London Borough of Merton
Air Quality Annual Status Report for 2018
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This report provides a detailed overview of air quality in the London Borough of Merton during 2018. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). 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

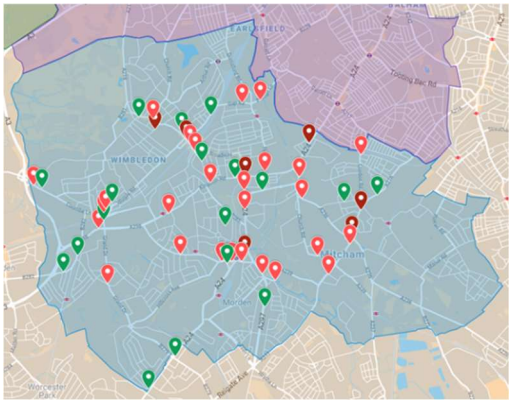
Pollutant	Objective (UK)	Averaging Period	Date[1]
Nitrogen dioxide - NO_2	200 μg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 μg m^{-3}	Annual mean	31 Dec 2005
Particles - PM_{10}	50 μg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40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

Note: [1] by which to be achieved by and maintained thereafter

1. Air Quality Monitoring

The latest monitoring results for 2018 confirm that air pollution in the London Borough of Merton still exceeds the Government Air Quality objectives, and therefore there is still a need for Merton to be designated as an AQMA and to pursue improvements in air quality. In 2018 Merton operated two automatic air quality monitoring sites and a diffusion tube network covering 50 locations around the borough.

All data from the automatic monitoring analysers undergoes quality assurance and quality control (QA/QC) procedures to ensure that the data is of a high quality. The standards of QA/QC at the London Air Quality Network (LAQN) sites are similar to those of the government's national Automatic Urban and Rural Network (AURN) sites. All data is traceability to national standards and operational procedures defined for the London Air Quality Network (LAQN). For QA/QC purposes, all continuous analysers are manually checked and calibrated every two weeks, serviced every six months and audited by an independent auditor (National Physical Laboratory) every six months. With data ratification being undertaken by King's College London.



Merton Council also undertakes non-automatic monitoring of nitrogen dioxide using diffusion tubes, this provides a comprehensive coverage of all hotspots including most main roads and town centres throughout the borough. All sites are kept under constant review and a few will be amended or moved, often in response to requests for more relevant monitoring at the beginning of each year. Diffusion tubes offer a relatively inexpensive means of gauging NO_2 concentrations at a number of locations across the borough. The results provide monthly NO_2 averages and can be used to compare measured concentrations with the annual mean NO_2 objective. The accuracy of diffusion tube data is improved by comparing results with automatic monitoring data and a bias adjusted applied based on calculation of a national factor.

A number of community groups also carry out diffusion tube monitoring to investigate localised areas of concern, this may lead to the identification of new hot spots that can then be added to the council monitoring network. This data will be reported in subsequent ASRs.

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2018

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
ME2	Merton Road, South Wimbledon	525808	170122	Roadside	Y	3m	0.6m	1.6m	PM_{10}	BAM
ME9	Civic Centre, Morden	525588	168498	Roadside	Y	0.6m	3.0m	2.5m	NO_2	chemiluminescent

Table C. Details of Non-Automatic Monitoring Sites for 2018

Notes:

Any ID's from 2016 or earlier are in brackets. Full site descriptions and the 2018 monitoring data for the revised network are provided below.

The 'distance from monitoring site to relevant exposure' for site ID 28 and 41 have been updated.

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance to kerb of nearest road (N/A if not applicable) (m)	Distance from monitoring site to relevant exposure (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)

1	A298 Bushey Rd nr Bushey Ct, SW20	523139	169056	Roadside	Y	1.5	15.3	2.5	NO2	N
2 (GA)	A24 Jct with Garth Drive Morden, SM3 9HU	542131	166112	Roadside	Y	1.7	12.2	2.4	NO2	N
3	A24 Jct Tudor Drive, SM4 4PE	524137	166122	Kerbside	Y	0.7	9.6	2.4	NO2	N
4 (FA)	154 Grand Drive Raynes Park	523315	168048	Kerbside	Y	0.9	3.6	2.4	NO2	N
5 (BA)	Sacred Heart Sch, Burlington Road New Malden	522501	168235	Kerbside	Y	0.7	7.9	2.4	NO2	N
6 (JC)	17 Grand Drive Raynes Park	523207	169195	Kerbside	Y	0.3	8.4	2.4	NO2	N
7	A298 Kingston Rd, SW20 8LX	524401	169351	Roadside	Y	1.5	8.3	2.4	NO2	N
8	A238 Coombe Lane, SW20 8NF	523246	169333	Kerbside	Y	0.6	2	2.2	NO2	N
9	2 Lambton Rd, SW20	523241	169415	Kerbside	Y	0.5	3.6	2.2	NO2	N
10	A238 Coombe Lane, SW20	521912	169806	Roadside	Y	1.7	16.4	2.4	NO2	N
11	Kingston Rd SW20 1JW	525602	170042	Kerbside	Y	0.4	3.4	2.4	NO2	N
12 (RA)	Pepys Road Morden	523357	169534	Kerbside	Y	0.6	10.1	2.4	NO2	N
13	B281 Cottenham Pk Rd, SW20	522069	169765	Kerbside	Y	0.6	12.4	2.2	NO2	N
14 (AC)	20 The Ridgeway Wimbledon	524120	170874	Kerbside	Y	0.4	1.5	2.4	NO2	N

15	20 High St,Wimbledon, SW19 5BY	523808	171100	Kerbside	Y	0.5	2.8	2.2	NO2	N
16	84 High St, Wimbledon, SW19	524071	171076	Kerbside	Y	0.6	2.9	2.2	NO2	N
17 (WA)	Woodside Wimbledon	524608	170873	Kerbside	Y	0.5	6.7	2.4	NO2	N
18	Hand & Racquet, Wimbledon Hill	524696	170725	Kerbside	Y	0.3	2.6	2.4	NO2	N
19	Wimbledon Station	524770	170645	Roadside	Y	2.5	3.6	2.4	NO2	N
20	Hartfield Rd, Wimbledon b	524867	170500	Kerbside	Y	0.4	4.8	2.2	NO2	N
21 (EA)	246 Merton Rd, Sth Wimbledon A219	525798	170081	Roadside	Y	0.5	1.9	2.4	NO2	N
22	12-16 Upper Green West, CR4 3AA	527785	169049	Roadside	Y	2	4.2	2.4	NO2	N
23	183 Kingston Rd, SW19 1LH	525156	169935	Kerbside	Y	0.6	1.9	2.2	NO2	N
24	75 Hartfield Rd SW19 3TJ	524994	170329	Kerbside	Y	0.7	4.1	2.4	NO2	N
25	Alexander Rd, SW19 7LE	525132	171174	Roadside	Y	2.1	4	2.2	NO2	N
26	Gap Rd, SW19 8JG	525708	171413	Roadside	Y	2.3	5.1	2.2	NO2	N
27	Plough Lane	526035	171472	Roadside	Y	2.3	6.5	2.2	NO2	N
28 (BC)	11 Haydons Road SW19 1HG	526158	170167	Roadside	Y	2.4	5.9	2.4	NO2	N

29 (HA)	A24 - 44 High St Colliers Wood, SW19 2AB	526927	170654	Kerbside	Y	0.7	2.6	2.4	NO2	N
30	A24 Christchurch Rd, SW19 2PB	526791	170087	Roadside	Y	0.3	3	2.4	NO2	N
31 (LA)	Alley Charminster Ave Morden	525449	169152	Background	Y	15	9	2.4	NO2	N
32	Merantum Way, SW19 2JY	526109	169818	Kerbside	Y	0.8	4.8	2.4	NO2	N
33	A24 Morden Rd, SW19 3BP	525803	169467	Roadside	Y	2.7	3.6	2.2	NO2	N
34 (GC)	Western Rd Colliers Wood	526840	169694	Roadside	Y	2	2.3	2.2	NO2	N
35 (MA)	Lavender Ave Morden	527621	169646	Kerbside	Y	0.4	5.8	2.2	NO2	N
36 (DC)	35 London Rd Tooting	527913	170518	Roadside	Y	1.5	1.9	2.4	NO2	N
37 (CC)	107 London Rd Tooting	527932	169502	Kerbside	Y	0.6	2.4	2.4	NO2	N
38 (EC)	BHF, 265 London Rd, Mitcham	527743	168874	Kerbside	Y	0.6	4.2	2.4	NO2	N
39 (FC)	Church Rd, Mitcham	527158	168646	Kerbside	Y	0.6	3	2.4	NO2	N
40	A217 London Rd, CR4 4BF	527370	168312	Kerbside	Y	0.8	5.4	2.4	NO2	N
41	A239 Morden Rd, SM4 6AU	526395	168172	Roadside	Y	1.5	3.1	2.4	NO2	N
42	St Hellier Rd, SM4 6JE	526211	167683	Roadside	Y	3.3	12.8	2.4	NO2	N
43	Morden Hall Rd nr jct, SM4 5JG	526151	168293	Roadside	Y	2.4	22.2	2.3	NO2	N
44 (AA)	Oxfam, London Rd, Morden	525817	168643	Kerbside	Y	0.6	4.9	2.4	NO2	N

45 (IC)	HSBC, London Rd Morden	525778	169824	Kerbside	Y	0.9	2.6	2.4	NO2	N
46 (HC)	80 Crown Lane Morden	525401	168502	Kerbside	Y	0.6	5	2.4	NO2	N
47	Civic Centre, Morden	525588	168498	Roadside	Y	1.5	1.5	2.4	NO2	Y
48	Aberconway Rd, SM4 5LF	525757	168509	Roadside	Y	1.2	7.7	2.4	NO2	N
49	Crown Rd, Jcn Stanley Rd	525500	168470	Kerbside	Y	0.8	2.9	2.4	NO2	N
50	Martin Way, SM4 4AR	524638	168616	Kerbside	Y	0.7	9.7	2.4	NO2	N
51	A24 Streatham Rd nr Sandy Lane/Gorringe Pk Sch	528219	169782	Roadside	Y	1.6	5.2	2.4	NO2	N
52	West Barnes Lane nr level crossing	522749	168500	Kerbside	Y	0.6	1.4	2.4	NO2	N
53	A24 139 Epsom Rd, nr traffic lights, SM3 9EY	524621	166786	Kerbside	Y	0.7	3.6	2.4	NO2	N

1.2 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for “annualisation” and bias adjustment. For results that indicate the exposure estimate, calculated for the nearest residential façade see, Appendix A3.

Notes:
Any ID’s from 2016 or earlier are in brackets. Full site descriptions and the 2018 monitoring data for the revised network are provided in Table C.
The ‘distance from monitoring site to relevant exposure’ for site ID 28 and 41 have been updated.

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

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (μg m^{-3})						
					2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
ME9	Civic Centre, Morden	RS Automatic	99%	99%	**48 (48.1)**	**40.1**	38 (37.9)	34	Faulty	Faulty	**48**
1	A298 Bushey Rd nr Bushey Ct, SW20	RS DT	100%	100%	not open	not open	not open	not open	not open	**52**	**47.8**
2 (GA)	A24 Jct with Garth Drive Morden, SM3 9HU	RS DT	100%	100%	37.5	39.6	32.8	32	32[d]	**41**[c]	36.7
3	A24 Jct Tudor Drive, SM4 4PE	KS DT	Closed	Closed	not open	not open	not open	not open	not open	34	closed
4 (FA)	154 Grand Drive Raynes Park	KS DT	100%	100%	34.7	37.7	**43.4** (36.5)	32	39.3[d]	37	30.4
5 (BA)	Sacred Heart Sch, Burlington Road New Malden	KS DT	100%	100%	37.2	42	32.9	28	32[c]	**42**	38.0
6 (JC)	17 Grand Drive Raynes Park	KS DT	100%	100%	N/A	**42.1**	32.4	N/A	34[d]	**45**	**43.0**
7	A298 Kingston Rd, SW20 8LX	RS DT	100%	100%	not open	not open	not open	not open	not open	**44**	**46.0**
8	A238 Coombe Lane, SW20 8NF	KS DT	92%	92%	not open	not open	not open	not open	not open	**53**	**43.1**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
					2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
9	2 Lambton Rd, SW20	KS DT	92%	92%	not open	not open	not open	not open	not open	**43**	**46.8**
10	A238 Coombe Lane, SW20	RS DT	100%	100%	not open	not open	not open	not open	not open	38	**43.6**
11	Kingston Rd SW20 1JW	KS DT	92%	92%	not open	not open	not open	not open	not open	35	35.8
12 (RA)	Pepys Road Morden	KS DT	Closed	Closed	32	35.9	32.8	26	36	30	closed
13	B281 Cottenham Pk Rd, SW20	KS DT	92%	92%	not open	not open	not open	not open	not open	**44**	36.9
14 (AC)	20 The Ridgeway Wimbledon	KS DT	100%	100%	N/A	**47.6**	**41.6** (38)	N/A	**45**[d]	**44**	**42.2**
15	20 High St, Wimbledon, SW19 5BY	KS DT	92%	92%	not open	not open	not open	not open	not open	26	26.2
16	84 High St, Wimbledon, SW19	KS DT	100%	100%	not open	not open	not open	not open	not open	39	**44.9**
17 (WA)	Woodside Wimbledon	KS DT	Closed	Closed	33.3	33.7	**40.5** (36.1)	25	37	30	closed

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
					2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
18	Hand & Racquet, Wimbledon Hill	KS DT	100%	100%	not open	not open	not open	not open	not open	**64**	**65.6**
19	Wimbledon Station	RS DT	100%	100%	not open	not open	not open	not open	not open	**52**	**54.5**
20	Hartfield Rd, Wimbledon b	KS DT	100%	100%	not open	not open	not open	not open	not open	**48**	**55.1**
21 (EA)	246 Merton Rd, Sth Wimbledon A219	KS DT	92%	92%	**52.7**	**57.5**	**61.1 (50.5)**	**65**	**61[d]**	**57**	**68.8**
22	12-16 Upper Green West, CR4 3AA	RS DT	100%	100%	not open	not open	not open	not open	not open	**77**	**63.7**
23	183 Kingston Rd, SW19 1LH	KS DT	100%	100%	not open	not open	not open	not open	not open	**61**	**58.3**
24	75 Hartfield Rd SW19 3TJ	KS DT	100%	100%	not open	not open	not open	not open	not open	38	39.0
25	Alexander Rd, SW19 7LE	RS DT	100%	100%	not open	not open	not open	not open	not open	**41**	39.1
26	Gap Rd, SW19 8JG	RS DT	100%	100%	not open	not open	not open	not open	not open	**47**	**45.3**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
					2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
27	Plough Lane	RS DT	100%	100%	not open	not open	not open	not open	not open	**46**	**45.5**
28 (BC)	11 Haydons Road SW19 1HG	RS DT	100%	100%	N/A	**48.3**	**43.6 (42.6)**	N/A	**54[d]**	**46**	**49.0**
29 (HA)	A24 - 44 High St Colliers Wood, SW19 2AB	KS DT	83%	83%	**50.7**	**52.2**	**49.8 (46.6)**	31	**49.9[c,d]**	**61**	**65.9**
30	A24 Christchurch Rd, SW19 2PB	KS DT	100%	100%	not open	not open	not open	not open	not open	**48**	**50.9**
31 (LA)	Alley Charminster Ave Morden	BG DT	100%	100%	24	26.1	26	17	24	20	20.5
32	Merantum Way, SW19 2JY	KS DT	100%	100%	not open	not open	not open	not open	not open	**42**	38.2
33	A24 Morden Rd, SW19 3BP	RS DT	92%	92%	not open	not open	not open	not open	not open	**49**	**48.2**
34(GC)	Western Rd Colliers Wood	RS DT	92%	92%	N/A	N/A	N/A	**53**	**64[d]**	**59**	**55.4**
35 (MA)	Lavender Ave Morden	KS DT	100%	100%	31.4	35.2	32.2	32	39	31	31.2
36 (DC)	35 London Rd Tooting	RS DT	100%	100%	N/A	**59.3**	**55.5 (50.2)**	**45**	**57[d]**	**42**	**46.9**
37 (CC)	107 London Rd Tooting	KS DT	100%	100%	N/A	**72.6**	**67.2 (54.5)**	**64**	**62[d]**	**61**	**67.3**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
					2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
38 (EC)	BHF, 265 London Rd, Mitcham	KS DT	100%	100%	N/A	**40.4**	38	37	39[d]	**41**	**44.3**
39 (FC)	Church Rd Mitcham	KS DT	83%	83%	N/A	**45.2**	36.2	37	**41[d]**	**45**	**47.9**
40	A217 London Rd, CR4 4BF	KS DT	100%	100%	not open	not open	not open	not open	not open	**46**	**51.9**
41	A239 Morden Rd, nr O, CR4 6AU	RS DT	100%	100%	not open	not open	not open	not open	not open	**41**	**47.5**
42	St Hellier Rd, SM4 6JE	RS DT	92%	92%	not open	not open	not open	not open	not open	35	37.9
43	Morden Hall Rd nr jct, SM4 5JG	RS DT	100%	100%	not open	not open	not open	not open	not open	**44**	**50.1**
44 (AA)	Oxfam, London Rd, Morden	KS DT	100%	100%	**45.1**	**48.2**	**51 (48.7)**	N/A	38[c,d]	**57**	**61.9**
45 (IC)	HSBC, London Rd Morden	KS DT	100%	100%	N/A	N/A	N/A	**40**	**45[c,d]**	**45**	**48.2**
46 (HC)	80 Crown Lane Morden	KS DT	100%	100%	N/A	N/A	N/A	**46**	**48[d]**	61	**52.9**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
					2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
47	Civic Centre, Morden	RS DT	100%	100%	not open	not open	not open	not open	not open	**51**	**51.3**
48	Aberconway Rd, SM4 5LF	RS DT	100%	100%	not open	not open	not open	not open	not open	**41**	**42.1**
49	Crown Rd, Jcn Stanley Rd	KS DT	100%	100%	not open	not open	not open	not open	not open	39	**39.9**
50	Martin Way, SM4 4AR	KS DT	83%	83%	not open	not open	not open	not open	not open	**45**	**43.2**
51	A24 Streatham Rd nr Sandy Lane/Gorringe Pk Sch	RS DT	100%	100%	not open	not open	not open	not open	not open	not open	37.8
52	West Barnes Lane nr level crossing	KS DT	92%	92%	not open	not open	not open	not open	not open	not open	34.6
53	A24 139 Epsom Rd, nr traffic lights, SM3 9EY	KS DT	100%	100%	not open	not open	not open	not open	not open	not open	**43.1**

Notes: Exceedance 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.

[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 D shows the NO_2 diffusion tube monitoring results, with bias corrected values for each year from 2012 to 2018. (Note – see Table M for the uncorrected monthly data for 2018).

Note: Prior to 11th October 2017 continuous monitoring of nitrogen dioxide was measured by instrument ME1. The roadside site was located at Morden Civic Centre and suffered a series of faults during 2016, no data is available for 2016 and 2017 for this reason. A new chemiluminescent NO_2 analyser was installed on the 11th October 2017 identified as ME9.

The results in bold indicate an exceedance of the annual mean objective of 40 μgm^{-3} and the results underlined indicate NO_2 annual means in excess of 60 μgm^{-3} indicating a potential exceedance of the NO_2 hourly mean AQS objective. Diffusion tube data above 40 μgm^{-3} have been corrected for distance and then bias corrected, data capture was above 75% across all sites therefore annualisation was not necessary. The distance correction calculations for monitoring sites that exceeded the annual mean objective are presented in Table L. Nitrogen dioxide concentration reduces rapidly with distance from the kerbside, the data in Table L shows what a dramatic effect distance has on a roadside / kerbside measurement.

Data capture for 2018 has improved again from 2017 with all sites above the 75% validity threshold. The overall data capture rate was 97%, which is very good. The reliability and accuracy of the data is therefore much improved since the implementation of the new monitoring regime in 2017.

Diffusion Tube Data Analysis

The number of sites increased from 20 pre 2017 to 50 sites in 2017, significantly improving coverage across the borough. This will be very useful to gauge trends in future years. To assess the overall change in NO_2 at the 20 original sites the average concentration for 2012-2017 has been compared to 2018 data; eleven sites are relatively static (approximately 5% concentration increase/decrease), three sites have decreased by 10-20%, four sites have increased by 10-20% and two sites have increased by 30% or more. In general, concentrations have slightly decreased along quieter roads, but overall have increased along the busier main routes and town centres, data is charted in Figure 3.

Any increase in concentration over time is a concern, the two sites that have seen the largest increase will be investigated, these are High Street, Colliers Wood (29) and London Road, Morden (44).

The results from the 2018 monitoring show that the objective of 40 μgm^{-3} was exceeded at 36 monitored locations in the borough which is 72% of sites, concentrations are mapped in Figure 1. Six of these sites also exceeded an annual mean of 60 μgm^{-3} which indicates that the 1 hour-mean objective may also have been exceeded at these locations.

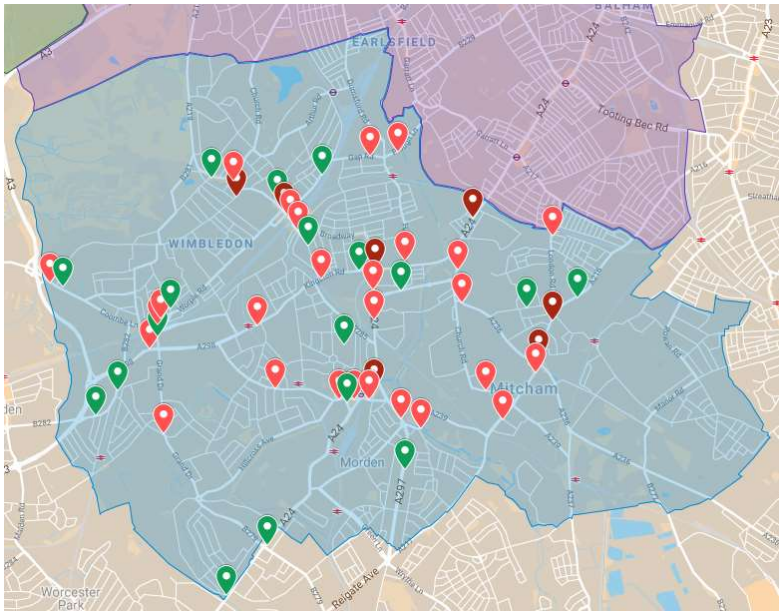
These sites were (site ID):

- (18) Wimbledon Hill, 65.6 μgm^{-3}
- (21) Merton Road, South Wimbledon, 68.8 μgm^{-3}
- (22) Upper Green West (Mitcham Town Centre), 63.7 μgm^{-3}

- **(29) High Street Colliers Wood, 65.9** μgm^{-3}
- (37) London Road, Tooting, 67.3 μgm^{-3}
- **(44) London Road, Morden, 61.9 μgm^{-3}**

In 2017 sites at Kingston Road (23) and Crown Lane Morden (46) were among the six sites exceeding an annual mean of 60 μgm^{-3}, concentrations fell below this threshold in 2018 indicating that an exceedance of the 1 hour-mean objective was unlikely to have occurred at these locations. In 2017 the highest NO_2 annual average was measured at Upper Green West - Mitcham Town Centre (22), as reported last year the elevated concentration was attributed to the redevelopment of the town centre which resulted in roadworks and queuing traffic throughout the year. As predicted the concentration significantly decreased in 2018 from 77 μgm^{-3} to 64 μgm^{-3} once the improvement works were completed.

Figure 1: London Borough of Merton mapped of 2018 NO_2 concentrations

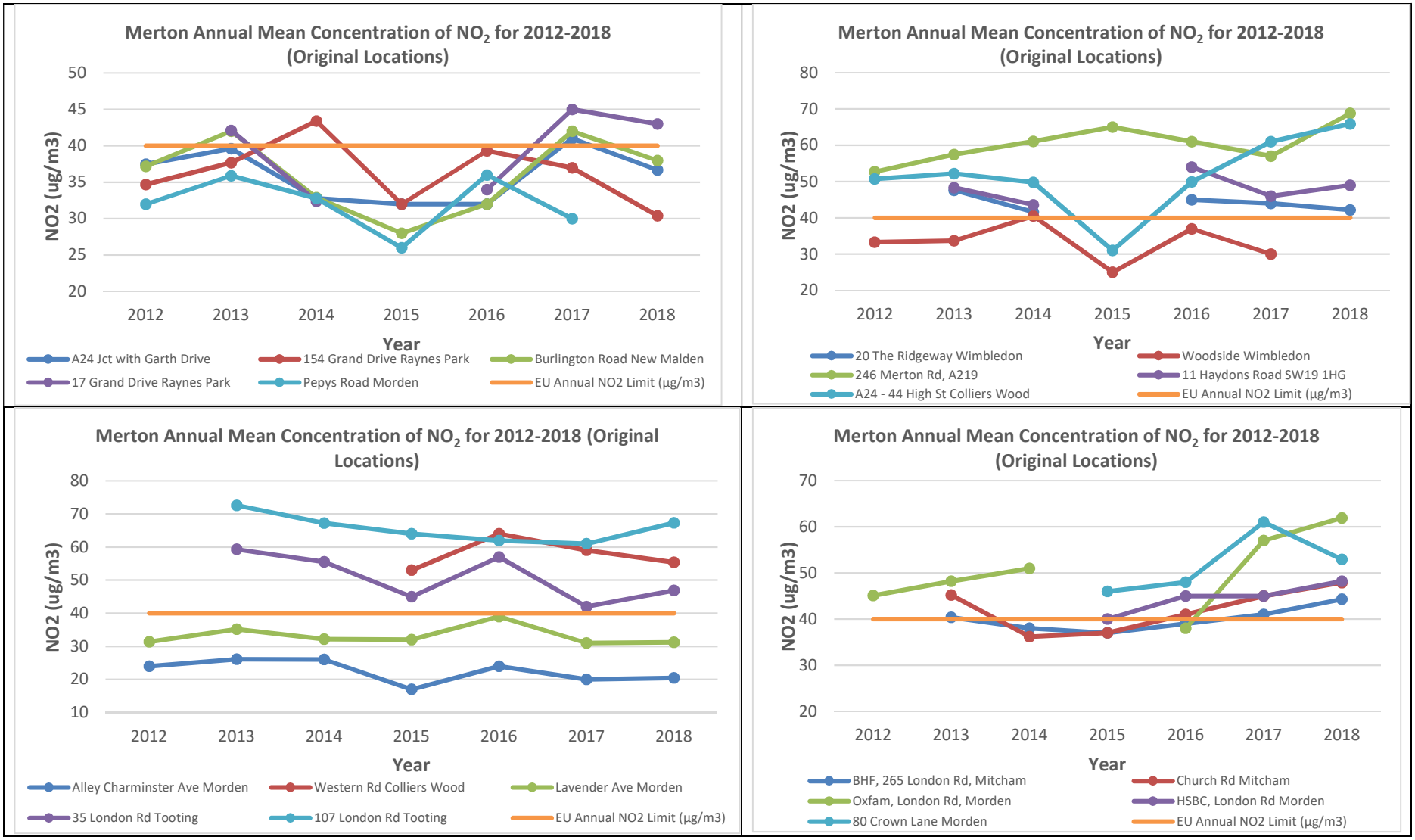


Compliant site: Annual mean NO_2 <40 μgm^{-3}

Non-compliant site: Annual mean NO_2 >40 μgm^{-3}

Non-compliant site: Annual mean NO_2 >60 μgm^{-3} indicating that the short term hourly NO_2 air quality objective may be exceeded.

Figure 2: Long term NO2 concentration trends in Merton 2012-2018



A clear overall reduction in NO_2 is not happening at the rate we had expected. It is known that Euro VI/6 standards have failed to deliver the forecast reductions in NO_2 levels in real world driving conditions that were predicted. The sale of diesel cars has seen a significant reduction over time but the diesel rental market, second-hand diesel market and tempting offers from vehicle manufacturers to buy diesel continues to keep/introduce diesels on to our roads. The number of overall vehicles on the road has continued to increase, hindering reductions in NO_2. A review of the Council's diesel levy will be completed in 2019/2020 to confirm how effective the levy has been in changing driver behaviour towards more environmentally friendly vehicles and the associated air quality benefits.

The overall monitoring results for the Borough show that NO_2 concentrations exceeded the UK annual mean objective (as it has done for each year since 2005), and improvements are still required. As the greatest exceedences occur in town centre and arterial routes through the borough Clean Air Zones supported by other transport related measures such as lobbying TfL for cleaner buses quicker, the diesel levy and encouraging behaviour change of drivers towards more sustainable and lower emission vehicles is key in tackling air pollution.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 µg m^{-3}						
			2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
ME9	99	99	No data	No data	No data	No data	No data	No data	0

Notes: Exceedance of the NO_2 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%

Note: Prior to 11th October 2017 continuous monitoring of nitrogen dioxide was measured by instrument ME1. The roadside site was located at Morden Civic Centre and suffered a series of faults during 2016, no data is available for 2016 and 2017 for this reason. A new chemiluminescent NO_2 analyser was installed on the 11th October 2017 identified as ME9.

Table F. Annual Mean PM10 Automatic Monitoring Results (µg m-3)

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
			2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
ME2	52	52	29	31	28	25	24[c]	24	34[c]

Notes: Exceedance of the PM_{10} 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%

Table F provides results for the automatic monitoring station at the Merton Road, South Wimbledon (ME2) site which houses a Beta Attenuation Monitor (BAM) particulate analyser. The automatic monitoring data for the automatic monitoring stations are subject to correction by Kings College London as part of the London Air Quality Network. BAM particulate analysers are equivalent to the PM_{10} reference method and the applicable correction factor has been applied by Kings College for all data presented in this report.

Data capture for the ME2 automatic PM_{10} analyser was 52% for 2018; as such it was necessary to annualise the data in accordance with the LLAQM Technical Guidance (see Appendix A3 for full calculations). The annual mean concentration for 2018 was estimated to be 34 µgm^{-3} indicating that this site met the annual mean objective (40 µgm^{-3}) for 2018, however this is a large spike looking back over the last 7 years.

The data was ratified by Kings College London who confirmed that there were a number of engineer callouts in 2018 regarding high data. There was a period from mid-June to October that the data showed "some cycling" pattern totally unexpected and as such data for July, August, September and October were excluded. As the data capture was below 75% no firm conclusions can be drawn from this single year of data as results may not be representative of the full year and should be used for guidance only.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µgm^{-3}						
			2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
ME2	52	52	26	31	17 (44.4)	21	8 (36.6)	10 (37.6)	13 (47.3)

Notes: Exceedance of the PM_{10} short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 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%
Warning: PM10 Particulate achieved a capture rate less than 90% for the year (52%). Results may not be representative of the full year and should be used for guidance only.

Table G provides a comparison of the 2018 monitoring data with the 24-hour mean objective. The objective of no more than 35 days exceeding 50 µgm^{-3} was achieved at the Merton Road (ME2) site in 2018. Given that the data capture rate for the year was less than 90% the 24-hour mean objective has been expressed as a 90.4th percentile value at 47.3 µgm^{-3}. As this value is below 50 µgm^{-3} it confirms that if there had been 100% data capture the short term objective would not have been exceeded. While overall there has been a significant reduction in the number of days exceeding 50 µgm-^{3} over the past 7 years with a significant reduction between 2015 and 2016; it is unclear if an upward trend is emerging as year on year between 2016 and 2018 there has been an increase in the 90.4% percentile concentration. As the data capture was below 90% no firm conclusions can be drawn from this single year of data as results may not be representative of the full year and should be used for guidance only.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table H provides a brief summary of *London Borough of Merton* progress against the Air Quality Action Plan, showing progress made this year.

Table H. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress
Monitoring Air Quality		
1	Make available on the Council website all monitoring data in an accessible form.	Annual Status Report due July 2019 diffusion tube map created and embedded in the ASR.
2	Continue to annually review our diffusion tube network and identify additional priority locations.	Additional tube locations expanded through Citizen Science Projects and will be reported in the ASR.
3	Positively encourage and support citizen science activities where these actively contribute to identify and tackling air quality in the borough	Merton Continue to support citizen science projects and provide training and resources including funding additional diffusion tubes.
4	Invest in hand-held monitoring equipment that can be used by citizen science groups and schools.	Investment planned in a new calibrated mobile monitor to use for monitoring specific locations and support projects.
5	Seek additional funding for a refresh and update of our monitoring network including grant funding, Section 106 and Community Infrastructure Levy.	This is ongoing.
6	Produce and update an interactive map of diffusion data that can be contributed to by groups and citizen science activities.	Map complete to be taken to the new AQ focus group.

7	Assess and incorporate new technology in the world of air quality.	Annual monitoring conference meeting held. Piloting new scheme 2018-2019. New Project for 2019.
8	We will commission modelling of air quality in the borough up to 2022, by Kings College London, including predicted trends and contributing sources.	Awaiting ASR Completion and new 2016 data available. ASR Now due July 2018.
9	Map Focus Areas & air quality 'hotspots' on planning GIS mapping to ensure these areas are highlighted	Map currently produced in partnership with our parking colleagues.
Reducing Emissions from Buildings & Developments		
10	Ensure that air quality is a vital part of the Council's New Local Plan.	Stage 2 Local Plan consultation ran (October 2018 - January 2019). Further consultation due in 2020. Mayor's London Plan (also part of Merton's development plan) due to be adopted late 2019.
11	Adoption of New AQ Supplementary Planning Guidance to ensure emissions from new development are minimised and effective mitigation is integrated into the scheme of design.	Partly complete but cannot be used until adoption of Local Plan. This plan will also combine best practice across the Regulatory Services Partnership.
12	Ensure air-quality-neutral development is required, and request where applicable an air quality assessment	This is now standard practice in the planning process.
13	Work with key partners in the GLA to explore the feasibility and delivery of air-quality-positive development particularly around our Focus Areas.	Ongoing
14	Ensure that new development contributes to funding air quality measures in the borough through Section 106 and CIL payments.	In 2018 we secured over £100k in Section 106 contributions towards managing air quality initiatives.

15	Ensure that new development have a scheme of mitigation for tackling air quality including traffic reduction and low emissions strategies.	This is now standard practice in the planning process. The development of Planning Guidance is underway to incorporate best practice.
16	Produce and promote guidance to homeowners on what they can do to their homes to help reduce pollution in the borough.	Seeking additional funding.
17	Consider how we can extend the provision of vehicle charging to smaller residential development to ensure the borough is ready for electric vehicles.	Part of the new SPD and awaiting adoption of local plan.
18	Continue to run our NRMM Project across the south of London and extend this to other boroughs.	This project has now been funded and will be delivered on behalf of London. Separate Project Plan underway.
19	Seek additional funding from DEFRA/GLA/Construction Industry to promote good practice on construction sites.	Funded as part of above the London Code of Practice has now been updated to include Construction Logistics and NRMM requirements.
20	Request adoption of new techniques that have proven to be beneficial to air quality, such as Construction Logistics and Delivery and Service Planning.	New staff appointed in 2018 paid for through Merton's Diesel Levy to deliver these actions.
21	Review the Council's allocation of the Section 106 and CILs budget to see if this can provide funding to benefit air quality measures	Internal meetings underway funding streams identified. Opportunities will run throughout the Plans progress.
22	Continue to request robust and enforceable measures to minimise the impact of developments during the construction phase	With new staffing in 2018 we have started to change our approach to planning.
Reducing Emissions from Road Transport		

23	Commitment to a cycle Quiet-way between Clapham Common & Wimbledon forming the Merton section of the Wandle trail.	TfL are currently reviewing the signage schedule directional/Wayfinding linage and signage is expected to be implemented summer of 2019.
24	Review funding available through Section 106 and CILs around transport and travel infrastructure.	Support for transport infrastructure from relevant substantial developments where meets Section 106 tests. In 2018-19 air quality monitoring has also been negotiated as part of Section 106 from substantial developments. Most travel and transport infrastructure funded either directly by Transport for London or via Merton's Local Improvement Plan 2/3.
25	Carryout a borough wide cycling network audit to review and update the network.	£1.5m is currently being spent on 18 initiatives with a focus on Cycling, Walking and Pedestrian safety. Cycling part of Merton's Local Improvement Plan 3, delivering the Mayor's Transport Strategy. This is due to be signed off in summer 2019.
26	Programme of installing bicycle infrastructure	As above
27	Feasibility study to consider the use of Clean Air Zones (CAZ's) or a Merton Specific Ultra Low Emission Zone for Focus Areas and beyond.	Funding agreed and consultation and scoping report underway, expected to have the scoping and recommendations report completed in 2019. Initial focus on Wimbledon TC, but options are being discussed for other focus areas in the borough.
28	Air Quality Audit traffic and congestion in our three air quality focus areas.	Linked to scoping report above
29	Support and promote the use of a cleaner vehicle checker to inform the public of cleaner vehicle choice.	Now promoted but we need to establish links on our website.
30	Lobby for Cleaner Buses and Taxis	This is an ongoing and priority action for the borough.
31	Introduce Air Quality initiatives, benefits and monitoring in the new South Wimbledon Junction design and build.	Future consideration

32	Review the impact of our diesel levy* and consider a review of parking and charges to help reduce combustion engine vehicle use and the consequent emissions. ***Note:** The Sustainable Communities and Transport Overview and Scrutiny Panel to conduct pre-decision scrutiny on the scope of any reviews on parking levies.*	Merton considerer the use of the parking agenda as key to delivering cleaner air. The diesel levy was one of a number of parking/Air Quality Initiatives which now include a review of parking charges throughout the borough and a future commitment to differential charges.
Raising Awareness		
33	We will continue to support, fund and promote airText and other health based initiatives in the borough.	Merton have funded this important initiative for another 2 years.
34	We will continue to support and update information on our Love Clean Air Website.	Ongoing and will be expanded to other neighbouring boroughs.
35	We will review and update our own corporate website to include themed initiatives.	Communications plan is currently under review
36	We will play an active and co-ordinating role in national and regional campaigns such as National Clean Air Day.	We actively participated in Clean Air day and will be working towards Car Free day.
37	Continue to aspire to London's Cleaner Air Borough status award.	Ongoing and new criteria issued
38	Ensure that the good work and best practice we are delivering is publicised and disseminated to colleagues in the air quality industry.	This is ongoing, we are now running the NRMM project throughout London and pulling together best practice and a consistent approach.
39	Work closely with our Public Health colleagues around joint health benefits.	We work closely and meet regularly with colleagues in Public Health including Directorship. Almost all initiatives are now linked to the public health agenda.
Working Together		

40	Establish a borough-wide air quality group.	We are using the established Environmental Forum to bring together interested and influential people to help deliver the AQAP and help lobby for changes.
41	Establish an internal steering group within the local authority.	Now includes Public Health and Sustainability
42	Provide internal training sessions on air quality to internal partners and Cllrs	New AQ role responsibility
43	Co-ordinate air quality funding and lobby national government to provide further financial and strategic support for local authorities to improve air quality.	We actively respond to all consultations and initiatives, locally, regionally and nationally to raise the issues of air quality and the support needed from Local Authorities
44	Lobby TFL for action on cleaner buses and taxis in our Air Quality Focus Areas.	This is a priority for the borough and an action we continue to do through partnership meetings with TFL
45	The Director of Public Health (DPH) to be kept fully updated on air quality status and initiatives.	See above Action 39
46	Public Health teams to support engagement and projects aimed at local stakeholders (businesses, schools, community groups and healthcare providers).	Joint SNAP (School Neighbourhood Approach Pilot, formerly the Superzones project) project and School Streets pilot are underway. Joint Parking review to link together Public Health and Air Quality and how parking policy can link to this important work.
47	All air quality policies to be signed off by the DPH and to form close links to Public Health objectives.	Joint working and linking to sustainability
48	Make air quality part of The Health & Wellbeing Strategy / Joint Strategic Needs Assessment (JSNA) – the DPH to be retained as a member of the AQ steering group.	Review for 2019
Leading by Example		

49	Review our procurement contracts for outsourced transport services and incorporate policies to establish the best and most cost effective fleet possible.	Parking are commissioning a new fleet and to move towards electric vehicles.
50	Review our maintenance and servicing arrangements for our buildings to ensure that these are as energy efficient and cost effective as possible.	Underway and part of facilities management activities.
51	Ensure all new build and extensions within the council portfolio are to the highest, most efficient standards possible within the allocated budget.	
52	Encourage more walking, cycling and use of public transport for council business and review active travel plan for all staff.	Complete review of active travel plan and parking arrangements for staff across the council. Final report due in 2019. We have a fleet of electric and non-electric bikes for staff and investment in new Brompton bikes that can be taken on public transport to move staff away from private vehicle use. Merton also offer a business mileage scheme for cycling, to push staff towards cycling.
53	Review staff parking to reduce the use of personal vehicles.	Project currently underway. Will include the diesel charge for staff permits. Dedicated transport planner appointed May 2019 by Parking Services and Future Merton to review staff travel plans. Due to report by end 2019.
54	Recruit an Air Quality Officer, funded by our Diesel Surcharge.	New staff appointed on 2018 and funded fulltime on a permanent contract.
Innovation & Technology		
55	We will work closely with our Public Health colleagues to keep up-to-date with the latest research relating to air quality and health.	Meeting monthly

56	We will work closely with Kings College, GLA and APRIL (Air Quality Expert Group) to review the latest monitoring techniques	Annual meetings attended and discussions underway with private companies testing new monitoring techniques.
57	Apply for grant schemes and incorporate new technologies and best practice.	Merton were successful in bidding for the London Wide NRMM project sponsored by the Mayor of London. We were also successful in the Pan London Anti idling project and the South London Consolidation Centre project.
58	Disseminate and publicise our ground-breaking work around schools, NRMM and wood burning appliances.	This is ongoing through working with partner boroughs and the GLA
Tackling Pollution in our Borough		
59	Anti-idling to be adopted as an enforcement action in the borough with associated signage in problem areas.	Over 100 anti-idling signs put up in the borough in 2018, a further 100 have been produced and are currently being rolled out in 2019.
60	Start partnership working with the GLA and surrounding boroughs on anti-idling campaigns.	Merton were successful in its bid to the Pan London project. Additional resources being sought from Cllr's and Community Leaders to supplement our internal anti-idling campaigns.
61	Work with neighbouring boroughs to consider tighter restrictions on bonfires.	Project ongoing as part of the South London Cluster Group.
62	Conduct campaigns relating to wood burning appliances and seek additional funding from DEFRA to carry out an impact assessment and explore further controls	Future action
62	Deliver cleaner construction throughout South London through our NRMM project and extend this nationally.	Project now London wide and funded by MAQF/GLA and match funding from London Boroughs.
64	Assess and inspect newly installed CHPs to ensure compliance with planning conditions	No staff for this function. Awaiting new structure 2019/2020.

Our Schools		
65	Maintain our ongoing commitment to school travel plans and the STARS review.	Merton employ staff specifically for this function, we are coordinating action and linking this to our schools work.
66	Carry out audits of schools in the most polluted areas of the borough and help provide a scheme of mitigation where necessary and possible.	New structure and staffing arrangements in April 2019.
67	Review and assess annually the necessity for audits at schools and nurseries in areas subject to high levels of pollution.	List of schools to audit now complete. New Audits start in April 2019.
68	Incorporate schools in areas of poor air quality into our monitoring network and regime.	Merton have now committed to extend monitoring to all schools in the borough, Roll-out starts summer 2019.
69	Joint working arrangements with Public Health partners around schools to deliver joint health benefits.	SNAP project (School Neighbourhood Approach Pilot, formerly the Superzones project) underway. Business Case has now been submitted and 4 schools have been chosen for the pilot scheme.
70	Work with and provide specialist advice and support to schools around air quality issues.	Measure now extended to pedestrian streets with parking.

3. Planning Update and Other New Sources of Emissions

Table I. Planning requirements met by planning applications in the London Borough of Merton in 2018

Action	Number	Notes
a) Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	5	A total of 273 planning applications were considered for air quality impacts.
b) Number of planning applications required to monitor for construction dust	43	There are a number of ongoing major developments in the borough which provide phased Construction Environmental Management Plans for approval.
c) Number of CHPs/Biomass boilers refused on air quality grounds	0	
d) Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	1	Some ongoing applications.
e) Number of developments required to install Ultra-Low NO_x boilers	0	An ultra-low NOx condition will be added to the standard planning conditions for all development size.
f) Number of developments where an AQ Neutral building and/or transport assessments undertaken	5	
g) Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0	

h) Number of planning applications with S106 agreements including other requirements to improve air quality	3	2 x Agreements Available Sustainable Transport Contributions expressly stated as which may include Car Clubs, one of those agreements includes further car club entitlements to be put in place by the owner for occupants of the development. 2 x further agreements with car club arrangements.
Number of planning applications with CIL payments that include a contribution to improve air quality	N/A	Under the CIL Regulations 2010 CIL expenditure is not accounted for at the planning application level.
i) NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	N/A	The London Borough of Merton is entirely outside of the Central Activity Zone and Canary Wharf.
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.	Total Sites Audited 12	Compliant Sites: 2 (22%) Non-compliant Sites: 6 (67%) Self-compliant Sites: 1 (11%) No NRMM on site: 3 Of the 12 sites audited 7 were 'Cold Engaged'

We recognise that this table has been difficult for some boroughs to complete, either because planning data is not collected or not collected in a form that is easily translatable into the table. The purpose of each row in the table is to assess implementation of GLA planning or policies. An

additional column has been added for notes where you can note any qualifications to the data or local policies that are relevant (e.g. use of standard conditions).

Notes on the table:

a. The purpose of this row is to identify whether all applications that are submitted with an air quality assessment or EIA are checked by the air quality officer/team. The requirement to submit an assessment is subject to local validation criteria, however the new London Plan specifies that all major developments should be accompanied by an assessment, so this should equal at least the number of major applications received once the new London Plan is finalised.

b. The purpose of this row is to understand how widely active dust monitoring is used on construction sites. Dust monitoring is recommended in the GLA Control of Dust and Emissions during Construction and Demolition SPG for some high-risk sites. This number should include all sites where monitoring is required by condition or secured as part of a construction management plan or similar.

c. This purpose of this row is to understand how far air quality policies are influencing the design or choice of communal heating systems. For the purposes of recording, “refused” should include applications where air quality impacts from the heating system are included in the reasons for formal refusal and applications where the energy strategy has been revised post-submission to remove CHP or biomass as a result of air quality concerns raised during the decision-making process.

d. The purpose of this row is to ensure that the emissions limits for CHP and Biomass set out in Appendix 7 of the GLA Sustainable Design and Construction SPG are implemented. You should only count instances where compliance with these limits (or tighter limits, if required) have been secured by condition. You may want to note instances where conditions have not been imposed in the notes column.

e. This row should record the number of planning permissions where use of ultra-low NO_x boilers were required as a direct condition or as a condition securing conformity with submitted documents, not the total number of boilers. Where standard conditions are used it is sufficient to say all developments, or all developments that meet a particular threshold (or however the decision to use standard conditions is done.)

f. The purpose of this row is to identify how well applicants are implementing the requirement to undertake an air quality neutral assessment as part of the overall air quality assessment for developments.

g. This row is intended to identify how challenging it is for developers to meet air quality neutral and should count the number of applications where the initial air quality neutral calculation showed the benchmarks were not met and additional on-site mitigation measures were agreed with the developer prior to grant of consent.

h. These rows should be used to record the number of developments where payments of off-site measures were secured from the developments. This could be measures in lieu of meeting Air Quality Neutral on-site or other actions and payments relating to local policies or needs. It is not necessary to provide the amount of financial contributions.

i. These rows should record the number of planning permissions where compliance with the NRMM LEZ is required as a direct condition or as a condition securing conformity a code of practice or a CMS requiring compliance. Where standard conditions are used it is sufficient to say all developments, or all developments that meet a particular threshold (or however the decision to use standard conditions is done.)

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

All data undergoes quality assurance and quality control (QA/QC) procedures to ensure that the data obtained are of a high quality.

The continuous analyser is manually checked at frequent intervals by the local authority Air Quality Officer when filters are changed and the inlet head cleaned to remove any build-up of dirt. For QA/QC purposes, all continuous analysers are manually checked and calibrated every two weeks, serviced every six months and audited by an independent auditor (National Physical Laboratory) every six months

PM_{10} Monitoring Adjustment

The TG09 guidance highlights that BAM instruments (as used at the Merton ME2 site) were shown to be equivalent to the PM_{10} reference method, provided that the results are corrected for slope. The monitoring results have been corrected by a factor of 1.2. Thus the results for the Merton ME2 site are reference equivalent.

Results from 2012 to 2018 (inclusive) are reported. Data capture for 2014 was 77%, for 2016, 71% and for 2017 80%. As the data capture fell below 90% for 2014, 2016 and 2017, the data has been annualised to provide an annual mean value and the 90.4th percentile of the one-hour mean has been included for comparison against the 24-hour mean objective. The "annualisation" calculation for the Merton Road ME2 site for 2018 is provided in Appendix A3 below.

A.2 Diffusion Tube Quality Assurance / Quality Control

Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (EC, 2008) sets data quality objectives for NO_2 along with other pollutants. Under the Directive, annual mean NO_2 concentration data derived from diffusion tube measurements must demonstrate an accuracy of ±25 % to enable comparison with the NO_2 air quality objectives of the Directive. In order to ensure that NO_2 concentrations reported are of a high quality, strict performance criteria need to be met through the execution of QA and QC procedures.

A number of factors have been identified as influencing the performance of NO_2 diffusion tubes including the laboratory preparing and analysing the tubes, and the tube preparation method (AEA, 2008). QA and QC procedures are therefore an integral feature of any monitoring programme, ensuring that uncertainties in the data are minimised and allowing the best estimate of true concentrations to be determined.

Merton's NO_2 diffusion tubes are analysed by Gradko using 50% TEA in acetone method of preparation. Gradko take an active role in developing rigorous QA and QC procedures in order to maintain the highest degree of confidence in their laboratory measurements. Gradko were involved in the production of the Harmonisation Practical Guidance for NO_2 diffusion tubes (AEA, 2008) and

have been following the procedures set out in the guidance since January 2009. Since April 2014 Gradko has taken part in a new scheme AIR PT, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

This section contains details of Gradko International Ltd's Results of laboratory precision

- Performance in AIR NO2 PT Scheme (April 2016 – February 2018)

- Summary of Precision Scores for 2016 - 2018

- UKAS schedule of accreditation (January 2019)

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO2 concentrations reported are of a high calibre.

Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (April 2017 – February 2019).

Gradko participate in the AIR PT NO_2 diffusion tube scheme which uses artificially spiked diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis. The scheme is designed to help laboratories meet the European Standard. Gradko demonstrated "good" laboratory performance for every month in 2018 for 50% TEA in Acetone.

The laboratory follows the procedures set out in the Harmonisation Practical Guidance and participates in the AIR proficiency-testing (AIR-PT) scheme. Previously to the Air-PT scheme, Gradko participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO2 diffusion tube analysis. Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme.

Laboratory performance in the AIR-PT is also assessed by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Inter-Comparison Exercise carried out at for Gradko at Marylebone Road, central London. A laboratory is assessed and given a 'z' score, a score of ± 2 or less indicates satisfactory laboratory performance. Gradko International Ltd's performance for 2018 is covered by rounds AR019 to AR030 of the AIR-PT scheme. For 2018 the laboratories results were deemed to be good for 111 participating local authorities, satisfactory for 7 and poor for 7 participating local authorities based upon a z score of ≤ ± 2.

In 2018, the tube precision for NO2 Annual Field Inter-Comparison for Gradko International using the 50% TEA in acetone method was 'good' for the results of all 8 participating local authorities and poor for no participating local authority.

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR0019, 21, 22, 24, 25, 27, 28 and 30

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

AIR PT Round	AIR PT AR019	AIR PT AR021	AIR PT AR022	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030
Round conducted in the period	April – May 2017	July – August 2017	September – October 2017	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
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 %	100 %	100 %	100 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	50 %	0 %	100 %	100 %	100 %	50 %	100 %	100 %
Gradko International [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 %	100 %	100 %	75 %
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]	100 %	NR [2]	NR [2]	NR [2]	25 %	50 %
Milton Keynes Council	75 %	0 %	75 %	100 %	75 %	100 %	100 %	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 %	75 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	50 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	75 %	100 %	100 %	100 %

[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.

2016 - 2018 Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies for Gradko Laboratory 50% TEA in Acetone

	Gradko, 50% TEA in Acetone
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	G
2016	P
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	P
2017	P
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G

P Poor Precision

G Good Precision

2016 Results of study carried out in 2016

2017 Results of study carried out in 2017

2018 Results of study carried out in 2018

Numerical results for this data are contained in the National Bias Adjustment Spreadsheet version 03/19.

UKAS schedule of accreditation (January 2019)

Gradko is accredited by UKAS for the analysis of NO_2 diffusion tubes. It undertakes the analysis of the exposed diffusion tubes by ultra violet spectrophotometry.

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS TESTING

2187

Accredited to ISO/IEC 17025:2005

Gradko International Ltd
(Trading as Gradko Environmental)

Issue No: 023 **Issue date:** 17 January 2019

St Martins House 77 Wales Street Winchester Hampshire SO23 0RH	Contact: Mr A Poole Tel: +44 (0)1962 860331 Fax: +44 (0)1962 841339 E-Mail: diffusion@gradko.co.uk Website: www.gradko.co.uk

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors	Chemical Tests	Documented In-House Methods
	Ammonia as ammonium (NH_4^+)	GLM 8 by Ion Chromatography
	Benzene Toluene Ethyl benzene Xylene	GLM 4 by Thermal Desorption/ FID Gas Chromatography
	Hydrogen chloride as chloride (Cl^-) Nitrogen dioxide as nitrite (NO_2^-) Sulphur dioxide as sulphate (SO_4^{2-}) Hydrogen fluoride as fluoride (F^-)	GLM 3 by Ion Chromatography
	Hydrogen sulphide	GLM 5 by Colorimetric determination (UV Spectrophotometry)
	Ozone as nitrate (NO_3^-)	GLM 2 by Ion Chromatography
	Nitrogen Dioxide as nitrite (NO_2^-)	GLM 7 by Colorimetric determination (UV Spectrophotometry)
	Sulphur dioxide as sulphate (SO_4^{2-})	GLM 1 by Ion Chromatography
	Formaldehyde as formaldehyde-DNPH	GLM 18 by HPLC
	Volatile Organic Compounds including: Benzene Toluene Ethylbenzene p-Xylene o-Xylene	GLM 13 by Thermal Desorption GC-Mass Spectrometry

Assessment Manager: RP

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Accredited to ISO/IEC 17025:2005

Schedule of Accreditation
issued by
United Kingdom Accreditation Service
2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Gradko International Ltd
(Trading as Gradko Environmental)
Issue No: 023 **Issue date:** 17 January 2019

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors (cont'd)	Chemical Tests (cont'd)	
	Qualitative Analysis and Estimation of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors	GLM 13 by Thermal Desorption GC-Mass Spectrometry with estimations in accordance with ISO standard 16000-6
	Naphthalene	GLM 13-1 by Thermal Desorption GC-Mass Spectrometry
	Tetrachloroethylene Trichloroethylene	GLM 13-2 by Thermal Desorption GC-Mass Spectrometry
	trans-1,2-Dichloroethene cis-1,2-Dichloroethene	GLM 13-3 by Thermal Desorption GC-Mass Spectrometry
	Indane Styrene	GLM 13-4 by Thermal Desorption GC-Mass Spectrometry
	1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene	GLM 13-5 by Thermal Desorption GC-Mass Spectrometry
	1,3-Butadiene	GLM 13-6 by Thermal Desorption GC-Mass Spectrometry
	Carbon Disulphide	GLM 13-7 by Thermal Desorption GC-Mass Spectrometry
	Vinyl Chloride	GLM 13-8 by Thermal Desorption GC-Mass Spectrometry
	Flexible scope for quantitative analysis of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors in accordance with methods developed and validated by in-house procedure LWI 47	LWI 47 by Thermal Desorption GC-Mass Spectrometry
END		

Assessment Manager: RP

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Factor from Local Co-location Studies (if available)

Co-location data was not submitted to the National Physical Laboratory (NPL) in 2018 however data will be submitted to NPL in 2019 to allow a local bias adjustment factor to be derived for Merton.

Discussion of Choice of Factor to Use

The Gradko Laboratories 50% TEA national correction factor has been used to bias adjust all NO_2 diffusion tubes. For 2018 the correction factor was 0.92.

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

For monitoring sites where data capture is less than 75% of a full calendar year (less than 9 months), the mean has been "annualised" using the methodology outlined in LLAQM Technical Guidance (TG16) before being compared to annual mean objectives.

NO_2 Adjustment

Data capture for the automatic analyser ME9 in 2018 was 99% and as such annualisation was not required.

PM_{10} Adjustment

Data capture for the automatic analyser ME2 in 2018 was 52% and as such annualisation has been completed using the methodology outlined in LLAQM Technical Guidance (TG16).

The monitoring data has been taken from the London Air website 'Monthly Species Reports' in Tables J1, J2, J3.

To estimate the measured mean concentration (M) for ME2 months with data capture >75% were used; March, April, May, November and December as shown in Table J1.

The annulisation factor (Ra) was calculated using data from Wandsworth – Putney urban background site in Table J2 and Richmond – Barnes Wetlands suburban site in Table J3.

The estimated PM_{10} annual mean concentration for ME2 is 27.2 μgm^{-3}

Table J1: 2018 PM_{10} data summary for ME2

Report Item Name	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PM10 Particulates													
Data capture rate (%):	52.0		73	95	80	99	25				69	78	100
Hourly mean (μgm^{-3}):	53.8		51	56.3	54.1	64.6	51.4				39.7	56.5	49.7
Low days:	171.0		20	28	21	26	7				19	20	30
Moderate days:	13.0		0	1	3	5	0				0	3	1
High days:	0.0		0	0	0	0	0				0	0	0
Very High days:	0.0		0	0	0	0	0				0	0	0
Mean: (AQS Objective <40 μgm^{-3})	32.0		27.9	31.4	35.4	38.1	31				23.6	35.3	28.1
Days where daily mean >50 μgm^{-3}: (AQS Objective <= 35)	13.0												

Measured mean concentration (Mar, Apr, May, Nov, Dec) (M)	33.7 μgm^{-3}
Annualisation factor (Ra)	0.81
Estimate of annual mean	**27.2 μgm^{-3}**

Table J2: 2018 data summary for Wandsworth – Putney urban background monitoring site

Report Item Name	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PM10 Particulates													
Data capture rate (%):	95.0	100	78	100	100	99	88	82	99	99	100	100	97
Hourly mean (ug/m3):	29.8	25.3	29	33.6	35	38.8	29.3	30.5	25.4	26.3	25	32.4	26.3
Low days:	345.0	31	21	30	30	31	26	25	31	30	31	30	29
Moderate days:	1.0	0	0	1	0	0	0	0	0	0	0	0	0
High days:	0.0	0	0	0	0	0	0	0	0	0	0	0	0
Very High days:	0.0	0	0	0	0	0	0	0	0	0	0	0	0
Mean: (AQS Objective <40 μgm^{-3})	17.0	14.2	18	20.4	20.7	24.8	16.6	17.9	12.4	14.7	14.9	18.9	15.6
Days where daily mean >50 μgm^{-3}: (AQS Objective <= 35)	1.0												

Annual Mean (Am)	17 μgm^{-3}
Period Mean (Mar, Apr, May, Nov, Dec) (Pm)	20.08
Ratio (Am/Pm)	0.87

Table J3: 2018 data summary for Richmond – Barnes Wetlands suburban monitoring site

Report Item Name	Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PM10 Particulates													
Data capture rate (%):	95.0	100	100	99	100	100	100	99	100	100	99	100	40
Hourly mean (ug/m3):	25.1	21.1	24.7	30	30.6	33	24.3	25.6	15.3	22.2	23.1	29	18.4
Low days:	345.0	31	28	30	30	31	30	31	31	30	31	30	12
Moderate days:	1.0	0	0	1	0	0	0	0	0	0	0	0	0
High days:	0.0	0	0	0	0	0	0	0	0	0	0	0	0
Very High days:	0.0	0	0	0	0	0	0	0	0	0	0	0	0
Mean: (AQS Objective <40 μgm^{-3})	14.0	12.3	14.8	17.8	18.3	19.9	13.9	14.6	8.9	11.8	12	16.5	10.5

Days where daily mean >50 μgm^{-3}: (AQS Objective <= 35)	1.0												

Annual Mean (Am)	14 μgm^{-3}
Period Mean (Mar, Apr, May, Nov) (Pm)	18.12
Ratio (Am/Pm)	0.77

Note: As the data capture for December was <75% this month was omitted from the period mean calculation.

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

Site	Site Type	Annual Mean (μg/m^3)	Period Mean (μg/m^3)	Ratio
Wandsworth - Putney	Urban Background	17	20	0.85
Richmond – Barnes Wetlands	Suburban	14	18	0.77
			Average	0.81

Distance Adjustment

Where exceedences of the annual mean have been measured, distance correction calculations have been performed so that concentrations are representative of exposure at the nearest façade. The concentration at the nearest receptor has been estimated using the LAQM NO_2 Fall-off with Distance Calculator (Version 4.1) in line with the procedure detailed in LLAQM.TG (16).

The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source. The monitored annual mean value used in the calculation is the 'raw' value which has not been bias adjusted and the background concentration is derived from the Wetlands background site in the London Borough of Richmond.

Table L: Distance Adjustment Monitored Annual Mean NO_2 compared to exposure at nearest façade (μgm^{-3})

Site ID	Site Name	Monitored annual mean NO_2 concentration (μgm^{-3})	Distance corrected NO_2 concentration (μgm^{-3})
1	A298 Bushey Rd nr Bushey Ct	**52.0**	35.7
5 (BA)	Sacred Heart Sch, Burlington Road New Malden	**41.3**	31.6
6 (JC)	17 Grand Drive Raynes Park	**46.8**	32.3
7	A298 Kingston Rd, SW20 8LX	**50.0**	38.7
8	A238 Coombe Lane by Lloyds	**46.9**	**41.0**
9	2 Lambton Rd(nr shops)	**50.9**	**40.1**
10	A238 nr 251 Coombe Lane	**47.4**	33.4
13	B281 4 Cottenham Pk Rd	**40.1**	29.0
14 (AC)	20 The Ridgeway Wimbledon	**45.9**	**40.1**
16	84 High St, Wimbledon, SW19	**48.8**	**40.5**
18	Hand & Racquet, Wimbledon Hill	**71.3**	**53.3**
19	Wimbledon Station	**59.2**	**55.7**
20	Hartfield Rd opp Suburban Bar	**59.9**	**43.0**
21 (EA)	246 Merton Rd, Sth Wimbledon A219	**74.8**	**61.9**
22	12-16 Upper Green West, CR4 3AA	**69.3**	**60.7**
23	183 Kingston Rd, SW19 1LH	**63.4**	**54.5**
24	75 Hartfield Rd SW19 3TJ	**42.4**	35.0
25	Alexander Rd, SW19 7LE	**42.5**	39.1
26	Gap Rd, SW19 8JG	**49.2**	**43.6**
27	Plough Lane	**49.4**	**42.0**
28 (BC)	11 Haydons Road SW19 1HG	**53.2**	**45.9**
29 (HA)	A24 - nr Colliers Wood tube, SW19 2AB	**71.6**	**58.9**
30	A24 Christchurch Rd, SW19 2**PB**	**55.3**	**42.1**
32	Merantum Way, SW19 2JY	**41.6**	34.1
33	A24 Morden Rd, SW19 3BP	**52.4**	**50.1**
34 (GC)	Western Rd Colliers Wood	**60.3**	**59.0**
36 (DC)	35 London Rd Tooting	**51.0**	**49.4**
37 (CC)	107 London Rd Tooting	**73.2**	**59.7**
38 (EC)	BHF, 265 London Rd, Mitcham	**48.2**	38.2

39 (FC)	Church Rd Mitcham	**52.1**	**42.7**
40	A217 London Rd, CR4 4BF	**56.4**	**43.0**
41	A239 Morden Rd, nr O, CR4 6AU	**51.6**	**46.6**
42	St Hellier Rd, SM4 6JE	**41.2**	33.6
43	Morden Hall Rd nr jct, SM4 5JG	**54.5**	35.7
44 (AA)	Oxfam, London Rd, Morden	**67.3**	**49.1**
45 (IC)	HSBC, London Rd Morden	**52.4**	**45.6**
46 (HC)	80 Crown Lane Morden	**57.5**	**43.0**
47	Civic Centre, Morden	**55.8**	**55.8**
48	Aberconway Rd, SM4 5LF	**45.7**	35.7
49	Crown Rd, Jcn Stanley Rd	**43.4**	37.6
50	Martin Way, SM4 4AR	**46.9**	33.6
51	A24 Streatham Rd nr Sandy Lane/Gorringe Pk Sch	**41.1**	35.6
53	A24 139 Epsom Rd, nr traffic lights, SM3 9EY	**46.8**	38.5

Notes:
Exceedance of the NO2 annual mean AQO of 40 μgm^{-3} are shown in bold
Exceedance of the NO2 annual mean AQO of 60 μgm^{-3} are shown in bold and underlined

Appendix B Full Monthly Diffusion Tube Results for 2018

Table M. NO_2 Diffusion Tube Results (μgm^{-3})

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Measured (raw)	Bias adjusted
1	64.29	39.64	60.12	51.17	50.84	48.99	53.07	42.41	52.25	53.69	49.70	57.41	100%	100%	**52.0**	**47.8**
2 (GA)	46.81	35.79	48.14	38.31	39.07	34.72	39.07	29.33	36.83	43.20	44.81	42.01	100%	100%	39.8	36.7
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	closed
4 (FA)	31.84	36.15	40.88	33.36	34.20	23.77	38.35	25.08	23.05	36.28	32.10	41.72	100%	100%	33.1	30.4
5 (BA)	48.83	41.95	32.66	40.61	43.32	40.32	40.83	35.37	36.01	46.60	42.73	46.39	100%	100%	**41.3**	38.0
6 (JC)	47.32	45.71	54.23	35.74	45.59	43.30	51.82	36.39	42.10	58.61	52.17	48.13	100%	100%	**46.8**	**43.0**
7	57.93	47.44	49.59	48.19	54.54	47.43	51.22	41.44	48.14	55.89	52.51	46.03	100%	100%	**50.0**	**46.0**
8	53.65	46.92	53.75	44.81	2.03	53.52	64.53	49.27	49.33	M	52.52	45.58	92%	92%	**46.9**	**43.1**
9	49.79	69.92	61.17	45.29	51.43	54.77	M	42.44	39.36	50.54	42.35	52.59	92%	92%	**50.9**	**46.8**
10	53.46	82.67	50.70	44.23	42.64	43.78	43.02	36.55	39.99	45.57	44.81	40.79	100%	100%	**47.4**	**43.6**
11	E <1.32	41.94	40.83	38.97	43.28	39.93	41.14	30.62	32.18	43.95	42.26	33.01	92%	92%	38.9	35.8

12 (RA)	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
13	45.71	37.52	42.58	39.65	41.86	38.41	43.54	35.20	38.17	40.52	M	38.04	92%	92%	**40.1**	36.9
14 (AC)	48.10	48.49	47.32	42.57	48.51	48.77	45.72	35.25	44.75	50.33	45.11	45.77	100%	100%	**45.9**	**42.2**
15	32.71	32.89	34.57	28.56	33.15	26.25	24.23	9.61	27.14	30.58	M	33.60	92%	92%	28.5	26.2
16	47.81	47.37	55.48	46.43	52.65	47.25	55.85	38.93	44.95	46.17	53.08	49.74	100%	100%	**48.8**	**44.9**
17 (WA)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	closed
18	71.68	68.37	67.13	65.19	75.85	67.65	85.88	62.85	67.08	77.88	75.56	70.34	100%	100%	**71.3**	**65.6**
19	52.01	65.75	61.28	61.38	65.02	54.99	66.09	48.65	51.67	62.31	62.20	59.35	100%	100%	**59.2**	**54.5**
20	51.44	72.17	62.73	51.56	67.65	59.15	63.11	46.08	49.72	63.51	67.93	63.93	100%	100%	**59.9**	**55.1**
21 (EA)	E <1.32	64.66	77.78	68.66	96.94	82.60	88.22	53.91	56.26	73.72	75.19	84.92	92%	92%	**74.8**	**68.8**
22	65.00	76.60	73.41	77.00	68.38	58.33	81.60	73.05	70.24	58.64	73.46	55.47	100%	100%	**69.3**	**63.7**
23	72.04	74.77	68.84	60.22	70.62	62.84	68.87	58.34	66.10	51.39	61.28	45.34	100%	100%	**63.4**	**58.3**
24	39.90	37.63	54.89	39.88	34.99	32.03	38.28	35.64	36.79	44.03	41.93	72.51	100%	100%	**42.4**	39.0
25	43.45	47.72	46.07	36.82	45.66	34.74	41.02	35.02	43.37	47.03	46.30	43.19	100%	100%	**42.5**	39.1
26	50.42	45.33	55.19	52.88	47.02	42.53	56.17	44.12	26.25	59.91	59.38	51.79	100%	100%	**49.2**	**45.3**
27	55.53	48.63	53.71	51.11	50.26	44.24	46.77	41.55	44.48	53.81	54.72	48.16	100%	100%	**49.4**	**45.5**
28 (BC)	47.38	70.48	52.61	52.45	55.71	54.84	56.32	44.00	46.34	53.75	55.70	49.23	100%	100%	**53.2**	**49.0**
29 (HA)	87.18	78.21	M	63.89	M	71.01	85.83	70.46	63.30	67.68	66.71	62.02	83%	83%	**71.6**	**65.9**
30	59.15	45.99	46.47	51.68	49.89	44.39	67.31	58.26	59.90	59.91	63.38	56.95	100%	100%	**55.3**	**50.9**
31 (LA)	27.71	28.64	25.08	21.24	22.09	14.59	12.50	18.24	19.29	22.37	30.12	25.98	100%	100%	22.3	20.5
32	49.74	42.41	49.26	39.69	33.83	32.07	42.92	40.43	39.73	39.95	43.09	45.62	100%	100%	**41.6**	38.2
33	52.68	70.02	55.53	54.26	52.03	40.94	53.68	42.15	46.40	53.15	M	55.40	92%	92%	**52.4**	**48.2**

34 (GC)	64.56	62.78	62.79	60.67	57.08	47.17	72.54	57.76	M	56.60	65.66	55.24	92%	92%	**60.3**	**55.4**
35 (MA)	37.73	35.52	36.97	32.51	34.94	27.50	31.59	28.37	28.77	40.11	37.55	34.89	100%	100%	33.9	31.2
36 (DC)	49.35	45.02	57.79	50.05	62.20	50.07	57.25	39.57	42.62	52.68	55.51	50.04	100%	100%	**51.0**	**46.9**
37 (CC)	70.00	78.36	75.85	60.66	91.97	76.57	83.62	58.24	68.37	70.79	77.78	65.81	100%	100%	**73.2**	**67.3**
38 (EC)	44.94	43.80	50.61	42.30	57.56	46.21	58.34	46.67	51.94	51.55	44.58	39.91	100%	100%	**48.2**	**44.3**
39 (FC)	53.03	46.98	M	49.47	57.40	55.00	58.01	46.74	50.13	56.85	M	47.50	83%	83%	**52.1**	**47.9**
40	56.20	65.66	55.55	52.00	62.13	57.17	62.39	47.63	55.85	58.80	56.78	46.44	100%	100%	**56.4**	**51.9**
41	48.91	77.48	54.81	49.13	59.28	41.03	50.90	44.15	47.88	51.80	49.93	44.49	100%	100%	**51.6**	**47.5**
42	47.59	43.65	49.03	41.29	42.61	36.26	42.38	29.53	36.21	41.58	M	42.92	92%	92%	**41.2**	37.9
43	50.71	77.24	48.38	53.99	69.70	61.55	60.93	36.02	48.54	49.69	53.02	44.14	100%	100%	**54.5**	**50.1**
44 (AA)	69.45	69.98	69.89	72.02	74.39	69.14	87.66	62.99	60.29	59.61	58.57	53.71	100%	100%	**67.3**	**61.9**
45 (IC)	48.33	65.57	53.40	45.96	50.49	47.24	50.18	47.80	50.81	62.55	51.84	54.74	100%	100%	**52.4**	**48.2**
46 (HC)	50.87	65.34	43.66	57.26	69.50	59.45	67.85	49.79	57.55	65.62	48.73	54.73	100%	100%	**57.5**	**52.9**
47	51.55	57.68	57.69	56.71	55.09	44.57	62.13	50.53	52.31	60.95	61.98	58.11	100%	100%	**55.8**	**51.3**
48	49.17	47.46	48.19	44.09	46.73	37.70	48.72	42.21	45.22	47.65	44.87	46.80	100%	100%	**45.7**	**42.1**
49	39.34	37.19	53.32	43.91	43.59	31.44	48.24	37.98	42.88	49.03	51.78	42.23	100%	100%	**43.4**	**39.9**
50	47.35	46.30	53.02	41.71	43.15	42.33	46.44	M	46.91	M	48.07	54.09	83%	83%	**46.9**	**43.2**
51	46.59	40.43	44.17	39.41	39.75	39.03	38.79	35.00	39.43	47.12	43.92	39.49	100%	100%	**41.1**	37.8
52	M	39.30	43.36	38.61	34.36	24.42	34.40	32.76	37.19	43.39	42.45	42.93	92%	92%	37.6	34.6
53	47.24	45.80	53.01	49.64	37.91	41.63	52.85	48.66	47.07	49.79	53.43	34.65	100%	100%	**46.8**	**43.1**

Exceedance of the NO_2 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%

Notes:
C = closed site
M = Missing diffusion tube
E = Erroneous concentration. Low concentrations (3 µg m-3 or less) are rare at urban background or roadside sites in built up areas. Where such a low concentration is measured at an urban site, where measured NO2 concentrations are usually much higher, it is unlikely to be genuine, and more likely due to a faulty diffusion tube. In this instance the result has been removed from the annual analysis and marked as erroneous.
High concentrations: unless there is a reason why the result is likely to be spurious, it is best to err on the side of including high values rather than rejecting them. As such higher than 'normal' concentrations have been left in the annual analysis.