The London Borough of Wandsworth

Air Quality Annual Status Report for 2022

Date of publication: May 2023

This report provides a detailed overview of air quality in the London Borough of Wandsworth during 2022. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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

Executive Summary

The London Borough of Wandsworth is committed to improving air quality in the Borough. The Council is demonstrating its political leadership; taking action; leading by example; monitoring air quality; using the planning system; integrating air quality into the public health system; and informing the public. This 2022 Annual Status Report reviews recent air quality monitoring in the Borough in accordance with Defra LAQM guidance. In doing so, it fulfils one further aspect of this ongoing commitment.

The report identifies that:

For carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide there is not a significant risk of the objectives being exceeded in the Council's area.

In January 2001, the Council designated an Air Quality Management Area (AQMA) across the whole Borough for nitrogen dioxide and particles (specifically PM_{10}). The findings from this report indicate that the AQMA should be maintained.

In view of the findings from the report, the Council will undertake the following actions:

1. Undertake consultation with the statutory and other consultees as required.

2. Maintain the existing monitoring programme.

3. Update and implement its Air Quality Action Plan in pursuit of the AQS objectives.

4. Prepare for the submission of its next Air Quality report.

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Abbreviations

Abbreviation	Description
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
EV	Electric Vehicle
GLA	Greater London Authority
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LLAQM	London Local Air Quality Management
NRMM	Non-Road Mobile Machinery
PM_{10}	Particulate matter less than 10 micron in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micron in diameter
TEB	Transport Emissions Benchmark
TfL	Transport for London

Table A. Summary of National Air Quality Standards and Objectives and World Health Organisation (WHO) guidelines

Pollutant	Standard / Objective (UK)	Averaging Period	Date[1]
Nitrogen dioxide (NO_2)	200 µg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
Nitrogen dioxide (NO_2)	40 µg m^{-3}	Annual mean	31 Dec 2005
Particles (PM_{10})	50 µg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
Particles (PM_{10})	40 µg m^{-3}	Annual mean	31 Dec 2004
Particles ($PM_{2.5}$)	20 µg m^{-3}	Annual mean	2020
Particles ($PM_{2.5}$)	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
Sulphur dioxide (SO_2)	266 µg m^{-3} not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
Sulphur dioxide (SO_2)	350 µg m^{-3} not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
Sulphur dioxide (SO_2)	125 µg m^{-3} mot to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004

Notes:

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

Pollutant	Standard / Objective (UK)	WHO guideline (µg/ m³)	Averaging period
PM_{10} particulates	40	15	Annual
$PM_{2.5}$ particulates	25	5	Annual
Nitrogen Dioxide	40	10	Annual

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2022

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
WA2	Wandsworth Town Hall	525779	174662	Urban background	Y	22	22	4.85	NO_2, O_3	Chemiluminescent
WA7	Putney High Street	524035	175334	Kerbside	Y	1	0.5	1.75	NO_2, PM_{10}	Chemiluminescent; TEOM
WA8	Putney High Street facade	524032	175335	Roadside	Y	1	1	4.85	NO_2	Chemiluminescent
WA9	Felsham Road, Putney	524044	175495	Urban background	Y	4.8m from Felsham Road	1	2.75	NO_2, PM_{10}	Chemiluminescent; TEOM
WAA	Thessaly Road, Battersea	529137	177249	Roadside	Y	7.5m from Battersea Park Road	1	1.75	NO_2, PM_{10}	Chemiluminescent; TEOM
WAB	Tooting High Street	527567	171628	Roadside	Y	2	2	1.75	NO_2, PM_{10}	Chemiluminescent; TEOM
WAC	Lavender Hill, Clapham Junction	527430	175454	Roadside	Y	8m from Lavender Hill	1	1.75	NO_2, PM_{10}	Chemiluminescent; TEOM

Table C. Details of Non-Automatic Monitoring Sites for 2022

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
W23	**37 West Hill**, Wandsworth Town	525111	174619	Roadside	Y	2.20	3.02	2.52	NO$_2$	N
W24	**Putney** sign (Mac Donald's), Putney	524045	175366	Roadside	Y	2.35	2.35	2.3	NO$_2$	N
W21 W22	**Felsham Road tube 1 & tube 2**, Putney	524044	175495	Urban Background	Y	4.8	1	3.35	NO$_2$	Y
W6	**21 Daylesford Avenue**, Putney	522270	175307	Urban Background	Y	11	2.4	2.85	NO$_2$	N
W25	**Roehampton Church School** (Roehampton Ln)	522542	173700	Roadside	Y	0.86	0.53	2.25	NO$_2$	N
W26	**Replingham Road** (corner of Heythrope street), Southfield	524847	173282	Kerbside	Y	2.54	0.62	2.37	NO$_2$	N
W27	**68-70 Sutherland Grove** (opposite St. Cecilia's school), Southfield	524633	173594	Urban Background	Y	2.00	0.65	2.83	NO$_2$	N
W28	**61 Summerley Street**, Earlsfield	526011	172869	Urban background	Y	2.06	0.60	2.36	NO$_2$	N
W29	**Junction Skelbrook Street / Garratt Lane**, Earlsfield	526099	172833	Roadside	Y	0.70	3.29	2.27	NO$_2$	N
W4	**108 Mitcham Road**, Tooting Broadway	527688	171204	Kerbside	Y	3	0.6	2.65	NO$_2$	N
W8	**50 Bickely Street**, Tooting Broadway	527524	171239	Urban Background	Y	2.97	1.85	2.8	NO$_2$	N
W30	**11B Elmbourne Road**, Balham	528900	172431	Urban Background	Y	4.50	0.50	2.56	NO$_2$	N

| Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
W31	**Junction Hildreth Street / Bedford Hill**, Balham	528607	173333	Kerbside	Y	1.44	3.64	2.21	NO$_2$	N
W32	**2-3 Balham High Road**, Balham	528436	173133	Kerbside	Y	4.40	0.71	2.30	NO$_2$	N
W34	**46 Shelgate Road**, Northcote	527569	174986	Urban Background	Y	2.14	0.40	2.38	NO$_2$	N
W35	**47 Northcote Road**, Northcote	527487	174981	Kerbside	Y	4.21	0.49	2.37	NO$_2$	N
W36	**St. Anne's Hill**, Fairfield	525875	174616	Urban Background	Y	2.73	0.89	2.38	NO$_2$	N
W37	**302A Merton Rd**, Southfields	525278	173483	Roadside	Y	17.3	3.35	2.33	NO$_2$	N
W38	**High View School**, Plough Terrace, Fairfield	526863	175239	Kerbside	Y	0.45	0.45	2.42	NO$_2$	N
NE2	**Chesterton School**, Latchmere	528043	176618	Roadside	Y	2.85	2.85	2.20	NO$_2$	N
NE3	**Queenstown Road**, Queenstown	528771	176819	Kerbside	Y	1.05	1.05	2.30	NO$_2$	N
NE4	**Lockington Road**, Battersea	528871	176943	Urban Background	Y	1.22	0.69	2.37	NO$_2$	N
NE5	**Kirtling Street**, Queenstown	529265	177353	Kerbside	Y	0.50	0.50	2.35	NO$_2$	N
NE6	**Nine Elms Lane**, Queenstown	529413	177486	Kerbside	Y	0.53	0.53	2.40	NO$_2$	N
NE7	**1 Nine Elms, Parry Street**, Queenstown	530129	177727	Roadside	Y	0.5	0.5	2.35	NO$_2$	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
NE8	**Battersea Park**, Queenstown	528023	177176	Urban Background	Y	420	420	2.37	NO$_2$	N
YR1	**Trafalgar House**, St Mary's Park	526201	175340	Kerbside	Y	0.84	0.84	2.30	NO$_2$	N
YR2	**Royal Academy of Dance**, St Mary's Park	526581	175731	Kerbside	Y	14.0	0.70	2.26	NO$_2$	N
YR3	**Cotton Row**, St Mary's Park	526480	175930	Urban background	Y	160m from York	160m from York road	2.34	NO$_2$	N
YR4	**York Road, corner with Falcon Road**, Latchmere	527086	176119	Kerbside	Y	0.75	0.75	2.25	NO$_2$	N
YR5	**256 Battersea Park Road**	527109	176022	Kerbside	Y	0.63	0.63	2.32	NO$_2$	N
YR6	**31-32 Battersea Square**	526817	176686	Kerbside	Y	0.44	0.44	2.35	NO$_2$	N
W39	**Carlton Dr/ Putney Hill** Putney, SW15 6BQ	523898	174717	Kerbside	Y	18	0.5	2.2	NO$_2$	N
W40	**Roehampton High St.** Roehampton, SW15 4HL	522343	173805	Kerbside	Y	13	0.5	2.2	NO$_2$	N
W41	**Northcote Rd/Broomwood Rd** Battersea, SW11 6RE	527675	174339	Kerbside	Y	2	0.7	2.2	NO$_2$	N
W42	**Bellevue Rd/ Trinity Rd** Bellevue Rd, SW17 7E0	527426	173249	Roadside	Y	10	1.1	2.2	NO$_2$	N
W43	**Trinity Rd** Fitzhugh Grove SW18 3SA	526783	174250	Roadside	Y	18	2	2.2	NO$_2$	N
W44	**Thessaly Rd** Marsh House SW8 4JJ	529425	176920	Roadside	Y	26	1.5	2.2	NO$_2$	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
W45	**A24 Wimbledon** Sewing Machines SW17 7BA	528096	172439	Roadside	Y	21	2.5	2.2	NO$_2$	N
W46	**Trinity Rd** SW17 7HL	527639	172882	Kerbside	Y	11	0.8	2.2	NO$_2$	N
W47	**West Hill** Wandsworth, SW18 1RB	525243	174643	Kerbside	Y	5	0.7	2.2	NO$_2$	N
W48	**Balham High Rd** Balham, SW17 7BS	528263	172735	Kerbside	Y	22	0.5	2.2	NO$_2$	N
W49	**Garratt Ln/ Earlsfield Rd** (Earlsfield, SW18 4SW)	525987	173077	Kerbside	Y	7	0.5	2.3	NO$_2$	N
W50	**Penwith Rd/Garratt Ln** (Earlsfield, SW18 4EJ)	525945	173083	Roadside	Y	13	1.1	2.2	NO$_2$	N
SA1	**Louisville Rd** (Tooting Bec, London SW17 8RL)	528160	172414	Kerbside	Y	9.5	0.4	2.3	NO$_2$	N
WH1	**Roehampton Lane/ Upper Richmond Road** (London SW15 5QY)	522078	175466	Kerbside	Y	13	1.0	2.2	NO$_2$	N
WH2	**Priory Lane/ Upper Richmond Rd** (Priory Ln, London SW15 5LA)	521752	175435	Roadside	Y	13	2.5	2.1	NO$_2$	N
WH3	**Clarence Ln/Roehampton Ln** (1 Clarence Ln London SW15 4PN)	522087	174262	Kerbside	Y	12	0.6	2.1	NO$_2$	N
New Locations added since January 2022										
W51	**Aldrington Road/North Drive** (Tooting Common, SW16 1TU)	529390	171787	Kerbside	Y	10	0.8	2.2	NO$_2$	N
BW1	**Burntwood Ln** (Junction of Tranmere Rd and Aboyne Rd, SW17 0AL)	526503	172556	Kerbside	Y	6	0.7	2.4	NO$_2$	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
BW2	**Burntwood Ln** (Bridgfort / France Court, SW17 0AH)	526335	172395	Kerbside	Y	5.15	1.0	2.4	NO_2	N

Figure 1. Map of Non-Automatic Monitoring Sites (Diffusion tubes).
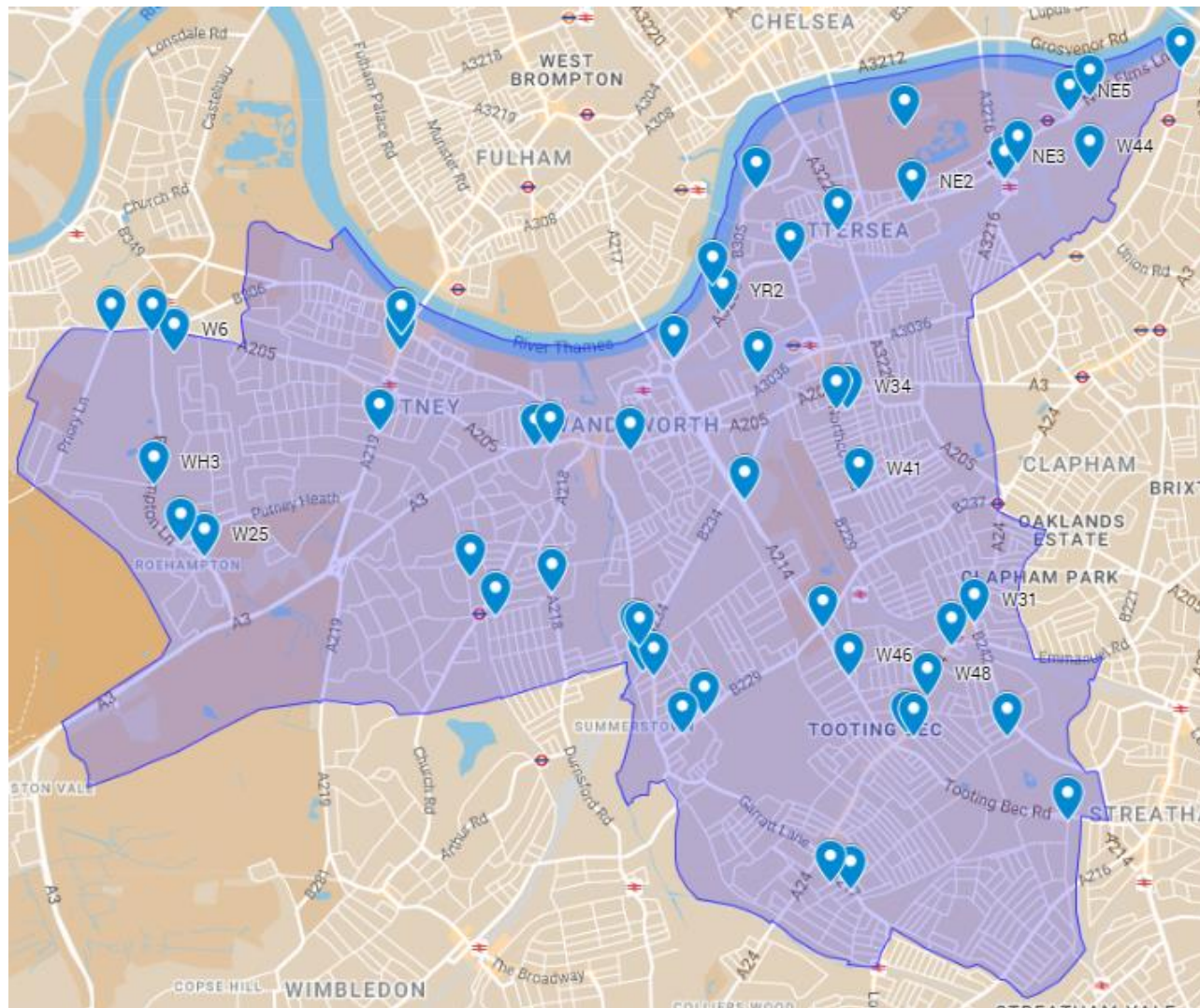
1.2 Comparison of Monitoring Results with AQOs

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

The results presented are after bias adjustment using the national bias adjustment factor (refer to Appendix A2 for details). Annualisation was required at one site (ID:BW1) in the main Wandsworth diffusion network in 2022, all other sites achieved a data capture rate of 75% or higher. Where the annual mean is 10% of, or above, the 40μg m^{-3} AQO relevant exposure has been calculated, refer to Table N, Appendix A for corrected data. All data presented in Table D has not been corrected for distance and represent a worst case picture.

Table D. Annual Mean NO₂ Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
WA2 (Wandsworth Town Hall)	Automatic	100	93	43	**40**	38	**41**	30	29	28
WA7 (Putney High Street)	Automatic	100	12	**124**	**76**	**68**	**69**	58	**62**	Insufficient valid results available for this year.
WA8 (Putney High Street first floor)	Automatic	100	67	**110**	**60**	**62**	**66**	53	57	**51ᶜ**

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
WA9 (Felsham Road)	Automatic	100	14	45	31	35	35	26	27	Insufficient valid results available for this year.
WAA (Thessaly Road, Battersea)	Automatic	100	75	40	33	33c	32	27	28	27
WAB (Tooting High Street)	Automatic	100	45	59	55	53	50	35c	34c	34c
WAC (Lavender Hill, Clapham Junction)	Automatic	100	21	46	43	42	37 c	31	35	Insufficient valid results available for this year.
W23 (37 West Hill)	Diffusion tube	100	83	not open	57	55	49	39	45	38
W24 (Putney Sign Mac Donald's)	Diffusion tube	100	100	not open	63	55	59	49	47	43
W21 & W22 (Felsham road, tube 1 & 2)	Diffusion tube	100	100	41	28	32	30	23	24	22
W6 (21 Daylesford Avenue)	Diffusion tube	100	100	28	23	23	23	16	16	15

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
W25 (Roehampton Church School)	Diffusion tube	100	100	not open	32	29	27	20	21	19
W26 (Replingham Road)	Diffusion tube	100	100	not open	31	30	31 c	21	19	17
W27 (68-70 Sutherland Grove)	Diffusion tube	100	100	not open	24	25	23	16	19	15
W28 (61 Summerley street)	Diffusion tube	100	100	not open	27	28	27	20	21	17
W29 (Junction Skelbrook St./Garratt L)	Diffusion tube	100	100	not open	31	32	31	21	22	19
W4 (108 Mitcham road)	Diffusion tube	100	100	**80**	**66**	**64**	**62**	**51**	**50**	**46**
W8 (50 Bickely street)	Diffusion tube	100	92	35	31	31	28	22	24	21
W30 (11B Elmbourne road)	Diffusion tube	100	100	not open	33	31	29	21	23	19
W31 (Junction Hildreth St./Bedford Hill)	Diffusion tube	100	100	not open	39	39	36	26	29	25
W32 (2-3 Balham High road)	Diffusion tube	100	92	not open	**46**	**44**	39	31	31	28

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
W34 (46 Shelgate road)	Diffusion tube	100	92	not open	31	30	31	21	22	19
W35 (47 Northcote road)	Diffusion tube	100	75	not open	34	35	32	24	25	21
W36 (St Anne's Hill)	Diffusion tube	100	100	not open	39	33	31	23	23	20
W37 (302A Merton Rd)	Diffusion tube	100	92	not open	not open	37	37	27	25	22
W38 (High View School)	Diffusion tube	100	92	not open	not open	32	29	22	23	20
NE2 (Chesterton School)	Diffusion tube	100	83	not open	not open	35	34	24	25	22
NE3 (Queenstown Road)	Diffusion tube	100	100	not open	not open	**63**	**59**	**42**	**40**	35
NE4 (Lockington Road)	Diffusion tube	100	92	not open	36	34	31	24	25	22
NE5 (Kirtling Street)	Diffusion tube	100	83	not open	not open	**46**	**39**	29	31	26
NE6 (Nine Elms Lane)	Diffusion tube	100	100	not open	not open	**54**	**48**	**40**	**40**	34

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
NE7 (1 Nine Elms, Parry)	Diffusion tube	100	100	not open	not open	**49**	**47**	34	34	28
NE8 (Battersea park)	Diffusion tube	100	100	not open	not open	24 c	20	15	16	14
YR1 (Trafalgar House)	Diffusion tube	100	100	not open	not open	**53**	**44**	34	31	28
YR2 (Royal Academy of Dance)	Diffusion tube	100	92	not open	not open	<u>**75**</u>	**57**	37	36	36
YR3 (Cotton Row)	Diffusion tube	100	92	not open	not open	31	29	24	24	20
YR4 (York road, corner with Falcon Road)	Diffusion tube	100	100	not open	not open	**49**	**49**	38	38	31
YR5 (256 Battersea Park Road)	Diffusion tube	100	100	not open	not open	<u>**73**</u>	<u>**70**</u>	**52**	**55**	**43**
YR6 (31-32 Battersea Square)	Diffusion tube	100	92	not open	not open	**44**	**43**	32	30	27
W39 Carlton Dr/ Putney Hill (Putney, SW15 6BQ)	Diffusion tube	100	100	not open	not open	not open	not open	29	32	28
W40 Roehampton High St. (Roehampton, SW15 4HL)	Diffusion tube	100	100	not open	not open	not open	not open	25	26	24

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
W41 Northcote /Broomwood Rd (Battersea, SW11 6RE)	Diffusion tube	100	100	not open	not open	not open	not open	25	26	20
W42 Bellevue Rd/ Trinity Rd (Bellevue Rd, SW17 7E0)	Diffusion tube	100	100	not open	not open	not open	not open	48	45	38
W43 Trinity Rd (Fitzhugh Grove SW18 3SA)	Diffusion tube	100	100	not open	not open	not open	not open	28	28	25
W44 Thessaly Rd (Marsh House SW8 4JJ)	Diffusion tube	100	83	not open	not open	not open	not open	21	22	19
W45 A24 Wimbledon (Sewing Machines SW17 7BA)	Diffusion tube	100	100	not open	not open	not open	not open	31	31	27
W46 Trinity Rd (SW17 7HL)	Diffusion tube	100	100	not open	not open	not open	not open	38	37	30
W47 West Hill (Wandsworth, SW18 1RB)	Diffusion tube	100	100	not open	not open	not open	not open	58	64	60
W48 Balham High Rd (SW17 7BS)	Diffusion tube	100	100	not open	not open	not open	not open	27	27	23
W49 Garratt Ln/ Earlsfield Rd (Earlsfield, SW18 4SW)	Diffusion tube	100	100	not open	not open	not open	not open	not open	32	29
W50 Penwith Rd/Garratt Ln (Earlsfield, SW18 4EJ)	Diffusion tube	100	75	not open	not open	not open	not open	not open	32	26

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
SA1 Louisville Rd, (Tooting Bec, London SW17 8RL)	Diffusion tube	100	100	not open	not open	not open	not open	not open	22	19
WH1 Roehampton Lane/ Upper Richmond Road (London SW15 5QY)	Diffusion tube	100	100	not open	not open	not open	not open	not open	32	27
WH2 Priory Lane/ Upper Richmond Rd (Priory Ln, London SW15 5LA)	Diffusion tube	100	100	not open	not open	not open	not open	not open	27	23
WH3 Clarence Ln/Roehampton Ln (1 Clarence Ln London SW15 4PN	Diffusion tube	100	100	not open	not open	not open	not open	not open	34	29
W51 Aldrington Road/North Drive (Tooting Common, SW16 1TU)	Diffusion tube	100	100	not open	not open	not open	not open	not open	not open	19
BW1 Burntwood Ln (Junction of Tranmere Rd and Aboyne Rd, SW17 0AL)	Diffusion tube	83	67	not open	not open	not open	not open	not open	not open	35
BW2 Burntwood Ln (Bridgfort / France Court SW17 0AH)	Diffusion tube	83	83	not open	not open	not open	not open	not open	not open	22

Notes:

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

Exceedances of the NO$_2$ annual mean AQO of 40 µg m^{-3} are shown in **bold**.

NO$_2$ annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO$_2$ hourly mean AQS objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias.

All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%. **This applied to WA8 (Putney High Street first floor), WAB (Tooting High Street) automatic analysers and site BW1 (Burtnwood Lane) in 2022.**

Results have been distance corrected where applicable.

(a) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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

Maximum data capture for the monitoring period, for all diffusion tube sites was a full 12 months – 100%. Missing tubes resulted in slightly reduced data capture at individual sites.

Data capture at WA9 (Felsham Road) was 14%, below the 90% required by DEFRA. For this reason the National bias adjustment factor for Gradko was used to bias adjust all air quality sites in Wandsworth borough. For more information, see Appendix A.2.

Figure 2: Map of NO$_2$ diffusion tubes monitoring sites in the London borough of Wandsworth showing annual mean results from 2022.

Diffusion tubes (<40μg m^{-3})

Diffusion tubes (>40μg m^{-3})

Legend

On this map, the squares represent NO$_2$ diffusion tubes and ID.
The annual mean objective NO$_2$ is 40μg m^{-3}.
All monitoring sites that recorded NO$_2$ concentrations above this level are coloured in red and all that are below this level are coloured in green.
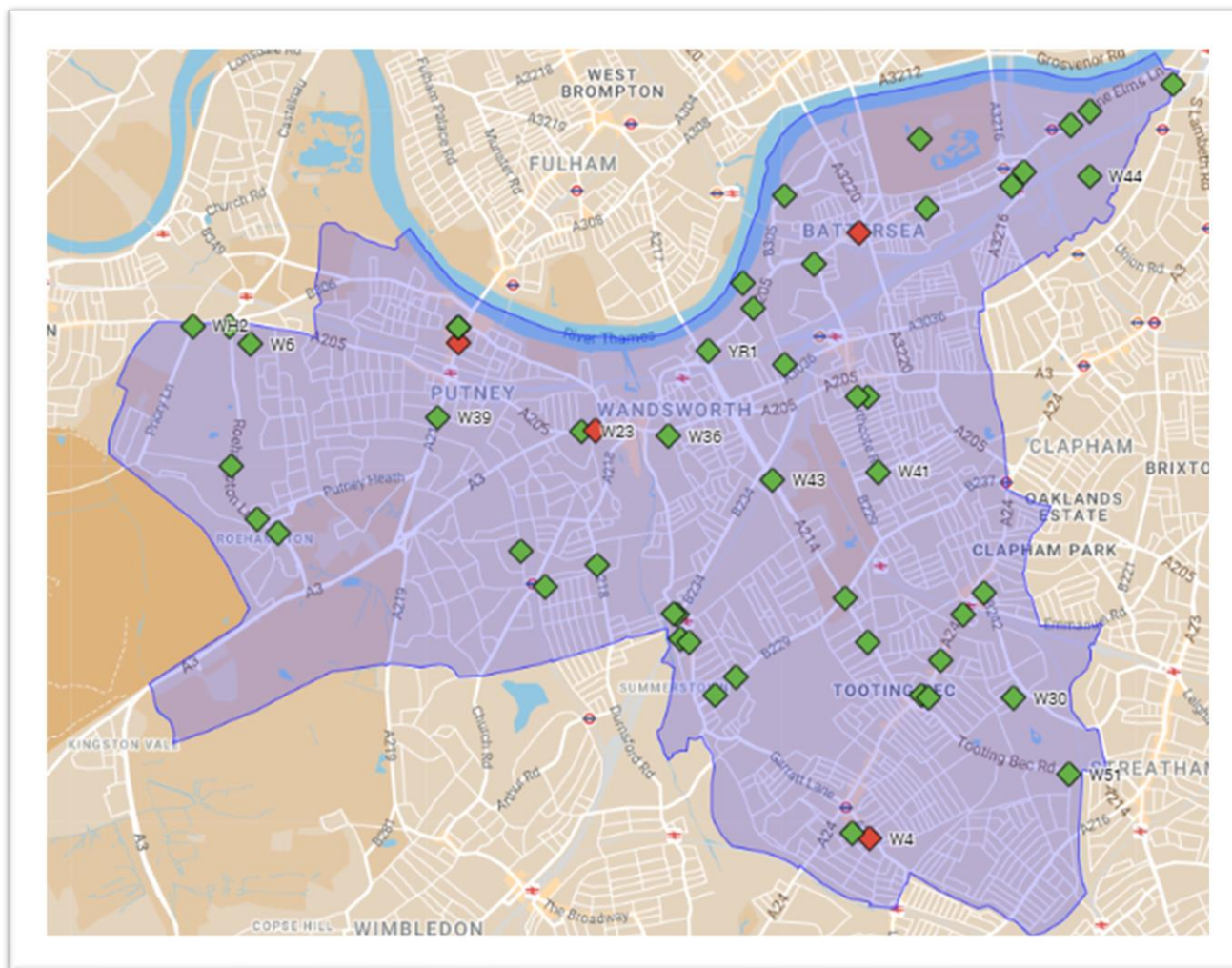
Table D shows the NO_2 diffusion tube monitoring results, with bias corrected values for each year from 2016 to 2022 (Note – see Table O for the uncorrected monthly data for 2022).

The results in bold and coloured coded in orange indicate an exceedance of the annual mean Air Quality Objective (AQO) of 40 µg m^{-3} and the results underlined and coloured coded in red indicate an NO_2 annual mean in excess of 60 µg m^{-3} highlighting a potential exceedance of the NO_2 hourly mean Air Quality Objective.

All data from the automatic monitoring stations have been fully ratified. Data capture rate of at least 75% was achieved at all nitrogen dioxide diffusion tube sites except at one site and automatic monitoring stations in 2022 except for:

- WAB (Tooting High Street) automatic monitoring station: 45% annual data capture rate,
- WA8 (Putney High Street first floor) automatic monitoring station: 67% annual data capture rate,
- WA7 (Putney High Street), WA9 (Felsham Road), WAC (Lavender Hill, Clapham Junction) insufficient valid results available for this year.

From the 7 automatic monitoring stations just 2 stations achieved a data capture rate of at least 75%.

We were aware of some data loss from monitoring stations due to equipment failures. Unfortunately, more data was lost following ratification when some data had to be withdrawn. Defra require a 90% data capture rate to be fully representative of the full year, so results for WAB (Tooting High Street) and WA8 (Putney High Street first floor) should be used for guidance only.

WA7 (Putney High Street), WA9 (Felsham Road), WAC (Lavender Hill, Clapham Junction) recorded insufficient valid results available for this year. The data from these automatic monitoring stations were considered unrepresentative, therefore it was decided to exclude the data from this year's annual report.

The automatic monitoring data are subject to correction by the Environmental Research Group (ERG) at Imperial College London as part of the London Air Quality Network (LAQN). Automatic monitoring took place over the full 12-month period in 2022, however, during the annual data ratification process in May 2022 due to ongoing issues with the monitoring equipment, a portion of the data was void reducing the valid data captures for 2022.

In 2022 there were challenges maintaining old equipment and sourcing technical components and calibration gases. There has been considerable resourcing allocated to refreshing the network in 2023, which will include $PM_{2.5}$ monitoring.

Consequently, it has been necessary to annualise the result of these site in accordance with the procedure described in LAQM TG (19). A nationally derived bias adjustment factor of 0.82 was applied to all diffusion tubes data as per the National Tube Bias Factor Spreadsheet 03/23 (see Table L for details). The distance correction calculations for diffusion tubes are presented in Appendix C, Table N. Nitrogen dioxide concentration reduces rapidly with distance from the kerbside, the data in Table N shows what effect distance has on a roadside/kerbside measurement.

By correcting for distance 40% more sites are predicted to achieve compliance at the nearest sensitive receptor, that is the NO_2 concentration is predicted to be below the AQO of 40 µg m^{-3} at the façade of the nearest residential property.

Automatic Monitoring Site data

Annual mean NO_2 concentrations measured at all the automatic monitoring stations have constantly decreased since 2016, and more generally over the 7 year period (2016-2022) for which data have been reported.

Data comparison for 2021 and 2022 show a decrease in levels of annual mean NO_2 concentrations recorded at three of the automatic monitoring stations: WA2 (Wandsworth Town Hall), WA8 (Putney High Street first floor) and WAA (Thessaly Road, Battersea).

In Putney High Street (at both WA7 and WA8 automatic monitoring stations) significant reductions were evident since 2019, however the automatic monitoring stations have still recorded data above the annual mean objective of 40 µg m^{-3}.

Annual mean NO_2 concentrations measured in 2022 at WAA (Thessaly Road, Battersea), WA2 (Wandsworth Town Hall) and WAB (Tooting High Street) were below the national objectives. The automatic monitoring station data are further described in Figure 3. The red line indicates the National Air Quality Objective limit of 40 µg m^{-3}. In 2022 for a third year in a row, WAB (Tooting High Street) has met the annual mean objective of 40 µg m^{-3}.

Table E provides the results from the automatic monitoring stations for NO_2 for the 1-hour mean objective of 200 µg m^{-3}. In 2022 for the third consecutive year the hourly objective was met at all sites and there were no exceedances recorded, however data capture was not sufficient at three of the automatic monitoring stations (WA7 Putney High Street, WA9 Felsham Road, Putney and WAC Lavender Hill, Clapham Junction).

Diffusion Tube Data Analysis

The diffusion tube locations network was reviewed at the beginning of 2017 with the introduction of new locations. Some monitoring locations were removed having undertaken sufficient monitoring to establish a long-term trend. In 2018, diffusion tubes along York Road and the Nine Elms areas were added. Diffusion tube locations were reviewed at the end of 2019, and new 10 locations were included. In 2020, 10 diffusion tubes were added and in 2021 a further 6 diffusion tubes were added. In 2022 an additional 3 diffusion tubes were added to the network which consists of network consisted of 51 monitoring locations across Wandsworth.

The data capture for 2022 for all sites was satisfactory (95%). One site (BW1 Burntwood Lane) recorded a data capture of less than 75%, so annualising in line with DEFRA guidance, LAQM TG (19) was required.

The results in bold (orange/red) indicate an exceedance of the annual mean objective of 40 µg m^{-3} and the results in bold and underlined (red) indicate NO_2 annual means in excess of 60 µg m^{-3} indicating a potential exceedance of the NO_2 hourly mean AQS objective.

The results from the 2022 monitoring (Table D) show that the annual mean national air quality objective (NAQO) of 40 µg m^{-3} was exceeded at 4 monitoring locations which is 8% of the total monitoring sites (51); this is a decrease of 4 from the previous year.

The 40 µg m^{-3} annual mean objective was exceeded at:

- **W24** -Putney High Street   43 µg m^{-3}
- **W4**   -Mitcham Road   46 µg m^{-3}
- **YR5** -Battersea Park Road   43 µg m^{-3}
- **W47** -West Hill   60 µg m^{-3}

Distance correction has been undertaken for all sites considered not representative of relevant exposure (Table N). Of the 4 non-automatic sites with concentrations in breach of the annual mean NO_2 Air Quality Objective, 1 exceedance (W47 West Hill) persisted following distance correction. This is down 3 sites from 2021.

It should be noted that only one site (W47-West Hill) exceeded the annual mean of 60 µg m^{-3} which indicates that the 1-hour mean objective may also have been exceeded, however when the distance adjustment to estimate the concentration at the nearest receptor (Table N) was applied, the site was below 60 µg m^{-3}.

All sites showed a decrease in NO_2 concentrations, except 1 site that did not change from the previous year (YR2-Royal Academy of Dance).

In 2018 the diffusion tube network was increased to monitor the effects of emissions from vehicles in the Vauxhall Nine Elms Opportunity Area – a regeneration area covering 561 acres and consisting of over 50 construction sites. In 2022, for the first time since monitoring, two locations: NE3 (Queenstown Road) and NE6 (Nine Elms Lane) recorded concentrations of nitrogen dioxide below 40 µg m-^{3}. This could be due to two factors: the reduction in construction vehicles in the area; and the extension of the Ultra Low Emission Zone (ULEZ) in October 2021. Further discussion of the effects of the extension of the ULEZ are below.

The overall downward trend at all monitoring sites continued when comparing data from 2016 to 2022 and all sites had a reduction in NO_2 concentrations when compared to 2021. This includes diffusion tubes in all of the 5 Air Quality Focus Areas (Putney High Street, Wandsworth Town, Clapham Junction, Tooting High Street, and York Road). This is a less mixed picture than in 2021 and it is fairly safe to say that the feared return of higher levels of pollution post COVID-19 does not appear to have materialised.

While there have been improvements in NO_2 concentrations, the overall monitoring results for the Borough show that NO_2 concentrations exceeded the UK annual mean objective, and improvements are still required. **Currently no location monitored in the borough would meet the new WHO guideline value of 10 µg m^{-3} (annual mean) set to protect the public from the health effects of gaseous nitrogen dioxide.**

The source of pollution in town centres and air quality focus areas remain road traffic and construction sites, it is essential that bold measures are taken to remove the dirtiest vehicles and reduce vehicle numbers to relieve congestion. Pressure for major developments may further exacerbate matters.

As the greatest exceedances occur in town centres and along arterial routes through the borough Clean Air Zones supported by other transport related measures such as lobbying TfL for cleaner buses quicker, and encouraging behaviour change of drivers towards more sustainable and lower emission vehicles is key in tackling air pollution.

The borough Air Quality Action Plan outlines a range of measures that are being undertaken to reduce transport-based emissions, progress updates for 2022 are provided in Table H. In 2022 Wandsworth commissioned a Citizen's Assembly, where the outcomes will form a core part of the new 2023 Air Quality Action Plan.

In 2022 an overall downward trend in levels of NO_2 was recorded at sites, with some sites recording a drop in NO_2 levels compared to 2020 during a year where movements were restricted. This is in part due to the strong encouragement for modal shift to more sustainable forms of transport in Wandsworth through both air quality initiatives and the declaration of the Climate Change emergency and Climate Change/Air Quality summits in 2020/2021. The Wandsworth Sustainability Partnership was launched in

November 2022 with the aim of bringing businesses, residents, and schools together to reduce their impact on levels of pollution in the borough.

The uptake of low and zero emission vehicles significantly contributed to the overall fall in levels of NO_2, with a 46% increase in privately owned battery electric cars registered in the borough from Quarter 3 2021 to Quarter 3 2022. Many factors at all levels of central and local government contributed to this. The extended ULEZ to the north and south circulars came into effect on 25th October 2021, and in May 2022 Transport for London (TfL) launched a consultation on proposals to expand the ULEZ London-wide which would encompass the whole of the borough. Recent 2020 – 23, Euro 6 diesel cars and light vehicles are delivering improvements on the earlier Euro 6 versions, which on real world driving cycles really are cleaner. Many are switching to electric or hybrid. The announcement by government to move forward a ban on the sale of pure internal combustion engine cars from 2040 to 2030 appears to have helped. According to the SMMT (Society of Motor manufacturers and Traders) although 2022 witnessed a drop in new vehicle registrations, it saw an increase in sales of electric vehicles, plug-ins and hybrids, which totalled approximately a third of all new vehicle sales in 2022, whilst diesel sales continued to fall.

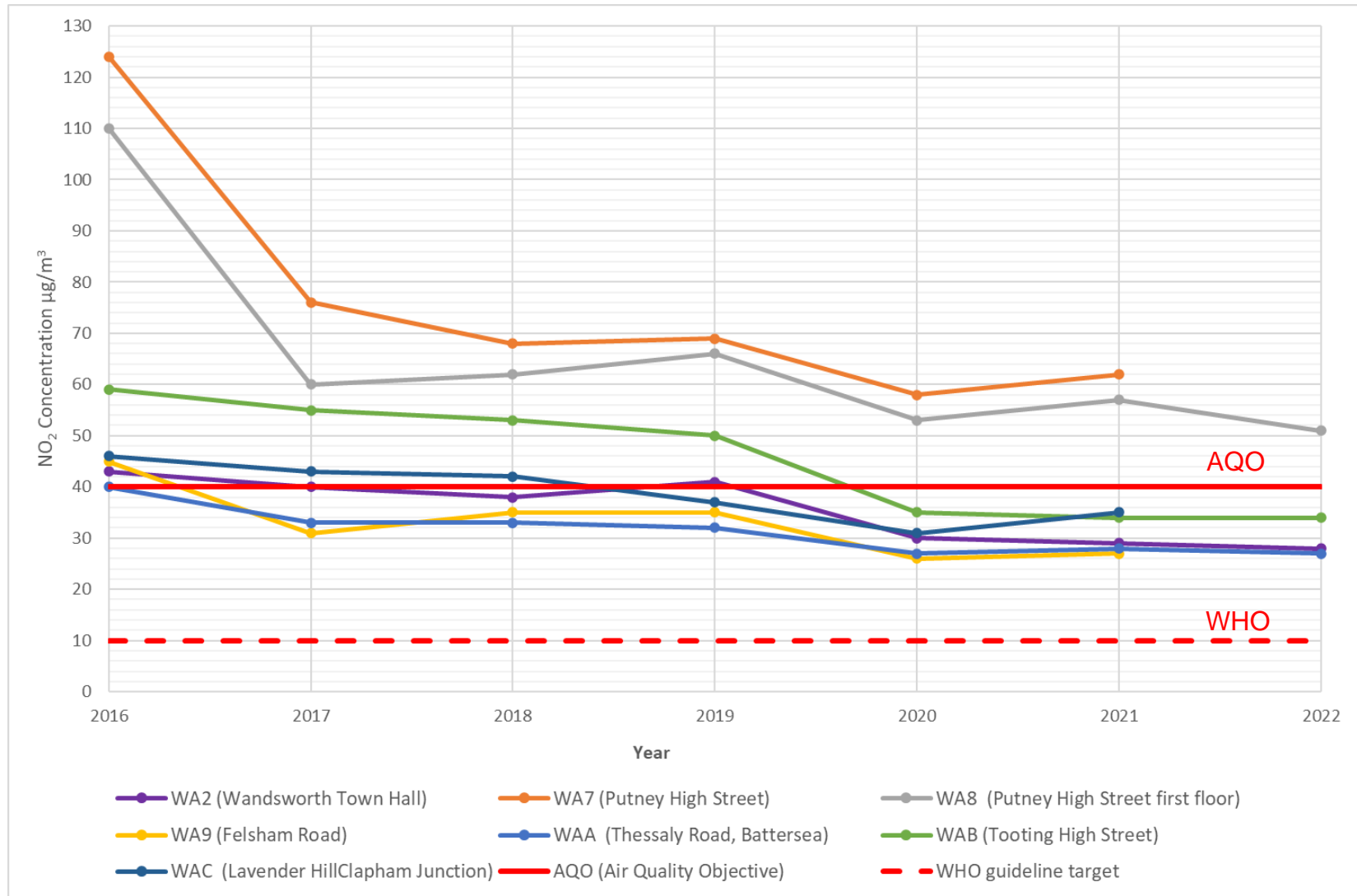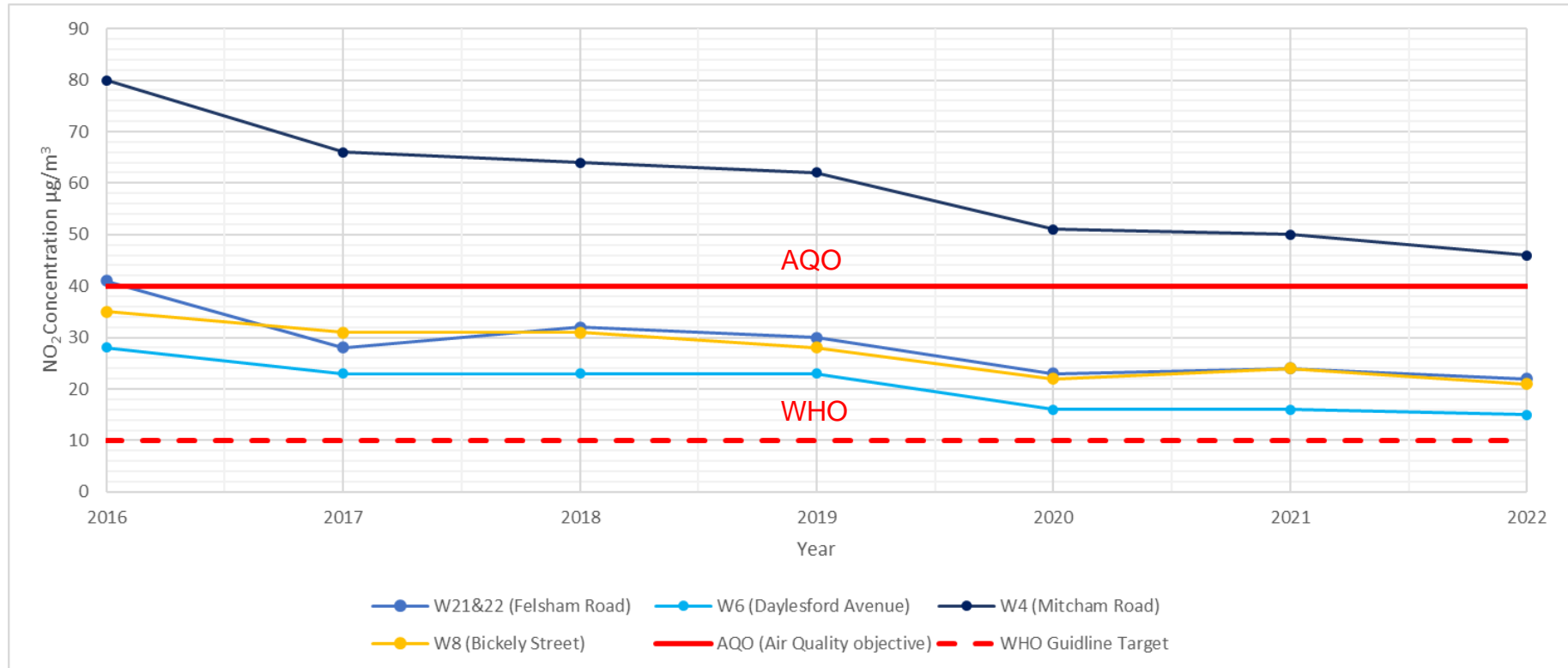**Figure 3. Trends in Annual Mean Nitrogen Dioxide Concentrations (NO$_2$) measured at the automatic monitoring stations (µg m^{-3})**

Figure 4. Long trends in Annual Mean Nitrogen Dioxide Concentrations (NO_2) measured with Diffusion Tubes ($\mu g\ m^{-3}$)

Table E.   NO₂ Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m⁻³

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2022 % [b]	Number of Hourly Means > 200 µg m⁻³						
			2016	2017	2018	2019	2020	2021	2022
WA2 Wandsworth Town Hall	100	93	0	0	0	0	0	0 (89.5)	0
WA7 Putney High Street	100	12	**1248**	**76 (247)**	**26**	11	4	1	Insufficient valid results available for this year
WA8 Putney High Street first floor	100	67	**403**	9	5	**19**	1	0	0 (137.7)
WA9 Felsham Road; Putney	100	14	**45**	7 (179)	0	0	0	0	Insufficient valid results available for this year
WAA Thessaly Road, Battersea	100	75	1	0 (98)	0 (0.97)	0	8	0	0
WAB Tooting High Street	100	45	2	0	2	3	0 (104)	0 (97.9)	0 (119.8)
WAC Lavender Hill - Clapham Junction	100	21	**23**	0	0	0	0	0	Insufficient valid results available for this year

Notes

Nitrogen Dioxide achieved a capture rate less than 90% for the year the results may not be representative of the full year and should be used for guidance only.

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

Exceedance of the NO$_2$ short term AQO of 200 µg m^{-3} over the permitted 18 hours per year are shown in **bold**.

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

(a) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

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

All data from the automatic monitoring stations have been fully ratified. Data capture rate of at least 75% was achieved at all nitrogen dioxide diffusion tube sites except at one site and automatic monitoring stations in 2022 except for:

- WAB (Tooting High Street) automatic monitoring station: 45% annual data capture rate,

- WA8 (Putney High Street first floor) automatic monitoring station: 67% annual data capture rate,

- WA7 (Putney High Street), WA9 (Felsham Road), WAC (Lavender Hill, Clapham Junction) insufficient valid results available for this year.

There were no exceedances of the hourly mean objective limit at four automatic monitoring stations where valid data results were available (WA2 Wandsworth Town Hall, WA8 Putney High Street First Floor, WAA Battersea and WAB Tooting High Street)).

The air quality objective was met at all these air quality sites for a second consecutive year.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2022% [b]	Annual Mean Concentration (µg m^{-3})						
			2016	2017	2018	2019	2020	2021	2022
WA7 Putney High Street	100	92	21	21	25	22	19	20	20
WA9 Felsham Road (Putney)	100	92	18	17	17	18	16	16	15
WAA Thessaly Road (Battersea)	100	98	32	27	25	23	25	23	20
WAB Tooting High Street	100	56	24	23	23	23	21	23	21[c]
WAC Lavender Hill (Clapham Junction)	100	90	18	20	21	20[c]	19	19	20

Notes

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

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

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

(a) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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

The National annual mean objective of 40 µg m^{-3} is comfortably achieved in 2022 however, in London a focus is required to be maintained on Particulate Matter even when meeting the PM$_{10}$ targets, because the London boroughs are collectively working to meet the World Health Organization (WHO) health based PM$_{2.5}$ limits by 2030. The WHO annual mean limits for PM$_{10}$ and PM$_{2.5}$

are significantly lower than the current UK/EU standard at 20 µg m^{-3} and 5 µgm^{-3} respectfully. In this circumstance the measured concentrations at WA7 (Putney High Street), (WAA) Thessaly Road and (WAB) Tooting High Street exceed the recommended World Health Organisation (WHO) guideline of 20 µgm^{-3}.

There was 1 µg m^{-3} increase in the levels of annual mean PM$_{10}$ concentrations recorded at WAC (Lavender Hill, Clapham Junction) a slight decrease in levels of annual mean PM$_{10}$ concentrations at WAB (Tooting High Street) and WAA (Thessaly Road) of 2 µgm^{-3} and WA9 (Felsham Road) of 1 µg m^{-3}. No change in levels of annual mean PM$_{10}$ concentrations at WA7 (Putney High Street).

Over the years PM$_{10}$ concentrations have been relatively static with minor fluctuations, proving very difficult to reduce further. Over the 7 year period from 2016–2022 it has gone up and down slightly one year to the next but a slight downward trend overall has been achieved. This is encouraging, however we cannot get complacent, and it is essential to continue monitoring the trends.

It should be noted that whilst all five sites meet the UK/EU limit value (40 µg m^{-3}) all but one site (WA9 Felsham Road) fail to meet the new, stricter WHO guidelines (15 µg m^{-3}) for PM$_{10}$.

The annual mean PM$_{10}$ results are further illustrated by Figure 5. The red line indicates the air quality objective of no more than 40 µg m^{-3}. The data capture rates for the automatic monitoring stations achieved above 75% apart from WAB (Tooting High Street) which achieved 56%. The data was annualised in accordance with LLAQM Technical Guidance.

Funding has been agreed to install new PM$_{10}$ and PM$_{2.5}$ monitors across the borough, including 3 monitors in the Air Quality Focus Areas.

Around half of UK concentrations of PM comes from anthropogenic sources in the UK such as wood burning, and tyre and brake wear from vehicles. In Wandsworth, where wood burning fires are still popular, specific efforts are being made to reduce PM's from burning, (Table J). In Winter 2022 Wandsworth ran a wood burning campaign and continued to investigate complaints regarding unauthorised burning and non-compliant appliances.

Figure 5. Trends in Annual Mean PM$_{10}$ Concentrations measured at the Continuous Monitoring Sites (μg m^{-3})
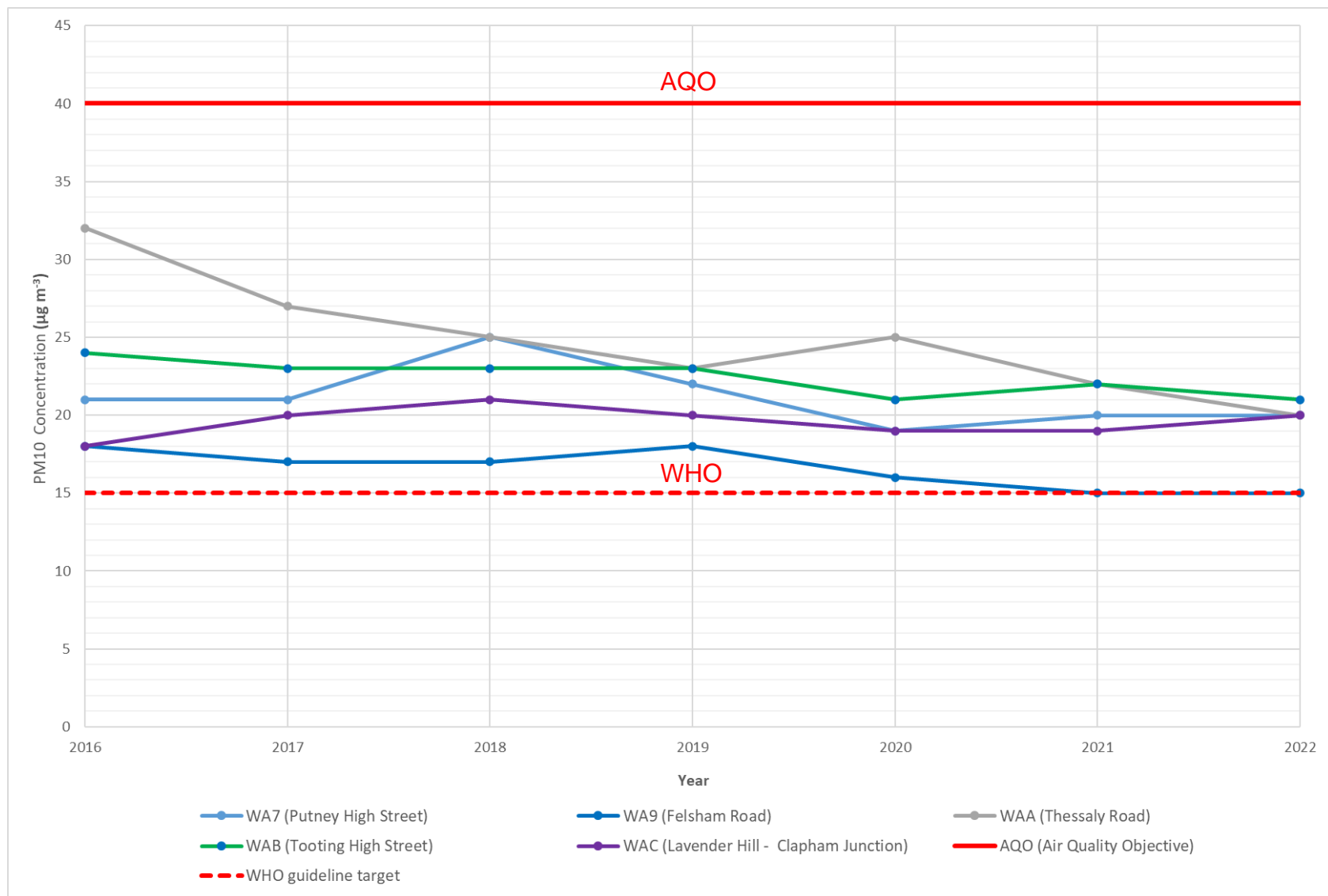
Table G. PM$_{10}$ Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM$_{10}$ 24-Hour Means > 50 µg m^{-3}

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2022% [b]	Number of Daily Means > 50 µg m^{-3}						
			2016	2017	2018	2019	2020	2021	2022
WA7 Putney High Street	100	92	4	2	3	9	2	3 (30.2)	2
WA9 Felsham Road (Putney)	100	92	6	5	1	5	2	0 (23)	1
WAA Thessaly Road (Battersea)	100	98	**43**	16	10	14	23	9	7
WAB Tooting High Street	100	56	11	11	3	9	4	4 (32.6)	0 (35.7)
WAC Lavender Hill (Clapham Junction)	100	90	1 (27.5)	4	3	2	5	0	1

Notes

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

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

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

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

Table G provides the comparison with the 24-hour mean objective for PM$_{10}$. The objective of no more than 35 days exceeding 50 µgm^{-3} was met at each site for all years since 2017. However, four out of five sites exceeded this daily standard at least once for all years reported. Overall, in 2022 the number of days exceeding the daily standard remains relatively low at all sites. except for

WAA (Thessaly Road) in Battersea with 7 days exceeding 50 µg m^{-3}. Levels have decreased, however vigilance is required as construction sites are still active.

The WAA (Thessaly Road) monitoring station has recorded a PM$_{10}$ annual mean concentration of 20 µg m^{-3} in 2022. The monitor sits within an opportunity area consisting of circa 10 major development sites all in close proximity (Nine Elms). The air quality monitor was installed to monitor emissions from the cumulative impact of emissions from constructions sites. In 2016 the highest levels of annual mean PM$_{10}$ concentrations were recorded; there was also a breach of the 24-hour mean objective for PM$_{10}$ with 43 exceedances, 8 more than the permitted 35. In 2017 this was addressed by appointing a Construction Site Compliance Officer (CSCO) and increasing funding for street cleansing. Following the appointment of a CSCO there was a steady decline in the annual mean PM$_{10}$ concentration, however in 2020 the annual mean PM$_{10}$ concentrations rose which is contrary to the trend of the other monitoring stations. In contrast to the monitoring stations across the boroughs, there was still traffic from construction vehicles in the area where the Thessaly Road monitoring station is situated. Additionally, there were works to improve the public realm, including a segregated cycle path, taking place in close proximity to the monitoring station. These roadworks may have contributed to the increase in the number of exceedances of the 24-hour mean objective for PM$_{10}$; roadworks completed in 2020 and the number of 24-hour mean exceedances for PM$_{10}$ reduced significantly.

Elevated PM$_{10}$ levels can result from episodes, which are often the result of local combined with imported transboundary conditions from elsewhere in the UK and Europe. In 2022 there were numerous pollution episodes which contributed to the exceedance of the 24-hour mean objective for PM$_{10}$ and none of these were due to localised incidences, unlike 2021 when there were two exceedances which were caused by local works.

Pollution episodes in the early part of year were due to the build-up in local emissions at roadside locations and poor dispersion. According to the ERG, domestic fuel burning in the evening also contributed to these episodes in January. All monitoring sites in Wandsworth, apart from WAB (Tooting High Street) which was not operational at the time, recorded an exceedance of the daily

standard for PM_{10} on Friday 25th March. According to analysis undertaken by ERG this was due to a significant long distance particulate import from the continent. Poor dispersion locally overnight and early morning contributed to higher levels of PM_{10}.

Table H.   Annual Mean $PM_{2.5}$ Breathe London Nodes (µg m^{-3})

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2022
St Anne's C of E Primary School	100	99	8.9
Griffin School	100	97	10.5
Bedford Hill	100	99	12.0
Chesterton Primary School	100	99	10.9

Notes

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

Exceedances of the $PM_{2.5}$ annual mean AQO of 20 µg m^{-3} are shown in **bold**.

Table H provides the comparison with the annual mean objective for $PM_{2.5}$. All Breathe London Node sites met the air quality objectives of 20 µg m^{-3} while noting that low cost sensors are not adequate for regulatory compliance assessment, they are a good indication and can be used as a guidance.

The Breathe London monitoring network provides measurements of NO_2 and $PM_{2.5}$ across London using 'low cost' sensors. While such sensors are considered of lower accuracy than automatic monitoring equipment they provide a valuable low-cost option in supporting additional coverage where there are gaps in the monitoring network. Funding has been agreed to install new $PM_{2.5}$ monitors across the borough, however Wandsworth are still looking to expand the network of Breathe London nodes. The Breathe London network also allows citizens community groups to be even more involved in monitoring local air quality.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of the London of Wandsworth progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2022 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

| Measure 1: Taking cost effective measures to minimise emissions from Council activities. |

No.	Action	Implementation Date	Cost	Funding	Progress
1.1	Installation of low NOx boilers on replacement.	36+ months	Low	Corporate	100% boilers specified for housing are Ultra-Low NOx. 100% of installed boilers are Ultra-Low NOx. 95% of systems in public buildings will be Ultra-Low NOx and remaining 5% are not boilers.
1.2	Installation of energy saving measures in Council buildings.	36+ months	Low	Corporate	Wandsworth Council's scope 1 and 2 emissions in 2021/22 were 12,788 tCO2e. This represents an overall decrease in emissions for 2021/22 compared to 2020/21 by 31% and the baseline levels in 2017/18 by 52%. Reductions in Scope 1 emissions from gas, vehicle and plant fuel have gone down by 1.35%, with smaller scale energy efficiency works for buildings and the start of a shift to EVs and more efficient vehicles contributing to this. Emissions from the vehicle fleet have reduced in 2021/22 by 4.59% compared to 2019/20. Scope 2 emissions reduced in 2021/22 due to the Council purchasing zero carbon electricity and also due to the ongoing decarbonisation of the National Grid as power generation increasingly moves away from fossil fuels. The Council has developed and is delivering a Decarbonisation Strategy which sets out a programme of works which, over time, will reduce energy usage across its portfolio of buildings and reduce its Scope 1 and 2 emissions. Phase 1 of the works are nearing completion and Phase 2 of the programme is in development. Installations have included building fabric upgrades such as insulation, LEDS, building management systems, heat pumps and solar panels.
1.3	Policy change to use petrol/LPG/CNG/hybrid/electric instead of diesel	36+ months	Medium	Transport	To use petrol/hybrid/electric vehicles for replacement of council fleet where possible. All vehicles purchased under 1.205 tonnes will not be diesel driven.

No.	Action	Implementation Date	Cost	Funding	Progress
	for Council fleet vehicles and contracted vehicles.				In November 2020 the strategic planning and transportation scrutiny committee approved plans to replace the borough's existing fleet of 32 commercial vehicles with 28 replacements that produce lower emissions. All of Wandsworth Councils HGV fleet has been replaced with 14 Euro 6 compliant vehicles.
1.4	Upgrading of vehicles to reduce emissions, retrofitting of vehicles with technology to reduce emissions where appropriate such as in-cab telematics.	12-36 months	Medium	Transport	The current council fleet is ULEZ and LEZ compliant.

Measure 2: To continue to implement and review the Council Service Transport Plan – promoting alternatives modes of transport to the car, for both journeys to work and business related journeys.

No.	Action	Implementation Date	Cost	Funding	Progress
2.1	To encourage active travel by staff (and/or discouraging travel by car).	36+ months	Low	Transport	Promotions and events, for example during Bike Week, featured on staff intranet on a regular basis.
2.2	Reducing the need for staff to drive to work, if a car is needed for work.	36+ months	Low	Transport	

Measure 3: Ensuring air quality is embedded in corporate policy.

No.	Action	Implementation Date	Cost	Funding	Progress
3.1	This measure seeks to implement the findings of the policy review undertaken to ensure that air quality is embedded into corporate policies, maintaining	<12 months	Low	Corporate	In 2022 Wandsworth made a decision to hold a Citizens Assembly to help draft and shape a new Air Quality Action Plan. This process has now concluded and the New Action Plan is scheduled for September 2023. As well as incorporating the outcomes of the Citizens Assembly the new Air Quality Action Plan will have clear links to Climate, active travel and health.

No	Action	Implementation Date	Cost	Funding	Progress
	commitment to air quality and cleaner borough status.				
3.2	Report Authors to consider the inclusion of relevant Air Quality impacts comments in committee reports.	<12 months	Low	Corporate	Air quality impacts are considered as part of the 'Supporting the Wandsworth Environment and Sustainability Strategy' comments that are included in every report that goes to committee.
3.3	Air quality to be considered as part of the procurement of goods, services and works.	12-36 months	Low	Corporate	Ongoing and now linking as above to the Climate Change agenda.
3.4	Consolidation of goods and services.	36+ months	Low	Corporate	The cargo bike hire scheme launched in summer 2022 in three locations across the borough, Tooting, Battersea, and Clapham Junction. To celebrate Clean Air Day in June 2022, the council hosted a cargo bike networking event for local organisations and business owners. The council continues to promote the Try Before You Buy Scheme which it subsidises.

Measure 4: Production of a Council air pollution communications strategy, bringing together internal and external communications.

No.	Action	Implementation Date	Cost	Funding	Progress
4.1	Establish role of air quality champion.	36+ months	Low	Communication & Public Engagement	Wandsworth runs an active Citizens Science initiative throughout the borough aimed at monitoring and engagement. Outcomes from the Citizens Assembly will include partnership working and community engagement, especially around messaging and comms. It is also anticipated that there will be a joint communications strategy and resourcing specifically aimed at joint comms and co-benefits of Climate and Air Quality to coordinate actions.
4.2	Production and maintenance of an air	36+ months	Low	Communication & Public	In 2022 the Communications Team worked with the new political administration to formulate its approach to air quality comms.

				Engagement	This includes promoting the recruitment for, and the work of, the Wandsworth Citizens' Assembly on air quality, the work of which will feed into a new Air Quality Action Plan. Clean Air Day was promoted in June and work to promote cargo bike schemes and cycle training is ongoing. Work has also continued on promoting the partnership work happening with local schools, including the St Mary's School Superzone and work to encourage active travel. As the School Streets programme has been expanded, comms including videos have been pushed out to local residents and media. All this work has been reflected in council channels, including social media, Headstart and Brightside magazines.
4.3	Provision of air quality information.	36+ months	Medium	Communication & Public Engagement	The review of webpages (for instance, Wandsworth Council webpage, or the Love Clean Air website which is part of the South London air quality network https://lovecleanair.org) are undertaken in line with the developments of new projects. A pilot scheme in Putney trialing new sensors which combine traffic data with pollution data. Two Breathe London Sensors (www.breathelondon.org) were installed in the borough in 2022, bringing the total number of sensors in the borough, at the end of 2022, to six. The Council is signed up to air TEXT (www.airtext.info). Data from the seven automatic monitoring stations are available on the LondonAir website (www.londonair.org.uk).
4.4	Maintain provision of information on cleaner fuels, technologies and vehicles.	12-36 months	Low	Communication & Public Engagement	See action 7.2.
4.5	Undertaking of events to raise awareness of air quality and active travel.	36+ months	Medium	Communication & Public Engagement	Raising awareness and empowering people to make positive changes is a key part of the Council's work on air pollution. In order to improve air quality and raise awareness in schools, Wandsworth Council has been undertaking air quality awareness raising activities with schools within the Borough. These activities are part of the Council's wide-ranging air quality improvement programme and they aim to increase awareness among children and parents of changes they can make to reduce air pollution and inspire them to adopt more sustainable means

					of transport such as walking, cycling and taking less polluted routes. Examples of activities / initiatives include:

of transport such as walking, cycling and taking less polluted routes. Examples of activities / initiatives include:

- The interactive air quality theatre show: eco-themed stage plays have been performed in front of children at primary schools to help teach youngsters about climate change, air pollution and the effect that transport choices have on the environment.

- Idling Action workshops: children at primary schools learn about idling and the effect of vehicle emissions on health. Following the workshop the children take part in an idling action event, interacting with drivers outside of their school. In 2022 the Idling Action London group ran 1 idling workshop at Chesterton School where a banner was created using the children's posters.

- In 2022 Wandsworth's Air Quality team ran 8 anti-idling physical events at: Balham Town Centre (twice); Tooting Town Centre (twice); Nine Elms, Battersea; St Boniface School in Tooting; and St Michael's School in Southfields.

- For both clean air day and car free day materials were prepared and promoted signposting residents and businesses to support available to travel actively and/or sustainably and to reduce exposure to air pollution. For Clean Air Day in June 2022, two pop-ups were hosted in Wandsworth Town Hall and on Battersea High Street to promote sustainable modes of transport. An air quality event took place in Clapham Junction which included air quality information, police bike marking, a free cargo bike taxi service and collaboration with an electric vehicle charging company.

In 2022 Wandsworth commissioned a Citizen's Assembly which will focus on Air Quality, especially the links between air quality, health and climate change. The Citizen's Assembly will take place in early 2023.

Wandsworth launched the Wandsworth Sustainability Partnership (WSP) in November 2022. The aim of the partnership is to create a forum through which partners from across the borough can hear about the work everyone in Wandsworth is delivering to address climate change, share best practice and

				identify ways everyone can work together to reduce emissions. The WSP has covered the Air Quality Citizen's Assembly.
4.6	Provide GPs and pharmacists with information to provide to individuals with pre-existing conditions and those vulnerable due to age or lifestyle.	36+ months	Low	Communication & Public Engagement	As part of Public Health's Air Pollution Action Plan, which was produced and approved in 2022, Public Health have completed development of an e-learning Making Every Contact Count (MECC) module on air pollution and health. This will be targeted towards GP staff and pharmacists. Further as part of the communications and engagement plan, leaflets will be distributed to GP surgeries and pharmacists in Wandsworth during 2023. This will supplement the air pollution alerts forwarded by the GLA to doctor's surgeries, schools, and pharmacies. Airtext, an early warning alert service for days of moderate or high air pollution levels, was supported and promoted on the Council website and in response to Council complaints and enquiries throughout 2022. Airtext as a critically important service providing direct alerts to vulnerable people, including those with COVID/long term COVID. Alerts are automatically forwarded to doctor's surgeries, schools, and pharmacies. Wandsworth consider this a low-cost way to raise awareness and reduce exposure amongst the most vulnerable.
4.7	Undertaking engagement with local businesses in hotspot.	36+ months	Medium	Communication & Public Engagement	Putney High Street was chosen to be the focus for Clean Air Villages 4. A feasibility study determined that Putney pier was unsuitable for the river freight project. Following this decision several businesses in Putney were engaged with to come up with a solution to reduce deliveries in the area. A cargo bike refuse service with rider was scheduled to operate from October 2022, however the project has not been able to commence due to issues with recruitment. A further project, Clean Air Logistics for London, has been undertaken at the end of 2022, focussing on micro hub logistics in Wandsworth Town Centre. This is DEFRA funded project due to be operational in June 2023. Businesses were engaged for Clean Air Day via the BID and town centre managers. In August 2022 three shared cargo bikes were put in place – two of these are hosted within businesses. Businesses have the opportunity to use these cargo bikes.
4.8	To undertake joint working with other organisations such as	36+ months	Low	Corporate	The air quality team undertake joint working with other local authorities, the GLA and external bodies such as the Cross River Partnership through the South

	the GLA, TfL, health professionals such as Wandsworth CCG and other local authorities such as neighbouring authorities and others, for instance, through externally funded joint projects.				London Air Quality Cluster Group, Idling Action London, Clean Air Villages, Wood burning group. Lobbying TfL for cleaner buses.

Measure 5: Call for actions from the Mayor of London, TfL and national government to improve air quality.					
No.	**Action**	**Implementation Date**	**Cost**	**Funding**	**Progress 4**
5.1	Campaign for the Mayor and TfL for cleaner buses to operate on routes throughout the borough using local monitoring data.	12-36 months	Low	Transport	The council regularly hold public transport liaison meetings with TfL and request new bus route contracts are awarded with green vehicles
5.2	Campaign to the Mayor and TfL for cleaner taxis to operate on borough roads and stricter controls to reduce emissions from vehicles – Low Emission Zone (LEZ), Ultra Low emission Zone (ULEZ), policies to reduce diesel vehicle use.	36+ months	Low	Transport	Led by portfolio holder/elected members. Ensured that there was public awareness around ULEZ/LEZ expansion ramifications.
5.3	Campaign to national government towards a "non- diesel economy".	36+ months	Low	Transport	Led by portfolio holder/elected members.

No.	Action	Implementation Date	Cost	Funding	Progress
	Measure 6: Encouraging walking and cycling and the use of public transport and discouraging driving to stations.				
6.1	Use of transport and planning policies to encourage walking and cycling.	12-36 months	Low	Transport	The Wandsworth Walking and Cycling Strategy was formally adopted in November 2022.
6.2	Promote the use of public transport.	36+ months	Low	Transport	The Council are working with Network Rail to develop a second entrance at Wandsworth Town Station. Detailed design is due to be completed by the end of May 2023 with construction due to begin in Autumn 2023, pending funding agreements. Work continues with Network Rail to progress improvements to Battersea Park Station. Work will begin in July 2023 to further develop the single option selected. Legible London products will be introduced late summer 2023.
6.3	Promote sustainable travel to schools – working with schools to implement packages of measures.	12-36 months	Low	Transport	22 School Streets (20 permanent and 2 experimental trials) operate in the borough. A trial for an additional 2 school streets is scheduled for the end of the academic year 2022/23.
6.4	Use of on-street parking controls to reduce the number of people driving to stations in the borough to continue their journey by rail into Central London.	12-36 months	Low	Transport	At the end of 2022 it was estimated that 88% of borough roads were covered by CPZs. By the end of 2023 it is estimated that this will remain unchanged at 88% but this depends on the outcome/progression of certain consultations. Multiple requests are received per year for amendments or for introduction of CPZ's.
6.5	Facilitate a higher proportion of travel by sustainable transport	12-36 months	Medium	Transport	The Council organises and provide cycle training courses at no charge for children and adults who live work or attend school in Wandsworth. All Primary Schools are offered level 1 and 2 bikeability cycle training. In 2022-23 (April to

	modes including cycling and walking.				March) 877 children received level 2 bikeability training. Training was delivered across 40 schools. 351 adults / families received 1-2-1 cycle training.
6.6	Promote and enable car clubs as an alternative to private car ownership, via; - provision of on–street car club parking spaces - planning obligations for car club parking/membership in new residential developments.	12-36 months	Low	Transport	Car club membership and use remained relatively stable in 2022 with around 46,000 members. Fresh impetus is expected to be given to car clubs in 2023 with the launch of new contracts and an additional operator for the round-trip model.
6.7	Introduction of 20mph speed limit areas on borough residential roads.	<12 months	Low	Transport	This action has been completed. A 20mph speed limit has been implemented on all remaining roads in Wandsworth including A and B Roads, excluding TfL Roads and a short section of Putney Hill at Tibbets Corner.

Measure 7: To encourage the uptake of low emission vehicles.

No.	Action	Implementation Date	Cost	Funding	Progress
7.1	Provision of green infrastructure / electric vehicle charging points.	12-36 months	Medium	Transport	No new chargepoints were added beyond those mentioned in last year's annual status report, pending procurement of a significant new phase of lamp column charging which should see 525 chargepoints added in 2023. The number of plug in vehicles registered in Wandsworth continues to rise. DfT figures for Q3 2022 (latest available) showed there to be 1,439 privately owned battery electric cars registered in the borough (a 46% increase from Q3 2021) and 1,783 privately owned plug-in hybrid cars (19% up from Q3 2021).
7.2	Maintain provision of information on cleaner.	12-36 months	Medium	Transport	Council website used to update residents and businesses. See https://www.wandsworth.gov.uk/roads-and-transport/transport/sustainable-travel/electric-vehicles/.

No.	Action	Implementation Date	Cost	Funding	Progress
7.3	Review of differential car parking charges based on emissions, ULEZ criteria, with diesel vehicles paying more.	12-36 months	Medium	Transport	In 2021, the differential charge (for 2nd and subsequent permits) was increased from an additional 20% of the first permit charge to an additional 30% of the first permit charge. Emissions based charging remains within the air quality action plan and a review will be considered after the potential implementation of the proposed ULEZ expansion.

Measure 8: Freight / deliveries actions.

No.	Action	Implementation Date	Cost	Funding	Progress
8.1	Enabling more delivery and servicing to be made outside peak hours.	12-36 months	Medium	High Street	Low Emissions Logistics Project. Tooting Town Centre projects. Clapham Junction projects.
8.2	Better management/prohibition of deliveries at "hotspots" such as Putney High Street.	12-36 months	High	High Street	Low Emissions Logistics Project. Tooting Town Centre projects. Clapham Junction projects. Improve air quality by applying lessons learned from Putney High Street to Clapham Junction and Tooting High Street.
8.3	To investigate consolidation of goods and services in hot spot areas, exploring options such as joint procurement and sharing of services supplied to businesses and low emission last mile delivery.	12-36 months	Medium	High Street	The London Low Emissions Logistics Project was a South London joint project funded by the MAQF. This project culminated in a feasibility study in 2017. A consolidation of goods and services was determined not to be feasible from this study, however the Council's work to consolidate deliveries through cargo bike schemes (see 3.4 and 4.7) and working with external organisations such as Cross River Partnership through its Clean Air Villages project and Construction Logistic for London project is ongoing.
8.4	Improve green infrastructure in and around high streets and areas of high footfall in Borough.	12-36 months	High	High Street	Design currently underway to improve the access an ecological value of Waterman's Green in Putney. Street trees and planters have been introduced on Putney High Street. Bedford Hill planting beds and SuDS features installed. Boroughwide trial of "Living Pillars" and current installation of 3 tier planters Have installed large planters on Old York Road and Battersea High Street as part of its pedestrianisation.

Measure 9: Ensuring that air quality and reducing emission is included in planning policy and implemented.				
No.	**Action**	**Implementation Date**	**Cost**	**Funding**	**Progress**

No.	Action	Implementation Date	Cost	Funding	Progress
9.1	Encouraging energy efficient measures and energy efficient design in new buildings.	36+ months	Low	Planning & Development	**Applications submitted that include energy assessments** Major developments by year of decision:

Applications submitted that include energy assessments

Major developments by year of decision:

2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
68%	74%	80%	76%	71%	93%

Developments completed with renewable energy installations

2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
29	12	21	17	12	14

Percent reduction in carbon dioxide emissions achieved overall through on-site renewable energy generation and energy efficiency measures

Mean for developments for which energy assessment data is available:

Permissions

Development Type	2017/18	2018/19	2019/20	2020/21	2021/22

Development Type	2017/18	2018/19	2019/20	2020/21	2021/22
Non-Major, New-Build, Residential	21%	25%	25%	31%	48%
Major	38%	36%	37%	36%	46%

Completions

Development Type	2017/18	2018/19	2019/20	2020/21	2021/22
Non-Major, New-Build, Residential	22%	34%	41%	31%	27%
Major	41%	47%	39%	34%	39%

BREEAM rating for major new non-residential development

Permissions:

Rating	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Outstanding	0%	0%	0%	6%	4%	8%
Excellent	48%	40%	82%	56%	48%	27%
Very Good	29%	30%	0%	0%	8%	0%
Good	0%	0%	0%	0%	0%	0%
Pass	0%	0%	0%	0%	0%	0%

					Unclassified	24%	30%	18%	39%	40%	65%

9.2	Boilers installed as part of development must have low NOx ratings in accordance with the standards set out in the Mayor of London's sustainable design and construction supplementary planning guidance.	36+ months	Low	Planning & Development	Ultra-low NOx condition recommended to be attached to all planning applications where heating system is being installed. Developments encouraged to install heat pumps as part of the Council's Climate change policy.
9.3	Air quality assessments for major developments and developments where exposure is likely or a creation of significant new emissions.	36+ months	Medium	Planning & Development	Air Quality Neutral Assessments in line with the Sustainable Design and Construction SDP being undertaken. In 2022, within the Environmental Protection Team, officers reviewed planning applications in terms of air quality for both minor and major developments. The Air Quality Team reviewed air quality assessments, air quality neutral reports, dust management plans, construction environmental management plans, schemes for monitoring dust on construction sites, method statements for the reduction of emissions from construction vehicles in compliance with the London Low Emission Zone, schemes of air pollution mitigation measures to protect future occupiers from air pollution exposure while living in their properties.
9.4	Ensuring that new major developments are air quality neutral in line with the London Plan and Mayor of London's sustainable design and construction supplementary 36+ months planning guidance.	36+ months	Low	Planning & Development	Air Quality Neutral Assessments in line with the Sustainable Design and Construction SDP being undertaken. In October 2020, Wandsworth Council has adopted a new Supplementary Planning Document (SPD) that includes air quality obligations for developers. https://www.wandsworth.gov.uk/media/7497/planningobligationsspd_2020_adoption_201002.pdf This SPD forms part of the Local Plan framework which guides the Council's decision making on planning applications. This will be reviewed and amended with in accordance with the updated GLA guidance.

No.	Action	Implementation Date	Cost	Funding	Progress
9.5	Ensure actions from previous air quality GLA audits of schools are being implemented.	12-36 months	Medium	School	We have installed green screens at four primary schools (Chesterton, St Marys, St Annes and St George's) in the borough to reduce children's exposure to air pollution in their playgrounds. 6 schools had an air quality audit in 2022 (Brandlehow, Riversdale, St Boniface, St Mary's, Honeywell and The Roche)
9.6	Undertake more school air quality audits in line with GLA audits.	12-36 months	Medium	School	

Measure 10: Creation of a design guide of best practice on reducing emissions and exposure for developments and streets.

No.	Action	Implementation Date	Cost	Funding	Progress
10	Develop a design guide of best practice. This project aims to take the well- established science of how air pollution is distributed in street canyons and translate it into design guidance that design engineers/planners can use in language that is familiar to them.	12-36 months	Low	Planning & Development	No funding available to progress this action. Action will progress if and when funding becomes available.

Measure 11: Proactive work to reduce particulate emissions from new developments.

No.	Action	Implementation Date	Cost	Funding	Progress
11	To undertake a project with a developer to assess the effectiveness of measures designed to reduce emissions from major construction sites and to develop a	12-36 months	Medium	Planning & Development	London Low Emission Construction Partnership (LLECP) - Joint venture with KCL and other London boroughs. The joint venture culminated in the production of the Best in Class guidance document. https://clec.uk/resources/llecp-best-class-guidance-document Construction Site Compliance Officer (CSCO) - appointed to manage environmental impacts from major developments.

	construction hub to disseminate best practice.				

Measure 12: Actions to reduce emissions by enforcement of regulatory powers.

No.	Action	Implementation Date	Cost	Funding	Progress
12.1	Regulation of industrial activities to control their emissions to air.	12-36 months	Low	Corporate	All permitted processes inspected and compliant.
12.2	Continue the thorough investigation and resolution of nuisance complaints with an air pollution component, such as bonfires and from demolition and building work dust.	12-36 months	Low	Corporate	Statutory function and service standards upheld.
12.3	Proactive response to reducing emissions from demolition and construction work.	12-36 months	Low	Corporate	CSCO working with developers to ensure best practice and GLA compliance. Non-road mobile machinery (NRMM) working across boroughs. Code of Practice updated in January 2022.
12.4	Continue to enforce and raise awareness of the fact that the whole borough is covered by a smoke control order and that the use of some solid fuel is prohibited.	12-36 months	Low	Corporate	The Council understand that solid fuel burning is a major source of $PM_{2.5}$ (up to 31% in London) that must be controlled at the local level. Addressing this source is crucial for achieving the LES target to meet WHO guideline levels for $PM_{2.5}$ by 2030. The Council remains committed to raise awareness about the smoke control order in the whole borough and that the use of some solid fuel is prohibited. All complaints investigated by Environment Health officers on unauthorised burning and appliances. In Winter 2022 Wandsworth ran a wood burning campaign though its residents magazine publication 'Brightside'. The website was also updated to reflect new legislation and research www.wandsworth.gov.uk/environment/pollution/air-quality/smoke-control-areas-permitted-appliances-and-fuels/

No.	Action	Implementation Date	Cost	Funding	Progress
12.5	Use of vehicle idling powers where appropriate and awareness raising of increased pollution through vehicle idling.	<12 months	Low	Corporate	Civil Enforcement Officers have been trained to serve FPNs where required but have struggled in the past to obtain driver details. Idling interventions are now recorded whereby the CEO approaches the driver to ask them to turn the engine off or move on, demonstrating a high total and success rate. Wandsworth is working with schools, encouraging all schools to pledge to not idle and we issue large banners to those that are interested. These are displayed on school fences. Online resources to schools are promoted. Wandsworth Council works with London Idling Action. Toolkits and online tutorials are promoted. All complaints are responded to and additional signage requests are investigated and erected where practical. Wandsworth were successful in its bid to the Pan London Idling Action project, this project closed in March 2022 but Wandsworth continues to feed into the legacy group through the South London Air Quality Cluster Group. An anti-idling Event Planner launched in September 2021 and continued to be delivered throughout 2022. In 2022 Wandsworth's Air Quality team ran 8 Anti-Idling physical events it: Balham Town Centre (twice); Tooting Town Centre (twice); Nine Elms, Battersea, Putney, St Boniface School in Tooting; and St Michael's School in Southfields.

Measure 13: Air quality monitoring to review and assess and evaluate actions.

No.	Action	Implementation Date	Cost	Funding	Progress
13.1	To continue to monitor air quality across the borough measuring nitrogen dioxide (NO_2) and fine particles (PM_{10}).	12-36 months	Low	Corporate	Continuous monitoring of air quality in line with requirements and reporting needs. In 2022, the Council continued to monitor air quality pollutants (NO_2 and PM_{10}) from 7 automatic monitoring stations as well as a diffusion tube network. In 2022, 3 new locations have been added to the diffusion tube network, totalling 52 diffusion tubes. In 2022, 2 additional Breathe London Sensors (www.breathelondon.org) were installed in the borough. The sensors monitor NO_2 and $PM_{2.5}$ and are the first monitors within the borough to monitor $PM_{2.5}$. A full review of automated stations was reported to the Environment Committee in 2022 and funding has been agreed to refresh the automated stations and include $PM_{2.5}$ monitoring 5 station in the borough by the end of 2023.

No.	Action	Implementation Date	Cost	Funding	Progress
13.2	To monitor air pollution to assess and evaluate action in hot spot areas (as identified by the Mayor of London) as part of the project to improve air quality.	12-36 months	Medium	Corporate	5 Air Quality Focus Areas (AQFA) and 1 opportunity area (OA) within Wandsworth have been reconfirmed by the GLA review in 2022. The AQFA are still considered hotspots and therefore we are continuing monitoring these areas and we give high priority for activities on reducing exposures. Increased measures are in place to ensure levels of pollution in the OA are mitigated.
13.3	Create a monthly dashboard of air pollutant levels in Borough using data from real-time stations.	12-36 months	Low	Corporate	This has now changed to a simplified reporting Matrix against the Air Quality Action Plan. New reporting and overview programme for the AQAP to be delivered as part of the Citizens Assembly outcomes.
13.4	Do heat map of air pollution in Borough.	12-36 months	Low	Corporate	Work to be completed.

Measure 14: Air quality innovation.

No.	Action	Implementation Date	Cost	Funding	Progress
14.1	Set up a Workshop on use of digital and technology in air quality improvements to bring clean tech companies to Borough to pilot new ideas.				Living pillars are innovative new tech. New $PM_{2.5}$ sensors are being trialled. $PM_{2.5}$ has not previously been a requirement of monitoring and as such the tech on the market is relatively new. In 2022 an additional new City Tree has been procured and awaiting installation.

Measure 15: New Projects.

	Trial of new monitoring equipment combining air quality data and traffic movements.				The GLA funded Superzone Project Wandsworth Council commenced in 2022. The public health team are undertaking work with St Marys RC Primary and partners within the council to deliver healthier neighbourhoods. Initial data scoping exercise took place in context of pollution risk mapping during 2022, this will contribute towards development of an online council risk map for air pollution and climate change in 2023.

3. Planning Update and Other New Sources of Emissions

Table K.   Planning requirements met by planning applications in the London Borough of Wandsworth in 2022

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	14
Number of planning applications required to monitor for construction dust	8
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	0
Number of developments required to install Ultra-Low NO_x boilers	5
Number of developments where an AQ Neutral building and/or transport assessments undertaken	10
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	2
Number of planning applications with S106 agreements including other requirements to improve air quality	0
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Central Activity Zone , Canary Wharf and Opportunity Areas Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit Please include confirmation that you have checked that the development has been registered with the GLA through the relevant [NRMM website] and that all NRMM used on-site is compliant with Stage IV of the Directive and/or exemptions to the policy.	7
NRMM: Greater London (excluding Central Activity Zone, Canary Wharf and Opportunity Areas) Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit 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	

Compliance Information

Total Audits	24
*Self-compliant	10
**Compliant	9
Non-compliant	2
No NRMM	2
Site Complete	1
Pending	0

Overall Compliance

Non-compliant 9%

*Self-compliant 48%

**Compliant 43%

Condition	Number
compliant with Stage IIIB of the Directive and/or exemptions to the policy.	Zonal Distribution of Sites

Zonal Distribution of Sites	
Canary Wharf (CW)	0
Central Activity Zone (CAZ)	0
Greater London (GL)	11
Opportunity Areas (OA)	13

NRMM condition recommended to be attached to all planning applications where construction and demolition is proposed

NRMM is a standard planning condition applied to all major developments.

All major developments are passed to the Air Quality Officers in Environmental Health for comment. All major developments are required to submit an AQA. All relevant national, Mayoral and Wandsworth local policies are applied by Environmental Health to all responses to Planning in all cases. Sites are considered for construction dust on a case-by-case basis, monitoring required and locations agreed, where a moderate or high risk to receptors is predicted. CHP/biomass are not recommended/actively discouraged and developers urged to select non-combustion or at least ultra-low NOx. More developments are proposing non-combustion, maximum insulation and renewables to increase BREEAM ratings.

3.1 New or significantly changed industrial or other sources

No new sources identified

4. Additional Activities to Improve Air Quality

4.1 London Borough of Wandsworth Fleet

In addition to the 13 zero emission capable vehicles a further 5 EV vans have been added to the fleet. These include 3 x Peugeot Expert Vans and 2 x Citroen Berlingo vans. Zero emission capable vehicles comprise of over 8% of the fleet.

4.2 NRMM Enforcement Project

The London Borough of Wandsworth has committed to supporting the NRMM Enforcement project in 2023-25.

Total emissions savings of NRMM project from 2016-2023

Borough	PM Saving	Nox Saving	CO2 Saving
Wandsworth	10.98928447	243.7129685	19314.21489

4.2 Air Quality Alerts

We continue to support airTEXT and its expansion in the borough. It is however clear from pilot work carried out by the Regulatory Services Partnership that there is a clear gap in information about local and internal air quality and the impact on the vulnerable. We coordinated a DEFRA bid on behalf of 15 London Boroughs, but this was not successful. It is anticipated that this work will be picked up locally by the borough in mid 2023 and coordinated though Public Health and comms.

4.3 Business Low Emission Neighbourhood (BLEN)

The Business Low Emission Neighbourhood (BLEN) project is a three-year project situated in the area of Thessaly and Stewarts Road in Nine Elms, funded by the Mayor's Air Quality Fund. The BLEN is supporting the involvement of local

businesses and people with supplement schemes underway and with air quality initiatives. The project was signed off by the GLA in early 2023.

The BLEN incorporated Wandsworth Council's Thessaly Road Improvement Scheme – a scheme designed to promote healthy streets whilst prioritising walking and cycling. The Thessaly Road Improvement Scheme was finished in early 2022. In 2021 3 new controlled pedestrian crossings, alongside 2-way cycle infrastructure was implemented, creating 1,500 metres of new cycle lanes and an additional 12 cycle storage spaces. Approximately 11,000 square km of public realm was created which included 6 trees, amongst 230m^2 new green infrastructure and new seating areas.

In 2022 6 electric vehicle charging points were installed in New Covent Garden Market; cycle and scooter storage was installed in St George's Primary School with cycle storage scheduled to be installed in Griffin Primary School and Carey Gardens Housing Estate. As part of Wandsworth Council's capital programme additional cycle storage will be installed in all three housing estates. Mayor's Air Quality Funding provided 10 bikes each to the two schools within the BLEN along with 10 other bikes to another school within Nine Elms using development funding. A low income cycling scheme was launched in 2022, enabling residents of the housing estates to trial a bike for free for 3 months. St George's Primary School has also installed green walls on 2 sides of their playground.

These measures, along with the Thessaly Road Improvement Scheme, will reduce the levels of Nitrogen dioxide from businesses and residents and will significantly reduce the exposure from pollution to children whilst in the school environment.

Appendix A   Details of Monitoring Site Quality 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 NO_2 continuous analyser is automatically calibrated every night and also manually checked and calibrated every two to four weeks by the contractor employed by the London Borough of Merton for Local Support Officer (LSO) visits during 2022. There is a need for frequent calibration adjustments as the gradual build-up of dirt within the analyser reduces the response rate. This fall off in response needs appropriate correction, to ensure the recording of the true concentrations. The calibration process involves checking the monitoring accuracy against a known concentration of span gas. The span gas used is nitric oxide and is certified to an accuracy of 5%. Both the automatic and manual calibrations use this same certified span gas (i.e. the automatic overnight one does not use the less accurate permeation tube method).

The NO_2 continuous analysers is serviced every six months by a contractor and audited by the National Physical Laboratory (NPL) every six months as part of Environmental Research Groups (ERG) - Imperial College London's, London Air Quality Network (LAQN) QA/QC procedure, to ensure optimum data quality.

PM$_{10}$ Monitoring Adjustment

PM$_{10}$ particulates are measured using a Tapered Element Oscillating Microbalance (TEOM) analyser, with the data presented as the gravimetric equivalent.

No automatic or fortnightly calibrations are carried out on the TEOM. Calibrations are only carried as part of the routine servicing and regular independent audits. The on-going performance of the monitor is checked online, by the ERG - Imperial College London Duty Officer. The role of the LSO at the fortnightly visits is to make more detailed performance checks. The LSO is also on standby at other times, to change the TEOM's monitoring filter as required, depending on the filter loading.

Since 2009, TEOM data have been improved by routine adjustments, using the volatile correction method (VCM). This corrects for the loss of any volatile mass, which has been driven off by the heat applied in the TEOM's inlet column. The VCM adjustments are carried out by Imperial College London, prior to dissemination of the data.

The TEOM equipment is serviced every six months by TRL and also audited by NPL every six months as part of the Imperial LAQN QA/QC procedure, to ensure optimum data quality. Both sites are part of the LAQN and KCL are responsible for the daily data collection, storage, validation and dissemination via the LAQN website (www.londonair.org.uk). KCL ratifies the data periodically, viewing data over longer time periods and using the results from fortnightly checks, equipment services and equipment audits.

For the monitoring data collected from the monitoring stations located in Putney High Street (WA7), Thessaly Road (WAA), Tooting High Street (WAB) and Lavender Hill (WAC), the Volatile Correction Method (VCM) has been used to correct the data. An FDMS was installed at the Felsham Road (WA9) monitoring station until 21 January 2015. This has now been converted to a TEOM, and therefore from 2019 the Volatile Correction Method (VCM) was used to correct the data.

A.2   Diffusion Tubes - 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 air 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.

Our NO_2 diffusion tubes are analysed for us 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 (May 2020 – June 2022)

- Summary of Precision Scores for 2020 – 2022

- UKAS schedule of accreditation (December 2022)

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 NO_2 concentrations reported are of a high calibre.

Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (May 2020 – June 2022)

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 in 2022 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.

Participation in a single round of an external proficiency-testing scheme represents a "snap-shot" in time of a laboratory's analytical quality. It is more informative therefore to consider performance over several rounds. Following on from above, therefore over a rolling five round AIR PT window, one would expect that 95 % of laboratory results should be ≤ ± 2. If this percentage is substantially lower than 95 % for a particular laboratory, within this five round window, then one can conclude that the laboratory in question has significant sources of error within their analytical procedure.

From the most recent laboratory performance data available, the five round window to used to assess Gradko International Ltd.'s performance is covered by rounds AR043 (May-June 2021), AR045 (July-August 2021), AR046 (September-October 2021), AR049 (January-February 2022) and AR050 (May-June 2022) of the AIR-PT scheme. During this time 100% of the results submitted by Gradko were determined to be satisfactory.

Table 1: Laboratory summary performance for AIR NO₂ PT rounds AR0030, 31, 33, 34, 36. 37, 39, 40 and 42

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 ≤ ± 2 as defined above.

AIR PT Round	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040	AIR PT AR042
Round conducted in the period	January – February 2019	April – May 2019	July – August 2019	September – November 2019	January – February 2020	May – June 2020	July – August 2020	September – October 2020	January – March 2021
Aberdeen Scientific Services	75 %	100 %	100 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
Edinburgh Scientific Services	100 %	NR [2]	100 %	25 %	50 %	NR [3]	NR [3]	100 %	25 %
SOCOTEC	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	NR [3]	NR [3]	100 % [1]	100 % [1]
Glasgow Scientific Services	100 %	100 %	100 %	50 %	100 %	NR [3]	NR [3]	100 %	50 %
Gradko International	75 %	100 %	100 %	100 %	75 %	NR [3]	NR [3]	75 %	25 %
Lambeth Scientific Services	50 %	100 %	50 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
Milton Keynes Council	100 %	100 %	50 %	100 %	100 %	NR [3]	NR [3]	25 %	0 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [3]	NR [3]	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	75 %	100 %	NR [3]	NR [3]	100 %	100 %
Staffordshire County Council	100 %	75 %	75 %	75 %	100 %	NR [3]	NR [3]	50 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [3]	NR [3]	100 %	NR [2]
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	100 %	NR [3]	NR [3]	NR [2]	NR [2]

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

AIR PT Nitrogen Dioxide Proficiency Scheme Results 2022

Methods: GLM 7 – CARY 60 Spectrophotometer

			Procedure GLM 7		
Date	**Round**	**Assigned value**	**Measured concentration**	**z-Score**	**% Bias**
Feb-22	AIR PT 49-1	2.36	2.29	-0.4	-3.0%
Feb-22	AIR PT 49-2	2.34	2.37	0.2	1.3%
Feb-22	AIR PT 49-3	0.88	0.83	-0.65	-5.7%
Feb-22	AIR PT 49-4	0.9	0.9	0.0	0.0%
May-22	AIR PT 50-1	1.6	1.54	-0.5	-3.8%
May-22	AIR PT 50-2	1.63	1.59	-0.29	-2.5%
May-22	AIR PT 50-3	1.22	1.18	-0.44	-3.3%
May-22	AIR PT 50-4	1.19	1.05	-1.48	-11.8%
Aug-22	AIR PT 52-1	1.90	1.82	-0.56	-4.2%
Aug-22	AIR PT 52-2	1.88	1.94	0.43	3.2%
Aug-22	AIR PT 52-3	2.67	2.63	-0.2	-1.5%
Aug-22	AIR PT 52-4	2.67	2.63	-0.2	-1.5%
Oct-22	AIR PT 53-1	1.67	1.75	0.64	4.8%
Oct-22	AIR PT 53-2	1.71	1.59	-0.94	-7.0%
Oct-22	AIR PT 53-3	1.1	1.13	0.36	2.7%
Oct-22	AIR PT 53-4	1.1	1.12	0.24	1.8%

Title: AIR PT Proficiency Scheme - Nitrogen Dioxide 2022

Proficiency Scheme - Nitrogen Dioxide 2022

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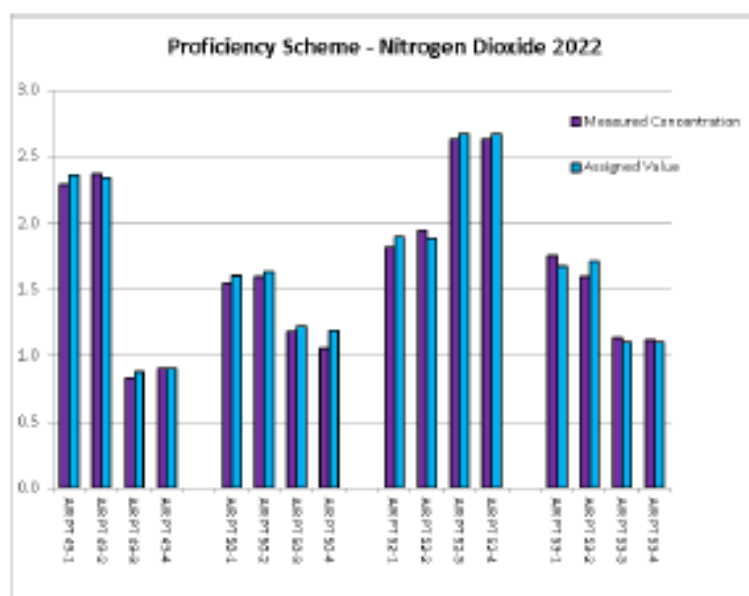
Precision Summary Results

The diffusion tube precision summary results are provided below. This details the total number of recorded good/bad precision results for the last 3 years for laboratories that currently provide diffusion tube analysis.

2020 - 2022 Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies UK Laboratories including for Gradko Laboratory 50% TEA in Acetone

Diffusion Tube Preparation Method	2020 Good	2020 Bad	2021 Good	2021 Bad	2022 Good	2022 Bad
Gradko, 50% TEA in Acetone	19	1	16	0	14	0
Gradko, 20% TEA in Water	27	0	34	0	27	0
ESG Didcot / SOCOTEC, 50% TEA in Acetone	24	0	25	3	26	0
ESG Didcot / SOCOTEC, 20% TEA in Water	6	0	14	1	5	0
Staffordshire Scientific Services	15	0	15	1	12	0
Glasgow Scientific Services	2	7	2	5	3	3
Edinburgh Scientific Services	4	1	6	0	1	0
Milton Keynes Council	4	0	4	0	1	0
Tayside Scientific Services	1	0	1	0	1	0
Lambeth Scientific Services	8	2	8	1	3	1
Aberdeen Scientific Services	7	0	7	0	7	0
South Yorkshire Air Quality Samplers	1	0	1	0	0	0
ESG Glasgow, 50% TEA in Acetone	1	0	0	1	1	0
ESG Glasgow, 20% TEA in Water	1	0	0	1	1	0
Somerset County Council	10	0	11	0	6	0

Schedule of Accreditation issued by United Kingdom Accreditation Service (UKAS)

Gradko is accredited by UKAS for the analysis of NO₂ diffusion tubes. It undertakes the analysis of the exposed diffusion tubes by ultra-violet spectrophotometry. The relevant test is shown below on the UKAS Schedule of Accreditation issued 19 December 2022.

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 17025:2017

Gradko International Ltd
(Trading as Gradko Environmental)

Issue No: 025   Issue date: 19 December 2022

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Winchester	Fax: +44 (0)1962 841339
Hampshire	E-Mail: diffusion@gradko.co.uk
SO23 0RH	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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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: 025   Issue date: 19 December 2022

UKAS
TESTING

2187

Accredited to
ISO/IEC 17025:2017

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 Tetrachloroethylene Trichloroethylene Styrene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene	GLM 13-1 by Thermal Desorption GC-Mass Spectrometry
	trans-1,2-Dichloroethene cis-1,2-Dichloroethene	GLM 13-3 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		

NO$_2$ diffusion tube analysis method

NO$_2$ diffusion tubes are passive monitoring devices. They are made up of a Perspex cylinder, with two stainless steel mesh discs, coated with TEA absorbent held inside a polythene cap, which is sealed onto one end of the tube. Diffusion tubes operate on the principle of molecular diffusion, with molecules of a gas diffusing from a region of high concentration (open end of the tube) to a region of low concentration (absorbent end of the tube) (AEA, 2008). NO$_2$ diffuses up the tube because of a concentration gradient and is absorbed by the TEA, which is present on the coated discs in the sealed end of the tube. All Wandsworth NO$_2$ diffusion tubes are prepared by Gradko using 50% v/v TEA with Acetone as the absorbent.

Prior to and after sampling, an opaque polythene cap is placed over the end of the diffusion tube opposite the TEA coated discs to prevent further absorption. The NO$_2$ diffusion tubes are labelled and kept refrigerated in plastic bags prior to and after exposure.

Discussion of Choice of Factor to Use

A co-location study using 2 nitrogen dioxide diffusion tubes has been carried out at the Felsham Road, Putney (automatic monitoring site ID: WA9; non- automatic monitoring site IDs: W21 and W22). Due to a low data capture rate at the Felsham Road automatic monitoring station the local bias adjustment factor was unable to be calculated. A local bias adjustment factor calculation could be presented in future for comparison with the national factor.

We have used the nationally derived bias adjustment factor of 0.82 as per diffusion Tube Bias Factor s/s 03/2023 for consistency as has been applied in the previous 5 years. As the guidance states, the use of nationally derived bias adjustment factor will provide the best estimate of the true annual mean concentration as it is based on more studies than a locally derived one.

Table L.   Bias Adjustment Factor

Year	Local or National	If Local, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.82
2021	National	03/22	0.83
2020	National	03/21	0.82
2019	National	03/20	0.93
2018	National	03/19	0.93
2017	National	03/18	0.89

Numerical results for this data are contained in the National Bias Adjustment Spreadsheet version 03/23

In 2022, the tube precision for NO$_2$ Annual Field Inter-Comparison for Gradko International using the 50% TEA in acetone method was 'good' for the results of 14 participating local authorities, no participating local authorities were deemed to be 'bad'.

Analysed by	Method	Year	Site Type	Local Authority	Length of study (months)	Diffusion tube mean conc. (Dm) (ug/m3)	Automatic monitor (Cm) (ug/m3)	Bias (B)	Tube Precision	Bias adjustment factor (A) (Cm/Dm)
Gradko	50% TEA in Acetone	2022	KS	Adur District Council	10	30	21	42.9%	G	0.70
Gradko	50% TEA in Acetone	2022	UC	Falkirk Council	12	32	26	22.7%	G	0.81
Gradko	50% TEA in Acetone	2022	UB	Falkirk Council	9	15	13	16.4%	G	0.86
Gradko	50% TEA in Acetone	2022	R	Lb Newham	12	30	23	29.1%	G	0.77
Gradko	50% TEA in acetone	2022	SU	Redcar & Cleveland Borough Council	12	14	10	44.9%	G	0.69
Gradko	50% TEA in Acetone	2022	R	Worthing Borough Council	9	33	23	44.2%	G	0.69
Gradko	50% TEA in acetone	2022	KS	Marylebone Road Intercomparison	12	52	42	23.0%	G	0.81
Gradko	50% TEA in acetone	2022	R	City Of London	11	60	54	11.6%	G	0.90
Gradko	50% TEA in acetone	2022	UB	City Of London	12	28	23	23.7%	G	0.81
Gradko	50% TEA in Acetone	2022	KS	London Borough Of Croydon	12	41	37	11.1%	G	0.90
Gradko	50% TEA in Acetone	2022	R	Royal Borough Of Windsor And Maidenhead	12	30	26	13.9%	G	0.88
Gradko	50% TEA in Acetone	2022	R	Royal Borough Of Windsor And Maidenhead	12	27	27	-1.0%	G	1.01
Gradko	50% TEA in Acetone	2022	R	Sandwell Mbc	12	34	27	27.1%	G	0.79
Gradko	50% TEA in Acetone	2022	UB	Sandwell Mbc	12	21	19	11.9%	G	0.89
Gradko	50% TEA in acetone	2022		**Overall Factor[3] (14 studies)**					**Use**	0.82

A.3   Adjustments to the Ratified Monitoring Data

<u>Short-term to Long-term Data Adjustment</u>

For monitoring sites where data capture is less than 75% of a full calendar year (less than 9 months), the mean of the 'raw' concentrations should be "annualised" in accordance with Box 7.10 of the LLAQM Technical Guidance (TG19) before being compared to annual mean objectives.

<u>Distance Adjustment</u>

The results presented in the Table N have been adjusted to represent exposure at the nearest façade. To estimate the concentration at the nearest receptor, the procedure specified in LLAQM.TG(19) has been applied to all monitoring locations that record an annual mean concentration above the NO_2 annual objective of $40\mu g/m^3$. The calculation has been applied also to monitoring locations that recorded an annual mean concentration within 10% of the NO_2 annual objective of $40\mu g/m^3$ (i.e. above $36\mu g/m^3$), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

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 values used in the calculation derived from the diffusion tube NE8 background site (Battersea park).

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

Short-Term to Long-Term Monitoring NO$_2$ Data Adjustment for the continuous monitoring station WAB - Tooting High Street

NO$_2$ data at the continuous monitoring station **WAB** (Tooting High Street) had data capture rate of 45% of the full calendar year. Therefore, NO$_2$ data have been "annualised" using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives.

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio (AM/PM)
Islington - Arsenal	Background	20.1	22.5	0.893
Windsor and Maidenhead - Aldebury Road	Background	14.5	16	0.908
Wandsworth - Wandsworth Town Hall	Background	27.8	31.1	0.894
			Average	**0.898**

WAB -Original Annual Mean: 38
WAB -Annualised Mean:34.1

Short-Term to Long-Term Monitoring NO$_2$ Data Adjustment for the continuous monitoring station WA8 – Putney High Street

NO$_2$ data at the continuous monitoring station **WA8** (Putney High Street first floor) had data capture rate of 67% of the full calendar year. Therefore, NO$_2$ data have been "annualised" using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives.

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio (AM/PM)
Islington - Arsenal	Background	20.1	18.3	1.097
Windsor and Maidenhead - Aldebury Road	Background	14.5	13.1	1.109
Wandsworth - Wandsworth Town Hall	Background	27.8	26.3	1.06
			Average	**1.089**

WA8 -Original Annual Mean: 47
WA8 -Annualised Mean:51.2

Short-Term to Long-Term Monitoring PM10 Data Adjustment for the continuous monitoring station WAB - Tooting High Street

PM10 data at the continuous monitoring station **WAB** (Tooting High Street) had data capture rate of 56% of the full calendar year. Therefore, PM10 data have been "annualised" using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives.

Site	Site Type	Annual Mean ($\mu g/m^3$)	Period Mean ($\mu g/m^3$)	Ratio (AM/PM)
Reigate and Banstead - Horley	Background	14.3	13.1	1.093
Richmond Upon Thames - Barnes Wetlands	Background	14.3	13	1.1
Wandsworth - Putney	Background	15.5	13.8	1.119
			Average	**1.104**

WAB -Original Annual Mean: 19
WAB -Annualised Mean: 21

Diffusion tube BW1 Burntwood Ln (junction of Tranmere Road and Aboyne Road, SW17 0AL)

NO$_2$ data of BW1 had data capture rate of 67% of the full calendar year. Therefore, NO$_2$ data have been "annualised" using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives.

Start Date	End date	Wandsworth Town Hall (Urban Background) Continuous Monitor DC for 2022 = 93% (B1)	D1 (Diffusion Tube data)	B1 when D1 available	Annualised Concentration
05/01/2022	02/02/2022	40.2	Missing		
02/02/2022	02/03/2022	21.5	Missing		
02/03/2022	31/03/2022	35.1	Missing		
31/03/2022	05/05/2022	29.4	30.3	29.4	
05/05/2022	07/06/2022	21.7	29.6	21.7	
07/06/2022	07/07/2022	19.8	28.3	19.8	
07/07/2022	05/08/2022	23	33.6	23	
02/08/2022	02/09/2022	24.2	31.5	24.2	
02/09/2022	28/09/2022	29.6	38.5	29.6	
28/09/2022	02/11/2022	25.2	34.8	25.2	
02/11/2022	30/11/2022	25.5	24.7	25.5	
30/11/2022	04/01/2023	36.5	Missing		
	Averages	27.6	31.4	24.8	
			Annualisation Ratio	1.11	35.0

Table N.   NO₂ Fall off With Distance Calculations

Site ID	Site Name	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (μg m^{-3})	Background Concentration (μg m^{-3})	Concentration Predicted at Receptor (μg m^{-3})
W23	37 West Hill	3.02	2.2	38	14	34.6
W24	Putney High Street	2.35	2.35	43	14	38.1
W4	108 Mitcham Road	0.6	3	46	14	36.5
YR2	Royal Academy of Dance	0.7	14	36	14	23.6
YR5	Battersea Park Road	0.63	0.63	43	14	39.3
W42	Bellevue Rd/Trinity Road	1.1	10	38	14	27.1
W47	West Hill	0.7	5	60	14	**43.0**

Appendix B   Full Monthly Diffusion Tube Results for 2022

Table O.   NO$_2$ Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted (0.82)
W23 (37 West Hill)	83	83			58	47	42	41	50	45	51	41	43	49	47	38
W24 (Putney High Street)	100	100	63	52	46	44	47	56	55	46	53	53	58	55	52	43
W21 (Felsham road)	100	100	33	26	36	22	19	20	20	21	24	28	28	35	26	21
W22 (Felsham road, tube)	92	92	34	28	37	23		24	20	22	25	30	30	35	28	23
W6 (21 Daylesford Avenue)	100	100	28	17	26	15	11	10	13	15	19	17	16	26	18	15
W25 (Roehampton Church School)	100	100	32	25	29	21	18	16	19	20	22	21	24	28	23	19
W26 (Replingham Road)	100	100	32	19	26	19	15	14	14	17	21	20	22	25	20	17
W27 (68-70 Sutherland Grove)	100	100	30	17	27	17	12	11	13	15	17	19	19	27	19	15
W28 (61 Summerley street)	100	100	34	21	27	18	14	12	14	17	19	19	21	29	20	17

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted (0.82)
W29 (Junction Skelbrook St./Garratt L)	100	100	35	20	30	22	16	15	17	20	22	22	23	32	23	19
W4 (108 Mitcham road)	100	100	**68**	**57**	**61**	**46**	**53**	**59**	**60**	**49**	**58**	**54**	**59**	**56**	**57**	**46**
W8 (50 Bickely street)	92	92	39	24	32	25	20	15	18	22	25		24	33	25	21
W30 (11B Elmbourne road)	100	100	38	25	29	20	17	16	17	18	24	23	24	30	24	19
W31 (Junction Hildreth St./Bedford Hill)	100	100	**43**	28	34	27	25	22	27	26	31	31	34	36	30	25
W32 (2-3 Balham High road)	92	92	**41**	32	**42**	31		27	30	30	33	35	38	**42**	34	28
W34 (46 Shelgate road)	92	92	38	23	33	20	16	14	17		23	21	23	30	24	19
W35 (47 Northcote road)	75	75	38	20	36	22		17		23	25	26	29		26	21
W36 (St Anne's Hill)	100	100	38	23	29	21	19	16	22	19	27	24	23	33	25	20
W37 (302A Merton Rd)	92	92	39	25	31	24	22	19	21		26	25	26	32	26	22
W38 (High View School)	92	92	34	22	35	22	18		18	21	21	26	25	32	25	20

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted (0.82)
NE2 (Chesterton School)	83	83	36	25	32		23	21	23	21		27	28	31	27	22
NE3 (Queenstown Road)	100	100	**55**	38	**50**	37	36	33	**42**	**41**	**46**	39	**45**	**44**	**42**	35
NE4 (Lockington Road)	92	92	**41**	24	37	24	20	17		20	24	25	30	28	26	22
NE5 (Kirtling Street)	83	83	**44**	26	**41**	26	26	24	27			34	38	36	32	26
NE6 (Nine Elms Lane)	100	100	**56**	39	**49**	37	34	35	45	37	**42**	**40**	38	39	**41**	34
NE7 (1 Nine Elms, Parry)	100	100	**49**	34	39	30	28	27	31	33	37	34	34	39	34	28
NE8 (Battersea park)	100	100	25	14	26	14	12	11	13	14	16	15	18	22	17	14
YR1 (Trafalgar House)	100	100	**46**	31	38	32	31	27	32	33	36	31	30	38	34	28
YR2 (Royal Academy of Dance)	92	92	**51**		**48**	38	39	**41**	**44**	**42**	**47**	**45**	**43**	**44**	**44**	36

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted (0.82)
YR3 (Cotton Row)	92	92	40	25	32	21	19	15	17	20	24		28	33	25	20
YR4 (York road, corner with Falcon Road)	100	100	54	41	42	34	36	32	31	31	36	35	40	39	37	31
YR5 (256 Battersea Park Road)	100	100	64	45	61	54	53	47	53	58	53	47	49	48	53	43
YR6 (31-32 Battersea Square)	92	92	40	27	41	31	26	29	33	28	36		35	36	33	27
W39 (Carlton Dr/ Putney Hill)	100	100	47	28	38	31	28	30	28	31	34	37	35	40	34	28
W40 (Roehampton High St.)	100	100	42	29	37	24	24	22	26	25	30	29	30	29	29	24
W41 (Northcote /Broomwood Rd)	100	100	40	24	34	19	18	15	17	19	23	23	30	31	24	20
W42 (Bellevue Rd/ Trinity Rd)	100	100	54	32	54	42	45	47	49	42	53	46	44	46	46	38
W43 (Trinity Rd)	100	100	44	30	38	28	25	24	27	27	33	30	34	34	31	25
W44 (Thessaly Rd)	83	83	37	24		22	17	14	17	18	23		27	27	23	19

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted (0.82)
W45 (A24 Wimbledon)	100	100	42	39	36	29	28	27	28	24	31	35	34	43	33	27
W46 (Trinity Rd)	100	100	50	36	43	30	31	31	32	31	39	35	39	42	37	30
W47 (West Hill)	100	100	82	73	77	60	71	73	70	74	77	72	76	68	73	60
W48 (Balham High Rd)	100	100	43	26	33	24	21	20	21	24	26	27	30	36	28	23
W49 (Garratt Ln/ Earlsfield Rd)	100	100	42	30	50	33	26	27	35	40	39	36	34	39	36	29
W50 (Penwith Rd/Garratt Ln)	75	75	43		37	32	27	26	30	32	32		30		32	26
SA1 (Louisville Rd)	100	100	36	21	30	23	17	14	21	22	24	21	21	29	23	19
WH1 (Roehampton Lane/ Upper Richmond	100	100	41	22	28	20	17	15	17	17	22	22	26	33	23	19
WH2 (Priory Lane/ Upper Richmond Rd)	100	100	40	27	46	28	25	25	29	32	40	34	35	36	33	27
WH3 (Clarence Ln/Roehampton Ln)	100	100	41	23	37	25	25	22	26	25	29	27	28	23	27	23

Site ID	Valid data capture for monitoring period %(a)	Valid data capture 2022 %(b)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted (0.82)
W51 (Aldrington Road/North Drive)	100	100	**42**	33	**47**	36	31	31	36	35	37	34	32	36	36	29
BW1 (Burntwood Ln)	80	67				30	30	28	34	31	38	35	25		31	26
BW2 (Burntwood Ln)	100	83			**41**	23	20	20	22	24	28	27	31	33	27	22

Notes

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

Exceedances of the NO$_2$ annual mean AQO of 40 µg m^{-3} are shown in **bold**.

NO$_2$ annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO$_2$ hourly mean AQS objective are shown in **bold and underlined**.

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

(a) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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