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

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[1] https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-london-boroughs

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Abbreviations

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

Table A. Summary of National Air Quality Standards and Objectives

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

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

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2018

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
HS2	Cranford	510370	177195	Background	Y	*40*	*70*	*2.5*	NO_2, PM_{10}, O_3, SO_2	*Chemiluminescent; TEOM*
HS4	Chiswick	521070	178480	Roadside	Y	*9*	*6*	*2.5*	NO_2, PM_{10}, $PM_{2.5}$	*Chemiluminescent; TEOM; Spirant BAM*
HS5	Brentford	517425	178074	Roadside	Y	9	6	2.5	NO_2, PM_{10}, $PM_{2.5}$	*Chemiluminescent; TEOM; Spirant BAM*
HS6	Heston	513656	176843	Roadside	Y	4	4	2.0	NO_2, PM_{10}	*Chemiluminescent; TEOM*

HS7	Hatton Cross	509355	174989	Urban Background	Y	75	75	2.0	NO_2, PM_{10}	*Chemiluminescent;* *Met One BAM 1020*
HS9	Feltham	510683	173259	Roadside	Y	4	4	2.0	NO_2, PM_{10}	*Chemiluminescent;* *TEOM*
HS8	Gunnersbury	519184	179369	Roadside	Y	4	4	2.0	NO_2, PM_{10}	*Chemiluminescent;* *Met One BAM 1020*

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

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
HS32	24 Adelaide Terrace	517592	178210	Roadside	*Y*	Y (0m)	7m		NO_2	N
HS33	30 Surrey Crescent	519452	178314	Roadside	*Y*	Y (0m)	10m		NO_2	N
HS34	Chiswick Community School	521028	177321	Intermediate	*Y*	Y (20m)	10m		NO_2	N

HS35	Hogarth Primary School	521174	178069	Intermediate	*Y*	Y (10m)	2m		NO_2	N
HS41	Hanworth Library	512107	172502	Roadside	*Y*	Y (25m)	4m		NO_2	N
HS42	High Street, Hounslow	513986	175761	Background	*Y*	Y (0m)	25m		NO_2	N
HS43	Glenhurst Road	517447	178059	Roadside	*Y*	Y (5m)	2m		NO_2	N
HS51	Marjory Kinnon School	509127	174568	Roadside	*Y*	Y (20m)	10m		NO_2	N
HS52	Bedfont Library	508873	173722	Roadside	*Y*	Y (30m)	6m		NO_2	N
HS53	Church of the good shepherd	510986	176032	Intermediate	*Y*	Y (25m)	10m		NO_2	N
HS54	Cranford lane / High St. Cranford Jct	510810	177667	Roadside	*Y*	Y (2m)	1m		NO_2	N
HS55	Cranford Library	510747	176687	Roadside	*Y*	Y (2m)	5m		NO_2	N
HS61	Twickenham Road	516203	175863	Roadside	*Y*	Y (2m)	5m		NO_2	N
HS62	Sutton Rd & Heston Rd Jct	513630	176938	Roadside	*Y*	Y (1m)	5m		NO_2	N
HS63	Lampton Road	513538	175828	Roadside	*Y*	Y (1m)	5m		NO_2	N
HS64	Junction of Roseheath Road	512860	175013	Roadside	*Y*	Y (1m)	5m		NO_2	N
HS65	Eastbourne Road at	511840	172745	Roadside	*Y*	Y (5m)	10m		NO_2	N
HS66	Brainton Avenue	510975	173646	Roadside	*Y*	Y (2m)	5m		NO_2	N
HS67	Busch Corner	516525	176846	Roadside	*Y*	Y (0m)	8m		NO_2	N
HS68	Junction of Commerce Road	517282	177296	Roadside	*Y*	Y (0m)	1.5m		NO_2	N
HS69	Kew Bridge	519005	178040	Roadside	*Y*	Y (0m)	1m		NO_2	N
HS70	Eastbury Grove (Chiswick Lane)	521438	177980	Roadside	*Y*	Y (4m)	2m		NO_2	N
HS71	Gunnersbury Avenue	519184	179369	Roadside	*Y*	Y (0m)	4m		NO_2	N
HS72	Heston Crossroads	513063	177552	Roadside	*Y*	Y (0m)	1m		NO_2	N
HS73	Browells Lane, Feltham	510578	172857	Roadside	*Y*	Y (6m)	2m		NO_2	N
HS74	Swift Road, Hanworth	512040	171808	Roadside	*Y*	Y (20m)	4m		NO_2	N

HS76	Clements Court, Hounslow	511570	175015	Background	*Y*	Y (15m)	1m		NO_2	N
HS77	Beaversfield Park	511990	175973	Background	*Y*	Y (15m)	25m		NO_2	N
HS78	Staines / Wellington Road	512762	175310	Roadside	*Y*	Y (0m)	2m		NO_2	N
HS79	Whitton Road	513384	175482	Roadside	*Y*	Y (10m)	1m		NO_2	N
HS80	Hounslow East	514442	175950	Roadside	*Y*	Y (0m)	3m		NO_2	N
HS81	Woodlands	515045	175934	Background	*Y*	Y (8m)	1m (cul de sac)		NO_2	N
HS82	Church Street	516594	175880	Roadside	*Y*	Y (0m)	1m		NO_2	N
HS83	Osterley Park	514721	177976	Background	*Y*	Y (0m)	500m		NO_2	N
HS84	Apex Corner	512781	172132	Roadside	*Y*	Y (4m)	1m (not main road)		NO_2	N
HS85	Hospital Road	513213	175655	Roadside	*Y*	Y (4m)	1m		NO_2	N
HS86	Jolly Waggoners	510955	176567	Roadside	*Y*	Y (3m)	1m (not main road)		NO_2	N
HS87A	Henleys Roundabout	511545	176430	Roadside	*Y*	Y (2m)	1m (not main road)		NO_2	N
HS90 (HS87B)	The Butts (HS87B)	571539	117572	Background	*Y*	Y (6m)	2m		NO_2	N
HS88	Thames path	521493	176737	Thames path	*Y*	Y (1m)	3m		NO_2	N
HS89	Mogden Sewage Works Gate	515424	174719	Roadside	*Y*	Y (1m)	1m		NO_2	N
HS91	Hogarth Ln / Dukes Av	521045	177970	Roadside	*Y*	Y (3m)	3m		NO_2	N
HS93	St Marys Communal Area (on metal railings)	521110	177970	Roadside	*Y*	Y (2m)	10m		NO_3	N
BREN A	Brentford, Glenhurst Road	517425	178071	Roadside	*Y*	Y (10m)	3m		NO_2, PM_{10}	Y
BREN B	Brentford, Glenhurst Road	517425	178071	Roadside	*Y*	Y (10m)	3m		NO_2, PM_{10}	Y
BREN C	Brentford, Glenhurst Road	517425	178071	Roadside	*Y*	Y (10m)	3m		NO_2, PM_{10}	Y
CHIS A	Chiswick High Road	521085	178499	Roadside	*Y*	Y (0m)	2m		NO_2, PM_{10}	Y

CHIS B	Chiswick High Road	521085	178499	Roadside	*Y*	Y (0m)	2m		NO_2, PM_{10}	Y
CHIS C	Chiswick High Road	521085	178499	Roadside	*Y*	Y (0m)	2m		NO_2, PM_{10}	Y
CRAN A	Cranford Avenue Park	510370	178198	Background	*Y*	Y (25m)	70m		NO_2, PM_{10}	Y
CRAN B	Cranford Avenue Park	510370	178198	Background	*Y*	Y (25m)	70m		NO_2, PM_{10}	Y
CRAN C	Cranford Avenue Park	510370	178198	Background	*Y*	Y (25m)	70m		NO_2, PM_{10}	Y
FELT A	Feltham High St / Hanworth Rd Jct	510676	173245	Roadside	*Y*	Y (4m)	2m		NO_2, PM_{10}	Y
FELT B	Feltham High St / Hanworth Rd Jct	510676	173245	Roadside	*Y*	Y (4m)	2m		NO_2, PM_{10}	Y
FELT C	Feltham High St / Hanworth Rd Jct	510676	173245	Roadside	*Y*	Y (4m)	2m		NO_2, PM_{10}	Y
HEST A	Heston Road	513676	176844	Roadside	*Y*	Y (4m)	1m		NO_2, PM_{10}	Y
HEST B	Heston Road	513676	176844	Roadside	*Y*	Y (4m)	1m		NO_2, PM_{10}	Y
HEST C	Heston Road	513676	176844	Roadside	*Y*	Y (4m)	1m		NO_2, PM_{10}	Y
MYR A	Myrtle Avenue	509334	174997	Background	*Y*	Y (10m)	12m (cul de sac)		NO_2, PM_{10}	Y
MYR B	Myrtle Avenue	509334	174997	Background	*Y*	Y (10m)	12m (cul de sac)		NO_2, PM_{10}	Y
MYR C	Myrtle Avebue	509334	174997	Background	*Y*	Y (10m)	12m (cul de sac)		NO_2, PM_{10}	Y

1.2 Comparison of Monitoring Results with AQOs

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

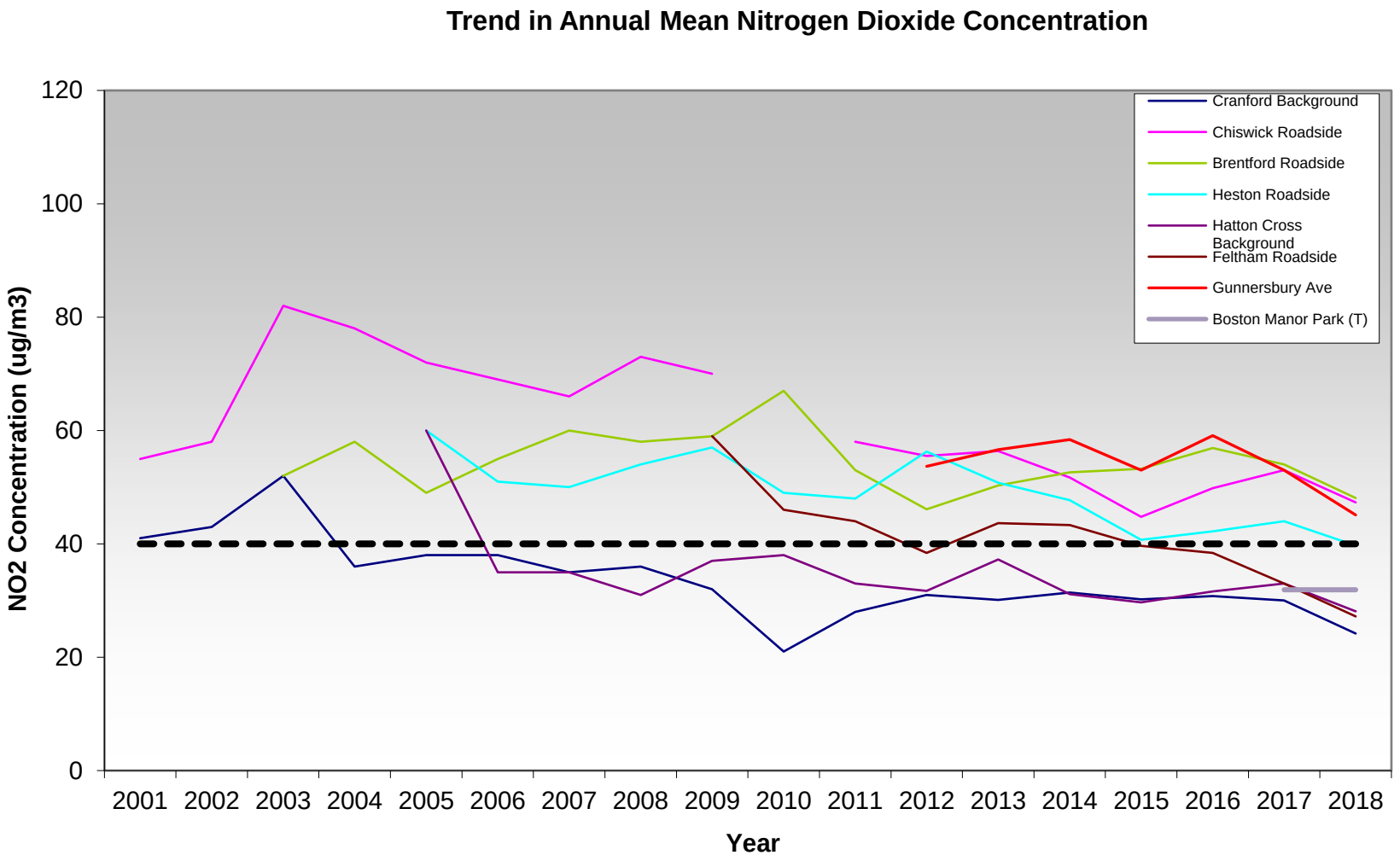
Table D. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results (μg m^{-3})

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (μgm^{-3})							
				2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
Cranford	Automatic	61.0%	61.0%	28	31	30.1	31.4	30.2	30.8	30	26
Chiswick	Automatic	99.7%	99.7%	**58**	**55.5**	**56.4**	**51.7**	**44.8**	**49.8**	**53**	**47**
Brentford	Automatic	99.8%	99.8%	**53**	**46.1**	**50.3**	**52.6**	**53.3**	**56.9**	**54**	**48**
Heston	Automatic	93.3%	93.3%	**48**	**56.3**	**50.81**	**47.7**	**40.7**	**42.2**	**44**	40
Hatton Cross	Automatic	90.2%	90.2%	33	31.7	37.24	31.1	29.7	31.6	33	28
Gunnersbury	Automatic	93.3%	93.3%	–	**53.7**	**56.62**	**58.4**	**53.0**	**59.1**	**53**	**45**
Feltham	Automatic	88.9%	88.9%	**44**	38.4	43.67	43.3	39.7	38.4	34	27
BREN	Diffusion tube	100.0%	100.0%	**51.9**	**56.1**	**58.7**	**66.3**	**62.1**	**64.7**	**65.4**	**48.6**
CHIS	Diffusion tube	94.4%	94.4%	**55.8**	**60.9**	**59.3**	**68**	**58.1**	**55.5**	**58.8**	**43.8**
CRAN	Diffusion tube	83.3%	83.3%	28.1	28.2	28.1	29.7	26.8	28.4	28.1	24.3
FELT	Diffusion tube	44.4%	44.4%	**40.3**	**42.6**	**41.6**	**45.3**	**41.7**	**45.2**	**43.3**	28.5
HATT	Diffusion tube	100.0%	100.0%	33.9	35.4	38.9	38.1	35.2	**38.4**	**38.1**	29.2
HEST	Diffusion tube	97.2%	97.2%	**48.8**	**49.3**	**50.8**	**56.3**	**49.2**	**55.9**	**56.3**	**44.2**
HS32	Diffusion tube	83.3%	83.3%	**52.8**	**55.4**	**55.9**	**63.5**	**58.8**	**59.4**	**50.3**	**43.2**
HS33	Diffusion tube	83.3%	83.3%	**51.5**	**54.4**	**55.6**	**61.4**	**59.4**	**57.6**	**54.9**	**42.5**
HS34	Diffusion tube	91.7%	91.7%	29.7	32.5	33.4	39.2	32.8	34.0	28.8	25.8
HS35	Diffusion tube	91.7%	91.7%	28.8	32	33.9	37.3	34.6	**37.2**	32.3	27.3
HS41	Diffusion tube	100.0%	100.0%	32.5	32.6	34.4	38.2	35.6	**55.5**	**51.5**	**41.7**
HS42	Diffusion tube	83.3%	83.3%	39.1	32.1	32.3	35.2	30.1	**36.5**	**33.2**	28.3
HS43	Diffusion tube	100.0%	100.0%	37.3	39.3	**43.3**	**43.9**	**41.2**	**43.1**	**35.4**	33.2
HS51	Diffusion tube	100.0%	100.0%	26.7	27.7	28.8	31.5	26.9	31.8	28.2	25.5
HS52	Diffusion tube	100.0%	100.0%	24.4	29	27.5	29.8	27.4	29.7	25.2	23.3
HS53	Diffusion tube	100.0%	100.0%	31.9	32.7	33.6	33.7	34.1	34.0	33.5	25.6

HS54	Diffusion tube	100.0%	100.0%	**44.5**	**45.5**	**42.8**	**48.6**	**48.4**	**45.9**	**40.9**	35.0
HS55	Diffusion tube	91.7%	91.7%	**40.4**	**43.8**	**45.1**	**49.6**	**44.5**	**50.7**	**43.8**	33.7
HS61	Diffusion tube	75.0%	75.0%	30	**40.2**	38.4	**41.1**	**42.4**	**40.8**	**40.0**	32.1
HS62	Diffusion tube	100.0%	100.0%	38.1	35.5	**40.3**	**43.5**	38.9	**43.6**	37.6	33.5
HS63	Diffusion tube	100.0%	100.0%	32.2	**44.9**	**48.6**	**52.2**	**48.3**	**48.2**	37.3	34.1
HS64	Diffusion tube	91.7%	91.7%	32.6	33.5	34	35.9	33.3	35.3	33.2	28.7
HS65	Diffusion tube	100.0%	100.0%	30.1	33.3	33.9	36.9	30.8	35.4	28.3	25.0
HS66	Diffusion tube	91.7%	91.7%	36.9	**40.8**	39.1	**48.6**	**43.3**	**46.6**	**44.1**	37.9
HS67	Diffusion tube	100.0%	100.0%	**63.5**	**66.5**	**64.7**	**74.9**	**74.2**	**67.8**	**59.6**	**48.4**
HS68	Diffusion tube	100.0%	100.0%	**43.3**	**43.4**	**48.8**	**51.7**	**52.1**	**52.2**	**43.8**	36.5
HS69	Diffusion tube	100.0%	100.0%	**48**	**50.7**	**58.9**	**59.2**	**60.1**	**55.4**	**48.0**	39.0
HS70	Diffusion tube	100.0%	100.0%	**51.8**	**51.1**	**54.3**	**63**	**61.9**	**64.9**	**59.9**	**47.2**
HS71 (Gunn)	Diffusion tube	100.0%	100.0%	**47.4**	**50.3**	**47.8**	**59**	**57.3**	**54.1**	**48.3**	37.8
HS72	Diffusion tube	91.7%	91.7%	**42.2**	**43.9**	**41.1**	**47.1**	**46.6**	**51.7**	**48.7**	36.1
HS73	Diffusion tube	91.7%	91.7%	33.1	34.8	31.7	36.4	33.0	33.2	29.8	25.3
HS74	Diffusion tube	100.0%	100.0%	37	36.6	35.7	**40.1**	37.3	**41.8**	38.4	30.9
HS76	Diffusion tube	91.7%	91.7%	27.3	31.8	34.7	36.7	35.7	**40.6**	26.8	27.0
HS77	Diffusion tube	100.0%	100.0%	27.6	26.4	29.2	30.4	26.9	33.8	28.0	21.8
HS78	Diffusion tube	83.3%	83.3%	**48.4**	**51.4**	**47.2**	**59.3**	**56.1**	**57.7**	**47.5**	**42.7**
HS79	Diffusion tube	100.0%	100.0%	34.7	37.9	37.8	**41.8**	35.7	**42.3**	33.2	30.1
HS80	Diffusion tube	75.0%	75.0%	**49.9**	**56.4**	**57.7**	**65.1**	**61.1**	**79.0**	**71.1**	**58.7**
HS81	Diffusion tube	75.0%	75.0%	26.8	25.9	29	26.9	24.8	26.8	23.0	22.0
HS82	Diffusion tube	83.3%	83.3%	34.5	34.2	31.9	35.2	32.5	31.2	26.2	22.2
HS83	Diffusion tube	91.7%	91.7%	27.9	20.4	27.8	22.4	22.0	27.0	24.8	19.9
HS84	Diffusion tube	100.0%	100.0%	38.4	39.6	**40.5**	**47.6**	**43.7**	**45.3**	39.8	31.6
HS85	Diffusion tube	100.0%	100.0%	**42.4**	**45.7**	**43.9**	**51.3**	**49.3**	**50.4**	**47.7**	37.9
HS86	Diffusion tube	100.0%	100.0%	**51.5**	**48**	**49.5**	**54.2**	**50.8**	**54.7**	**53.5**	**41.3**
HS87A	Diffusion tube	91.7%	91.7%	**46.7**	**47.2**	**50.7**	**59.1**	**56.0**	**66.0**	**62.7**	**44.7**
HS88	Diffusion tube	91.7%	91.7%	24.1	24.7	26.4	27.3	25.4	26.8	23.4	20.7
HS89	Diffusion tube	100.0%	100.0%	34.8	34.9	39.3	39.7	**41.3**	**42.0**	32.1	28.8
HS90 (HS87B)	Diffusion tube	100.0%	100.0%	31.8	31.1	31.5	32.7	30.1	33.7	26.5	25.3
HS91	Diffusion tube	91.7%	91.7%	–	–	–	–	–	–	**62.1**	**45.0**
HS93	Diffusion tube	16.70%	16.70%	–	–	–	–	–	–	–	**56.3**

Notes: Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Graph 1: Shows long-term trend in NO_2 annual Mean concentration level at continuous monitoring sites



In our assessment, NO_2 annual mean concentrations at all seven monitoring stations have shown a reduction of varying degree, but broadly in the order of around 10%. However, there are significant exceedances at Chiswick High Road, Great West Road (Brentford) and Gunnersbury Avenue, the latter two being TfL routes, where the Council would be working in partnership with stakeholders and seek greater engagement and commitment, as outlined in the adopted (2018) Hounslow's air quality action plan (AQAP).

We have assessed the impact of the exceedances of the air quality objectives (AQO) of nitrogen dioxide (NO_2) at sensitive receptors in the above areas within Hounslow, using the Defra Tool, which approximately indicates as to which sensitive receptors might be impacted by such exceedances (see Tables 1-4 at Appendix A.10).

There is notable and above average reduction in NO_2 annual mean concentration levels at Feltham, which is partly due to closure of level crossing at Feltham Station (British Rail), due to Feltham Bridge widening project that commenced around August 2018. The number of diffusion tube sites exceeding the NO_2 annual mean AQO (EU limit value) has reduced from 22 in 2017 to 17 in 2018 (including a new diffusion tube (HS93) at St. Mary's School, Chiswick), which is a positive outcome. No diffusion tubes exceeded the threshold of 60µg/m³ in 2018 anywhere in the borough, of which there were 3 in 2017, another positive outcome, particularly for Busch Corner (HS67) that had consistently exceeded this limit until 2016. It should be noted that a new diffusion tube (HS93) has been installed at St Mary's school playground communal area since mid-2018, which is expected to help us inform effectiveness of the green wall installed in mid-2019.

It should also be noted that no data analysis has been possible for the calendar year 2018, due to poor data capture, for our temporary continuous monitoring station at Boston Manor Park, although graphical representations of mean, from Nov. 18 to Jun. 19, concentrations levels of NO_2 and PM_{10} are below their respective air quality objectives (AQO).

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 µgm-3						
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
Cranford	*n/a*	61.0%	0 (107)	0 (113)	0	0	2	10	0 (0)
Chiswick	*n/a*	99.7%	0	1 (147)	0	0	6	12	0
Brentford	*n/a*	99.8%	0	0 (140)	4	0	7	12	0
Heston	*n/a*	93.3%	4	1	4 (168)	0 (120)	1 (176)	6	0
Hatton Cross	*n/a*	90.2%	0 (111)	0 (131)	0	0	0 (134)	0	0
Gunnersbury	*n/a*	93.3%	9 (191)	4	**36**	0	**39**	**46**	0
Feltham	*n/a*	88.9%	0 (131)	17 (134)	0	0	0	0	0

Notes: Exceedance of the NO_2 short term AQO of 200 µg m^{-3} over the permitted 18 days per year are shown in **bold**.

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

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

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

As discussed above, there were no exceedances of the 1-hour mean NO2 objective at any of the continuous monitoring sites. Since the data capture rate at Cranford was below the minimum threshold limit of 75%, it was annualised in accordance with the methodology outlines within Technical Guidance 16 (TG16), the 99.8th percentile also showed no exceedances of the NO_2 hourly AQO.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm-3)						
			2012 [c]	2013c	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
Cranford	n/a	53.0%	18.0	19.0	18.1	17.0	17.5	18	15.0
Chiswick	n/a	97.0%	27.0	26.0	25.5	22.1	22.4	20	20.0
Brentford	n/a	99.4%	31.0	30.0	31.9	31.1	30.7	28	26.0
Heston	n/a	91.6%	27.0	28.0	24.5	24.9	25.9	23	22.0
Hatton Cross	n/a	95.5%	21.0	20.0	20.4	18.1	19.0	18	21.0
Gunnersbury	n/a	92.6%	–	31.0	28.7	25.6	27.0	27	22.0
Feltham	n/a	88.5%	20.0	23.0	20.0	18.7	19.1	19	20.0

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

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

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

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

The annual mean concentration of particulate matter (PM_{10}) at all sites are below the AQO, all sites showing marginal reductions, except at Chiswick and Feltham, with latter showing marginal increase, most likely due dust emissions from Feltham Bridge works that began around August 2018, as opposed to traffic related emissions. Data at Cranford was annualised in accordance with the TG16 methodology as stated

above. There is a notable and above average reduction in PM_{10} annual mean concentration levels at Gunnersbury, which is partly due to upgrade of TEOM monitor to BAM 1020 monitor.

Graph 2: Long-term trend in NO_2 annual Mean concentration level at continuous monitoring sites

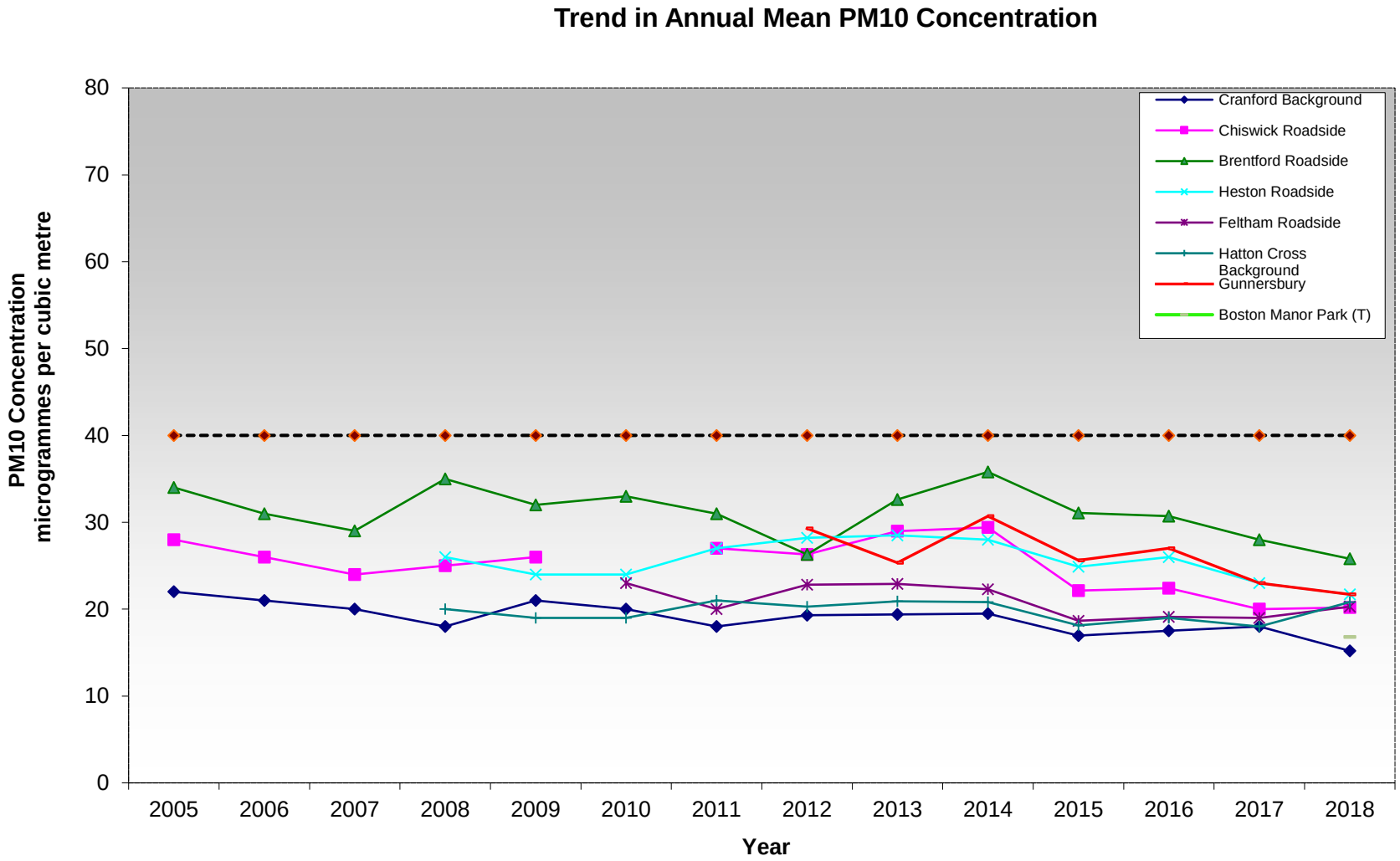


Table G. PM_{10} Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µgm-3						
			2012 [c]	2013[c]	2014 [c]	2015 [c]	2016 c	2017 [c]	2018 [c]
Cranford	n/a	53.0%	15 (39)	1 (19)	5	4	8	5	0 (23)
Chiswick	n/a	97.0%	15 (47)	15	15	5	9	6	1
Brentford	n/a	99.4%	31 (52)	28	42	30	28	24	4
Heston	n/a	91.6%	26	9	18	10	17 (42)	9	2
Hatton Cross	n/a	95.5%	8	1 (21)	6	4	6	3	2
Gunnersbury	n/a	92.6%	13	1 (22)	7	15	15	15	1
Feltham	n/a	88.5%	28 (54)	16	17	4	7	4	4

Notes: Exceedance of the PM_{10} short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.

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

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

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

According to our data analysis, there were no exceedances of the 24-hour AQO of PM_{10} at any of the continuous monitoring sites, including at Cranford, where data capture rate was below the minimum threshold of 75% and data was annualised and expressed as 90.4th percentile.

Table H. Annual Mean $PM_{2.5}$ Automatic Monitoring Results (µg m^{-3})

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
Chiswick	n/a	99%	-	-	-	-	-	15	15
Brentford	n/a	97%	-	-	-	-	-	14	13

Notes: Exceedance of the $PM_{2.5}$ annual mean AQO of 25 µg m^{-3} are shown in **bold**.

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

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

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

There annual mean concentration level of the fine particulate matter ($PM_{2.5}$) were below 25 µg m^{-3} at Chiswick and Brentford. However, trend over the past two years indicates little improvement, although a longer monitoring period is required, before a clear trend may be established. Reducing concentration of fine particulates and reducing public exposure, where relevant, is one of the Council's top priorities because it is known to cause harm to public health, given no threshold limit is considered safe.

Table I. SO_2 Automatic Monitor Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of: [c]		
			15-minute means > 266 µg m^{-3}	1-hour mean > 350 µg m^{-3}	24-hour mean > 125 µg m^{-3}
Cranford	61	61	12 (0)	10 (0)	0 (0)

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

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

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

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Concentrations of SO_2 were recorded at the Cranford continuous monitoring site. There were no exceedances of SO_2 mean concentration level for the 15-minute, 1-hour and the 24-hour objectives. Since data capture was below the minimum threshold of 75%, data was annualised in accordance with the methodology within the TG16.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of Hounslow's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2018 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further information
2 (AQAP): Enforcement of Non-Road Mobile Machinery (NRMM) air quality policies	The Council proactively cooperates and has implemented this London Mayor's initiative, led by Merton, to identify and enforce NRMM at major construction sites within the borough. Planning conditions on NRMM are being applied, albeit for fewer planning applications in 2018 than we would like	Benefits: Some construction contractors change their work methods and machinery after first site visit and are found to be compliant with NRMM regime in subsequent visit. This process will eventually help reduce background concentrations levels	NRMM being reinforced into Planning conditions.
3 (AQAP): Th Council will ensure that all CHPs	The current planning monitoring system is not fully capable of identifying, though two applications involving CHPs were refused, albeit on	We discourage the use of CHPs at current and hope to allow only those CHPs that are compliant with the ai quality legislation, with the aim of reducing NOx emissions in future.	A new Planning and Monitoring system is being evaluated.

installed will be compliant with the latest GLA requirements	grounds of size, demand and economic viability but not on air quality grounds. A new planning system is being evaluated, which may be implemented towards end of the year.		
3.1 (AQAP)	More stringent Planning conditions are still under review	Improved outcomes for air quality	Await adoption of enhanced planning conditions
4.1 (AQAP)	Environmental Strategy, in conjunction with external partners, provided training to Planning, Transport & Traffic Officers, on 6th June, 2019	Greater awareness and understanding of requirements of legislative standards, impacts assessments and application on Air Quality and Noise	Similar training in future and work on planning conditions
5 (AQAP)	Number of junctions treated to improve cycling	Improvements to cycling infrastructure, to encourage modal shift	6 junctions treated at: Entry treatments on Bedfont Road, Boston Manor Road, Prince Regent Road and High Street.
5 (AQAP)	Cycle parking facilities installed	Improved cycling infrastructure	32 On-street: 12 at Isleworth Leisure Centre, 8 lamppost style at Wellesley Rd Practice and Paxton Rd Chiswick, 22 Turnham Green Terrace (for station); 62 Off-street: 12 at Strand on the Green school, 2 X storage containers for Lampton Park Cycle Hub – approx. 25 bikes each
5 (AQAP)	Protected crossing facilities provided (e.g. refuges, zebra crossings, pelican crossings etc)	Improved walking infrastructure	Two sites: Bedfont Road toucan, Prince Regent Road zebra crossing.

9 (AQAP)	Public Health is to re-launch the 'Beat the Streets', aimed at raising greater awareness involving schools and parents (review of travel plans); and poor air quality alerts now being sent to schools, care homes and GPs surgeries	Greater awareness raising of impacts of poor air quality and lack of physical activity on public health; Reduce impact of poor air quality on more vulnerable members of society and those with respiratory health conditions; and Reduce hospital admissions	More advanced dialogue with Public Health and CCG and monitor progress on on-going basis.
14 (AQAP)	The Council is organising to attend and present at the Hounslow Economic Business Forum, with a view to address and influence around 30 major businesses in the borough, to promote more sustainable servicing and deliveries to Chiswick High Road and other areas that will be impacted by ULEZ in Sept/Oct 2021	To promote more sustainable forms of delivery and servicing and potentially help make high street pollution free, attractive and cost-effective ways to sustain our communities	Awaits engagement in Sept/Oct 2019.
15 (AQAP)	Council raised awareness about poor air quality by promoting AirText in a local magazine, 'Hounslow Matters', social media and distribution of leaflets, in an attempt to increase subscription of Hounslow specific AirText campaign	Improved awareness of impacts of poor air quality	Improved subscription of AirText alerts
26 (AQAP)	Council submitted a MAQF bid for LEN, which unfortunately was deemed as unsuccessful by GLA.		Bid unsuccessful
27 (AQAP)	Council has put up signs for anti-idling signs, with aim to educate motorists with signage, information leaflets and verbal warnings. Where necessary Civil Enforcement Officers will issue £60 Penalty Charge Notices. This campaign uses Traffic Management Order (TMO)	No cost benefit assessed to date	No PCNs issued to end of June, 2019

27.1	The Council has held three anti-idling events outside schools audited for poor air quality. We also carried out enforced against illegally parked vehicles outside St Marys and William Hogarth schools; Council made contributions towards green wall and indoor purifiers & monitoring at St Marys school, in addition to funding from the London Mayor as part of air quality audit programme.	Too early for cost benefit analysis	Green Wall, additional monitoring (diff tubes) and classroom air quality monitoring installed at St. Marys School; Green infrastructure being planned at Cavendish Primary school;

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in Hounslow in 2018

Action	Number	Notes
a) Number of planning applications where an air quality imp assessment was reviewed for air quality impacts	30	
b) Number of planning applications required to monitor for construction dust	5	Most sites require CEMP, which usually requires thresholds that trigger mitigation measures
c) Number of CHPs/Biomass boilers refused on air quality grounds	2 (?)	Biomass boilers are discouraged
d) Number of CHPs/Biomass boilers subject to GLA emissior limits and/or other restrictions to reduce emissions	Unknown	Biomass boilers are discouraged
e) Number of developments required to install Ultra-Low NO boilers	Unknown	
f) Number of developments where an AQ Neutral building and/or transport assessments undertaken	30	
g) Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmar and so required to include additional mitigation	30	
h) Number of planning applications with S106 agreements including other requirements to improve air quality	Unknown	
Number of planning applications with CIL payments that include a contribution to improve air quality	0	Need to seek CIL funding for air quality improvements
i) NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	N/A	N/A
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.	2 sites audited;	1 compliant; 1 non-compliant Number of conditions on NRMM not known;

We recognise that this table has been difficult for some boroughs to complete, either because planning data is not collected or not collected in a form that is easily translatable into the table. The purpose of each row in the table is to assess implementation of GLA planning or policies. An additional column has been added for notes where you can note any qualifications to the data or local policies that are relevant (e.g. use of standard conditions).

Notes on the table:

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

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

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

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

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

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

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

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

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

3.1 New or significantly changed industrial or other sources

After checking the Council inventory, we can confirm that there no new significant sources (petrol stations, fuel storage depots, poultry farms, biogas 20kW-50MW and CHPs above 50MW) of emissions in the borough.

REPORT END

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

The Council performs local site operator (LSO) duties, including calibrations, at a regular intervals of once a fortnight. Cranford site suffered from power failures earlier in 2018 and consequently resulted in much lower data capture rate than usual. Monitor at Feltham site had to be moved a few feet (within LAQM guidelines) to accommodate works to Feltham Bridge and therefore, it resulted in lower data capture rates than usual. This works also resulted closure of level crossing and traffic being diverted along Hounslow Road instead, which is the most probable reason for a reduction in NO_2 annual mean concentration level being at the limit for the first time ever.
Regarding our AQMA, the London Borough of Hounslow Air Quality Order 2015 came into operation on the 12th day of November 2015, whereby an amendment was made to the existing order (Air Quality Order 2005) and it specifically includes the hourly objective of nitrogen dioxide of the national Air Quality Regulations. This designation applies to the entire borough.

PM_{10} Monitoring Adjustment

A.2 Diffusion Tube Quality Assurance / Quality Control

- Hounslow's continuous monitoring stations are audited by Ricardo-AEA twice a year in order to provide QA/QC, which are followed up by service and maintenance obligations of ESU organisation.
- Gradko International Limited;
- 20% Tea/Water;
- UKAS approved Laboratory (2187) Quality Management System
- Results of laboratory precision (tube precision and WASP results: http://laqm.defra.gov.uk/diffusion-tubes/precision.html for precision http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html for WASP results)
- Bias adjustment factor from the database (available on the LAQM Support Website at: http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html) was applied. The version of the database spreadsheet used was 06/16.
- The Local Authority has compared the diffusion tubes with the reference method in a co-location study. Details of six co-location sites at Chiswick, Brentford, Hatton Cross, Heston, Feltham and Cranford are given below.
- In line with the preceding year, locally derived bias adjustment factor (BAF) of 0.87 has been used this year, in spite of the national bias adjustment factor reported to be 0.93, being more conservative than the local BAF.
- Gradko laboratory, with good precision and accuracy in 2018.

Site ID	Ann Mean from Continuous Monitor (Cm)	Annual Mean from Diffusion Tubes (Cd)	Bias Adjustment Factor
HS2	24.2	27.7	0.87
HS4	47.3	50.6	0.93
HS5	48.1	55.6	0.87
HS6	39.7	50.1	0.79
HS7	28.1	34.1	0.82
HS8	45.1	43.6	1.03
HS9	27.2	35.9	0.76
Average BAF (all sites)			0.87

Factor from Local Co-location Studies (if available)

A locally derived bias adjustment factor (BAF) has been calculated and used in accordance with guidance/Tool given in section 7.192 in TG16.

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

All the diffusion tubes, except those in Feltham (ID: FELT A, FELT B, FELT C) and St. Mary's Communal Area (ID: HS93), had data capture rates below 75% and therefore, only these diffusion tubes required correction for annualisation factor, before bias correction was applied. The annual mean values for the above diffusion tubes results are presented in Table D and Appendix B. Dates for the period mean are from 12th June to 31st December 2018.

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

Site	Site Type	Annual Mean (µg/m³)	Period Mean (µg/m³)	Ratio
Hatton Cross	Urb. BG	28.05	26.85	1.04
Heston Road	Roadside	39.74	36.98	1.07
Feltham	Roadside	27.17	23.89	1.14
			Average	**1.09**

Hounslow sites	Period Mean	Annualised Mean
Cranford	24.2	26.3

Table M. Using Hatton Cross data to Annualise Diffusion tube data for Feltham (as per Box 7.10)

Start Date	End Date	B1	FELT A	FELT B	FELT C	B1 when FELT A, FELT B and FELT C is available
30 Jan 2018 12:00	28 Feb 2018 12:00	37.29	35.64	41.34	31.44	37.29
28 Feb 2018 12:00	10 Apr 2018 12:00	31.21	35.20	43.39	36.67	31.21
10 Apr 2018 12:00	01 May 2018 12:00	20.08	38.07	36.96	35.83	20.08
01 May 2018 12:00	06 Jun 2018 12:00	25.85				
06 Jun 2018 12:00	02 Aug 2018 12:00	21.42				
02 Aug 2018 12:00	07 Sep 2018 12:00	23.50				
07 Sep 2018 12:00	04 Oct 2018 12:00	26.24				
04 Oct 2018 12:00	06 Nov 2018 12:00	32.93	37.41	37.04	32.51	32.93
06 Nov 2018 12:00	04 Dec 2018 12:00	26.44	43.59	39.22	27.80	26.44
04 Dec 2018 12:00	05 Feb 2019 12:00	36.47				
	Mean, Am	**28.14**	**37.98**	**39.59**	**32.85**	**29.59**
	Ratio Am/Pm, Ra	**0.95**				
	Annualised Mean, Ra*M		**36.1**	**37.7**	**31.2**	

Table N. Using Hatton Cross site to Annualise Diffusion tube (HS93) data for St. Mary's Communal Area (as per Box 7.10)

Start Date	End Date	B1	D1	B1 when D1 is available
30 Jan 2018 12:00	28 Feb 2018 12:00	37.29		
28 Feb 2018 12:00	10 Apr 2018 12:00	31.21		
10 Apr 2018 12:00	01 May 2018 12:00	20.08		
01 May 2018 12:00	06 Jun 2018 12:00	25.85		
06 Jun 2018 12:00	02 Aug 2018 12:00	21.42		
02 Aug 2018 12:00	07 Sep 2018 12:00	23.50		
07 Sep 2018 12:00	04 Oct 2018 12:00	26.24		
04 Oct 2018 12:00	06 Nov 2018 12:00	32.93		
06 Nov 2018 12:00	04 Dec 2018 12:00	26.44	55.82	26.44
04 Dec 2018 12:00	05 Feb 2019 12:00	36.47	73.71	36.47
	Mean, M	**28.14**	**64.76**	**31.45**
	Ratio Am/Pm, Ra	**0.89**		
	Annualised Mean, Ra*M		**61.6**	

A.4 Chiswick Collocation Site

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	08/01/2018	01/02/2018	54.53	46.74	46.88	49	4.5	9	11.1	55.49	100.00	Good	Good
2	01/02/2018	27/02/2018	45.81	47.10	45.96	46	0.7	2	1.8	52.25	100.00	Good	Good
3	27/02/2018	09/04/2018	53.71	55.63	53.01	54	1.4	3	3.4	57.57	98.07	Good	Good
4	09/04/2018	30/04/2018	54.94	58.42	57.38	57	1.8	3	4.4	63.41	100.00	Good	Good
5	30/04/2018	06/06/2018	53.52	55.82	48.42	53	3.8	7	9.4	54.77	99.89	Good	Good
6	06/06/2018	31/07/2018	44.21	45.49	43.84	45	0.9	2	2.1	36.42	100.00	Good	Good
7	31/07/2018	07/09/2018	47.56	48.03	49.04	48	0.8	2	1.9	34.74	100.00	Good	Good
8	07/09/2018	05/10/2018	47.08	50.46	49.38	49	1.7	4	4.3	37.46	98.81	Good	Good
9	05/10/2018	08/11/2018	53.53	55.36	54.94	55	1.0	2	2.4	46.16	100.00	Good	Good
10	08/11/2018	05/12/2018	57.69		62.93	60	3.7	6	33.3	47.23	100.00	Good	Good
11	05/12/2018	06/02/2019		48.23	49.44	49	0.8	2	7.6	48.15	99.93	Good	Good
12													
13													
												Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

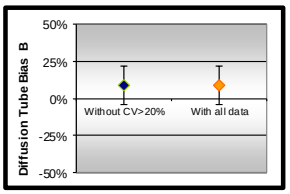
Site Name/ ID: Chiswick, Hounslow

Precision: 11 out of 11 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.94 (0.84 - 1.07)
Bias B: 6% (-7% - 19%)
Diffusion Tubes Mean: 51 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 49 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 48 (43 - 55) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A: 0.94 (0.84 - 1.07)
Bias B: 6% (-7% - 19%)
Diffusion Tubes Mean: 51 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 49 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 48 (43 - 55) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

A.5 Brentford Collocation Site

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	05/01/2018	01/02/2018											
2	01/02/2018	27/02/2018	52.00	49.80	50.96	51	1.1	2	2.7	52.41	99.84	Good	Good
3	27/02/2018	09/04/2018	60.10	57.45	52.73	57	3.7	7	9.3	52.3	99.39	Good	Good
4	09/04/2018	30/04/2018	64.51	60.08	65.44	63	2.9	5	7.1	52.3	100	Good	Good
5	30/04/2018	06/06/2018	66.48	63.39	67.48	66	2.1	3	5.3	57.63	100	Good	Good
6	06/06/2018	31/07/2018	55.09	56.38	55.14	56	0.7	1	1.8	47.35	100	Good	Good
7	31/07/2018	04/09/2018	56.64	54.56	58.19	56	1.8	3	4.5	41.25	100	Good	Good
8	07/09/2018	05/10/2018	52.56	53.78	53.08	53	0.6	1	1.5	44.54	99.33	Good	Good
9	05/10/2018	07/11/2018	55.99	56.22	53.11	55	1.7	3	4.3	47.21	99.75	Good	Good
10	07/11/2018	05/12/2018	52.23	50.67	52.19	52	0.9	2	2.2	41.26	100	Good	Good
11	05/12/2018	06/02/2019	50.76	52.09	48.63	50	1.7	3	4.3	48.44	100	Good	Good
12													
13													
												Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

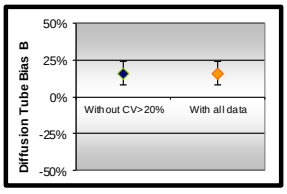
Site Name/ ID: Brentford, Hounslow

Precision: 10 out of 10 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A: 0.87 (0.81 - 0.93)
Bias B: 15% (7% - 23%)
Diffusion Tubes Mean: 56 µgm^{-3}
Mean CV (Precision): 3
Automatic Mean: 48 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 49 (45 - 52) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 10 periods of data
Bias factor A: 0.87 (0.81 - 0.93)
Bias B: 15% (7% - 23%)
Diffusion Tubes Mean: 56 µgm^{-3}
Mean CV (Precision): 3
Automatic Mean: 48 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 49 (45 - 52) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

A.6 Heston Collocation Site

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	05/01/2018	01/02/2018											
2	01/02/2018	07/03/2018	49.68	75.87	75.63	67	15.1	22	37.4	49.3	100.0	Poor Precision	Good
3	07/03/2018	09/04/2018	59.22	61.67	58.30	60	1.7	3	4.3	46.5	98.9	Good	Good
4	09/04/2018	01/05/2018	51.73	51.81	52.39	52	0.4	1	0.9	37.4	100.0	Good	Good
5	01/05/2018	06/06/2018		49.45	47.50	48	1.4	3	12.4	39.5	37.0	Good	or Data Capture
6	06/06/2018	03/08/2018	40.62	42.49	44.46	43	1.9	5	4.8	37.6	99.9	Good	Good
7	03/08/2018	04/09/2018	46.57	44.59	47.47	46	1.5	3	3.7	32.4	99.9	Good	Good
8	04/09/2018	09/10/2018	45.48	42.21	44.12	44	1.6	4	4.1	33.9	99.6	Good	Good
9	09/10/2018	06/11/2018	54.72	54.09	51.75	54	1.6	3	3.9	41.4	95.7	Good	Good
10	06/11/2018	04/12/2018	50.38	54.77	51.06	52	2.4	5	5.9	38.6	99.9	Good	Good
11	04/12/2018	04/02/2019	48.68	48.72	47.11	48	0.9	2	2.3	41.0	98.9	Good	Good
12													
13													
												Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Heston, Hounslow

Precision: 9 out of 10 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 8 periods of data

Bias factor A: 0.78 (0.73 - 0.83)

Bias B: 29% (21% - 37%)

Diffusion Tubes Mean: 50 µgm^{-3}

Mean CV (Precision): 3

Automatic Mean: 39 µgm^{-3}

Data Capture for periods used: 99%

Adjusted Tubes Mean: 39 (36 - 41) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 9 periods of data

Bias factor A: 0.77 (0.73 - 0.81)

Bias B: 30% (23% - 37%)

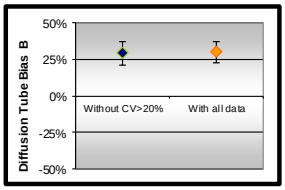
Diffusion Tubes Mean: 52 µgm^{-3}

Mean CV (Precision): 5

Automatic Mean: 40 µgm^{-3}

Data Capture for periods used: 99%

Adjusted Tubes Mean: 40 (38 - 42) µgm^{-3}



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Version 04 - February 2011

A.7 Hatton Cross Collocation Site

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	30/01/2018	28/02/2018	36.07	35.26	44.56	39	5.2	13	12.8	37.29	98.42	Good	Good
2	28/02/2018	10/04/2018	40.60	34.39	34.21	36	3.6	10	9.0	31.21	87.61	Good	Good
3	10/04/2018	01/05/2018	27.84	32.86	31.43	31	2.6	8	6.4	20.08	90.69	Good	Good
4	01/05/2018	06/06/2018	35.49	32.36	35.24	34	1.7	5	4.3	25.85	92.37	Good	Good
5	06/06/2018	02/08/2018	23.84	23.47	24.05	24	0.3	1	0.7	21.42	65.30	Good	or Data Capture
6	02/08/2018	07/09/2018	30.49	32.13	35.14	33	2.4	7	5.9	23.50	96.76	Good	Good
7	07/09/2018	04/10/2018	30.12	32.76	30.18	31	1.5	5	3.7	26.24	99.54	Good	Good
8	04/10/2018	06/11/2018	38.97	38.55	34.70	37	2.4	6	5.8	32.93	94.45	Good	Good
9	06/11/2018	04/12/2018	33.08	35.07	36.26	35	1.6	5	4.0	26.44	91.08	Good	Good
10	04/12/2018	05/02/2019	48.80	44.93	38.91	44	5.0	11	12.4	36.47	99.87	Good	Good
11													
12													
13													
												Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Hatton Cross, Hounslow

Precision: 10 out of 10 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 9 periods of data

Bias factor A: 0.81 (0.74 - 0.89)

Bias B: 23% (12% - 34%)

Diffusion Tubes Mean: 36 µgm^{-3}

Mean CV (Precision): 8

Automatic Mean: 29 µgm^{-3}

Data Capture for periods used: 95%

Adjusted Tubes Mean: 29 (26 - 32) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 9 periods of data

Bias factor A: 0.81 (0.74 - 0.89)

Bias B: 23% (12% - 34%)

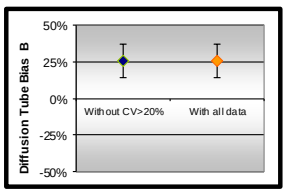
Diffusion Tubes Mean: 36 µgm^{-3}

Mean CV (Precision): 8

Automatic Mean: 29 µgm^{-3}

Data Capture for periods used: 95%

Adjusted Tubes Mean: 29 (26 - 32) µgm^{-3}



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Version 04 - February 2011

A.8 Cranford Collocation Site

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2018	01/02/2018							
2	01/02/2018	28/02/2018	26.62	30.46	34.93	31	4.2	14	10.3
3	28/02/2018	09/04/2018	26.74	19.65	27.03	24	4.2	17	10.4
4	09/04/2018	30/04/2018	29.12	28.39	29.01	29	0.4	1	1.0
5	30/04/2018	06/06/2018	25.94	25.43	20.78	24	2.8	12	7.1
6	06/06/2018	02/08/2018							
7	02/08/2018	04/09/2018	22.65	24.92	27.50	25	2.4	10	6.0
8	04/09/2018	08/10/2018	25.19	24.40	23.36	24	0.9	4	2.3
9	08/10/2018	06/11/2018	26.20	29.24	29.20	28	1.7	6	4.3
10	06/11/2018	04/12/2018	31.10	30.22	29.93	30	0.6	2	1.5
11	04/12/2018	05/02/2019	30.90	32.37	29.08	31	1.6	5	4.1
12									
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
		Good	
21.21	52.86	Good	or Data Capture
		Good	
		Good	
20.12	88.31		Good
19.68	100.00	Good	Good
22.87	98.90	Good	Good
28.91	100.00	Good	Good
28.21	100.00	Good	Good
33.17	100.00	Good	Good
Overall survey -->		Good precision	Good Overall DC

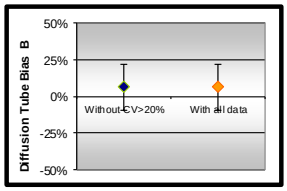
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: **Cranford, Hounslow**

Precision: 9 out of 9 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 5 periods of data
Bias factor A 0.96 (0.83 - 1.13)
Bias B 4% (-11% - 20%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 27 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 27 (23 - 31) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 5 periods of data
Bias factor A 0.96 (0.83 - 1.13)
Bias B 4% (-11% - 20%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 27 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 27 (23 - 31) µgm^{-3}



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Version 04 - February 2011

A.9 Feltham Collocation Site

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	05/01/2018	28/02/2018	35.64	41.34	31.44	36	5.0	14	12.3
2	28/02/2018	10/04/2018	35.20	43.39	36.67	38	4.4	11	10.8
3	10/04/2018	01/05/2018	38.07	36.96	35.83	37	1.1	3	2.8
4									
5									
6									
7									
8									
9	04/10/2018	06/11/2018	37.41	37.04	32.51	36	2.7	8	6.8
10	06/11/2018	03/12/2018	43.59	39.22	27.80	37	8.2	22	20.3
11	03/12/2018	05/02/2019							
12									
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
31.87	99.92	Good	Good
33.06	99.39	Good	Good
28.43	100.00	Good	Good
24.59	31.15	Good	or Data Capture
29.10	36.52	Poor Precision	or Data Capture
Overall survey -->		Good precision	Poor Overall DC

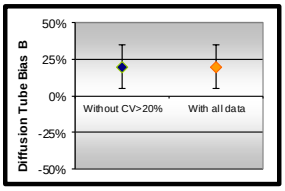
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: **Feltham, Hounslow**

Precision: 4 out of 5 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 3 periods of data
Bias factor A 0.84 (0.74 - 0.96)
Bias B 19% (5% - 34%)
Diffusion Tubes Mean: 37 µgm^{-3}
Mean CV (Precision): 9
Automatic Mean: 31 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 31 (28 - 36) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 3 periods of data
Bias factor A 0.84 (0.74 - 0.96)
Bias B 19% (5% - 34%)
Diffusion Tubes Mean: 37 µgm^{-3}
Mean CV (Precision): 9
Automatic Mean: 31 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 31 (28 - 36) µgm^{-3}



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Co-location questionnaire for the above studies would have been submitted to the LAQM.

Discussion of Choice of Factor to Use

Local bias adjustment factor (0.87) has been applied to be consistent with previous years, even though the locally derived BAF is around 6% lower than the national bias adjustment factor (0.93), which may be more conservative, however it is more susceptible to regional variations.

Distance Adjustment

As it may be seen from Tables 1 and 4, there are marginal (less than 5%) exceedances of the annual mean of the air quality objective (AQO) for nitrogen dioxide (NO_2), at sensitive receptors at both Chiswick High Road and Great West Road (A4). However, given the prevailing NO_2 annual mean concentration levels at Heston Road and Gunnersbury Avenue, it can be seen from Tables 3 and 4 that there are no exceedances of the NO_2 AQO at either site, during and according to the 2018 data.

A.10 Impact of NO_2 exceedances at sensitive receptors

Table 1 – Impact of NO_2 exceedances on Chiswick High Road Sensitive Receptors

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	10	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	27	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	47	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	41.9	µg/m^3

Table 2 – Impact of NO_2 exceedances on Great West Road (A4), Brentford Sensitive Receptors

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	10	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	31	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	48	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	42.7	$\mu g/m^3$

Table 3 – Impact of NO_2 exceedances at Heston Road Sensitive Receptors

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	4	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	26.3	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	40	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	36.2	$\mu g/m^3$

Table 4 – Impact of NO_2 exceedances at Gunnersbury Avenue Sensitive Receptors

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	5	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	31.5	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	40	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	39.5	$\mu g/m^3$

Appendix B Full Monthly Diffusion Tube Results for 2018

Table P. NO_2 Diffusion Tube Results

Site ID	*Valid data capture for monitoring period %* [a]	*Valid data capture 2018%* [b]	*Annual Mean NO_2*													
			Jan	*Feb*	*March*	*Apr*	*May*	*June*	*Jul*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Annual mean – raw data* [c]	*Annual mean – bias adjusted* [c]
BREN A	100%	100%	46.37	52.00	60.10	64.51	66.48	55.09	55.09	56.64	52.56	55.99	52.23	50.76	55.7	**48.4**
BREN B	100%	100%	49.75	49.80	57.45	60.08	63.39	56.38	56.38	54.56	53.78	56.22	50.67	52.09	55.0	**47.8**
BREN C	100%	100%	59.75	50.96	52.73	65.44	67.48	55.14	55.14	58.19	53.08	53.11	52.19	48.63	56.0	**48.6**
CHIS A	92%	92%	54.53	45.81	53.71	54.94	53.52	44.21	44.21	47.56	47.08	53.53	57.69		50.6	**44.0**
CHIS B	92%	92%	46.74	47.10	55.63	58.42	55.82	45.49	45.49	48.03	50.46	55.36		48.23	50.6	**44.0**
CHIS C	100%	100%	46.88	45.96	53.01	57.38	48.42	43.84	43.84	49.04	49.38	54.94	62.93	49.44	50.4	**43.8**
CRAN A	83%	83%	27.26	26.62	26.74	29.12	25.94			22.65	25.19	26.20	31.10	30.90	27.2	23.6
CRAN B	83%	83%	34.38	30.46	19.65	28.39	25.43			24.92	24.40	29.24	30.22	32.37	27.9	24.3
CRAN C	83%	83%	28.46	34.93	27.03	29.01	20.78			27.50	23.36	29.20	29.93	29.08	27.9	24.3
FELT A	50%	50%	22.37	35.64	35.20	38.07						37.41	43.59		33.6	29.2
FELT B	42%	42%		41.34	43.39	36.96						37.04	39.22		37.7	32.7
FELT C	42%	42%		31.44	36.67	35.83						32.51	27.80		31.2	27.1
HAT A	100%	100%		36.07	40.60	27.84	35.49	23.84		30.49	30.12	38.97	33.08	48.80	34.5	30.0
HAT B	100%	100%		35.26	34.39	32.86	32.36	23.47		32.13	32.76	38.55	35.07	44.93	34.2	29.7
HAT C	100%	100%		44.56	34.21	31.43	35.24	24.05		35.14	30.18	34.70	36.26	38.91	34.5	29.9
HEST A	92%	92%	38.13	49.68	59.22	51.73		40.62	40.62	46.57	45.48	54.72	50.38	48.68	47.8	**41.5**
HEST B	100%	100%	53.68	75.87	61.67	51.81	49.45	42.49	42.49	44.59	42.21	54.09	54.77	48.72	51.8	**45.0**
HEST C	100%	100%	45.52	75.63	58.30	52.39	47.50	44.46	44.46	47.47	44.12	51.75	51.06	47.11	50.8	**44.2**

HS32	83%	83%	46.82	46.83	50.35	54.86	49.11	50.48	50.48	52.10	46.33	49.62			49.7	**43.2**
HS33	83%	83%	48.36	45.75	44.99	51.42	48.75	50.90	50.90	51.47	51.28	51.19	44.76	46.51	48.9	**42.5**
HS34	92%	92%	29.75	28.77	37.69		28.22	21.05	21.05	24.96	26.97	34.30	39.73	34.71	29.7	25.8
HS35	92%	92%	37.40	34.03	36.89	35.47	30.60	21.98	21.98	27.84	27.07		37.21	34.70	31.4	27.3
HS41	100%	100%	50.01	47.59	51.62	54.98	45.91	45.24	45.24	46.98	50.07	44.74	50.00	44.18	48.0	**41.7**
HS42	83%	83%	32.93	38.20	31.79	33.19	28.70	27.30	27.30			35.48	34.72	36.41	32.6	28.3
HS43	100%	100%	34.67	42.43	42.23	42.20	39.14	32.61	32.61	33.75	37.84	44.89	37.59	38.80	38.2	33.2
HS51	100%	100%	39.59	32.67	27.35	28.78	28.27	21.34	21.34	27.09	29.15	34.70	28.14	34.09	29.4	25.5
HS52	100%	100%	25.33	30.45	26.49	26.43	29.49	22.01	22.01	23.73	25.97	30.67	26.64	32.30	26.8	23.3
HS53	100%	100%	32.28	28.31	29.18	28.73	30.67	21.97	21.97	28.86	30.58	34.38	29.78	36.99	29.5	25.6
HS54	100%	100%	38.90	41.30	42.58	37.69	40.13	36.93	36.93	40.97	42.96	43.44	32.09	48.98	40.2	35.0
HS55	92%	92%	42.09		38.70	41.80	42.95	32.95	32.95	34.49	29.16	39.89	44.91	47.05	38.8	33.7
HS61	75%	75%		38.81	39.71	39.15	33.29			32.01	32.75	38.93	38.12	39.41	36.9	32.1
HS62	100%	100%	37.05	40.31	47.97	38.18	37.90	26.63	26.63	36.00	35.38	42.01	45.86	49.35	38.6	33.5
HS63	100%	100%	48.00	41.97	43.14	40.63	36.84	34.54	34.54	34.21	33.01	41.46	45.21	36.82	39.2	34.1
HS64	92%	92%	38.28	35.23	39.85	33.38	31.83	29.28	29.28	29.17		30.29	29.06	37.65	33.0	28.7
HS65	100%	100%	31.89	34.06	31.07	29.06	25.51	22.65	22.65	24.90	23.39	33.53	34.64	32.49	28.8	25.0
HS66	92%	92%	46.65	40.29	41.49	39.30	47.70	36.84	36.84		41.19	52.87	46.52	49.68	43.6	37.9
HS67	100%	100%	59.60	50.00	57.00	65.71	56.39	50.96	50.96	59.03	56.55	51.05	52.33	59.48	55.8	**48.4**
HS68	100%	100%	41.83	43.14	41.66	46.44	39.94	33.86	33.86	42.25	42.71	45.02	47.54	46.02	42.0	36.5
HS69	100%	100%	42.67	44.86	49.03	49.59	50.78	42.05	42.05	37.35	36.33	46.86	49.65	46.87	44.8	39.0
HS70	100%	100%	54.93	50.92	64.70	65.10	59.19	51.07	51.07	49.56	52.16	35.06	66.19	51.54	54.3	**47.2**
HS71	100%	100%	42.82	40.56	48.62	49.09	43.05	31.47	31.47	45.88	42.85	41.98	49.09	55.85	43.6	37.8
HS72	92%	92%	47.93	42.03	49.00	47.62	39.20	33.25	33.25	38.01	39.95		38.92	47.97	41.6	36.1
HS73	92%	92%	29.28	29.78	29.07	29.99	28.06	21.52	21.52	29.33	32.78	35.25		33.59	29.1	25.3
HS74	100%	100%	37.49	34.87	44.91	36.69	30.37	27.90	27.90	31.52	33.44	37.77	44.24	39.91	35.6	30.9
HS76	92%	92%	32.58	32.49	33.59	28.76	28.25	22.35	22.35		28.51	41.63	35.88	34.98	31.0	27.0
HS77	100%	100%	29.75	23.40	26.95	27.12	19.25	15.99	15.99	22.96	21.93	30.80	31.96	34.75	25.1	21.8
HS78	83%	83%	46.54	54.16	49.03	56.82	53.29	45.75	45.75	47.17	45.66			47.09	49.1	**42.7**

HS79	100%	100%	38.80	39.54	40.70	34.59	29.89	25.71	25.71	30.94	33.78	39.41	38.23	37.92	34.6	30.1
HS80	75%	75%		75.07	63.03	76.32	72.12	62.45	62.45			62.18	73.47	60.88	67.6	**58.7**
HS81	75%	75%	27.43	28.59	26.85	23.45				19.19	22.06	26.55	23.85	29.84	25.3	22.0
HS82	83%	83%	27.57	30.96	26.39	26.80	22.25			20.26	20.24	26.34	25.23	29.56	25.6	22.2
HS83	92%	92%		32.26	24.84	25.24	22.65	14.81	14.81	19.09	19.71	23.64	31.10	23.85	22.9	19.9
HS84	100%	100%	19.63	39.77	42.93	41.87	35.08	30.18	30.18	34.34	40.18	43.32	38.53	39.98	36.3	31.6
HS85	100%	100%	48.03	48.85	46.48	41.87	40.42	40.62	40.62	41.21	43.16	46.30	41.80	44.42	43.6	37.9
HS86	100%	100%	53.09	50.14	48.69	49.05	46.07	37.16	37.16	46.09	46.95	47.99	50.92	57.46	47.6	**41.3**
HS87A	92%	92%		54.07	51.45	49.68	44.00	43.84	43.84	58.83	54.33	49.16	59.39	57.38	51.5	**44.7**
HS88	92%	92%	26.97		27.73	26.37	19.09	16.20	16.20	19.42	21.43	31.78	33.15	23.55	23.8	20.7
HS89	100%	100%	33.70	36.18	37.29	29.66	32.35	27.96	27.96	31.58	36.46	37.67	34.85	32.28	33.2	28.8
HS90	100%	100%	28.34	32.26	34.93	33.82	29.84	23.69	23.69	20.05	24.92	28.72	35.36	33.79	29.1	25.3
HS91	92%	92%	56.10	50.72	61.33	56.93	48.01	50.29	50.29	55.52	56.78	65.69	69.07	<0.34	51.8	**45.0**
HS93	17%	17%											55.82	73.71	57.9	**50.3**

Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.

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

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

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%