		41.90	35.27	37.11	39.99	44.74	47.98	49.80	49.73	46.25	
51	N/A	91.66667	<u>70.57</u>	59.96	<u>64.81</u>	48.96		55.42	56.75	58.59	<u>60.87</u>	<u>75.11</u>	<u>73.11</u>	<u>66.78</u>	<u>65.07</u>	<u>60.52</u>	
52	N/A	100	<u>70.21</u>	<u>61.75</u>	<u>67.75</u>	59.94	<u>62.39</u>	52.22	51.03	<u>66.11</u>	<u>61.23</u>	<u>66.35</u>	<u>66.09</u>	<u>63.91</u>	<u>65.42</u>	<u>60.84</u>	
53	N/A	100	46.99	52.36	51.54	39.39	36.06	35.58	32.95	38.35	38.23	43.18	47.15	49.77	46.81	43.54	
54	N/A	83.33333	50.59	44.18	34.78	28.11		26.38	21.63	22.65	24.05	36.83		40.62	37.25	34.65	
55	N/A	100	47.53	43.05	35.82	27.38	25.10	25.94	20.69	21.99	21.31	30.29	40.47	42.76	36.63	34.07	

Exceedance of the NO₂ annual mean AQO of 40 µg m⁻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%