

# London Borough of Wandsworth Air Quality Annual Status Report for 2021

Date of publication: 31<sup>st</sup> May 2022



This report provides a detailed overview of air quality in the London Borough of Wandsworth during 2021. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process<sup>1</sup>.

## **Contact details:**

*Jason Andrews*

EH Pollution Manager (Air Quality), Regulatory Services Partnership (London Boroughs of Merton, Richmond upon Thames and Wandsworth)

Tel: 0208 5453859 Email: [jason.andrews@merton.gov.uk](mailto:jason.andrews@merton.gov.uk)

*Maria Vaz*

Senior Air Quality Officer, Regulatory Services Partnership (London Boroughs of Merton, Richmond upon Thames and Wandsworth)

Tel: 0208 2885677 Email: [maria.vaz@merton.gov.uk](mailto:maria.vaz@merton.gov.uk)

---

<sup>1</sup> 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<sub>10</sub>). 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.

## Contents

Abbreviations .....	5
1. Air Quality Monitoring .....	7
1.1 Locations .....	7
1.2 Comparison of Monitoring Results with AQOs .....	13
2. Action to Improve Air Quality .....	37
2.1 Air Quality Action Plan Progress .....	37
3. Planning Update and Other New Sources of Emissions .....	54
3.1 New or significantly changed industrial or other sources.....	55
4. Additional Activities to Improve Air Quality .....	56
4.1 London Borough of Wandsworth Fleet .....	56
4.2 NRMM Enforcement Project.....	56
4.2 Air Quality Alerts .....	56
4.3 Business Low Emission Neighbourhood (BLEN) .....	56
Appendix A Details of Monitoring Site Quality QA/QC .....	58
A.1 Automatic Monitoring Sites.....	58
A.2 Diffusion Tubes - Quality Assurance / Quality Control.....	59
This section contains details of Gradko International Ltd.'s Results of laboratory precision.....	60
A.3 Adjustments to the Ratified Monitoring Data .....	69
Appendix B Full Monthly Diffusion Tube Results for 2021 .....	72

## Tables

Table A.	Summary of National Air Quality Standards and Objectives .....	6
Table B.	Details of Automatic Monitoring Sites for 2021 .....	7
Table C.	Details of Non-Automatic Monitoring Sites for 2021 .....	8
Table D.	Annual Mean NO <sub>2</sub> Ratified and Bias-adjusted Monitoring Results .....	14
Table E.	NO <sub>2</sub> Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m <sup>-3</sup> .....	29
Table F.	Annual Mean PM <sub>10</sub> Automatic Monitoring Results (µg m <sup>-3</sup> ) .....	31
Table G.	PM <sub>10</sub> Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM <sub>10</sub> 24-Hour Means > 50 µg m <sup>-3</sup> .....	34
Table J.	Delivery of Air Quality Action Plan Measures .....	38
Table K.	Planning requirements met by planning applications in Wandsworth in 2021 .....	54
Table L.	Bias Adjustment Factor .....	68
Table M.	Short-Term to Long-Term Monitoring Data Adjustment.....	70
Table N.	NO <sub>2</sub> Fall off With Distance Calculations .....	71
Table O.	NO <sub>2</sub> Diffusion Tube Results .....	72

## Abbreviations

<b>Abbreviation</b>	<b>Description</b>
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
LBW	London Borough of Wandsworth
NRMM	Non-Road Mobile Machinery
PM <sub>10</sub>	Particulate matter less than 10 micron in diameter
PM <sub>2.5</sub>	Particulate matter less than 2.5 micron in diameter
TEB	Transport Emissions Benchmark
TfL	Transport for London

**Table A. Summary of National Air Quality Standards and Objectives**

Pollutant	Standard / Objective (UK)	Averaging Period	Date <sup>(1)</sup>
Nitrogen dioxide (NO <sub>2</sub> )	200 µg m <sup>-3</sup> not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
Nitrogen dioxide (NO <sub>2</sub> )	40 µg m <sup>-3</sup>	Annual mean	31 Dec 2005
Particles (PM <sub>10</sub> )	50 µg m <sup>-3</sup> not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
Particles (PM <sub>10</sub> )	40 µg m <sup>-3</sup>	Annual mean	31 Dec 2004
Particles (PM <sub>2.5</sub> )	25 µg m <sup>-3</sup>	Annual mean	2021
Particles (PM <sub>2.5</sub> )	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
Sulphur dioxide (SO <sub>2</sub> )	266 µg m <sup>-3</sup> not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
Sulphur dioxide (SO <sub>2</sub> )	350 µg m <sup>-3</sup> not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
Sulphur dioxide (SO <sub>2</sub> )	125 µg m <sup>-3</sup> not to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004

**Notes:**

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

# 1. Air Quality Monitoring

## 1.1 Locations

**Table B. Details of Automatic Monitoring Sites for 2021**

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
WA2	Wandsworth Town Hall	525779	174662	Urban background	Y	22	22	4.85	NO <sub>2</sub> , O <sub>3</sub>	Chemiluminescent
WA7	Putney High Street	524035	175334	Kerbside	Y	1	0.5	1.75	NO <sub>2</sub> , PM <sub>10</sub>	Chemiluminescent; TEOM
WA8	Putney High Street facade	524032	175335	Roadside	Y	1	1	4.85	NO <sub>2</sub>	Chemiluminescent
WA9	Felsham Road, Putney	524044	175495	Urban background	Y	4.8m from Felsham Road	1	2.75	NO <sub>2</sub> , PM <sub>10</sub>	Chemiluminescent; TEOM
WAA	Thessaly Road, Battersea	529137	177249	Roadside	Y	7.5m from Battersea Park Road	1	1.75	NO <sub>2</sub> , PM <sub>10</sub>	Chemiluminescent; TEOM
WAB	Tooting High Street	527567	171628	Roadside	Y	2	2	1.75	NO <sub>2</sub> , PM <sub>10</sub>	Chemiluminescent; TEOM
WAC	Lavender Hill, Clapham Junction	527430	175454	Roadside	Y	8m from Lavender Hill	1	1.75	NO <sub>2</sub> , PM <sub>10</sub>	Chemiluminescent; TEOM

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

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
W23	37 West Hill, Wandsworth Town	525111	174619	Roadside	Y	2.20	3.02	2.52	NO <sub>2</sub>	N
W24	Putney sign (Mac Donald's), Putney	524045	175366	Roadside	Y	2.35	2.35	2.3	NO <sub>2</sub>	N
W21 W22	Felsham Road tube 1 & tube 2, Putney	524044	175495	Urban Background	Y	4.8	1	3.35	NO <sub>2</sub>	Y
W6	21 Daylesford Avenue, Putney	522270	175307	Urban Background	Y	11	2.4	2.85	NO <sub>2</sub>	N
W25	Roehampton Church School (Roehampton Ln)	522542	173700	Roadside	Y	0.86	0.53	2.25	NO <sub>2</sub>	N
W26	Replingham Road (corner of Heythrope street), Southfield	524847	173282	Kerbside	Y	2.54	0.62	2.37	NO <sub>2</sub>	N
W27	68-70 Sutherland Grove (opposite St. Cecilia's school), Southfield	524633	173594	Urban Background	Y	2.00	0.65	2.83	NO <sub>2</sub>	N
W28	61 Summerley Street, Earlsfield	526011	172869	Urban background	Y	2.06	0.60	2.36	NO <sub>2</sub>	N
W29	Junction Skelbrook Street / Garratt Lane, Earlsfield	526099	172833	Roadside	Y	0.70	3.29	2.27	NO <sub>2</sub>	N
W4	108 Mitcham Road, Tooting Broadway	527688	171204	Kerbside	Y	3	0.6	2.65	NO <sub>2</sub>	N
W8	50 Bickely Street, Tooting Broadway	527524	171239	Urban Background	Y	2.97	1.85	2.8	NO <sub>2</sub>	N
W30	11B Elmbourne Road, Balham	528900	172431	Urban Background	Y	4.50	0.50	2.56	NO <sub>2</sub>	N
W31	Junction Hildreth Street / Bedford Hill, Balham	528607	173333	Kerbside	Y	1.44	3.64	2.21	NO <sub>2</sub>	N

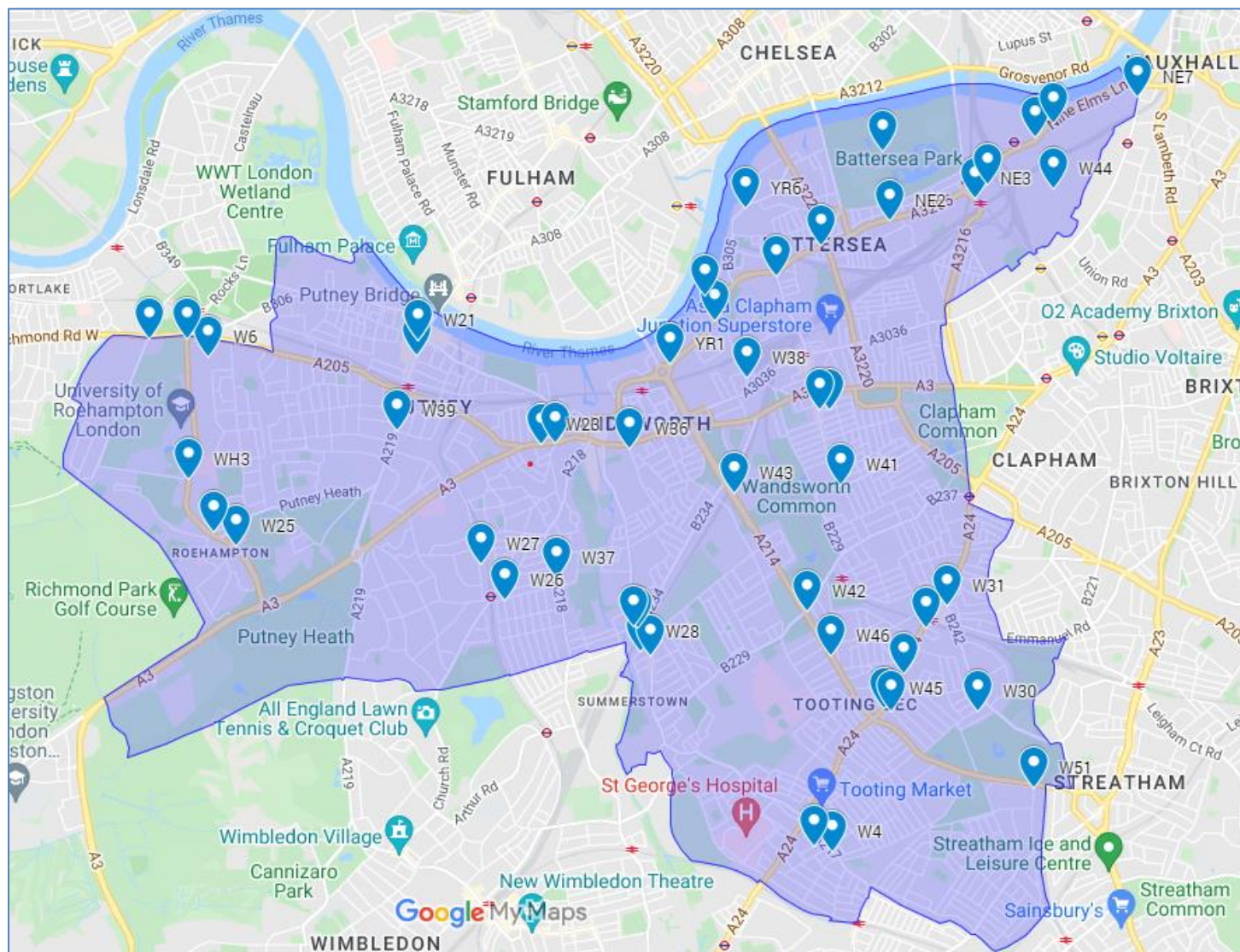


Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
W32	2-3 Balham High Road, Balham	528436	173133	Kerbside	Y	4.40	0.71	2.30	NO <sub>2</sub>	N
W34	46 Shelgate Road, Northcote	527569	174986	Urban Background	Y	2.14	0.40	2.38	NO <sub>2</sub>	N
W35	47 Northcote Road, Northcote	527487	174981	Kerbside	Y	4.21	0.49	2.37	NO <sub>2</sub>	N
W36	St. Anne's Hill, Fairfield	525875	174616	Urban Background	Y	2.73	0.89	2.38	NO <sub>2</sub>	N
W37	302A Merton Rd, Southfields	525278	173483	Roadside	Y	3.35	3.35	2.33	NO <sub>2</sub>	N
W38	High View School, Plough Terrace, Fairfield	526863	175239	Kerbside	Y	0.45	0.45	2.42	NO <sub>2</sub>	N
NE2	Chesterton School, Latchmere	528043	176618	Roadside	Y	2.85	2.85	2.20	NO <sub>2</sub>	N
NE3	Queenstown Road, Queenstown	528771	176819	Kerbside	Y	1.05	1.05	2.30	NO <sub>2</sub>	N
NE4	Lockington Road, Battersea	528871	176943	Urban Background	Y	1.22	0.69	2.37	NO <sub>2</sub>	N
NE5	Kirtling Street, Queenstown	529265	177353	Kerbside	Y	0.50	0.50	2.35	NO <sub>2</sub>	N
NE6	Nine Elms Lane, Queenstown	529413	177486	Kerbside	Y	0.53	0.53	2.40	NO <sub>2</sub>	N
NE7	1 Nine Elms, Parry Street, Queenstown	530129	177727	Roadside	Y	0.5	0.5	2.35	NO <sub>2</sub>	N
NE8	Battersea Park, Queenstown	528023	177176	Urban Background	Y	420	420	2.37	NO <sub>2</sub>	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)
YR1	Trafalgar House, St Mary's Park	526201	175340	Kerbside	Y	0.84	0.84	2.30	NO <sub>2</sub>	N
YR2	Royal Academy of Dance, St Mary's Park	526581	175731	Kerbside	Y	0.70	0.70	2.26	NO <sub>2</sub>	N
YR3	Cotton Row, St Mary's Park	526480	175930	Urban background	Y	160m from York	160m from York road	2.34	NO <sub>2</sub>	N
YR4	York Road, corner with Falcon Road, Latchmere	527086	176119	Kerbside	Y	0.75	0.75	2.25	NO <sub>2</sub>	N
YR5	256 Battersea Park Road	527109	176022	Kerbside	Y	0.63	0.63	2.32	NO <sub>2</sub>	N
YR6	31-32 Battersea Square	526817	176686	Kerbside	Y	0.44	0.44	2.35	NO <sub>2</sub>	N
W39	Carlton Dr/ Putney Hill Putney, SW15 6BQ	523898	174717	Kerbside	Y	18	0.5	2.2	NO <sub>2</sub>	N
W40	Roehampton High St. Roehampton, SW15 4HL	522343	173805	Kerbside	Y	13	0.5	2.2	NO <sub>2</sub>	N
W41	Northcote Rd/Broomwood Rd Battersea, SW11 6RE	527675	174339	Kerbside	Y	2	0.7	2.2	NO <sub>2</sub>	N
W42	Bellevue Rd/ Trinity Rd Bellevue Rd, SW17 7E0	527426	173249	Roadside	Y	10	1.1	2.2	NO <sub>2</sub>	N
W43	Trinity Rd Fitzhugh Grove SW18 3SA	526783	174250	Roadside	Y	18	2	2.2	NO <sub>2</sub>	N
W44	Thessaly Rd Marsh House SW8 4JJ	529425	176920	Roadside	Y	26	1.5	2.2	NO <sub>2</sub>	N
W45	A24 Wimbledon Sewing Machines SW17 7BA	528096	172439	Roadside	Y	21	2.5	2.2	NO <sub>2</sub>	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)
W46	Trinity Rd SW17 7HL	527639	172882	Kerbside	Y	11	0.8	2.2	NO <sub>2</sub>	N
W47	West Hill Wandsworth, SW18 1RB	525243	174643	Kerbside	Y	5	0.7	2.2	NO <sub>2</sub>	N
W48	Balham High Rd Balham, SW17 7BS	528263	172735	Kerbside	Y	22	0.5	2.2	NO <sub>2</sub>	N
<b>New Locations added since January 2021</b>										
W49	Garratt Ln/ Earlsfield Rd (Earlsfield, SW18 4SW)	525987	173077	Kerbside	Y	7	0.5	2.3	NO <sub>2</sub>	N
W50	Penwith Rd/Garratt Ln (Earlsfield, SW18 4EJ)	525945	173083	Roadside	Y	13	1.1	2.2	NO <sub>2</sub>	N
SC1	Louisville Rd (Tooting Bec, London SW17 8RL)	528160	172414	Kerbside	Y	9.5	0.4	2.3	NO <sub>2</sub>	N
WH1	Roehampton Lane/ Upper Richmond Road (London SW15 5QY)	522078	175466	Kerbside	Y	13	1.0	2.2	NO <sub>2</sub>	N
WH2	Priory Lane/ Upper Richmond Rd (Priory Ln, London SW15 5LA)	521752	175435	Roadside	Y	13	2.5	2.1	NO <sub>2</sub>	N
WH3	Clarence Ln/Roehampton Ln (1 Clarence Ln London SW15 4PN)	522087	174262	Kerbside	Y	12	0.6	2.1	NO <sub>2</sub>	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 not required at any site in the main Wandsworth diffusion network in 2021, as all sites achieved a data capture rate of 75% or higher. Where the annual mean is 10% of, or above, the  $40\mu\text{g m}^{-3}$  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 NO<sub>2</sub> Ratified and Bias-adjusted Monitoring Results**

Site ID	Site type	Valid data capture for monitoring period % <sup>(a)</sup>	Valid data capture 2021 % <sup>(b)</sup>	2015	2016	2017	2018	2019	2020	2021
<b>WA2</b> (Wandsworth Town Hall)	Automatic	100	82	36	43	40	38	41	30	29
<b>WA7</b> (Putney High Street)	Automatic	100	94	<u>123</u>	<u>124</u>	<u>76</u>	<u>68</u>	<u>69</u>	58	<u>62</u>
<b>WA8</b> (Putney High Street first floor)	Automatic	100	89	<u>96</u>	<u>110</u>	<u>60</u>	<u>62</u>	<u>66</u>	53	57
<b>WA9</b> (Felsham Road)	Automatic	100	91	40	45	31	35	35	26	27
<b>WAA</b> (Thessaly Road, Battersea)	Automatic	100	89	40	40	33	33 c	32	27	28
<b>WAB</b> (Tooting High Street)	Automatic	100	45	<u>60</u>	59	55	53	50	35c	34c
<b>WAC</b> (Lavender Hill, Clapham Junction)	Automatic	100	95	not open	46	43	42	37 c	31	35
<b>W23</b> (37 West Hill)	Diffusion tube	100	83	not open	not open	57	55	49	39	45
<b>W24</b> (Putney Sign Mac Donald's)	Diffusion tube	100	92	not open	not open	<u>63</u>	55	59	49	47
<b>W21 &amp; W22</b> (Felsham road, tube 1 & 2)	Diffusion tube	100	92	35	41	28	32	30	23	24

Site ID	Site type	Valid data capture for monitoring period % <sup>(a)</sup>	Valid data capture 2021 % <sup>(b)</sup>	2015	2016	2017	2018	2019	2020	2021
<b>W6</b> (21 Daylesford Avenue)	Diffusion tube	100	92	24	28	23	23	23 c	16	16
<b>W25</b> (Roehampton Church School)	Diffusion tube	100	92	not open	not open	32	29	27	20	21
<b>W26</b> (Replingham Road)	Diffusion tube	100	83	not open	not open	31	30	31 c	21	19
<b>W27</b> (68-70 Sutherland Grove)	Diffusion tube	100	83	not open	not open	24	25	23	16	19
<b>W28</b> (61 Summerley street)	Diffusion tube	100	92	not open	not open	27	28	27	20	21
<b>W29</b> (Junction Skelbrook St./Garratt L)	Diffusion tube	100	92	not open	not open	31	32	31	21	22
<b>W4</b> (108 Mitcham road)	Diffusion tube	100	92	<u>79</u>	<u>80</u>	66	64	62	51	50
<b>W8</b> (50 Bickely street)	Diffusion tube	100	83	33	35	31	31	28	22	24
<b>W30</b> (11B Elmbourne road)	Diffusion tube	100	92	not open	not open	33	31	29	21	23
<b>W31</b> (Junction Hildreth St./Bedford Hill)	Diffusion tube	100	92	not open	not open	39	39	36	26	29



Site ID	Site type	Valid data capture for monitoring period % <sup>(a)</sup>	Valid data capture 2021 % <sup>(b)</sup>	2015	2016	2017	2018	2019	2020	2021
<b>W32</b> (2-3 Balham High road)	Diffusion tube	100	75	not open	not open	46	44	39	31	31
<b>W34</b> (46 Shelgate road)	Diffusion tube	100	92	not open	not open	31	30	31	21	22
<b>W35</b> (47 Northcote road)	Diffusion tube	100	92	not open	not open	34	35	32	24	25
<b>W36</b> (St Anne's Hill)	Diffusion tube	100	83	not open	not open	39	33	31	23	23
<b>W37</b> (302A Merton Rd)	Diffusion tube	100	92	not open	not open	not open	37	37	27	25
<b>W38</b> (High View School)	Diffusion tube	100	92	not open	not open	not open	32	29	22	23
<b>NE2</b> (Chesterton School)	Diffusion tube	100	83	not open	not open	not open	35	34	24	25
<b>NE3</b> (Queenstown Road)	Diffusion tube	100	92	not open	not open	not open	63	59	42	40
<b>NE4</b> (Lockington Road)	Diffusion tube	100	92	not open	not open	36	34	31	24	25
<b>NE5</b> (Kirtling Street)	Diffusion tube	100	92	not open	not open	not open	46	39	29	31



Site ID	Site type	Valid data capture for monitoring period % <sup>(a)</sup>	Valid data capture 2021 % <sup>(b)</sup>	2015	2016	2017	2018	2019	2020	2021
NE6 (Nine Elms Lane)	Diffusion tube	100	92	not open	not open	not open	54	48	40	40
NE7 (1 Nine Elms, Parry)	Diffusion tube	100	92	not open	not open	not open	49	47	34	34
NE8 (Battersea park)	Diffusion tube	100	92	not open	not open	not open	24 c	20	15	16
YR1 (Trafalgar House)	Diffusion tube	100	92	not open	not open	not open	53	44	34	31
YR2 (Royal Academy of Dance)	Diffusion tube	100	75	not open	not open	not open	75	57	37	36
YR3 (Cotton Row)	Diffusion tube	100	83	not open	not open	not open	31	29	24	24
YR4 (York road, corner with Falcon Road)	Diffusion tube	100	92	not open	not open	not open	49	49	38	38
YR5 (256 Battersea Park Road)	Diffusion tube	100	75	not open	not open	not open	73	70	52	55
YR6 (31-32 Battersea Square)	Diffusion tube	100	92	not open	not open	not open	44	43	32	30
W39 Carlton Dr/ Putney Hill (Putney, SW15 6BQ)	Diffusion tube	100	92	not open	not open	not open	not open	not open	29	32

Site ID	Site type	Valid data capture for monitoring period % <sup>(a)</sup>	Valid data capture 2021 % <sup>(b)</sup>	2015	2016	2017	2018	2019	2020	2021
<b>W40</b> Roehampton High St. (Roehampton, SW15 4HL)	Diffusion tube	100	92	not open	not open	not open	not open	not open	25	26
<b>W41</b> Northcote /Broomwood Rd (Battersea, SW11 6RE)	Diffusion tube	100	92	not open	not open	not open	not open	not open	25	26
<b>W42</b> Bellevue Rd/ Trinity Rd (Bellevue Rd, SW17 7E0)	Diffusion tube	100	83	not open	not open	not open	not open	not open	48	45
<b>W43</b> Trinity Rd (Fitzhugh Grove SW18 3SA)	Diffusion tube	100	92	not open	not open	not open	not open	not open	28	28
W44 Thessaly Rd (Marsh House SW8 4JJ)	Diffusion tube	100	92	not open	not open	not open	not open	not open	21	22
W45 A24 Wimbledon (Sewing Machines SW17 7BA)	Diffusion tube	100	92	not open	not open	not open	not open	not open	31	31
<b>W46</b> Trinity Rd (SW17 7HL)	Diffusion tube	100	92	not open	not open	not open	not open	not open	38	37
<b>W47</b> West Hill (Wandsworth, SW18 1RB)	Diffusion tube	100	83	not open	not open	not open	not open	not open	58	64
<b>W48</b> Balham High Rd (Balham, SW17 7BS)	Diffusion tube	100	92	not open	not open	not open	not open	not open	27	27
<b>W49</b> Garratt Ln/ Earlsfield Rd (Earlsfield, SW18 4SW)	Diffusion tube	100	92	not open	not open	not open	not open	not open	not open	32

Site ID	Site type	Valid data capture for monitoring period % <sup>(a)</sup>	Valid data capture 2021 % <sup>(b)</sup>	2015	2016	2017	2018	2019	2020	2021
<b>W50</b> Penwith Rd/Garratt Ln (Earlsfield, SW18 4EJ)	Diffusion tube	100	92	not open	not open	not open	not open	not open	not open	32
<b>SC1</b> Louisville Rd, (Tooting Bec, London SW17 8RL)	Diffusion tube	100	92	not open	not open	not open	not open	not open	not open	22
<b>WH1</b> Roehampton Lane/ Upper Richmond Road (London SW15 5QY)	Diffusion tube	100	92	not open	not open	not open	not open	not open	not open	32
<b>WH2</b> Priory Lane/ Upper Richmond Rd (Priory Ln, London SW15 5LA)	Diffusion tube	100	92	not open	not open	not open	not open	not open	not open	27
<b>WH3</b> Clarence Ln/Roehampton Ln (1 Clarence Ln London SW15 4PN)	Diffusion tube	100	92	not open	not open	not open	not open	not open	not open	34

**Notes:**

The annual mean concentrations are presented as  $\mu\text{g m}^{-3}$ .

Exceedances of the NO<sub>2</sub> annual mean AQO of  $40 \mu\text{g m}^{-3}$  are shown in **bold**.

NO<sub>2</sub> annual means in excess of  $60 \mu\text{g m}^{-3}$ , indicating a potential exceedance of the NO<sub>2</sub> hourly mean AQS objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias.

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

Results have been distance corrected where applicable.

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

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

**Figure 2: Map of NO<sub>2</sub> diffusion tubes monitoring sites in the London borough of Wandsworth showing annual mean results from 2021.**

**Legend**

On this map, the squares represent NO<sub>2</sub> diffusion tubes and ID. The annual mean objective NO<sub>2</sub> is 40µg m<sup>-3</sup>. All monitoring sites that recorded NO<sub>2</sub> concentrations above this level are coloured in red and all that are below this level are coloured in green.

Diffusion tubes (<40µg m<sup>-3</sup>)



Diffusion tubes (>40µg m<sup>-3</sup>)

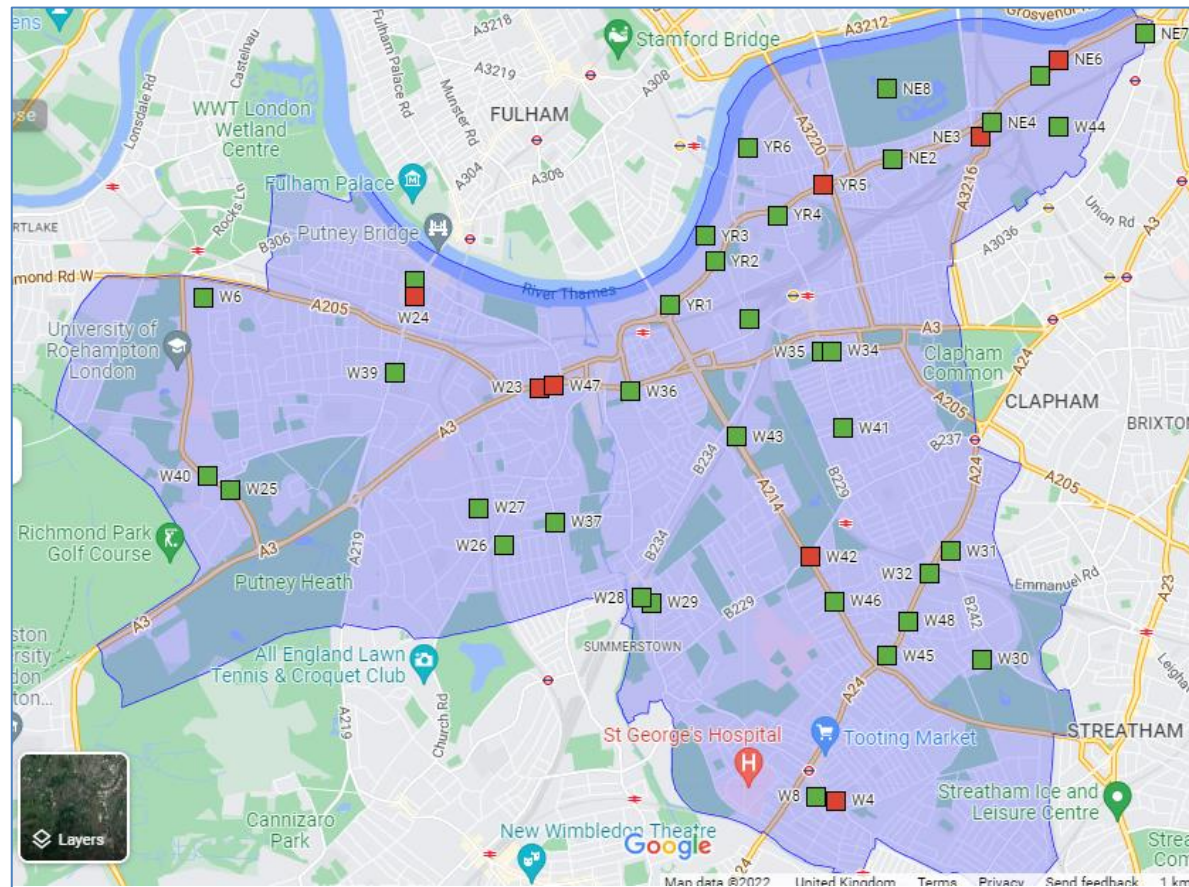


Table D shows the NO<sub>2</sub> diffusion tube monitoring results, with bias corrected values for each year from 2015 to 2021 (Note – see Table O for the uncorrected monthly data for 2021).

The results in bold and coloured coded in orange indicate an exceedance of the annual mean Air Quality Objective (AQO) of 40 µg m<sup>-3</sup> and the results underlined and coloured coded in red indicate an NO<sub>2</sub> annual mean in excess of 60 µg m<sup>-3</sup> highlighting a potential exceedance of the NO<sub>2</sub> 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 and automatic monitoring stations in 2021 except for:

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

We were aware of some data loss for Tooting High Street due to equipment failure. 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) should be used for guidance only.

Consequently, it has been necessary to annualise the result of this site in accordance with the procedure described in [LAQM TG \(19\)](#). A nationally derived bias adjustment factor of 0.83 was applied to all diffusion tubes data as per the National Tube Bias Factor Spreadsheet 03/22 (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<sub>2</sub> concentration is predicted to be below the AQO of 40 µg m<sup>-3</sup> at the façade of the nearest residential property

## Automatic Monitoring Site data

Annual mean NO<sub>2</sub> concentrations measured at all the automatic monitoring stations have constantly decreased since 2016, and more generally over the 7-year period (2015-2021) for which data have been reported.

In contrast, comparing only data for 2020 and 2021, there was a slight increase in levels of annual mean NO<sub>2</sub> concentrations recorded at five of the automatic monitoring stations: (WA7 and WA8) Putney High Street; (WA9) Felsham Road; (WAC) Lavender Hill 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 automatics monitoring stations have still recorded data above the annual mean objective of 40 µg m<sup>-3</sup>.

At WA2 (Wandsworth Town Hall) and WAB (Tooting High Street) reductions were recorded in 2021, below the national objectives. The automatic monitoring station data are further described in Figure 3. The red line indicates the Air Quality objective limit of 40 µg m<sup>-3</sup>. In 2021 for the second consecutive year WAB (Tooting High Street) has met the annual mean objective of 40 µg m<sup>-3</sup>.

Table E provides the results from the automatic monitoring stations for NO<sub>2</sub> for the 1-hour mean objective of 200 µg m<sup>-3</sup>. In 2021, for the second consecutive year the hourly objective was met at all sites, in contrast with 2019 where this standard was exceeded at WA8 Putney High Street first floor.

In 2020 all sites showed a reduction in NO<sub>2</sub> concentrations which was exceptionally good news as this was the most significant decrease seen in the last 7 years. The decrease came with a caveat however, that all results in 2020 needed to be treated with caution due to the COVID-19 pandemic which affected traffic patterns and in turn air quality. This was due to an increase in the use of private vehicles due to the public's lack of confidence in public transport.

As expected, in 2021 NO<sub>2</sub> concentrations were slightly higher at five of the seven sites than in 2020, however the overall downward trend at all monitoring sites continued when comparing data from 2016 to 2021. This helps demonstrate the mixed picture in 2021 for Wandsworth.

### **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 2021 the diffusion tube network consisted of 48 monitoring locations across Wandsworth.

The data capture for 2021 for all sites was satisfactory (89.25%). No site recorded a data capture of less than 75%, so annualising in line with DEFRA guidance, [LAQM TG \(19\)](#) was not required.

Due to a high level of uncertainty around the accuracy of August 2021 data, the decision was made to remove from the 12 months of data set. On average the data were 50% lower than expected. Data were confirmed with the laboratory; however they were not in line with the rest of London.

The results in bold (orange/red) indicate an exceedance of the annual mean objective of  $40 \mu\text{g m}^{-3}$  and the results in bold and underlined (red) indicate  $\text{NO}_2$  annual means in excess of  $60 \mu\text{g m}^{-3}$  indicating a potential exceedance of the  $\text{NO}_2$  hourly mean AQS objective.

The results from the 2021 monitoring (Table D) show that the annual mean national air quality objective (NAQO) of  $40 \mu\text{g m}^{-3}$  was exceeded at 8 monitoring locations which is 16% of the total monitoring sites (48); this is an increase of 1 from the previous year and indicates that the higher exceedances still need significant input to bring about compliance.

The  $40 \mu\text{g m}^{-3}$  annual mean objective was exceeded at:

- **W23** - West Hill  $45 \mu\text{g m}^{-3}$
- **W24** -Putney High Street  $47 \mu\text{g m}^{-3}$
- **W4** -Mitcham road  $50 \mu\text{g m}^{-3}$
- **NE3** - Queenstown Road  $40 \mu\text{g m}^{-3}$
- **NE6** -Nine Elms Lane  $40 \mu\text{g m}^{-3}$
- **YR5** -Battersea Park Road,  $55 \mu\text{g m}^{-3}$
- **W42** -Bellevue Rd/Trinity Rd  $45 \mu\text{g m}^{-3}$
- **W47** -West Hill  $64 \mu\text{g m}^{-3}$

After distance correction for nearest façade (Table N), the annual mean objective is exceeded at 4 sites (W23 West Hill, W24 Putney High Street, YR5 Battersea Park Road and W47 West Hill). This is down 5 sites from.

It should be noted that only one site (W47-West Hill) exceeded the annual mean of  $60 \mu\text{g m}^{-3}$  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  $60 \mu\text{g m}^{-3}$ .



There were 22 sites that showed an increase in NO<sub>2</sub> concentrations, 9 sites that showed a decrease in NO<sub>2</sub> concentrations and 10 sites that did not change from the previous year. As with the automatic monitoring stations, in 2020 all sites showed a reduction in NO<sub>2</sub> concentrations due to altered traffic patterns affecting air quality due to the COVID-19 pandemic. All results in 2020 therefore need to be treated with caution.

The overall downward trend at all monitoring sites continued when comparing data from 2016 to 2021 and all sites had a reduction in NO<sub>2</sub> concentrations when compared to 2019.

While there have been improvements in NO<sub>2</sub> concentrations, currently no location monitored in the borough would meet the new WHO guideline value of 10 µg/m<sup>3</sup> (annual mean) set to protect the public from the health effects of gaseous nitrogen dioxide.

The source of pollution in town centres remains 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.

The borough Air Quality Action Plan outlines a range of measures that are being undertaken to reduce transport based emissions, progress updates for 2021 are provided in Table H.

The overall monitoring results for the Borough show that NO<sub>2</sub> concentrations exceeded the UK annual mean objective (as it has done for each year since 2005), and improvements are still required. 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.

As predicted in last year's ASR, in 2021 an upward trend in levels of NO<sub>2</sub> was recorded at sites, however some sites recorded a slight drop in NO<sub>2</sub> levels or stayed the same. 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. In 2021 there has been a re-assignment of street space, focussing on pedestrianisation and segregated cycle paths in high streets and public realm areas, with summer weekend closures of Northcote Road continuing and permanent pedestrianisation measures proposed for both Battersea High Street and Old York Road following successful trials and subject to consultation.

The extended ULEZ to the north and south circulars came into effect on 25th October 2021. It is too early in this report to see the effects, the full data set in 2022 should indicate the impact of the ULEZ on the levels of NO<sub>2</sub>.

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 significantly. The fuel crisis in 2021 may have accelerated this. According to the SMMT (Society of Motor manufacturers and Traders), despite semiconductor shortages in the industry, 2021 was a bumper year for sales of electric vehicles, plug-ins and hybrids. Pure electric car sales exceeded 190,000 during 2021, which accounts for one in nine new registrations with more registered in 2021 than in 2016-2020 combined.

**Figure 3. Trends in Annual Mean Nitrogen Dioxide Concentrations (NO<sub>2</sub>) measured at the automatic monitoring stations (µg m<sup>-3</sup>)**

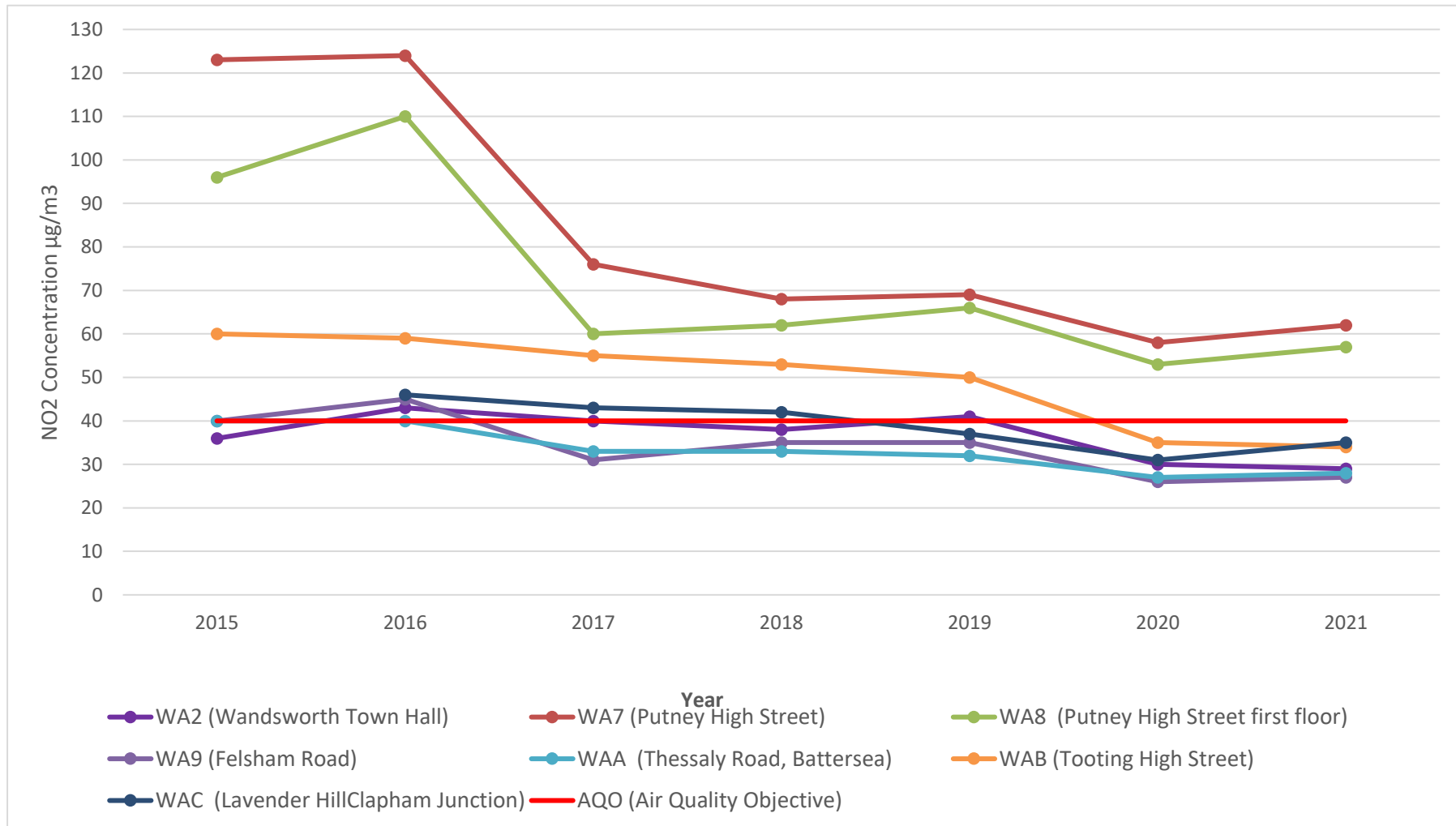
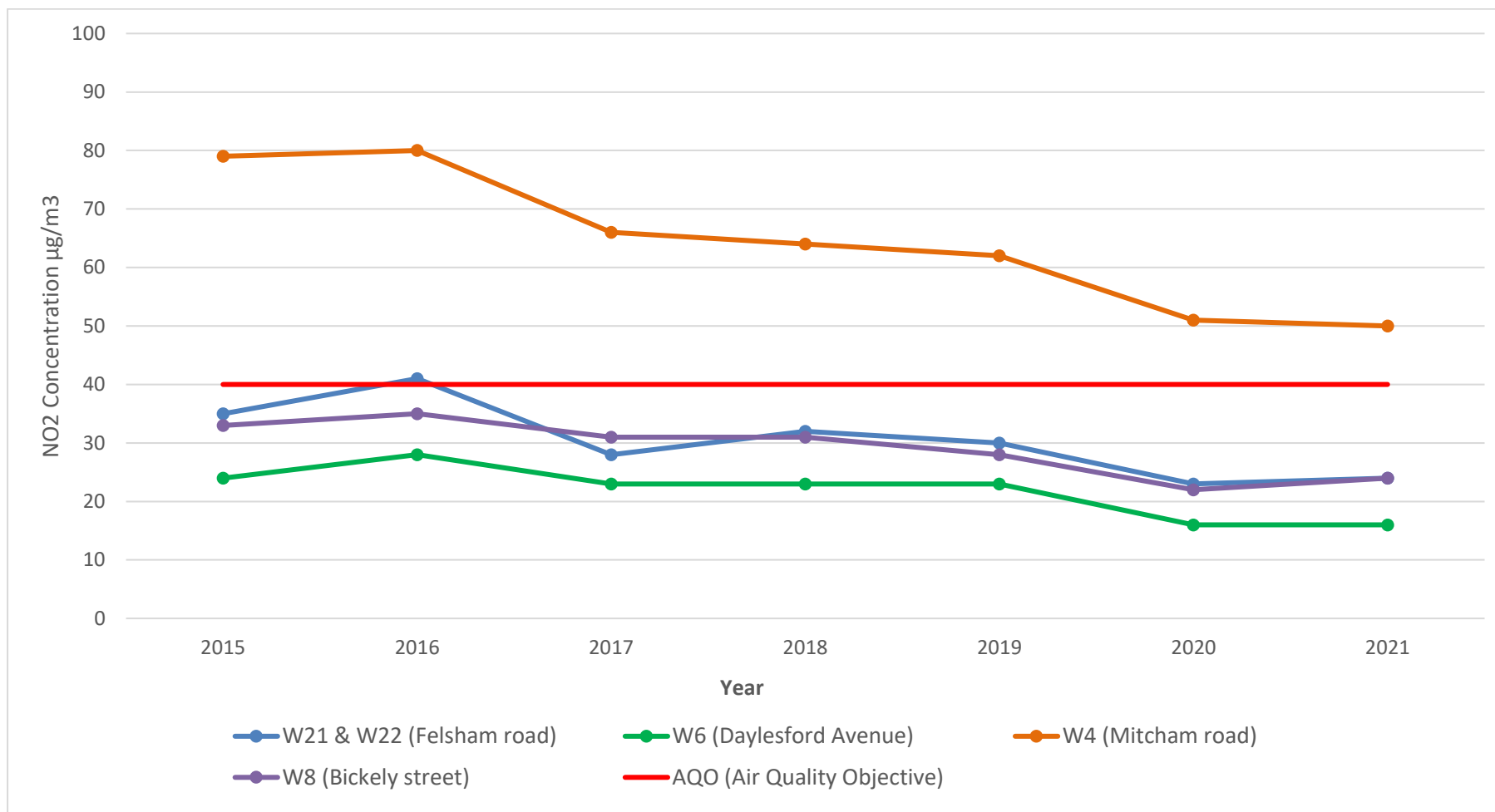


Figure 4. Long trends in Annual Mean Nitrogen Dioxide Concentrations (NO<sub>2</sub>) measured with Diffusion Tubes (µg m<sup>-3</sup>)



**Table E. NO<sub>2</sub> Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m<sup>-3</sup>**

Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021 % <sup>b</sup>	Number of Hourly Means > 200 µg m <sup>-3</sup>							
			2015	2016	2017	2018	2019	2020	2021	
<b>WA2</b> Wandsworth Town Hall	100	82	0 (108.1)	0	0	0	0	0	0	0 (89.5)
<b>WA7</b> Putney High Street	100	94	<b>1443</b>	<b>1248</b>	<b>76</b> <b>(247)</b>	<b>26</b>	11	4		1
<b>WA8</b> Putney High Street first floor	100	89	<b>329</b>	<b>403</b>	9	5	<b>19</b>	1		0
<b>WA9</b> Felsham Road; Putney	100	91	0 (104)	<b>45</b>	7 (179)	0	0	0		0
<b>WAA</b> Thessaly Road, Battersea	100	89	0 (113.6)	1	0 (98)	0 (0.97)	0	8		0
<b>WAB</b> Tooting High Street	100	45	9	2	0	2	3	0 (104)		0 (97.9)
<b>WAC</b> Lavender Hill - Clapham Junction	100	95	not open	<b>23</b>	0	0	0	0		0

**Notes**

Results are presented as the number of 1-hour periods where concentrations greater than 200 µg m<sup>-3</sup> have been recorded.

Exceedance of the NO<sub>2</sub> short term AQO of 200 µg m<sup>-3</sup> 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. All data capture at all monitoring stations are in excess of 75% at all monitoring stations, except at the WAB (Tooting High Street) site, where the data capture rate was 45%. Defra require a 90% data capture rate to be fully representative of the full year, so results for WAB (Tooting High Street) should be used for guidance only.

One exceedance of the hourly mean objective limit was observed at one automatic monitoring station (WA7 Putney High Street), but the number of exceedances were less than 18 of the 200  $\mu\text{g m}^{-3}$  permitted hours per year. The air quality objective was met at all seven air quality sites for a second consecutive year.

The overall monitoring results for the Borough in 2021 therefore show that  $\text{NO}_2$  concentrations exceeded the UK annual mean objective (as it has done for each year since 2002). This is also in line with the modelling prediction of the Borough. Traffic volumes on the local road network appear to be returning and may increase further. It will be interesting to see the results for 2022 as the new normal settles in and the effects of the extended Ultra Low Emission Zone are felt.

**Table F. Annual Mean PM<sub>10</sub> Automatic Monitoring Results (µg m<sup>-3</sup>)**

Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021% <sup>b</sup>	Annual Mean Concentration (µg m <sup>-3</sup> )						
			2015	2016	2017	2018	2019	2020	2021
<b>WA7</b> Putney High Street	100	83	25	21	21	25	22	19	20
<b>WA9</b> Felsham Road	100	96	18	18	17	17	18	16	16
<b>WAA</b> Thessaly Road	100	97	27	32	27	25	23	25	23
<b>WAB</b> Tooting High Street	100	87	25	24	23	23	23	21	23
<b>WAC</b> Lavender Hill - Clapham Junction	100	96	N/A	18	20	21	20 <sup>c</sup>	19	19

**Notes**

The annual mean concentrations are presented as µg m<sup>-3</sup>.

Exceedances of the PM<sub>10</sub> annual mean AQO of 40 µg m<sup>-3</sup> are shown in **bold**.

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

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

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

All data from the automatic monitoring stations have been fully ratified.

The National annual mean objective of  $40 \mu\text{g m}^{-3}$  is comfortably achieved in 2021 however, in London a focus is required to be maintained on Particulate Matter even when meeting the  $\text{PM}_{10}$  targets, because the London boroughs are collectively working to meet the World Health Organization (WHO) health based  $\text{PM}_{2.5}$  limits by 2030. The WHO annual mean limits for  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  are significantly lower than the current UK/EU standard at  $20 \text{ mg/m}^3$  and  $5 \text{ mg/m}^3$  respectfully. In this circumstance the measured concentrations at Putney High Street (WA7), Thessaly Road (WAA) and Tooting High Street (WAB) exceed the recommended World Health Organisation (WHO) guideline of  $20 \mu\text{gm}^{-3}$ .

There was  $1 \mu\text{gm}^{-3}$  increase in the levels of annual mean  $\text{PM}_{10}$  concentrations recorded at (WA7) Putney High Street and a  $2 \mu\text{gm}^{-3}$  increase in the levels of annual mean  $\text{PM}_{10}$  concentrations recorded at (WAB) Tooting High Street in 2021, a slight decrease in levels of annual mean  $\text{PM}_{10}$  concentrations at and (WAA) Thessaly Road of  $2 \mu\text{gm}^{-3}$ . No change in levels of annual mean  $\text{PM}_{10}$  concentrations at (WA9) Felsham Road and (WAC) Lavender Hill.

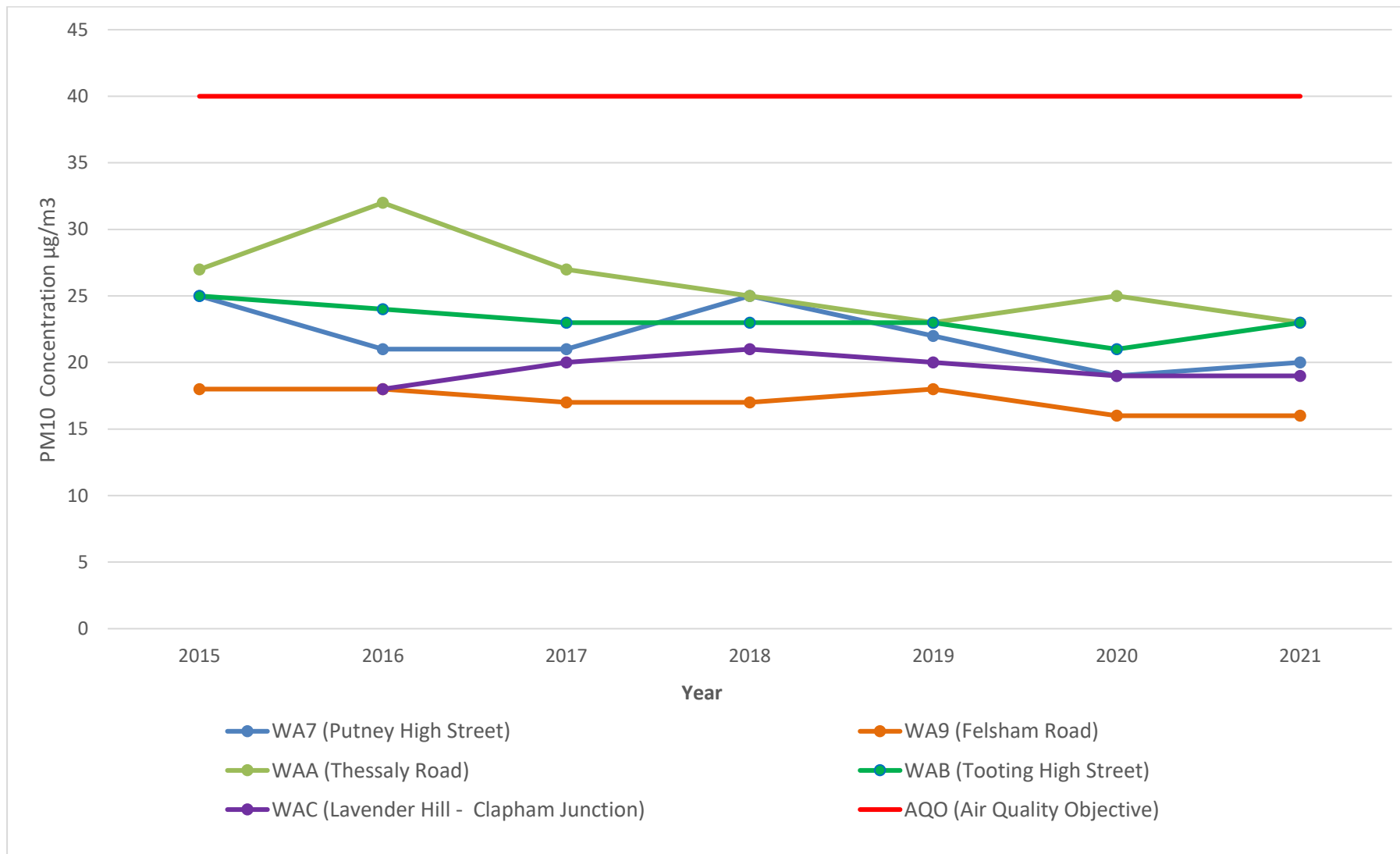
Over the years  $\text{PM}_{10}$  concentrations have been relatively static with minor fluctuations, proving very difficult to reduce further. Over the 7 year period from 2015–2021 it has gone up and down slightly one year to the next but a slight downward trend overall has been achieved. This is encouraging, 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 ( $40 \mu\text{g m}^{-3}$ ) they fail to meet the new, stricter WHO guidelines ( $15 \mu\text{g m}^{-3}$ ) for  $\text{PM}_{10}$ .

The annual mean  $\text{PM}_{10}$  results are further illustrated by Figure 5. The red line indicates the air quality objective of no more than  $40 \mu\text{g m}^{-3}$ . The data capture rates for all five automatic monitoring stations were above 75%.



Figure 5. Trends in Annual Mean PM<sub>10</sub> Concentrations measured at the Continuous Monitoring Sites ( $\mu\text{g m}^{-3}$ )



**Table G. PM<sub>10</sub> Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM<sub>10</sub> 24-Hour Means > 50 µg m<sup>-3</sup>**

Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021% <sup>b</sup>	Number of Daily Means > 50 µg m <sup>-3</sup>						
			2015	2016	2017	2018	2019	2020	2021
<b>WA7</b> Putney High Street	100	83	10	4	2	3	9	2	3 (30.2)
<b>WA9</b> Felsham Road	100	96	4(21.2)	6	5	1	5	2	0 (23)
<b>WAA</b> Thessaly Road Battersea	100	97	16	<b>43</b>	16	10	14	23	9
<b>WAB</b> Tooting High Street	100	87	10	11	11	3	9	4	4 (32.6)
<b>WAC</b> Lavender Hill - Clapham Junction	100	96	N/A	1 (27.5)	4	3	2	5	0

**Notes**

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50 µg m<sup>-3</sup> 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%).

All data from the automatic monitoring stations have been fully ratified.

Table G provides the comparison with the 24-hour mean objective for PM<sub>10</sub>. The objective of no more than 35 days exceeding 50 µg m<sup>-3</sup> was met at each site for all years since 2017. However, three out of five sites exceeded this daily standard at least once for all years reported. Overall, in 2021 the number of days exceeding the daily standard remains relatively low at all sites. except for Thessaly Road (WAA) in Battersea with 10 days exceeding 50 µg m<sup>-3</sup>. Again, levels are going up and down year on year so vigilance is required.

The (WAA) Thessaly Road monitoring station has recorded a PM<sub>10</sub> annual mean concentration of 23 µg m<sup>-3</sup> in 2021. 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<sub>10</sub> concentrations were recorded; there was also a breach of the 24-hour mean objective for PM<sub>10</sub> 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<sub>10</sub> concentration, however in 2020 the annual mean PM<sub>10</sub> 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<sub>10</sub>; roadworks completed in 2020 and the number of 24-hour mean exceedances for PM<sub>10</sub> reduced significantly.

Elevated PM<sub>10</sub> 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 2021 there were numerous pollution episodes which contributed to the exceedance of the 24-hour mean objective for PM<sub>10</sub> however two of the exceed recorded at the Thessaly Road monitor were localised incidences.

The concentrations measured in Wandsworth are considered typical of those measured elsewhere across London (KCL, 2012).

## **2. Action to Improve Air Quality**

### **2.1 Air Quality Action Plan Progress**

Table J provides a brief summary of the London Borough of Wandsworth progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2021 are shown at the bottom of the table.

**Table J. Delivery of Air Quality Action Plan Measures**

<b>Measure 1: Taking cost effective measures to minimise emissions from Council activities.</b>					
<b>No.</b>	<b>Action</b>	<b>Implementation Date</b>	<b>Cost</b>	<b>Funding</b>	<b>Progress</b>
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 2020/21 were 18,637 tCO <sub>2</sub> e. This represents an overall decrease in emissions for 2020/21 compared to 2019/20 and the baseline levels in 2017/18. Total emissions decreased by 12% between 2019/20 and 2020/21. The Council has developed and approved 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. Scope 2 emissions reduced in 2020/21 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 started purchasing zero carbon electricity in October 2020. Decarbonisation works are funded from carbon offset funds, the Council's ringfenced climate change fund and capital programmes. The Council's Climate Change Steering Group, comprised of Assistant Directors, monitor the progress of decarbonisation work across the Council and assess applications for and monitor funding of projects that support the Council's plans to reach net zero by 2030 across its operations.

1.3	Policy change to use petrol/LPG/CNG/hybrid/electric instead of diesel for Council fleet vehicles and contracted vehicles.	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. 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. Some of the new vehicles will be electric and others will be hybrids.
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	ULEZ compliance of all vehicles by 2021 target including telematics met. There were 21 new LEZ compliant vehicles purchased to replace the existing non-compliant vehicles.
<b>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.</b>					
<b>No.</b>	<b>Action</b>	<b>Implement ation Date</b>	<b>Cost</b>	<b>Funding</b>	<b>Progress</b>
2.1	To encourage active travel by staff (and/or discouraging travel by car).	36+ months	Low	Transport	A Staff Travel Network has formed to complement the work being done by the Town Hall Regeneration and an Electric Vehicle Co-Ordination Group. The network aims to promote active and/or sustainable modes of travel and create a communication channel on service area needs and opportunities available.
2.2	Reducing the need for staff to drive to work, if a car is needed for work.	36+ months	Low	Transport	
<b>Measure 3: Ensuring air quality is embedded in corporate policy.</b>					
<b>No.</b>	<b>Action</b>	<b>Implement ation Date</b>	<b>Cost</b>	<b>Funding</b>	<b>Progress</b>
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 commitment to air quality and cleaner borough status.	<12 months	Low	Corporate	New Air Quality Action Plan drafted for 2022, full consultation is now closed. Policy to go back to new administration for consideration and potential changes. New AQAP links to Public Health and Climate Change agendas outlining joint benefits.

3.2	Report Authors to consider the inclusion of relevant Air Quality impacts comments in committee reports.	<12 months	Low	Corporate	Current work on merging of Climate Change and joint air quality benefits to be reflected in all areas of the council's work.
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	In 2021 the council entered into an agreement with Peddle My Wheels to operate a community cargo bike scheme in 3 locations of the borough from 2022. The scheme is targeted at businesses and organisations although residents will also be able to access the bikes. In 2021 the council ran an online cargo bike networking event for businesses and organisations and used materials from the day to create an online resource on the council's webpage. 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	Now a joint council community group Health Streets Forum is used as a link to coordinate actions on Climate Change and Air Quality. Wandsworth continue to support citizen science projects in Tooting and Putney providing training and resources including funding additional diffusion tubes. The air quality team liaises with the citizens and coordinate all community diffusion tube monitoring.
4.2	Production and maintenance of an air quality communications strategy including an annual update and training for officers.	36+ months	Low	Communication & Public Engagement	Since 2019 our Air Quality Board has been working closely with our Corporate Communications team to design a new Communications Plan for Air Quality. This new Plan includes regular press releases sent to the local, regional and specialist press on measures such as anti-idling events. Proactive work with schools, measures taken to improve air quality, such as lobbying for cleaner buses, and the promotion of cleaner transport options such as river transport, 20mph zones and electric cars. Initiatives including electric vehicle charging points, cargo bikes, Clean Air Day, Car Free Day, City Trees and living pillars, green walls, anti-idling, cycling infrastructure and



					campaigning against airport expansion have also been promoted. This has resulted in extensive media coverage with regular features in the Councils Brightside, Headstart and Homelife magazines. There has also been extensive coverage on the council social media feeds.
4.3	Provision of air quality information.	36+ months	Medium	Communication & Public Engagement	<p>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 <a href="https://lovecleanair.org">https://lovecleanair.org</a>) are undertaken in line with the developments of new projects.</p> <p>A pilot scheme in Putney trialing new sensors which combine traffic data with pollution data.</p> <p>Four Breathe London Sensors (<a href="http://www.breathelondon.org">www.breathelondon.org</a>) were installed in the borough.</p> <p>The Council is signed up to air TEXT (<a href="http://www.airtext.info">www.airtext.info</a>).</p> <p>Data from the seven automatic monitoring stations are available on the LondonAir website (<a href="http://www.londonair.org.uk">www.londonair.org.uk</a>).</p>
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	<p>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:</p> <p>Wandsworth took part in the 'engines off' anti-idling campaign via their social media channels. In 2021 Wandsworth Air Quality team ran 3 Anti-Idling physical events at Griffin Primary School, Putney High St. Bus Stand, Clapham Junction Taxi Rank.</p> <p>The interactive air quality theatre show: eco-themed stage plays have been performed in front of children at primary schools to help teach youngsters</p>

					<p>about climate change, air pollution and the effect that transport choices can have on the environment. In 2021, 6 theatre shows booked across 3 schools.</p> <p>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.</p> <p>Wandsworth hosted a Together on Climate Change Week. At the main event at Battersea Arts Centre on Saturday 13<sup>th</sup> November, there were a number of stallholders from the community as well as council officers, including the Air Quality Team and Sustainable travel. Approximately 221 attendees were at the event. An air quality talk was given on the main stage. Throughout the week there was an online air quality engagement seminar. The Council also ran a cargo bike networking event sharing tips and opportunities for businesses to use cargo bikes for freight delivery and a Stepping Out of The Family Car event which explored active and/or sustainable modes of travel for families and support available. Current post-online event views are 193.</p> <p>Air quality officers attended the Happy Streets festival in Nine Elms, London. Officers interacted with residents about the effects of air pollution, how to minimise their impact on air quality and the expanded Ultra-Low Emission Zone.</p>
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	<p>Actions to engage with GPs and pharmacists and provide information related to at-risk or vulnerable individuals was unable to be progressed due to the need for COVID-19 response work during 2021 for both Public Health and the NHS.</p> <p>In late 2021 Public Health started to develop an Action Plan as part of its focus on air pollution and health in the borough. They are in the process of developing an e-learning module for local NHS personnel and pharmacists to increase awareness of the impact of air pollution on vulnerable and at-risk individuals, the module will be deployed later in 2022/23.</p> <p>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 2020. Airtext as a critically important service providing direct alerts to vulnerable people, including those with COVID/long term COVID. Alerts are automatically</p>

					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	<p>In 2021 businesses across the borough were encouraged to express interest in a community cargo bike scheme. Subsequently the council has entered into an agreement with Peddle My Wheels to operate a community cargo bike scheme in 3 locations of the borough from 2022.</p> <p>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. The solution will be delivered in 2022.</p>
4.8	To undertake joint working with other organisations such as 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.	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 London Air Quality Cluster Group, Idling Action London, Clean Air Villages, Wood burning group. Lobbying TfL for cleaner buses.
<b>Measure 5: Call for actions from the Mayor of London, TfL and national government to improve air quality.</b>					
<b>No.</b>	<b>Action</b>	<b>Implementation Date</b>	<b>Cost</b>	<b>Funding</b>	<b>Progress 4</b>
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	Led by portfolio holder/elected members. Lobbying TfL for the provision of more low emission bus routes. Improve air quality by applying lessons learned from Putney High Street to Clapham Junction and Tooting High Street.
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	36+ months	Low	Transport	Led by portfolio holder/elected members. Ensured that there was public awareness around ULEZ/LEZ expansion ramifications.

	Low emission Zone (ULEZ), policies to reduce diesel vehicle use.				
5.3	Campaign to national government towards a “non- diesel economy”.	36+ months	Low	Transport	Led by portfolio holder/elected members.
<b>Measure 6: Encouraging walking and cycling and the use of public transport and discouraging driving to stations.</b>					
No.	Action	Implementation Date	Cost	Funding	Progress
6.1	Use of transport and planning policies to encourage walking and cycling.	12-36 months	Low	Transport	In 2021 a new Walking and Cycling Strategy has been drafted with significant engagement from the public. A stakeholder group met to input into the drafting at various stages and a public survey which had 2,300 responses and a later consultation on the draft strategy which had 350 responses has also guided its creation.
6.2	Promote the use of public transport.	36+ months	Low	Transport	We are working with Network Rail to develop a second entrance at Wandsworth Town Station. The detailed design will soon begin and be completed by the end of 2022. The second entrance will be funded by developer contributions. Work continues with Network Rail to progress improvements to Battersea Park Station. A single option has been selected. We have developed a strategy for an additional 23 Legible London products across Nine Elms. These will be introduced in summer 2022.
6.3	Promote sustainable travel to schools – working with schools to implement packages of measures.	12-36 months	Low	Transport	School Streets: 19 School Streets continue to operate in the borough and in 2021 were made permanent. Engineering and engagement continues to be undertaken to enforce the restrictions. Engagement has also been carried out at further schools in the borough with a view to rolling out more School Streets in 2022.
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 2020 was estimated 88% of borough roads were covered by CPZs. By the end of 2021 it is estimated that this increased to 89%. Multiple requests received per year for amendments or for introduction of CPZ's.

6.5	Facilitate a higher proportion of travel by sustainable transport modes including cycling and walking.	12-36 months	Medium	Transport	Free 1 to 1 cycle training offered to adults and young people who live and work in the borough or bike ability level 2 training to school children across the borough. In 2021-22 (April to March) 574 adults and 852 children received training. Training was delivered across 37 schools.
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 grew by 6,785 in 2021, to more than 46,000 members by the end of the year (15% year-on-year growth in membership).  Total vehicles in the round-trip car club model dropped from 139 to 119, partly due to vehicle supply issues in the automotive sector and partly due to operator Ubeevo withdrawing from dedicated bay locations (it still operates under a “back to area” model). In addition, an average 89 vehicle were available in the borough daily through the free-floating car club Zipcar Flex.
6.7	Introduction of 20mph speed limit areas on borough residential roads.	<12 months	Low	Transport	A 20mph speed limit was 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	A further 215 lamp column chargepoints were delivered in the year to March 2022, along with 128 dedicated fast chargers provided by Liberty Charge, via the Council’s membership of the Virgin Park and Charge (VPACH) consortium. This brings the total number of public chargepoints to 907, two-thirds of which (612) are lamp column chargepoints (3-5kW), with 284 offering fast charging (7-22kW) and 11 providing rapid charging (50kW). OZEV grant funding has been secured to deliver a further 160+ lamp column chargepoints in 2022, to be supplemented by contributions from the council and chargepoint operators.  The number of plug in vehicles registered in Wandsworth continues to rise. DfT figures for Q4 2021 showed there to be 1,265 privately owned battery electric vehicles registered in the borough (a 73% increase from Q4 2020) and 1,423 privately owned plug-in hybrids (43% up from the previous year). Company vehicle registrations of EVs have increased massively over 2021,

					from 185 battery electric vehicles registered at the end of 2020 to 1,288 by the end of 2021.
7.2	Maintain provision of information on cleaner.	12-36 months	Medium	Transport	Council website used to update residents and businesses. See <a href="https://www.wandsworth.gov.uk/roads-and-transport/transport/sustainable-travel/electric-vehicles/">https://www.wandsworth.gov.uk/roads-and-transport/transport/sustainable-travel/electric-vehicles/</a> .
7.3	Review of differential car parking charges based on emissions, ULEZ criteria, with diesel vehicles paying more.	12-36 months	Medium	Transport	Wandsworth are considering the use of the parking agenda as key to delivering cleaner air. The borough is reviewing the appropriateness of differential charges. The diesel levy is one of a number of parking/Air Quality Initiatives which we are exploring for a future commitment to differential charges.
<b>Measure 8: Freight / deliveries actions.</b>					
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 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 and 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. Have installed large planters as part of a School Street to close the road.
-----	--	--------------	------	-------------	--

**Measure 9: Ensuring that air quality and reducing emission is included in planning policy and implemented.**

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	<p><b>Applications submitted that include energy assessments</b></p> <p>Major developments by year of decision:</p> <table border="1"> <thead> <tr> <th>2015/16</th> <th>2016/17</th> <th>2017/18</th> <th>2018/19</th> <th>2019/20</th> <th>2020/21</th> </tr> </thead> <tbody> <tr> <td>66%</td> <td>68%</td> <td>74%</td> <td>80%</td> <td>76%</td> <td>71%</td> </tr> </tbody> </table> <p>--</p> <p><b>Developments completed with renewable energy installations</b></p> <table border="1"> <thead> <tr> <th>2015/16</th> <th>2016/17</th> <th>2017/18</th> <th>2018/19</th> <th>2019/20</th> <th>2020/21</th> </tr> </thead> <tbody> <tr> <td>26</td> <td>29</td> <td>12</td> <td>21</td> <td>17</td> <td>12</td> </tr> </tbody> </table> <p>--</p>	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	66%	68%	74%	80%	76%	71%	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	26	29	12	21	17	12
2015/16	2016/17	2017/18	2018/19	2019/20	2020/21																								
66%	68%	74%	80%	76%	71%																								
2015/16	2016/17	2017/18	2018/19	2019/20	2020/21																								
26	29	12	21	17	12																								

					<p><b>Percent reduction in carbon dioxide emissions achieved overall through on-site renewable energy generation and energy efficiency measures</b></p> <p>Mean for developments for which energy assessment data is available:</p> <p><b>Permissions</b></p> <hr/> <table border="1"> <thead> <tr> <th>Development Type</th> <th>17/18</th> <th>18/19</th> <th>19/20</th> <th>20/21</th> </tr> </thead> <tbody> <tr> <td><b>Non-Major, New-Build, Residential</b></td> <td>21%</td> <td>25%</td> <td>25%</td> <td>31%</td> </tr> <tr> <td><b>Major</b></td> <td>38%</td> <td>36%</td> <td>37%</td> <td>36%</td> </tr> </tbody> </table> <hr/> <p><b>Completions</b></p> <hr/> <table border="1"> <thead> <tr> <th>Development Type</th> <th>17/18</th> <th>18/19</th> <th>19/20</th> <th>20/21</th> </tr> </thead> <tbody> <tr> <td><b>Non-Major, New-Build, Residential</b></td> <td>22%</td> <td>34%</td> <td>41%</td> <td>31%</td> </tr> <tr> <td><b>Major</b></td> <td>41%</td> <td>47%</td> <td>39%</td> <td>34%</td> </tr> </tbody> </table> <hr/> <p>--</p>	Development Type	17/18	18/19	19/20	20/21	<b>Non-Major, New-Build, Residential</b>	21%	25%	25%	31%	<b>Major</b>	38%	36%	37%	36%	Development Type	17/18	18/19	19/20	20/21	<b>Non-Major, New-Build, Residential</b>	22%	34%	41%	31%	<b>Major</b>	41%	47%	39%	34%
Development Type	17/18	18/19	19/20	20/21																															
<b>Non-Major, New-Build, Residential</b>	21%	25%	25%	31%																															
<b>Major</b>	38%	36%	37%	36%																															
Development Type	17/18	18/19	19/20	20/21																															
<b>Non-Major, New-Build, Residential</b>	22%	34%	41%	31%																															
<b>Major</b>	41%	47%	39%	34%																															



					<p><b>BREEAM rating for major new non-residential development</b></p> <p>Permissions:</p> <table border="1"> <thead> <tr> <th>Rating</th> <th>2016/17</th> <th>2017/18</th> <th>2018/19</th> <th>2019/20</th> <th>2020/21</th> </tr> </thead> <tbody> <tr> <td><b>Outstanding</b></td> <td>0%</td> <td>0%</td> <td>0%</td> <td>6%</td> <td>4%</td> </tr> <tr> <td><b>Excellent</b></td> <td>48%</td> <td>40%</td> <td>82%</td> <td>56%</td> <td>48%</td> </tr> <tr> <td><b>Very Good</b></td> <td>29%</td> <td>30%</td> <td>0%</td> <td>0%</td> <td>8%</td> </tr> <tr> <td><b>Good</b></td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td><b>Pass</b></td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td><b>Unclassified</b></td> <td>24%</td> <td>30%</td> <td>18%</td> <td>39%</td> <td>40%</td> </tr> </tbody> </table>	Rating	2016/17	2017/18	2018/19	2019/20	2020/21	<b>Outstanding</b>	0%	0%	0%	6%	4%	<b>Excellent</b>	48%	40%	82%	56%	48%	<b>Very Good</b>	29%	30%	0%	0%	8%	<b>Good</b>	0%	0%	0%	0%	0%	<b>Pass</b>	0%	0%	0%	0%	0%	<b>Unclassified</b>	24%	30%	18%	39%	40%
Rating	2016/17	2017/18	2018/19	2019/20	2020/21																																										
<b>Outstanding</b>	0%	0%	0%	6%	4%																																										
<b>Excellent</b>	48%	40%	82%	56%	48%																																										
<b>Very Good</b>	29%	30%	0%	0%	8%																																										
<b>Good</b>	0%	0%	0%	0%	0%																																										
<b>Pass</b>	0%	0%	0%	0%	0%																																										
<b>Unclassified</b>	24%	30%	18%	39%	40%																																										
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	<p>Air Quality Neutral Assessments in line with the Sustainable Design and Construction SDP being undertaken.</p> <p>In 2021, 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</p>																																										

					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. <a href="https://www.wandsworth.gov.uk/media/7497/planningobligationsspd_2020_adoption_201002.pdf">https://www.wandsworth.gov.uk/media/7497/planningobligationsspd_2020_adoption_201002.pdf</a> This SPD forms part of the Local Plan framework which guides the Council's decision making on planning applications.
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 three primary schools (Chesterton, St Marys and St Annes) in the borough to reduce children's exposure to air pollution in their playgrounds.
9.6	Undertake more school air quality audits in line with GLA audits.	12-36 months	Medium	School	3 schools had an air quality audit in 2021/2022.
<b>Measure 10: Creation of a design guide of best practice on reducing emissions and exposure for developments and streets.</b>					
<b>No.</b>	<b>Action</b>	<b>Implementation Date</b>	<b>Cost</b>	<b>Funding</b>	<b>Progress</b>
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 construction hub to disseminate best practice.	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. <a href="https://clec.uk/resources/llecp-best-class-guidance-document">https://clec.uk/resources/llecp-best-class-guidance-document</a>  Construction Site Compliance Officer (CSCO) - appointed to manage environmental impacts from major developments.

**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 <sub>2.5</sub> (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 <sub>2.5</sub> 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.

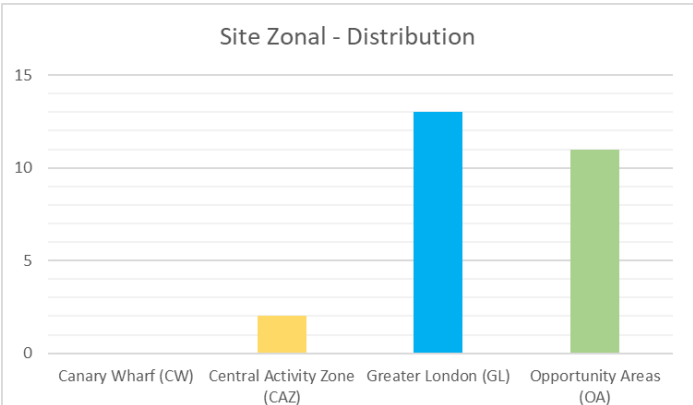
					All complaints investigated by Environment Health officers on unauthorised burning and appliances.
12.5	Use of vehicle idling powers where appropriate and awareness raising of increased pollution through vehicle idling.	<12 months	Low	Corporate	All Civil Enforcement Officers have been trained and are able to serve FPN's where required. Use of CAQC's to approach drivers who are idling. GLA Anti-idling campaign. 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. In 2021 Wandsworth Air Quality team ran three Anti-Idling physical events at Griffin Primary School, Putney High St. Bus Stand, Clapham Junction Taxi Rank.
<b>Measure 13: Air quality monitoring to review and assess and evaluate actions.</b>					
No.	Action	Implementation Date	Cost	Funding	Progress
13.1	To continue to monitor air quality across the borough measuring nitrogen dioxide (NO <sub>2</sub> ) and fine particles (PM <sub>10</sub> ).	12-36 months	Low	Corporate	Continuous monitoring of air quality in line with requirements and reporting needs. In 2021, the Council continued to monitor air quality pollutants (NO <sub>2</sub> and PM <sub>10</sub> ) from 7 automatic monitoring stations as well as a diffusion tube network. In 2021, 6 new locations have been added to the diffusion tube network. In 2021, 4 Breathe London Sensors ( <a href="http://www.breathelondon.org">www.breathelondon.org</a> ) were installed in the borough. The sensors monitor NO <sub>2</sub> and PM <sub>2.5</sub> and are the first monitors within the borough to monitor PM <sub>2.5</sub> .
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 within Wandsworth. Actions taken where appropriate (e.g. Tooting High Street). Tooting Town Centre AQAP. Clapham Junction AQAP.

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.
13.4	Do heat map of air pollution in Borough.	12-36 months	Low	Corporate	Work to be completed
<b>Measure 14: Air quality innovation.</b>					
<b>No.</b>	<b>Action</b>	<b>Implementation Date</b>	<b>Cost</b>	<b>Funding</b>	<b>Progress</b>
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.				City tree and living pillars are innovative new tech. New PM <sub>2.5</sub> sensors are being trialled. PM <sub>2.5</sub> has not previously been a requirement of monitoring and as such the tech on the market is relatively new.
<b>Measure 15: New Projects.</b>					
	Trial of new monitoring equipment combining air quality data and traffic movements.				Air quality monitoring sensors on Putney High Street. Currently exploring monitors in the existing and proposed City trees. Trialling an extensive traffic monitoring exercise in the West Hill ward to establish local traffic and through traffic movements. This will help understand travel patterns and potential impact of introducing new restrictions to reduce the volume of through traffic.

### 3. Planning Update and Other New Sources of Emissions

**Table K. Planning requirements met by planning applications in Wandsworth in 2021**

Condition	Number																		
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	12																		
Number of planning applications required to monitor for construction dust	6																		
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 <sub>x</sub> boilers	7																		
Number of developments where an AQ Neutral building and/or transport assessments undertaken	8																		
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0																		
Number of planning applications with S106 agreements including other requirements to improve air quality	1																		
Number of planning applications with CIL payments that include a contribution to improve air quality	0 Under the CIL Regulations 2010 CIL expenditure is not accounted for at the planning application level.																		
<p><b>NRMM: Central Activity Zone and Canary Wharf</b></p> <p>Number of conditions related to NRMM included.</p> <p>Number of developments registered and compliant.</p> <p>Please include confirmation that you have checked that the development has been registered with the GLA through the relevant <a href="#">NRMM website</a> and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.</p>	<table border="1"> <thead> <tr> <th colspan="2">Site Status Count</th> </tr> </thead> <tbody> <tr> <td><b>Total Registered Site</b></td> <td>34</td> </tr> <tr> <td><b>*Self-compliant</b></td> <td>12</td> </tr> <tr> <td><b>**Compliant</b></td> <td>8</td> </tr> <tr> <td><b>Non-compliant</b></td> <td>1</td> </tr> <tr> <td><b>No NRMM</b></td> <td>3</td> </tr> <tr> <td><b>Site Complete</b></td> <td>1</td> </tr> <tr> <td><b>Pending</b></td> <td>0</td> </tr> <tr> <td><b>Total Audits</b></td> <td>25</td> </tr> </tbody> </table>	Site Status Count		<b>Total Registered Site</b>	34	<b>*Self-compliant</b>	12	<b>**Compliant</b>	8	<b>Non-compliant</b>	1	<b>No NRMM</b>	3	<b>Site Complete</b>	1	<b>Pending</b>	0	<b>Total Audits</b>	25
Site Status Count																			
<b>Total Registered Site</b>	34																		
<b>*Self-compliant</b>	12																		
<b>**Compliant</b>	8																		
<b>Non-compliant</b>	1																		
<b>No NRMM</b>	3																		
<b>Site Complete</b>	1																		
<b>Pending</b>	0																		
<b>Total Audits</b>	25																		
<p><b>NRMM: Greater London (excluding Central Activity Zone and Canary Wharf)</b></p> <p>Number of conditions related to NRMM included.</p>																			

Condition	Number										
<p>Number of developments registered and compliant.</p> <p>Please include confirmation that you have checked that the development has been registered at <a href="http://www.nrmm.london">www.nrmm.london</a> and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.</p>	 <table border="1"> <caption>Site Zonal - Distribution</caption> <thead> <tr> <th>Zone</th> <th>Number of Developments</th> </tr> </thead> <tbody> <tr> <td>Canary Wharf (CW)</td> <td>0</td> </tr> <tr> <td>Central Activity Zone (CAZ)</td> <td>2</td> </tr> <tr> <td>Greater London (GL)</td> <td>13</td> </tr> <tr> <td>Opportunity Areas (OA)</td> <td>11</td> </tr> </tbody> </table>	Zone	Number of Developments	Canary Wharf (CW)	0	Central Activity Zone (CAZ)	2	Greater London (GL)	13	Opportunity Areas (OA)	11
Zone	Number of Developments										
Canary Wharf (CW)	0										
Central Activity Zone (CAZ)	2										
Greater London (GL)	13										
Opportunity Areas (OA)	11										

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

For 2020 no new sources have been identified.

## **4. Additional Activities to Improve Air Quality**

### **4.1 London Borough of Wandsworth Fleet**

There are a total of 11 vehicles within the fleet and of these 13 are zero emission capable vehicles. These include 1 x Toyota Prius car; 1 x Lexus Hybrid car; 3 x eNV200 combi car; 4 x Nissan Leaf car; 3 x Kia Niro Hybrid cars. The vehicles make up 8% of the fleet.

### **4.2 NRMM Enforcement Project**

The London Borough of Wandsworth has committed to supporting the NRMM Enforcement project in 2022-23.

### **4.2 Air Quality Alerts**

The London Borough of Wandsworth supports airTEXT.

The Regulatory Services Partnership is currently funding a review of Health Messaging in London to look at needs and opportunities. The scoping work is currently underway and expected to be complete in June 2022.

### **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 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<sup>2</sup> new green infrastructure and new seating areas.

In 2022 electric vehicle charging points will be implemented in local businesses; cycle storage will be installed to serve residents of the three housing estates and schools within the BLEN; schools will have green walls installed; and a low income cycling scheme will be launched. 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. Each NO<sub>2</sub> continuous analyser is automatically calibrated every night and also manually checked and calibrated every two weeks by the contractor, TRL (Transport Research Laboratories), employed by Wandsworth Council for local site operator visits during 2020. Regular calibration visits of between 2-4 weeks were maintained throughout 2021. 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<sub>2</sub> continuous analysers are serviced every six months by TRL and also audited by the National Physical Laboratory's (NPL) every six months as part of the Environmental Research Group – Imperial College London (ERG) LAQN QA/QC procedure, to ensure optimum data quality.

Data ratification and air quality support services were undertaken by ERG (Environmental Research Group – Imperial College London) in 20210, and it continues to be undertaken by them.

#### PM<sub>10</sub> Monitoring Adjustment

PM<sub>10</sub> particulates are measured using Tapered Element Oscillating Microbalance (TEOM) analysers, with the data presented as the gravimetric equivalent.

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

## **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<sub>2</sub> along with other pollutants. Under the Directive, annual mean NO<sub>2</sub> concentration data derived from diffusion tube measurements must demonstrate an accuracy of  $\pm 25\%$  to enable comparison with the NO<sub>2</sub> air quality objectives of the Directive.

In order to ensure that NO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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 NO<sub>2</sub> PT Scheme (Feb – October 2021)
- Summary of Precision Scores for 2019 – 2021
- UKAS schedule of accreditation (April 2020)

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<sub>2</sub> concentrations reported are of a high calibre.

### **Summary of Laboratory Performance in AIR NO<sub>2</sub> Proficiency Testing Scheme (February – October 2021)**

Gradko participate in the AIR PT NO<sub>2</sub> 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 2021 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 NO<sub>2</sub> 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  $\pm 2$  or less indicates satisfactory laboratory performance. Gradko International Ltd.'s performance for 2021 is covered by rounds AR041 to AR046 of the AIR-PT scheme. For 2021 the laboratories results were deemed to be good for 101 participating local authorities and poor for 13 participating local authorities based upon a z score of  $\leq \pm 2$ .

In 2021, the tube precision for NO<sub>2</sub> Annual Field Inter-Comparison for Gradko International using the 50% TEA in acetone method was 'good' for the results of 14 participating local authorities and poor for 0 participating local authorities.

**Table 1: Laboratory summary performance for AIR NO<sub>2</sub> 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 NO<sub>2</sub> PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of  $\leq \pm 2$  as defined above.

AIR PT Round	AIR PT 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 NO<sub>2</sub> diffusion tube monitoring and therefore did not submit results for any of the AIR NO<sub>2</sub> PT rounds listed.



(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH  
 tel.: 01962 860331 fax: 01962 841339 email:diffusion@gradko.com

### AIR PT Nitrogen Dioxide Proficiency Scheme Results 2021

Methods: GLM 7 – CARY 60 Spectrophotometer

AIR PT Proficiency Scheme - Nitrogen Dioxide 2021					
Date	Round	Assigned value	Procedure GLM 7		
			Measured concentration	z-Score	% Bias
Feb-21	AIR PT 42-1	1.71	1.13	-4.17	-33.9%
Feb-21	AIR PT 42-2	1.74	0.81	-6.29	-53.4%
Feb-21	AIR PT 42-3	1.40	0.83	-5.43	-40.7%
Feb-21	AIR PT 42-4	1.37	1.16	-1.91	-15.3%
Mar-21	AIR PT 42-1 Rpt	1.71	1.79	0.62	4.7%
Mar-21	AIR PT 42-2 Rpt	1.74	1.75	0.08	0.6%
Mar-21	AIR PT 42-3 Rpt	1.40	1.40	0	0.0%
Mar-21	AIR PT 42-4 Rpt	1.37	1.41	0.39	2.9%
May-21	AIR PT 43-1	1.19	1.23	0.35	3.4%
May-21	AIR PT 43-2	1.19	1.22	0.26	2.5%
May-21	AIR PT 43-3	2.00	1.97	-0.2	-1.5%
May-21	AIR PT 43-4	1.94	1.98	0.26	2.1%
Aug-21	AIR PT 45-1	1.58	1.58	0	0.0%
Aug-21	AIR PT 45-2	1.57	1.56	-0.08	-0.6%
Aug-21	AIR PT 45-3	2.43	2.41	-0.08	-0.8%
Aug-21	AIR PT 45-4	2.42	2.37	-0.28	-2.1%
Oct-21	AIR PT 46-1	2.7	2.77	0.33	2.6%
Oct-21	AIR PT 46-2	2.71	2.6	-0.49	-4.1%
Oct-21	AIR PT 46-3	2.17	2.06	-0.65	-5.1%
Oct-21	AIR PT 46-4	2.13	2.15	0.13	0.9%

Results from AIR-PT 42 showed a significant negative bias. An investigation was carried out and a repeat set of samples ordered (Mar-21) to confirm results.

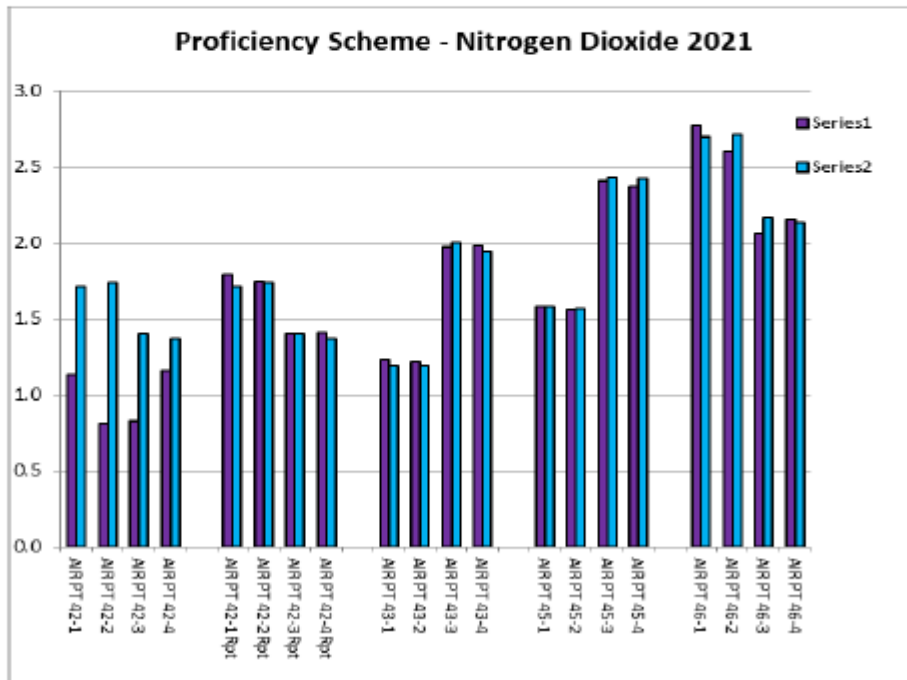
Results from the investigation showed for AIR PT samples, extraction of nitrite was not complete and required further time on the shaker to extract all nitrite from the tubes. Successful extraction was demonstrated on the repeat Air PT samples in March 2021.

The investigation also showed that for laboratory standards and customer samples, extraction of nitrite from tubes was complete without further shaking, and there was no risk associated with results reported to customers.

For any queries please contact the Laboratory Manager at [linda@gradkolab.com](mailto:linda@gradkolab.com)

Linda Gates

05/05/2022



## 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.

**2019 - 2021 Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies UK Laboratories including for Gradko Laboratory 50% TEA in Acetone**

**Precision Summary Table**

<b>Diffusion Tube Preparation Method</b>	<b>2019 Good</b>	<b>2019 Bad</b>	<b>2020 Good</b>	<b>2020 Bad</b>	<b>2021 Good</b>	<b>2021 Bad</b>
<b>Gradko, 50% TEA in Acetone</b>	27	0	19	1	14	0
<b>Gradko, 20% TEA in Water</b>	30	1	27	0	32	0
<b>ESG Didcot / SOCOTEC, 50% TEA in Acetone</b>	40	1	24	0	20	3
<b>ESG Didcot / SOCOTEC, 20% TEA in Water</b>	12	0	6	0	4	1
<b>Staffordshire Scientific Services</b>	17	0	15	0	13	1
<b>Glasgow Scientific Services</b>	9	2	2	7	1	5
<b>Edinburgh Scientific Services</b>	4	2	4	1	1	0
<b>Milton Keynes Council</b>	2	0	4	0	1	0
<b>Tayside Scientific Services</b>	1	0	1	0	1	0
<b>Lambeth Scientific Services</b>	8	1	8	2	4	1
<b>West Yorkshire Analytical Services</b>	1	1	0	0	0	0
<b>Aberdeen Scientific Services</b>	6	0	7	0	7	0
<b>South Yorkshire Air Quality Samplers</b>	3	0	1	0	1	0
<b>ESG Glasgow, 50% TEA in Acetone</b>	1	0	1	0	0	1
<b>ESG Glasgow, 20% TEA in Water</b>	1	0	1	0	0	1
<b>Somerset County Council</b>	9	0	10	0	2	0

Numerical results for this data are contained in the National Bias Adjustment Spreadsheet version 03/22

Gradko is accredited by UKAS for the analysis of NO<sub>2</sub> diffusion tubes. It undertakes the analysis of the exposed diffusion tubes by ultra violet spectrophotometry.



## Schedule of Accreditation

issued by

### United Kingdom Accreditation Service

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

 <b>UKAS</b> TESTING 2187 Accredited to ISO/IEC 17025:2017	<b>Gradko International Ltd</b> <b>(Trading as Gradko Environmental)</b> Issue No: 024    Issue date: 15 April 2020	St Martins House 77 Wales Street Winchester Hampshire SO23 0RH Contact: Mr A Poole Tel: +44 (0)1962 860331 Fax: +44 (0)1962 841339 E-Mail: diffusion@gradko.co.uk Website: www.gradko.co.uk
Testing performed at the above address only		

#### DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors	<u>Chemical Tests</u>	Documented In-House Methods
	Ammonia as ammonium (NH <sub>4</sub> <sup>+</sup> )	GLM 8 by Ion Chromatography
	Benzene Toluene Ethyl benzene Xylene	GLM 4 by Thermal Desorption/ FID Gas Chromatography
	Hydrogen chloride as chloride (Cl <sup>-</sup> ) Nitrogen dioxide as nitrite (NO <sub>2</sub> <sup>-</sup> ) Sulphur dioxide as sulphate (SO <sub>4</sub> <sup>2-</sup> ) Hydrogen fluoride as fluoride (F <sup>-</sup> )	GLM 3 by Ion Chromatography
	Hydrogen sulphide	GLM 5 by Colorimetric determination (UV Spectrophotometry)
	Ozone as nitrate (NO <sub>3</sub> <sup>-</sup> )	GLM 2 by Ion Chromatography
	Nitrogen Dioxide as nitrite (NO <sub>2</sub> <sup>-</sup> )	GLM 7 by Colorimetric determination (UV Spectrophotometry)
	Sulphur dioxide as sulphate (SO <sub>4</sub> <sup>2-</sup> )	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



Accredited to  
ISO/IEC 17025:2017

**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: 024 Issue date: 15 April 2020

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)	<u>Chemical Tests</u> (cont'd)  Qualitative Analysis and Estimation of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors  Naphthalene  Tetrachloroethylene Trichloroethylene  trans-1,2-Dichloroethene cis-1,2-Dichloroethene  Indane Styrene  1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene  1,3-Butadiene  Carbon Disulphide  Vinyl Chloride  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	  GLM 13 by Thermal Desorption GC-Mass Spectrometry with estimations in accordance with ISO standard 16000-6  GLM 13-1 by Thermal Desorption GC-Mass Spectrometry  GLM 13-2 by Thermal Desorption GC-Mass Spectrometry  GLM 13-3 by Thermal Desorption GC-Mass Spectrometry  GLM 13-4 by Thermal Desorption GC-Mass Spectrometry  GLM 13-5 by Thermal Desorption GC-Mass Spectrometry  GLM 13-6 by Thermal Desorption GC-Mass Spectrometry  GLM 13-7 by Thermal Desorption GC-Mass Spectrometry  GLM 13-8 by Thermal Desorption GC-Mass Spectrometry  LWI 47 by Thermal Desorption GC-Mass Spectrometry
END		

## **NO<sub>2</sub> diffusion tube analysis method**

NO<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> 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). We have used the nationally derived bias adjustment factor of 0.83 as per diffusion Tube Bias Factor s/s 03/2022 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. If the local bias adjustment factor (0.91) had been applied then there would have been 10 exceedances of the AQO rather than 8.

**Table L. Bias Adjustment Factor**

Year	Local or National	If Local, Version of National Spreadsheet	Adjustment Factor
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

National Diffusion Tube Bias Adjustment Factor Spreadsheet				Spreadsheet Version Number: 03/22						
<p>Follow the steps below in the correct order to show the results of relevant co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.</p> <p>The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.</p> <p>Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.</p>										<p>This spreadsheet will be updated at the end of June 2022</p> <p><a href="#">LAQM Helpdesk Website</a></p>
<b>Step 1:</b>		<b>Step 2:</b>		<b>Step 3:</b>		<b>Step 4:</b>				
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.				
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data.		If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953				
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	50% TEA in acetone	2021	UC	Falkirk Council	12	35	34	3.5%	G	0.97
Gradko	50% TEA in acetone	2021	UB	Falkirk Council	12	16	13	22.5%	G	0.82
Gradko	50% TEA in acetone	2021	SU	Redcar & Cleveland Borough Council	11	14	11	29.2%	G	0.77
Gradko	50% TEA in acetone	2021	R	Royal Borough of Windsor and Maidenhead	12	29	26	9.3%	G	0.91
Gradko	50% TEA in acetone	2021	R	Royal Borough of Windsor and Maidenhead	11	26	25	7.2%	G	0.93
Gradko	50% TEA in Acetone	2021	R	Sandwell MBC	12	37	28	31.4%	G	0.76
Gradko	50% TEA in Acetone	2021	UB	Sandwell Metropolitan Borough Council	11	23	19	22.2%	G	0.82
Gradko	50% TEA in acetone	2021	UB	Middlesbrough	12	18	14	32.6%	G	0.75
Gradko	50% TEA in acetone	2021	R	London Borough of Richmond upon Thames	12	24	21	15.1%	G	0.87
Gradko	50% TEA in acetone	2021	B	London Borough of Richmond upon Thames	9	16	13	21.5%	G	0.82
Gradko	50% TEA in acetone	2021	KS	Marylebone Road Intercomparison	10	52	41	24.2%	G	0.81
Gradko	50% TEA in acetone	2021	R	Reading Borough Council	12	30	26	15.3%	G	0.86
Gradko	50% TEA in acetone	2021	R	Merton Council	9	50	32	55.4%	G	0.64
Gradko	50% TEA in acetone	2021	UB	Wandsworth Council	11	23	26	9.8%	G	0.91
<b>Overall Factor* (14 studies)</b>								<b>Use</b>	<b>0.83</b>	

### **A.3 Adjustments to the Ratified Monitoring Data**

#### Short-term to Long-term Data Adjustment

For monitoring sites where data capture is less than 75% of a full calendar year (less than 9 months), the mean 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. In 2021 data capture at all sites was very good and above 75% except for one site.

The measured annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations at the continuous monitoring station WAB - Tooting High Street had 45% data capture consequently the mean of the 'raw' concentrations has being "annualised".

#### Distance Adjustment

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<sub>2</sub> annual objective of 40µg/m<sup>3</sup>. The calculation has been applied also to monitoring locations that recorded an annual mean concentration within 10% of the NO<sub>2</sub> annual objective of 40µg/m<sup>3</sup> (i.e. above 36µg/m<sup>3</sup>), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

The methodology consists of comparing the monitored annual mean NO<sub>2</sub> concentrations at a given point against known relationships between NO<sub>2</sub> 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<sub>2</sub> Data Adjustment for the continuous monitoring station WAB - Tooting High Street**

NO<sub>2</sub> data at the continuous monitoring station WAB - Tooting High Street had data capture rate of 45% of the full calendar year. Therefore, NO<sub>2</sub> 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 <sup>3</sup> )	Period Mean (µg/m <sup>3</sup> )	Ratio (AM/PM)
Wandsworth – Putney	Urban Background	26	26.2	0.99
Hillingdon - Keats Way	Suburban	24	25.1	0.96
Windsor and Maidenhead – Aldebury Road	Urban Background	14	15.2	0.92
			<b>Average</b>	<b>0.956</b>

**Table N. NO<sub>2</sub> 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 ( $\mu\text{g m}^{-3}$ ))	Background Concentration ( $\mu\text{g m}^{-3}$ )	Concentration Predicted at Receptor ( $\mu\text{g m}^{-3}$ )
<b>W23</b>	37 West Hill	3.02m	5.22	45	16	<b>40.9</b>
<b>W24</b>	Putney High Street	2.35m	4.7	47	16	<b>41.8</b>
<b>W4</b>	108 Mitcham Road	0.6m	3.06	50	16	39.9
<b>NE3</b>	Queenstown Road	1.05m	2.1	40	16	36.6
<b>NE6</b>	Nine Elms Lane	0.53m	1.06	40	16	37.0
<b>YR4</b>	York road /Falcon Road,	0.75m	1.5	38	16	35.1
<b>YR5</b>	Battersea Park Road	0.63m	1.26	55	16	<b>50.0</b>
<b>W42</b>	Bellevue Rd/Trinity Road	1.1m	10	43	16	30.8
<b>W46</b>	Trinity Road	0.8m	11	37	16	26.4
<b>W47</b>	West Hill	0.7m	5	64	16	<b>46.3</b>

## Appendix B Full Monthly Diffusion Tube Results for 2021

Table O. NO<sub>2</sub> Diffusion Tube Results

Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021 % <sup>b</sup>	Annual Mean NO <sub>2</sub>												Annual mean – raw data	Annual mean – bias adjusted (*0.83)
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		
<b>W23</b> (37 West Hill)	100	83	45	58	48	54	54	50	51	N/A	56	N/A	83	43	<b>54</b>	<b>45</b>
<b>W24</b> (Putney High Street)	100	92	56	63	59	45	51	56	64	N/A	59	59	63	52	<b>57</b>	<b>47</b>
<b>W21</b> (Felsham road, tube 1)	100	92	30	39	29	26	29	20	24	N/A	31	29	29	30	29	24
<b>W22</b> (Felsham road, tube 2)	100	92	31	41	30	26	27	20	24	N/A	29	29	30	31	29	24
<b>W6</b> (21 Daylesford Avenue)	100	92	21	27	22	17	19	14	15	N/A	20	18	26	20	20	16
<b>W25</b> (Roehampton Church Sc.)	100	92	26	32	25	25	25	19	23	N/A	29	24	32	23	26	21
<b>W26</b> (Replingham Road)	100	83	24	31	23	N/A	20	19	18	N/A	23	20	27	24	23	19
<b>W27</b> (68-70 Sutherland Grove)	100	83	25	30	22	22	19	15	21	N/A	22	20	27	N/A	22	19
<b>W28</b> (61 Summerley street)	100	92	28	36	26	23	20	17	20	N/A	24	24	30	27	25	21
<b>W29</b> (Skelbrook / Garratt lane)	100	92	31	33	30	28	22	21	22	N/A	27	24	32	27	27	22
<b>W4</b> (108 Mitcham road)	100	92	72	73	56	52	58	56	62	N/A	57	58	68	55	61	<b>50</b>
<b>W8</b> (50 Bickely street)	100	83	42	N/A	29	31	20	23	24	N/A	29	25	37	29	29	24



Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021 % <sup>b</sup>	Annual Mean NO <sub>2</sub>													Annual mean – raw data	Annual mean – bias adjusted (*0.83)
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec			
W30 (11B Elmbourne road)	100	92	37	34	26	26	21	21	20	N/A	28	27	35	29	28	23	
W31 (Hildreth St. / Bedford Hill)	100	92	42	45	36	36	24	29	30	N/A	35	31	41	32	35	29	
W32 (2-3 Balham High road)	100	75	N/A	44	38	39	N/A	35	34	N/A	36	33	40	37	37	31	
W34 (46 Shelgate road)	100	92	35	31	27	25	24	18	23	N/A	28	21	34	26	27	22	
W35 (47 Northcote road)	100	92	37	35	31	31	27	25	31	N/A	32	24	34	26	30	25	
W36 (St Anne's Hill)	100	83	33	30	N/A	28	22	24	24	N/A	26	27	37	29	28	23	
W37 (302A Merton Rd)	100	92	37	36	34	29	29	27	27	N/A	29	26	35	27	30	25	
W38 (High View School)	100	92	35	34	26	26	23	19	23	N/A	29	26	31	28	27	23	
NE2 (Chesterton School)	100	83	36	34	27	N/A	28	24	26	N/A	34	28	38	28	30	25	
NE3 (Queenstown Road)	100	92	54	51	51	50	51	46	50	N/A	51	42	49	41	49	40	
NE4 (Lockington Road)	100	92	38	32	31	30	25	23	27	N/A	30	27	32	29	30	25	
NE5 (Kirtling Street)	100	92	44	45	39	35	32	29	37	N/A	37	36	40	33	37	31	
NE6 (Nine Elms Lane)	100	92	53	52	47	49	54	43	51	N/A	50	40	55	38	48	40	
NE7 (1 Nine Elms, Parry)	100	92	48	39	39	37	41	34	40	N/A	46	38	48	36	41	34	

Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021 % <sup>b</sup>	Annual Mean NO <sub>2</sub>													Annual mean – raw data	Annual mean – bias adjusted (*0.83)
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec			
<b>NE8</b> (Battersea park)	100	92	24	24	18	18	16	12	15	N/A	22	18	23	18	19	16	
<b>YR1</b> (Trafalgar House)	100	92	39	40	38	38	35	32	38	N/A	38	35	45	32	37	31	
<b>YR2</b> (Royal Academy of Dance)	100	75	46	43	38	37	N/A	30	N/A	N/A	53	49	51	40	43	36	
<b>YR3</b> (Cotton Row)	100	83	34	32	26	25	23	N/A	21	N/A	28	28	36	29	28	24	
<b>YR4</b> (York road/ Falcon Road)	100	92	51	51	45	38	39	38	46	N/A	52	46	51	44	45	38	
<b>YR5</b> (Battersea Park Road)	100	75	66	v	62	64	62	70	70	N/A	86	57	62	N/A	67	55	
<b>YR6</b> (Battersea Square)	100	92	39	42	33	34	31	29	34	N/A	43	36	40	33	36	30	
<b>W39</b> (Carlton Dr/ Putney Hill )	100	92	34	48	40	35	33	36	35	N/A	45	35	50	34	39	32	
<b>W40</b> (Roehampton High St)	100	92	29	40	32	31	29	23	27	N/A	35	30	37	31	31	26	
<b>W41</b> (Northcote /Broomwood Rd )	100	92	37	45	32	31	28	24	28	N/A	32	29	33	28	32	26	
<b>W42</b> (Bellevue / Trinity Rd)	100	83	62	64	60	N/A	45	61	62	N/A	72	28	49	45	55	45	
<b>W43</b> (Trinity Rd)	100	92	40	32	33	33	35	26	30	N/A	37	36	38	32	34	28	
<b>W44</b> (Thessaly Rd)	100	92	33	33	25	26	19	20	23	N/A	31	25	32	26	27	22	
<b>W45</b> (A24 Wimbledon)	100	92	51	37	37	35	31	28	30	N/A	37	36	44	40	37	31	
<b>W46</b> (Trinity Rd)	100	92	54	53	41	40	41	41	44	N/A	48	41	44	38	44	37	

Site ID	Valid data capture for monitoring period % <sup>a</sup>	Valid data capture 2021 % <sup>b</sup>	Annual Mean NO <sub>2</sub>													Annual mean – raw data	Annual mean – bias adjusted (*0.83)
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec			
<b>W47</b> (West Hill)	100	83	67	86	71	64	83	70	79	N/A	96	82	N/A	71	77	<b><u>64</u></b>	
<b>W48</b> (Balham High Rd)	100	92	44	37	34	35	26	26	27	N/A	36	30	38	29	33	27	
<b>New Locations added in January 2021</b>																	
<b>W49</b> (Garratt Ln/ Earlsfield Rd )	100	92	32	41	39	44	38	33	37	N/A	44	37	40	35	38	32	
<b>W50</b> (Penwith Rd/Garratt Ln )	100	92	39	43	39	45	34	35	37	N/A	42	34	42	29	38	32	
<b>SC1</b> (Louisville Rd, Tooting Bec)	100	92	37	32	25	24	19	21	21	N/A	26	26	34	25	26	22	
<b>WH1</b> (Roehampton Lane/ Upper Richmond Road)	100	92	39	49	40	42	39	38	39	N/A	39	32	34	33	38	32	
<b>WH2</b> (Priory Lane/ Upper Richmond)	100	92	27	34	28	29	28	28	27	N/A	35	53	35	29	32	27	
<b>WH3</b> (Clarence Ln)	100	92	34	49	39	44	40	47	34	N/A	49	35	41	34	41	34	

## Notes

Concentrations are presented as µg m<sup>-3</sup>.

Exceedances of the NO<sub>2</sub> annual mean AQO of 40 µg m<sup>-3</sup> are shown in **bold**.

NO<sub>2</sub> annual means in excess of 60 µg m<sup>-3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 33%.

(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%).