London Borough of Hounslow Air Quality Annual Status Report for 2017
Date of publication: 31st May 2018

This report provides a detailed overview of air quality in Hounslow Council during 2017. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). https://www.london.gov.uk/what-wedo/environment/pollution-and-air-quality/working-boroughs

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Abbreviations

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

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	Objective (UK)	Averaging Period	Date[1]
Nitrogen dioxide - NO_2	200 □g m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 □g m^{-3}	Annual mean	31 Dec 2005
Particles - PM_{10}	50 □g m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 □g m^{-3}	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 □g 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 2017

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}	*Chemiluminescent; TEOM*
HS5	Brentford	517425	178074	Roadside	Y	9	6	2.5	NO_2, PM_{10}	*Chemiluminescent; TEOM*
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; TEOM*
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; TEOM*

Table C. Details of Non-Automatic Monitoring Sites for 2017

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 colocated with an automatic monitor? (Y/N)
HS32	24 Adelaide Terrace	517592	178210	Roadside	Y	Y (0m)	7m	n/a	NO_2	N
HS33	30 Surrey Crescent	519452	178314	Roadside	Y	Y (0m)	10m	n/a	NO_2	N
HS34	Chiswick Community School	521028	177321	Intermediate	Y	Y (20m)	10m	n/a	NO_2	N
HS35	Hogarth Primary School	521174	178069	Intermediate	Y	Y (10m)	2m	n/a	NO_2	N
HS41	Hanworth Library	512107	172502	Roadside	Y	Y (25m)	4m	n/a	NO_2	N
HS42	High Street, Hounslow	513986	175761	Background	Y	Y (0m)	25m	n/a	NO_2	N
HS43	Glenhurst Road	517447	178059	Roadside	Y	Y (5m)	2m	n/a	NO_2	N
HS51	Marjory Kinnon School	509127	174568	Roadside	Y	Y (20m)	10m	n/a	NO_2	N
HS52	Bedfont Library	508873	173722	Roadside	Y	Y (30m)	6m	n/a	NO_2	N
HS53	Church of the good shepherd	510986	176032	Intermediate	Y	Y (25m)	10m	n/a	NO_2	N
HS54	Cranford lane / High St. Cranford Jct	510810	177667	Roadside	Y	Y (2m)	1m	n/a	NO_2	N
HS55	Cranford Library	510747	176687	Roadside	Y	Y (2m)	5m	n/a	NO_2	N
HS61	Twickenham Road	516203	175863	Roadside	Y	Y (2m)	5m	n/a	NO_2	N
HS62	Sutton Rd & Heston Rd Jct	513630	176938	Roadside	Y	Y (1m)	5m	n/a	NO_2	N
HS63	Lampton Road	513538	175828	Roadside	Y	Y (1m)	5m	n/a	NO_2	N
HS64	Junction of Roseheath Road	512860	175013	Roadside	Y	Y (1m)	5m	n/a	NO_2	N
HS65	Eastbourne Road at	511840	172745	Roadside	Y	Y (5m)	10m	n/a	NO_2	N
HS66	Brainton Avenue	510975	173646	Roadside	Y	Y (2m)	5m	n/a	NO_2	N

HS67	Busch Corner	516525	176846	Roadside	Y	Y (0m)	8m	n/a	NO_2	N
HS68	Junction of Commerce Road	517282	177296	Roadside	Y	Y (0m)	1.5m	n/a	NO_2	N
HS69	Kew Bridge	519005	178040	Roadside	Y	Y (0m)	1m	n/a	NO_2	N
HS70	Eastbury Grove (Chiswick Lane)	521438	177980	Roadside	Y	Y (4m)	2m	n/a	NO_2	N
HS71	Gunnersbury Avenue	519184	179369	Roadside	Y	Y (0m)	4m	n/a	NO_2	N
HS72	Heston Crossroads	513063	177552	Roadside	Y	Y (0m)	1m	n/a	NO_2	N
HS73	Browells Lane, Feltham	510578	172857	Roadside	Y	Y (6m)	2m	n/a	NO_2	N
HS74	Swift Road, Hanworth	512040	171808	Roadside	Y	Y (20m)	4m	n/a	NO_2	N
HS76	Clements Court, Hounslow	511570	175015	Background	Y	Y (15m)	1m	n/a	NO_2	N
HS77	Beaversfield Park	511990	175973	Background	Y	Y (15m)	25m	n/a	NO_2	N
HS78	Staines / Wellington Road	512762	175310	Roadside	Y	Y (0m)	2m	n/a	NO_2	N
HS79	Whitton Road	513384	175482	Roadside	Y	Y (10m)	1m	n/a	NO_2	N
HS80	Hounslow East	514442	175950	Roadside	Y	Y (0m)	3m	n/a	NO_2	N
HS81	Woodlands	515045	175934	Background	Y	Y (8m)	1m (cul de sac)	n/a	NO_2	N
HS82	Church Street	516594	175880	Roadside	Y	Y (0m)	1m	n/a	NO_2	N
HS83	Osterley Park	514721	177976	Background	Y	Y (0m)	500m	n/a	NO_2	N
HS84	Apex Corner	512781	172132	Roadside	Y	Y (4m)	1m (not main road)	n/a	NO_2	N
HS85	Hospital Road	513213	175655	Roadside	Y	Y (4m)	1m	n/a	NO_2	N
HS86	Jolly Waggoners	510955	176567	Roadside	Y	Y (3m)	1m (not main road)	n/a	NO_2	N
HS87A	Henleys Roundabout	511545	176430	Roadside	Y	Y (2m)	1m (not main road)	n/a	NO_2	N
HS90 (HS87B)	The Butts (HS87B)	571539	117572	Background	Y	Y (6m)	2m	n/a	NO_2	N
HS88	Thames path	521493	176737	Thames path	Y	Y (1m)	3m	n/a	NO_2	N

HS89	Mogden Sewage Works Gate	515424	174719	Roadside	Y	Y (1m)	1m	n/a	NO_2	N
HS91	Dukes Ave / Hogarth Lane	521045	177970	Roadside	Y	Y (3m)	3m	n/a	NO_2	N
BREN A	Brentford, Glenhurst Road	517425	178071	Roadside	Y	Y (10m)	3m	3m	NO_2, PM_{10}	Y
BREN B	Brentford, Glenhurst Road	517425	178071	Roadside	Y	Y (10m)	3m	3m	NO_2, PM_{10}	Y
BREN C	Brentford, Glenhurst Road	517425	178071	Roadside	Y	Y (10m)	3m	3m	NO_2, PM_{10}	Y
CHIS A	Chiswick High Road	521085	178499	Roadside	Y	Y (0m)	2m	3m	NO_2, PM_{10}	Y
CHIS B	Chiswick High Road	521085	178499	Roadside	Y	Y (0m)	2m	3m	NO_2, PM_{10}	Y
CHIS C	Chiswick High Road	521085	178499	Roadside	Y	Y (0m)	2m	3m	NO_2, PM_{10}	Y
CRAN A	Cranford Avenue Park	510370	178198	Background	Y	Y (25m)	70m	3m	NO_2, PM_{10}	Y
CRAN B	Cranford Avenue Park	510370	178198	Background	Y	Y (25m)	70m	3m	NO_2, PM_{10}	Y
CRAN C	Cranford Avenue Park	510370	178198	Background	Y	Y (25m)	70m	3m	NO_2, PM_{10}	Y
FELT A	Feltham High St / Hanworth Rd Jct	510676	173245	Roadside	Y	Y (4m)	2m	2.5m	NO_2, PM_{10}	Y
FELT B	Feltham High St / Hanworth Rd Jct	510676	173245	Roadside	Y	Y (4m)	2m	2.5m	NO_2, PM_{10}	Y
FELT C	Feltham High St / Hanworth Rd Jct	510676	173245	Roadside	Y	Y (4m)	2m	2.5m	NO_2, PM_{10}	Y
HEST A	Heston Road	513676	176844	Roadside	Y	Y (4m)	1m	2.5m	NO_2, PM_{10}	Y
HEST B	Heston Road	513676	176844	Roadside	Y	Y (4m)	1m	2.5m	NO_2, PM_{10}	Y
HEST C	Heston Road	513676	176844	Roadside	Y	Y (4m)	1m	2.5m	NO_2, PM_{10}	Y
MYR A	Myrtle Avenue	509334	174997	Background	Y	Y (10m)	12m (cul de sac)	2.5m	NO_2, PM_{10}	Y
MYR B	Myrtle Avenue	509334	174997	Background	Y	Y (10m)	12m (cul de sac)	2.5m	NO_2, PM_{10}	Y
MYR C	Myrtle Avenue	509334	174997	Background	Y	Y (10m)	12m (cul de sac)	2.5m	NO_2, PM_{10}	Y

n/a – denotes inlet height for diffusion tubes has not been recorded, however the same for continuous monitoring stations has been recorded.

1.2 Comparison of Monitoring Results with AQOs

The results presented are after application of appropriate bias adjustment, the details of which are described in Appendix A.

Nitrogen Dioxide

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

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (μgm^{-3})						
				2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]
Cranford	Automatic	93.9%	93.9%	28	31	30.1	31.4	30.2	30.8	30
Chiswick	Automatic	99.8%	99.8%	**58**	**55.5**	**56.4**	**51.7**	**44.8**	**49.8**	**53**
Brentford	Automatic	99.8%	99.8%	**53**	**46.1**	**50.3**	**52.6**	**53.3**	**56.9**	**54**
Heston	Automatic	94.4%	94.4%	**48**	**56.3**	**50.81**	**47.7**	**40.7**	**42.2**	**44**
Hatton Cross	Automatic	85.4%	85.4%	33	31.7	37.24	31.1	29.7	31.6	33
Gunnersbury	Automatic	92.8%	92.8%	–	**53.7**	**56.62**	**58.4**	**53.0**	**59.1**	**53**
Feltham	Automatic	98.4%	98.4%	**44**	38.4	43.67	43.3	39.7	38.4	34
BREN	Diffusion tube	100.0%	100.0%	**51.9**	**56.1**	**58.7**	**66.3**	**62.1**	**64.7**	**65.4**
CHIS	Diffusion tube	100.0%	100.0%	**55.8**	**60.9**	**59.3**	**68**	**58.1**	**55.5**	**58.8**
CRAN	Diffusion tube	91.7%	91.7%	28.1	28.2	28.1	29.7	26.8	28.4	28.1
FELT	Diffusion tube	91.7%	91.7%	**40.3**	**42.6**	**41.6**	**45.3**	**41.7**	**45.2**	**43.3**
HATT	Diffusion tube	100.0%	100.0%	33.9	35.4	38.9	38.1	35.2	38.4	**38.1**
HEST	Diffusion tube	100.0%	100.0%	**48.8**	**49.3**	**50.8**	**56.3**	**49.2**	**55.9**	**56.3**
HS32	Diffusion tube	100.0%	100.0%	**52.8**	**55.4**	**55.9**	**63.5**	**58.8**	**59.4**	**50.3**

HS33	Diffusion tube	91.7%	91.7%	**51.5**	**54.4**	**55.6**	**61.4**	**59.4**	**57.6**	**54.9**
HS34	Diffusion tube	91.7%	91.7%	29.7	32.5	33.4	39.2	32.8	34.0	28.8
HS35	Diffusion tube	91.7%	91.7%	28.8	32	33.9	37.3	34.6	37.2	32.3
HS41	Diffusion tube	91.7%	91.7%	32.5	32.6	34.4	38.2	35.6	**55.5**	**51.5**
HS42	Diffusion tube	83.3%	83.3%	39.1	32.1	32.3	35.2	30.1	36.5	**33.2**
HS43	Diffusion tube	100.0%	100.0%	37.3	39.3	**43.3**	**43.9**	**41.2**	**43.1**	**35.4**
HS51	Diffusion tube	100.0%	100.0%	26.7	27.7	28.8	31.5	26.9	31.8	28.2
HS52	Diffusion tube	100.0%	100.0%	24.4	29	27.5	29.8	27.4	29.7	25.2
HS53	Diffusion tube	100.0%	100.0%	31.9	32.7	33.6	33.7	34.1	34.0	33.5
HS54	Diffusion tube	83.3%	83.3%	**44.5**	**45.5**	**42.8**	**48.6**	**48.4**	**45.9**	**40.9**
HS55	Diffusion tube	100.0%	100.0%	**40.4**	**43.8**	**45.1**	**49.6**	**44.5**	**50.7**	**43.8**
HS61	Diffusion tube	91.7%	91.7%	30	**40.2**	38.4	**41.1**	**42.4**	**40.8**	**40.0**
HS62	Diffusion tube	100.0%	100.0%	38.1	35.5	**40.3**	**43.5**	38.9	**43.6**	37.6
HS63	Diffusion tube	100.0%	100.0%	32.2	**44.9**	**48.6**	**52.2**	**48.3**	**48.2**	37.3
HS64	Diffusion tube	100.0%	100.0%	32.6	33.5	34	35.9	33.3	35.3	33.2
HS65	Diffusion tube	100.0%	100.0%	30.1	33.3	33.9	36.9	30.8	35.4	28.3
HS66	Diffusion tube	100.0%	100.0%	36.9	**40.8**	39.1	**48.6**	**43.3**	**46.6**	**44.1**
HS67	Diffusion tube	100.0%	100.0%	**63.5**	**66.5**	**64.7**	**74.9**	**74.2**	**67.8**	**59.6**
HS68	Diffusion tube	100.0%	100.0%	**43.3**	**43.4**	**48.8**	**51.7**	**52.1**	**52.2**	**43.8**
HS69	Diffusion tube	91.7%	91.7%	**48**	**50.7**	**58.9**	**59.2**	**60.1**	**55.4**	**48.0**
HS70	Diffusion tube	100.0%	100.0%	**51.8**	**51.1**	**54.3**	**63**	**61.9**	**64.9**	**59.9**
HS71 (Gunn)	Diffusion tube	100.0%	100.0%	**47.4**	**50.3**	**47.8**	**59**	**57.3**	**54.1**	**48.3**
HS72	Diffusion tube	91.7%	91.7%	**42.2**	**43.9**	**41.1**	**47.1**	**46.6**	**51.7**	**48.7**
HS73	Diffusion tube	91.7%	91.7%	33.1	34.8	31.7	36.4	33.0	33.2	29.8
HS74	Diffusion tube	100.0%	100.0%	37	36.6	35.7	**40.1**	37.3	**41.8**	38.4
HS76	Diffusion tube	100.0%	100.0%	27.3	31.8	34.7	36.7	35.7	**40.6**	26.8
HS77	Diffusion tube	75.0%	75.0%	27.6	26.4	29.2	30.4	26.9	33.8	28.0
HS78	Diffusion tube	91.7%	91.7%	**48.4**	**51.4**	**47.2**	**59.3**	**56.1**	**57.7**	**47.5**
HS79	Diffusion tube	91.7%	91.7%	34.7	37.9	37.8	**41.8**	35.7	**42.3**	33.2
HS80	Diffusion tube	83.3%	83.3%	**49.9**	**56.4**	**57.7**	**65.1**	**61.1**	**79.0**	**71.1**
HS81	Diffusion tube	100.0%	100.0%	26.8	25.9	29	26.9	24.8	26.8	23.0
HS82	Diffusion tube	100.0%	100.0%	34.5	34.2	31.9	35.2	32.5	31.2	26.2

HS83	Diffusion tube	75.0%	75.0%	27.9	20.4	27.8	22.4	22.0	27.0	24.8
HS84	Diffusion tube	100.0%	100.0%	38.4	39.6	**40.5**	**47.6**	**43.7**	**45.3**	39.8
HS85	Diffusion tube	91.7%	91.7%	**42.4**	**45.7**	**43.9**	**51.3**	**49.3**	**50.4**	**47.7**
HS86	Diffusion tube	91.7%	91.7%	**51.5**	**48**	**49.5**	**54.2**	**50.8**	**54.7**	**53.5**
HS87A	Diffusion tube	91.7%	91.7%	**46.7**	**47.2**	**50.7**	**59.1**	**56.0**	**66.0**	**62.7**
HS88	Diffusion tube	100.0%	100.0%	24.1	24.7	26.4	27.3	25.4	26.8	23.4
HS89	Diffusion tube	100.0%	100.0%	34.8	34.9	39.3	39.7	**41.3**	**42.0**	32.1
HS90 (HS87B)	Diffusion tube	100.0%	100.0%	31.8	31.1	31.5	32.7	30.1	33.7	26.5
HS91	Diffusion tube	83.3%	83.3%	–	–	–	–	–	–	**62.1**

Notes: Exceedance of the NO_2 annual mean AQO of 40 µgm^{-3} are shown in **bold**.

NO_2 annual means in excess of 60 µg m^{-3} (underlined), 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 have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

In our assessment, NO_2 annual mean concentrations at four (Brentford, Cranford, Feltham & Gunnersbury) of the seven continuous monitoring stations have shown a reduction to a varying degree, except at Chiswick, Hatton Cross and Heston that showed marginal increase. As stated previously, as areas such as Gunnersbury Avenue, Great West Road (Brentford, Heston) with exceedances are TfL routes, where the Council would be working in partnership with such stakeholders and seek greater engagement and commitment, as part of the latest air quality action plan (AQAP) that the Council consulted in November 2017. We hope that the draft AQAP will be adopted later in 2018 following further amendments, taking account of comments and feedback from the consultation exercise. However, it should be acknowledged that on-going improvements in vehicle engine technology, coupled with tightening of the proposed boundary of the ultra-low emission zone (ULEZ), is likely lead to significant improvements in local air quality.

We have assessed the impact of above exceedances at sensitive receptors in areas of air quality hot spots within Hounslow, using the Defra Tool, which indicates the extent to which some of these receptors are likely to experience the NO_2 annual mean concentration level above the AQO of 40µg/m³ (see Tables 1-4 at Appendix A6). In this context, there are sensitive receptors near Gunnersbury, Brentford and Chiswick sites, where the first two sites are TfL routes and exceedances are significant at Gunnersbury but marginal at Brentford, and Chiswick High Road that is under the jurisdiction of LA, where further intervention may be required following impact assessment of wider outcomes of Mayor's ULEZ programme.

Whilst analysis of NO_2 diffusion tube monitoring method shows that the annual mean concentration level at Brentford is above 60µg/m₃, however the collocated continuous monitoring method that is inherently more accurate shows that NO_2 concentration are below 60µg/m₃. In 2017, both the local and the national bias adjustment factor (BAF) are the same and is calculated at 0.89.

The number of diffusion tube sites that exceeded the NO_2 annual mean AQO (EU limit value) has reduced from 33 in 2016 to 22 in 2017, which is a positive indicator for local air quality in/around Hounslow. The number of diffusion tubes that exceeded the threshold of 60µg/m³ has dropped from 5 in 2016 to 3 in 2017. These are located at London Road (HS80), Henlys Roundabout (HS87A) and Hogarth Lane (HS91).

Graph showing long-term trend in NO_2 annual Mean concentration level at continuous monitoring sites

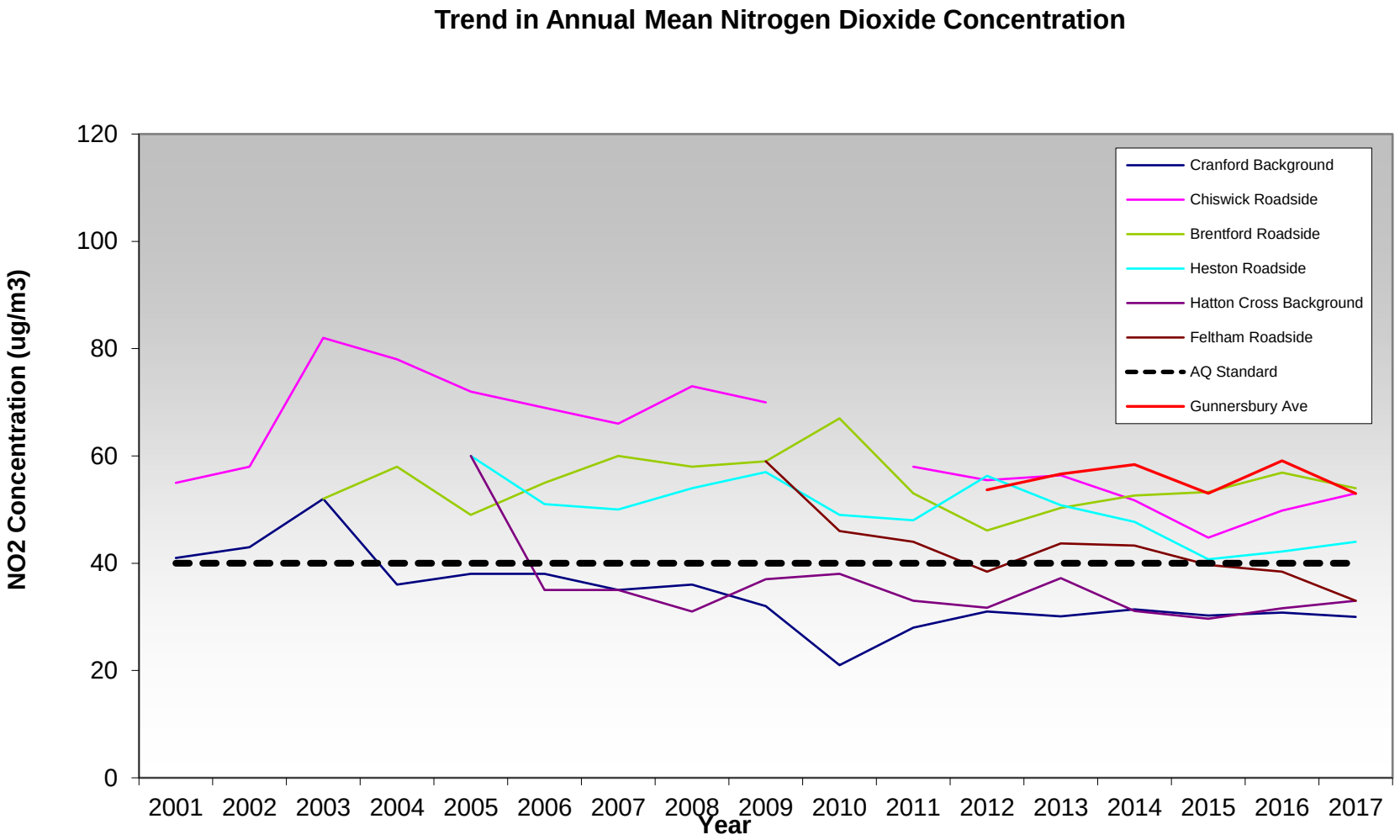


Table E. NO_2 Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Number of Hourly Means > 200 µgm^{-3}								
			2009[c]	2010 [c]	2011[c]	2012 [c]	2013[c]	2014 [c]	2015 [c]	2016 [c]	2017
Cranford	*n/a*	93.9%	-	0 (86)	0	0 (107)	0 (113)	0	0	2	10
Chiswick	*n/a*	99.8%	-	-	0 (155)	0	1 (147)	0	0	6	12
Brentford	*n/a*	99.8%	-	1 (100)	0	0	0 (140)	4	0	7	12
Heston	*n/a*	94.4%	-	3 (153)	1	4	1	4 (168)	0 (120)	1 (176)	6
Hatton Cross	*n/a*	85.4%	-	0 (128)	0	0 (111)	0 (131)	0	0	0 (134)	0
Gunnersbury	*n/a*	92.8%	-	-	-	9 (191)	4	**36**	0	**39**	**46**
Feltham	*n/a*	98.4%	-	0 (116)	0 (146)	0 (131)	17 (134)	0	0	0	0

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

Where the period of valid data is less than 85% of a full year, the 99.8th 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%

As discussed above, the only continuous monitoring site to exceed the 1-hour mean NO2 objective was the Gunnersbury Avenue location. All other sites in the borough remained below the permitted number (18) of exceedances. We anticipate that the early introduction of ULEZ

announced by the London Mayor should have positive and desirable impact in delivering significant NOx reductions towards achieving compliance with the AQO. However, in line with our previous representations made to the London Mayor, we would reiterate that GLA consider additional measures, including but not limited to, extension of the ULEZ to Greater London, to maximise emission reductions necessary to protect communities and deliver public health and quality of life.

Particulate Matter

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})								
			2009[c]	2010 [c]	2011[c]	2012 [c]	2013[c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]
Cranford	n/a	93.0%	21.0	21.0	20.0	18.0	19.0	18.1	17.0	17.5	18
Chiswick	n/a	97.3%	26.0	26.0	–	27.0	26.0	25.5	22.1	22.4	20
Brentford	n/a	99.6%	32.0	32.0	33.0	31.0	30.0	31.9	31.1	30.7	28
Heston	n/a	99.7%	24.0	24.0	24.0	27.0	28.0	24.5	24.9	25.9	23
Hatton Cross	n/a	94.6%	19.0	19.0	19.0	21.0	20.0	20.4	18.1	19.0	18
Gunnersbury	n/a	99.2%	–	–	–	–	31.0	28.7	25.6	27.0	27
Feltham	n/a	99.8%	–	–	23.0	20.0	23.0	20.0	18.7	19.1	19

Notes: Exceedance of the PM_{10} annual mean AQO of 40 µgm^{-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%

All of the continuous monitoring sites in the borough were below the annual mean PM_{10} objective during 2017, with averages for most sites marginally lower than those recorded in 2016.

Graph showing long-term trend in NO_2 annual Mean concentration level at continuous monitoring sites

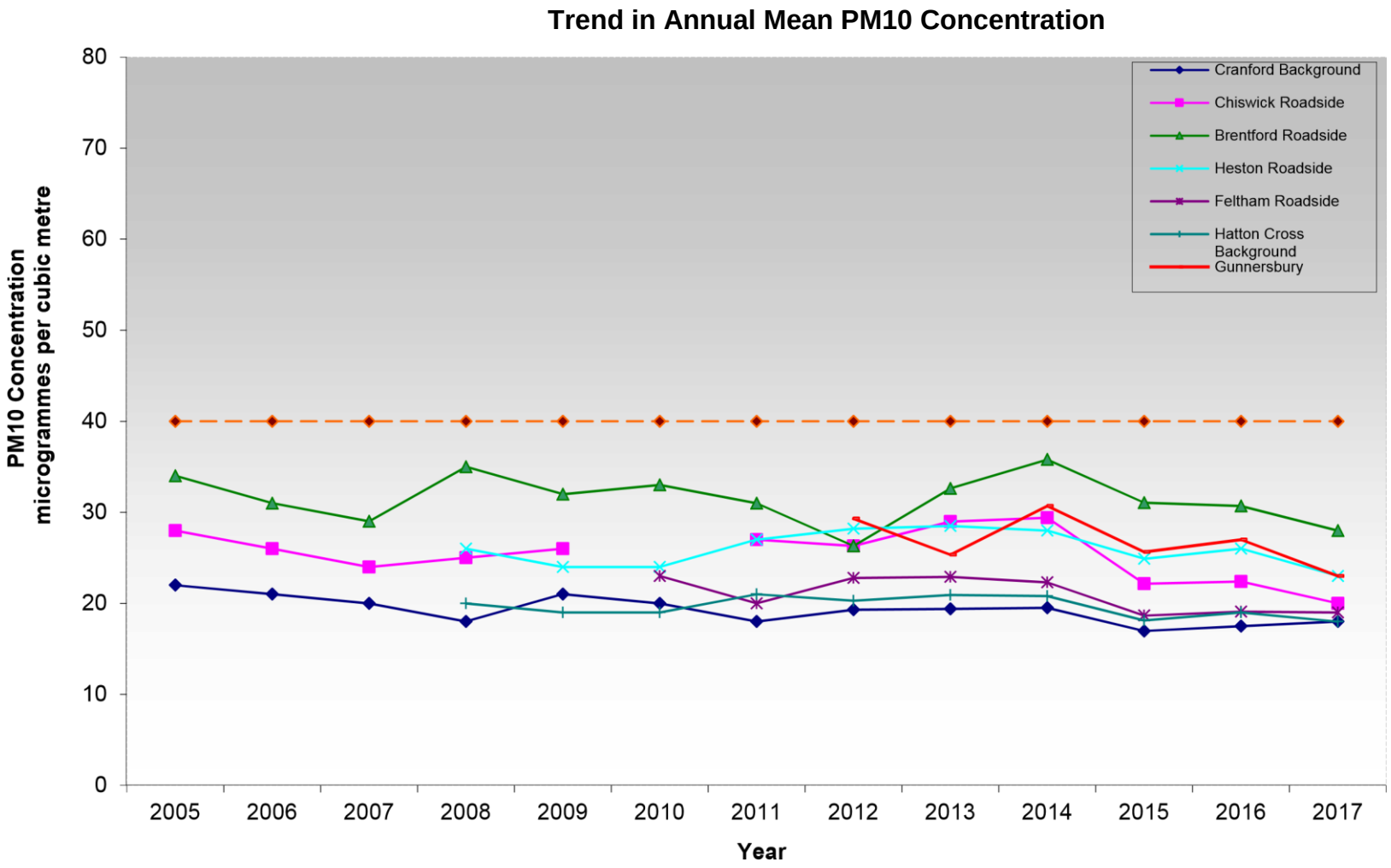


Table G. PM10 Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Number of Daily Means > 50 µgm^{-3}								
			2009	2010	2011	2012	2013	2014	2015	2016	2017
Cranford	n/a	93.0%	4 (51)	1 (34)	1 29)	15 (39)	1 (19)	5	4	8	5
Chiswick	n/a	97.3%	12 (57)	-	15 (49)	15 (47)	15	15	5	9	6
Brentford	n/a	99.6%	20 (86)	10 (61)	35	31 (52)	28	42	30	28	24
Heston	n/a	99.7%	10 (62)	7 (34)	31	26	9	18	10	17 (42)	9
Hatton Cross	n/a	94.6%	2 (37)	1 (26)	12	8	1 (21)	6	4	6	3
Gunnersbury	n/a	99.2%	-	1 (36)	0 (30)	13	1 (22)	7	15	15	15
Feltham	n/a	99.8%	-	-	-	28 (54)	16	17	4	7	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 90% 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%)

It's encouraging to note the downward trend in exceedances of the 24-hour objective at all the continuous monitoring sites, except for Gunnersbury site, where there has been no change between 2015 and 2017. However, our perception is that the introduction of ULEZ may lead to further reduction in exceedances of this objective. Given the number of exceedances of the 24-hour exceedances is below the permitted days per year, we do not consider it necessary to proceed to a detailed assessment. However, we will continue to closely monitor trends in Brentford & Gunnersbury sites and closely work in partnership with the relevant stakeholders, under whose jurisdiction these transport routes operate and who are responsible for delivering AQO.

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 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
			2017	-	-	-	-	-	-
Chiswick	n/a	54.54%	15.5	-	-	-	-	-	-
Brentford	n/a	52.74%	14.4	-	-	-	-	-	-

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%

Ozone

Table I. O3 Automatic Monitor Results: Comparison with 8 Hour Running Mean

Site ID	Site Type	Within AQMA?	Description	% Data Capture 2017	Number of Exceedances					
					2012	2013	2014	2015	2016	2017
HS2 Cranford	Background	Y	Maximum 8hour Running Mean > 100 □g/m3	90.5%	5	5	4	NA	**12**	**26**
Objective					10					

Though this borough not seen exceedances of O_3 objective in the past, therefore the latest data may need further interrogation, before considering what action, if any, may be appropriate.

Sulphur Dioxide

Table J. SO2 Automatic Monitor Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Number of: [c]		
			15-minute means > 266 µgm^{-3}	1-hour mean > 350 µgm^{-3}	24-hour mean > 125 µgm^{-3}
Cranford	94	94	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" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), 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.

Benzene

Table K. Automatic Monitoring of Benzene: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2017 %[a]	Annual Mean Concentrations (□g/m3)					
				2012	2013	2014	2015	2016	2017
HS BTEX 1	Roadside	Y	43	2.0	0.6	0.7	-	0.9	0.8
HS BTEX 2	Roadside	Y	43	1.6	0.7	0.7	-	0.7	1.0
HS BTEX 3	Roadside	Y	42	2.2	0.7	0.7	-	0.8	0.8
HS BTEX 5	Background	Y	42	2.1	0.7	0.6	-	0.7	0.7
HS BTEX 9	Roadside	Y	41	2.1	0.7	0.7	-	0.8	0.6
Objective				5					

a - data capture for the full calendar year (2-week exposure per month is equivalent to monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

Non-automatic monitoring of benzene concentrations took place at five diffusion tube sites within Hounslow, as summarised above. Only a single set of BTEX diffusion tubes, which are exposed for two weeks, were used in each month which is responsible for the low data capture rates. The recorded concentrations at each site remained stable over the year.

2. Action to Improve Air Quality

Table L. Commitment to Cleaner Air Borough Criteria

Theme	Criteria		Achieved (Y/N)	Evidence
1. Political leadership	***1.a***	Pledged to become a Cleaner Air for London Borough (at cabinet level) by taking significant action to improve local air quality and signing up to specific delivery targets.	Y	The political Leadership signed to the Clear Air Borough Agreement in 2013
	1.b	Provided an up-to-date Air Quality Action Plan (AQAP), fully incorporated into LIP funding and core strategies.	Y	The Draft AQAP together with the measures along the lines suggested by GLA is appended to this document. The draft AQAP has had public consultation (Dec. 2017) and been revised to take account of comments and feedback from the consultation. Draft AQAP will be submitted to Cabinet for approval post elections (mid-late 2018), recommending for adoption, subject to any further amendments.
2. Taking action	**2.a**	Taken decisive action to address air pollution, especially where human exposure and vulnerability (e.g. schools, older people, hospitals etc.) is highest.	On-going	The Council has joined the anti-idling campaign lead by City of London and least 3 engagement events are being planned within the borough, with participation and support from volunteers and other local environmental groups. Outcome >>>: Agreed to implement anti-idling outside schools, taxi ranks and in/around bus depots

	2.b	Developed plans for business engagement (including optimising deliveries and supply chain), retrofitting public buildings using the RE:FIT framework. The council will be integrating anti-idling campaign into the work of civil enforcement officers, (etc. etc.)	On-going	Success of outcome dependent upon the proportion of business that would be willing to engage and the level of reduction in deliveries from their supply chain and how clean is the delivery vehicle fleet.
	2.c	Integrated transport and air quality, including by improving traffic flows on borough roads to reduce stop/start conditions	Y	Hounslow has completed an infrastructure project for cycle path on Hounslow Road that has been partly funded by the MAQF phase 1 grant, designed to achieve modal shift target in LIP. Outcome >>> Project under construction.
	2.d	Made additional resources available to improve local air quality, including by pooling its collective resources (s106 funding, LIPs, parking revenue, etc).	Y	Public Health has committed some funding to support $PM_{2.5}$ monitoring programme, to improve health outcomes generally and identify areas of exposure to $PM_{2.5}$. Though further work will be required in identifying areas impacted by primary $PM_{2.5}$ emissions, once we've established reasonable baseline using the new monitoring capability. Outcome >>>: Early indications from 6-month monitoring at two locations within the borough suggest that concentration levels are below the AQO.
3. Leading by example	**3.a**	Invested sufficient resources to complement and drive action from others	Y	Hounslow Council has committed additional resource of one member of staff for air quality, climate change strategy, using various funding streams. Outcome >>>: Retainer has been secured, for the time being at least, for additional resources secured in 2017 (additional staff inducted)

	3.b	Maintained an appropriate monitoring network so that air quality impacts within the borough can be properly understood	Y	All existing AQ monitors stations are well maintained, including a comprehensive diffusion tube monitoring network. A diffusion tube has been moved to establish a more representative monitoring near schools off Hogarth Lane, Chiswick.
	3.c	Reduced emissions from council operations, including from buildings, vehicles and all activities.	Y	Under Scope 1 and Scope 2 CO2 emission reductions from corporate buildings and street lighting, CO2 emission reductions of 11.2% (9979 tonnes in 2013/14 to 8858 tonnes in 2014/15). Data on vehicle fleet use and management is poor to derive any reductions.
	3.d	Adopted a procurement code which reduces emissions from its own and its suppliers' activities, including from buildings and vehicles operated by and on their behalf (e.g. rubbish trucks).	On-going	LBH to update procurement policy requiring business that use large vehicle fleet operators to have attained the Silver FORS accreditation. Procurement policy would also need to be aligned with Construction Logistics and Cyclist Safety (CLOCS) and TfL's Work Related Road Risk (WRRR) requirements. Also, Council's 90% waste collection vehicle fleet is Euro VI compliant since Nov. 2016, which is expected to deliver significant NOx reductions in NOx (anecdotal).
4. Using the planning system	**4.a**	Fully implemented the Mayor's policies relating to air quality neutral, combined heat and power and biomass.	Y/On-going	Work closely with our Planning division and use suitable planning conditions to ensure that all approved planning applications meet the Mayor's requirements relating to AQ neutral, CHPs, quantification of cumulative impacts and secure commensurate level of protection through design-in mitigation measures.
	4.b	Collected s106 from new developments to ensure air quality neutral development, ***where possible***	Y	Amounts agreed/collected, in conjunction with planning.
	4.c	Provided additional enforcement of construction and demolition guidance, with regular checks on medium and high risk building sites.	N	Planners occasionally visit construction sites, however as they are not trained to carry out enforcement of any kind. However, the Council has sign-up to NRMM group in south west London, since 2016.

5. Integrating air quality into the public health system	**5**	Included air quality in the borough's Health and Wellbeing Strategy and/or the Joint Strategic Needs Assessment	Y	Environment Strategy (Air Quality) is engaged with Public Health, in devising suitable air quality context within the Hounslow JSNA. Further Public Health has made financial commitment towards improving air quality by virtue of helping us monitor $PM_{2.5}$ and gather associated intelligence that can help the Council establish a real baseline and make informed decision as to what action/measures might be appropriate.
6. Informing the public	**6.a**	Raising awareness about air quality through borough-wide engagement events during consultation on air quality action plan (AQAP), Oct. 2017, including poster campaign in borough primary schools	Y	The Council engaged with local communities and primary schools to raise awareness about air pollution and associated impacts. We have engaged with our local clinical commissioning group (CCG)/ Public Health to raise awareness of health impact of poor air quality, and we're exploring new ways to increase subscription membership of AirTEXT, via SMS & e-mail through Hounslow specific
				AirTEXT App. We continue to raise awareness of air quality in the borough using Area Forums' meetings and through engagement with schools, where some actions such as enforcement shall commence soon and more actions likely to intensify following air quality audits in schools and subsequent outcomes reports that await published.

2.1 Air Quality Action Plan Progress

Table K provides a brief summary of Hounslow Council progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2015 are shown at the bottom of the table

As the borough's revised air quality action plan (AQAP) draft has just been prepared, it therefore has not yet been formally signed-off or adopted. The Council has made every endeavour and embarked on a path to develop and commission external services as necessary, consult and implement a suitable AQAP, to discharge LA's statutory obligations and in line with Defra reporting requirements. However, the existing AQAP has enabled us to implement to

date the measures listed below and consequently make the following progress. Therefore, this ASR should be read in conjunction with the draft AQAP (separate document).

Table M. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaint	Further information
1	Implemented Enhanced traffic signals (SCOOT systems), coupled with road layout improvements at Chiswick High Road (in conjunction with Traffic/Defra/TfL), in order to reduce peak time congestion due to queuing, thereby improve air quality	• Pre and post implementation survey results indicate queue length reductions at several junctions, as well as increases in queue at other junctions/directions. Whilst the mean NO_2 concentration level across the borough fell by 7.5%, reduction at Chiswick site was 13.4% • Benefits might include reduced peak-time congestion and exposure to reduced pollutant concentration level.	Both pre and post traffic surveys were conducted using the same methodology and service provider.
2	Hounslow Road cycle path infrastructure project (2015/16) and road layout improvements to encourage cycling to work/schools, in order to bring about modal shift in travel and healthier life styles. This project part funded by LIP and Mayor's Air Quality Fund (MAQF) Phase 1.	• Phase 1 of Project (Hounslow Road Crematorium to A312) has been completed. • Benefits include in existing car journeys being replaced through uptake of cycling, walking and use of public transport. Therefore, this is expected to lead in reduction in emissions and healthier life styles, both by reducing exposure to harmful pollutants and increased	Post completion survey will be undertaken, in order to determine uptake of cycling and walking and associated reduction in car journeys & associated emission reductions.

		exercise, thereby helping to reduce obesity in certain parts of the borough.	
3	Road layout improvements at Twickenham Road junction with South Street	• This project was completed in 2014 and pre and post enhanced air quality monitoring was commissioned to analyse the impact. Whilst the overall traffic flow seems to have improved, however peak-time congestion still remains and there have been only marginal reductions in NO_2 annual mean concentration level.	Enhanced air quality monitoring at this site is being continued in order to assess the impact of road closure at Church Road nearby
4	Hounslow Council has installed two $PM_{2.5}$ monitors at Brentford & Chiswick sites, in order to establish a baseline of its impact on public health and deliver our obligations under LLAQM to seek successive reductions in the background concentration level.	• This project was implemented in 2017/18	$PM_{2.5}$ analysers in operation at Brentford & Chiswick since June 2017. See data analysis in Table H above
5	The Council installed additional diffusion tube at edge of schools' playground to undertake baseline data 'before' doing impact assessment and the need for mitigation. Participated in the Mayor's air quality audits in three borough schools. The Council will review measures recommended by the schools' audit reports and consider all appropriate measures to reduce impacts of air pollution, including	• Undertook initial monitoring to establish NO_2 baseline data. Further measures through engagement with relevant schools anticipated in 2018/19	The Council took initial steps and installed (Jun 2017) an additional diffusion tube (id: HS91) for monitoring NO_2 concentration level at edge of play grounds of William Hogarth Primary & St. Mary's Primary schools, along Hogarth Lane (A4). Therefore, Council will consider and implement all appropriate measures, including exposure reduction and others.

	exposure reduction and other measures that may have been implemented elsewhere as a ‘good practice’.		

3. Planning Update and Other New Sources of Emissions

Hounslow Council has now embraced NRMM into planning/Development Management, and relevant enforcement is led by south west London group, who ascertain whether or not construction sites are compliant with NRMM emissions regulatory regime when processing planning applications.

3.1 New or significantly changed industrial or other sources

Having checked the relevant inventory within the Council, the Officer 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.

Table N. Planning requirements met by planning applications in London Borough of Hounslow in 2017

Condition	**Number** *Please complete all fields in this column with the total numbers*
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	*26*
Number of planning applications required to monitor for construction dust	26
Number of CHPs/Biomass boilers refused on air quality grounds	Unknown
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	Unknown
Number of developments required to install Ultra-Low NO_x boilers	Unknown
Number of developments where an AQ Neutral building and/or transport assessments undertaken	26
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	Unknown
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

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	*n/a.*
all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	
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.	12 conditions included; 2 registered and compliant; 10 unregistered/uncompliant and being chased.

Recognising that Hounslow Council is in early stages of implementing a regime to capture air quality information within Development Management, therefore, please accept data fields with number denoted by 'Unknown', as this data is not currently available.

Report End

This report has been approved by the directors of Public Health and Environment/Asset Management:

Laura Maclehose, Acting Director of Public Health;

Signature: pp

Michael Sudlow, Director of Asset Management and Major Projects;

Signature……  ……

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

Air quality analysers are calibrated overnight using permeation tubes and are manually calibrated once fortnightly by a local site operator (LSO) in the Local Authority. However, this frequency of calibrations may sometimes be reduced, in order to align calibration with filter change that justifies a calibration at a later date.
In regards to the AQMA, the London Borough of Hounslow Air Quality Order 2015 came into operation on the 12th day of November 2015, which was made as an amendment 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

Particulate matter data monitored using TEOM is VCM corrected, in accordance with LAQM Defra Guidelines, TG16, Section 7.143

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 two co-location sites at Chiswick and Brentford are given below.
- In line with the preceding year, locally derived bias adjustment factor (BAF) of 0.89 has been used this year, and this year there was no difference between the local BAF and the national BAF.
- Gradko laboratory, with good precision and accuracy in 2015.

Bias adjustment factors for the previous years have been given in Table D above.

Calculation of local bias adjustment factors is as follows:

Site ID	Location	Ann Mean from Continuous Monitor (Cm)	Annual Mean from Diffusion Tubes (Cd)	Bias Adjustment Factor
HS2	Cranford	30	28.1	1.07
HS4	Chiswick	**53**	**58.8**	0.90
HS5	Brentford	**54**	**65.4**	0.83
HS6	Heston	**44**	**56.3**	0.78
HS7	Hatton Cross	33	38.1	0.87
HS8	Gunnersbury	**55**	**54.2**	1.01
HS9	Feltham	34	**43.3**	0.79
Average BAF (all sites)				**0.89**

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.

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

A.3 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	03/12/2016	30/01/2017	47.38	44.46	46.61	46	1.5	3	3.8
2	30/01/2017	01/03/2017	32.51	33.13	31.80	32	0.7	2	1.7
3	01/03/2017	03/04/2017		32.73	32.40	33	0.2	1	2.1
4	03/04/2017	27/04/2017	25.03	20.29	25.45	24	2.9	12	7.1
5	27/04/2017	31/05/2017	12.61	24.68	25.68	21	7.3	35	18.1
6	31/05/2017	28/06/2017	25.25	23.76	24.14	24	0.8	3	1.9
7	28/06/2017	02/08/2017	21.45	21.76	21.17	21	0.3	1	0.7
8	02/08/2017	31/08/2017	26.78	26.85	25.96	27	0.5	2	1.2
9	31/08/2017	27/09/2017	27.87	26.19	26.76	27	0.9	3	2.1
10	27/09/2017	03/11/2017	24.62	19.82	28.30	24	4.3	18	10.6
11	03/11/2017	04/12/2017	26.91	26.91	35.03	30	4.7	16	11.7
12	04/12/2017	05/01/2018	27.26	34.38	28.46	30	3.8	13	9.5
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
60.38	96.3	Good	Good
36.25	98.8	Good	Good
31.69	99.7	Good	Good
24.17	98.7	Good	Good
25.02	99.5	Poor Precision	Good
22.32	99.9	Good	Good
18.47	100	Good	Good
23.36	99.9	Good	Good
25.88	99.4	Good	Good
27.78	99.7	Good	Good
33.61	99.2	Good	Good
35.16	99.9	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Cranford

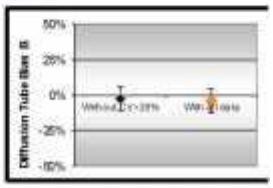
Precision: 11 out of 12 periods have a CV smaller than 20%

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

Bias calculated using 11 periods of data
Bias factor A: 1.07 (0.98 - 1.17)
Bias B: -6% (-15% - 2%)
Diffusion Tubes Mean: 29 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 31 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 31 (28 - 34) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data
Bias factor A: 1.07 (0.99 - 1.16)
Bias B: -7% (-15% - 1%)
Diffusion Tubes Mean: 28 µgm^{-3}
Mean CV (Precision): 9
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 30 (28 - 33) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

A.4 Chiswick High Road 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	03/12/2016	30/01/2017	86.22	105.44	100.03	97	9.9	10	24.6
2	30/01/2017	01/03/2017	55.71	61.81	53.54	57	4.3	8	10.7
3	01/03/2017	03/04/2017	59.02	59.33	62.18	60	1.7	3	4.3
4	03/04/2017	27/04/2017	42.39	49.83	50.60	48	4.5	10	11.3
5	27/04/2017	31/05/2017	59.67	62.25	61.09	61	1.3	2	3.2
6	31/05/2017	28/06/2017	59.37	62.26	60.99	61	1.4	2	3.6
7	28/06/2017	02/08/2017	54.39	55.96	53.67	55	1.2	2	2.9
8	02/08/2017	31/08/2017	53.20	53.97	52.38	53	0.8	2	2.0
9	31/08/2017	27/09/2017	59.33	60.04	59.87	60	0.4	1	0.9
10	27/09/2017	03/11/2017	45.88	47.71	48.91	47	1.5	3	3.8
11	03/11/2017	04/12/2017	70.33	49.81	53.63	58	10.9	19	27.1
12	04/12/2017	05/01/2018	54.53	46.74	46.88	49	4.5	9	11.1
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
90.22	95.3	Good	Good
58.38	98.8	Good	Good
52.16	98.7	Good	Good
49.09	98.7	Good	Good
52.84	99.5	Good	Good
47.67	99.9	Good	Good
39.38	100	Good	Good
41.82	99.9	Good	Good
47.90	99.4	Good	Good
51.32	99.7	Good	Good
57.65	99.2	Good	Good
50.25	98.9	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Chiswick (High Road)

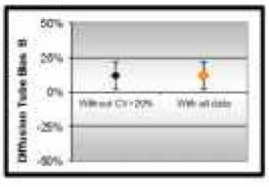
Precision: 12 out of 12 periods have a CV smaller than 20%

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

Bias calculated using 12 periods of data
Bias factor A: 0.9 (0.83 - 0.99)
Bias B: 11% (1% - 20%)
Diffusion Tubes Mean: 59 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 53 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 53 (49 - 58) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data
Bias factor A: 0.9 (0.83 - 0.99)
Bias B: 11% (1% - 20%)
Diffusion Tubes Mean: 59 µgm^{-3}
Mean CV (Precision): 6
Automatic Mean: 53 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 53 (49 - 58) µgm^{-3}



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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

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	03/12/2016	30/01/2017	105.36	107.66	101.65	105	3.0	3	7.5
2	30/01/2017	01/03/2017	62.78	55.80	54.90	58	4.3	7	10.7
3	01/03/2017	03/04/2017	68.25	71.06	72.02	70	2.0	3	4.9
4	03/04/2017	27/04/2017	63.25	62.44	61.06	62	1.1	2	2.7
5	27/04/2017	31/05/2017	65.25	68.64	69.36	68	2.2	3	5.4
6	31/05/2017	28/06/2017	67.28	67.32	63.51	66	2.2	3	5.4
7	28/06/2017	02/08/2017	67.29	66.23	64.91	66	1.2	2	3.0
8	02/08/2017	31/08/2017	59.83	60.06	62.37	61	1.4	2	3.5
9	31/08/2017	27/09/2017	65.34	68.62	67.39	67	1.7	2	4.1
10	27/09/2017	03/11/2017	51.46	36.30	57.20	48	10.8	22	26.8
11	03/11/2017	04/12/2017	70.23	75.87	37.97	61	20.4	33	50.8
12	04/12/2017	05/01/2018	46.37	49.75	59.75	52	7.0	13	17.3
13									

If 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
62.53	95.3	Good	Good
55.74	98.8	Good	Good
55.96	99.7	Good	Good
54.42	99.7	Good	Good
46.99	99.5	Good	Good
41.25	99.9	Good	Good
44.41	100	Good	Good
44.76	99.9	Good	Good
51.15	99.4	Good	Good
50.80	99.7	Poor Precision	Good
61.54	99.2	Poor Precision	Good
52.76	99.9	Good	Good
Overall survey -->		Good precision	Good Overall DC

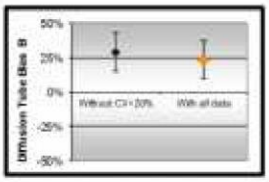
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Brentford

Precision 10 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A 0.78 (0.71 - 0.88)
Bias B 27% (13% - 41%)
Diffusion Tubes Mean: 68 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 53 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 53 (48 - 59) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.82 (0.74 - 0.92)
Bias B 22% (8% - 36%)
Diffusion Tubes Mean: 65 µgm^{-3}
Mean CV (Precision): 8
Automatic Mean: 54 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 54 (48 - 60) µgm^{-3}



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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

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	03/12/2016	30/01/2017	108.41	103.88	109.82	107	3.1	3	7.7
2	30/01/2017	01/03/2017	49.65	55.34	52.57	53	2.8	5	7.1
3	01/03/2017	03/04/2017	55.25	56.47	58.45	57	1.6	3	4.0
4	03/04/2017	27/04/2017	51.12	50.28	49.25	50	0.9	2	2.3
5	27/04/2017	31/05/2017	56.01	57.04	55.83	56	0.7	1	1.6
6	31/05/2017	28/06/2017	48.96	50.96	50.25	50	1.0	2	2.5
7	28/06/2017	02/08/2017	50.03	47.51	49.68	49	1.4	3	3.4
8	02/08/2017	31/08/2017	48.89	48.62	45.80	48	1.7	4	4.3
9	31/08/2017	27/09/2017	55.69	52.71	55.17	55	1.6	3	4.0
10	27/09/2017	03/11/2017	41.59	46.29	53.93	47	6.2	13	15.5
11	03/11/2017	04/12/2017	78.05	41.91	54.12	58	18.4	32	45.7
12	04/12/2017	05/01/2018	38.13	53.68	45.52	46	7.8	17	19.3
13									

If 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
65.35	95.3	Good	Good
47.00	98.8	Good	Good
39.08	99.7	Good	Good
49.33	99.7	Good	Good
44.54	99.5	Good	Good
43.09	99.9	Good	Good
32.99	100	Good	Good
34.41	99.9	Good	Good
39.10	99.4	Good	Good
36.45	99.7	Good	Good
47.66	99.2	Poor Precision	Good
42.20	99.9	Good	Good
Overall survey -->		Good precision	Good Overall DC

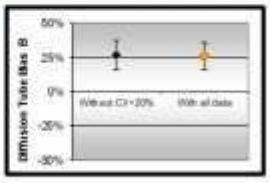
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Heston

Precision 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 0.8 (0.74 - 0.88)
Bias B 25% (14% - 36%)
Diffusion Tubes Mean: 56 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 45 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 45 (42 - 49) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.8 (0.74 - 0.87)
Bias B 25% (15% - 34%)
Diffusion Tubes Mean: 56 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 45 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 45 (42 - 49) 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

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	03/12/2016	30/01/2017	56.24	59.10	53.71	56	2.7	5	6.7
2	30/01/2017	01/03/2017	39.35	34.63	41.40	38	3.5	9	8.6
3	01/03/2017	03/04/2017	40.69	42.02	40.22	41	0.9	2	2.3
4	03/04/2017	27/04/2017	41.76	50.75	44.76	46	4.6	10	11.4
5	27/04/2017	31/05/2017	33.64	32.96	37.36	35	2.4	7	5.9
6	31/05/2017	28/06/2017	29.76	28.75	31.50	30	1.4	5	3.5
7	28/06/2017	02/08/2017	31.73	31.03	33.54	32	1.3	4	3.2
8	02/08/2017	31/08/2017	37.67	33.16	31.18	34	3.3	10	8.3
9	31/08/2017	27/09/2017	34.80	40.62	38.64	38	3.0	8	7.3
10	27/09/2017	03/11/2017	33.04	31.68	5.05	23	15.8	68	39.2
11	03/11/2017	04/12/2017	47.84	45.75	43.51	46	2.3	5	5.6
12	04/12/2017	05/01/2018	42.73	39.44	30.78	38	6.2	16	15.3
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
61.29	95.3	Good	Good
36.07	98.8	Good	Good
32.84	99.7	Good	Good
34.72	99.7	Good	Good
22.25	99.5	Good	Good
19.53	99.9	Good	Good
19.52	100	Good	Good
24.62	99.9	Good	Good
29.04	99.4	Good	Good
29.40	99.7	Poor Precision	Good
44.72	99.2	Good	Good
35.78	98.9	Good	Good
Overall survey -->		Good precision	Good Overall DC

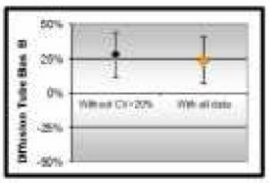
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Hatton Cross

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.83 (0.73 - 0.96)
Bias B: 20% (4% - 37%)
Diffusion Tubes Mean: 39 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 33 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 33 (29 - 38) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.85 (0.74 - 1)
Bias B: 17% (0% - 35%)
Diffusion Tubes Mean: 38 µgm^{-3}
Mean CV (Precision): 12 caution
Automatic Mean: 32 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 32 (28 - 38) µgm^{-3}



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A.8 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	03/12/2016	30/01/2017	80.75	69.47	79.82	77	6.3	8	15.6
2	30/01/2017	01/03/2017	43.76	51.00	43.01	46	4.4	10	11.0
3	01/03/2017	03/04/2017	42.18	45.75	45.33	44	1.9	4	4.8
4	03/04/2017	27/04/2017	42.18	37.59	41.76	41	2.5	6	6.3
5	27/04/2017	31/05/2017	39.40	46.12	42.11	43	3.4	8	8.4
6	31/05/2017	28/06/2017	37.12	35.65	35.40	36	0.9	3	2.3
7	28/06/2017	02/08/2017	36.43	38.39	36.17	37	1.2	3	3.0
8	02/08/2017	31/08/2017	40.06	39.15	38.92	39	0.6	2	1.5
9	31/08/2017	27/08/2017	36.97	36.01	38.17	37	1.1	3	2.7
10	27/09/2017	03/11/2017	33.49	33.62	33.89	34	0.2	1	0.5
11	03/11/2017	04/12/2017	42.50	44.12	43.66	43	0.8	2	2.1
12	04/12/2017	05/01/2018							
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
51.10	95.3	Good	Good
37.30	98.8	Good	Good
33.24	99.7	Good	Good
38.90	99.7	Good	Good
32.75	99.5	Good	Good
26.45	99.9	Good	Good
23.40	100	Good	Good
24.92	99.9	Good	Good
32.07	99.4	Good	Good
28.53	99.7	Good	Good
41.30	99.2	Good	Good
34.39	98.9		Good
Overall survey -->		Good precision	Good Overall DC

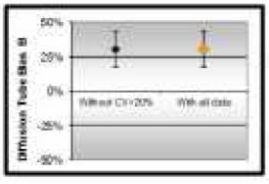
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Feltham

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

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A: 0.78 (0.71 - 0.86)
Bias B: 29% (16% - 42%)
Diffusion Tubes Mean: 43 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 34 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 34 (31 - 37) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A: 0.78 (0.71 - 0.86)
Bias B: 29% (16% - 42%)
Diffusion Tubes Mean: 43 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 34 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 34 (31 - 37) µgm^{-3}



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Discussion of Choice of Factor to Use

Local bias adjustment factor (0.89) has been applied to be consistent with previous years, though there is no difference between the locally derived and the national bias adjustment factor (0.89).

A.9 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

All the diffusion tubes had data capture rates greater than or equal to 75 and therefore, there was no need to determine and apply the annualisation factor. The annual mean values for the above diffusion tubes results are presented in Table D and Appendix B. ***Annualising continuous monitoring data for $PM_{2.5}$***

Background Site	**Annual Mean (2017), Am**	**Period Mean (14.06.17 to 31.12.17), Pm**	**Ratio (Am/Pm)**
London N. Kensington	11.60	9.40	1.23
Reading New Town	9.67	7.58	1.28
London Bexley	10.79	9.21	1.17
London Eltham	12.42	9.84	1.26
		Average Ratio	**1.24**

Hounslow Sites	**Period Mean**	**Annualised Annual Mean**
Hounslow Brentford	11.62	14.36
Hounslow Chiswick	12.54	15.50

A.10 The extent of exceedances of the NO_2 limit value at sensitive receptors in Chiswick, Brentford, Heston and Gunnersbury.

The Council acknowledges that there are a limited number of sensitive receptor facades that are likely to be to be exposed to exceedances of the NO_2 annual mean concentration level. Whilst there is no exceedance at facades at Heston Road junction Great West Road and just marginal exceedance at Great West Road, Brentford, however there remain significant exceedances at Chiswick High Road and Gunnersbury Avenue, the latter being a TfL route and the former being a LA route, where the Council's view is that the implementation of ULEZ, coupled with other measures aimed at exposure reduction that the LA intends to pursue as part of its air quality action plan (AQAP), is likely to reduce the current extent of exceedances and the associated risk to public health and quality of life.

Table 1 – Impact of NO_2 exceedances on Brentford (A4) Sensitive Receptors

Enter data into the red cells

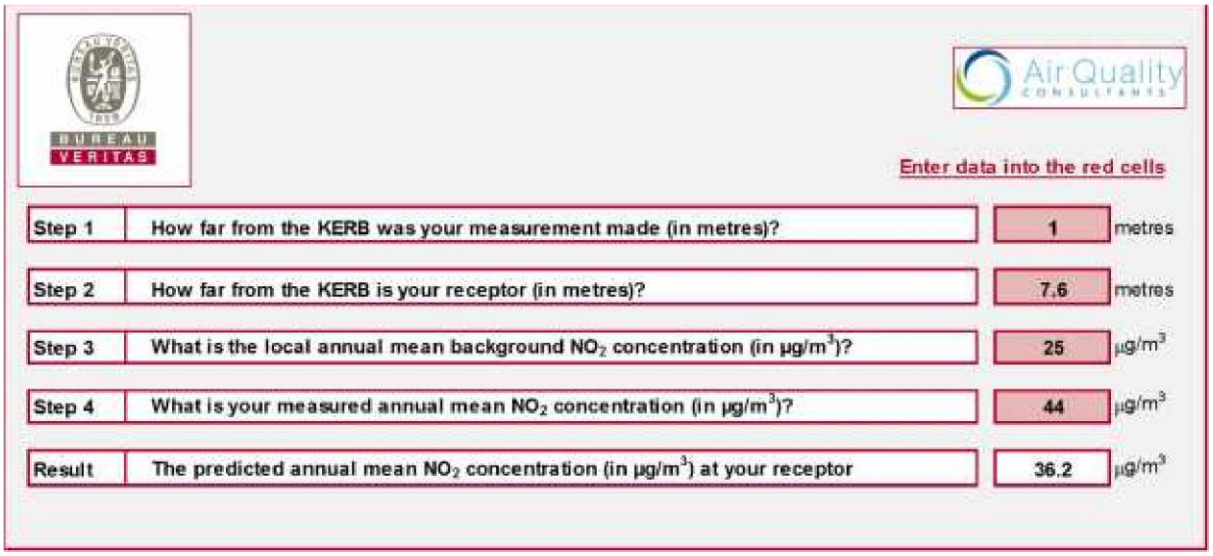
Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	20	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	31.8	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	54	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	43.1	$\mu g/m^3$

Table 2 – 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)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	6.1	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	28.6	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	53	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	48.5	$\mu g/m^3$

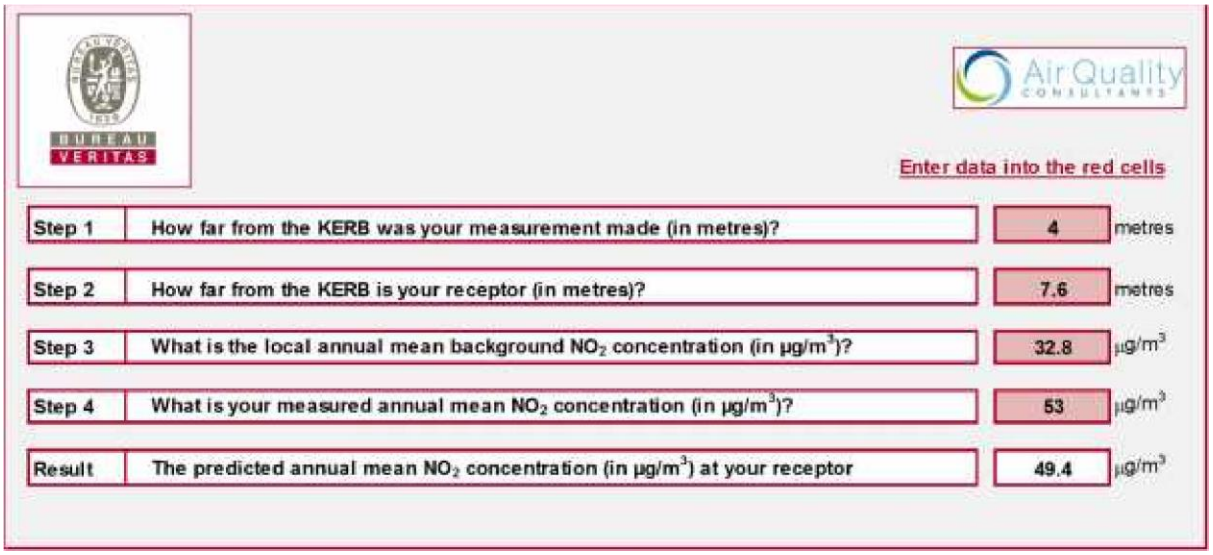
Table 3 – Impact of NO_2 exceedances on Heston Road Sensitive Receptors



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)?	7.6	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	25	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	44	$\mu g/m^3$
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 on Gunnersbury Ave. (A406) 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)?	7.6	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	32.8	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	53	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	49.4	$\mu g/m^3$

Appendix B Full Monthly Diffusion Tube Results for 2017

Table M. NO2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017% [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	100.0%	100.0%	105.36	62.78	68.25	63.25	65.25	67.28	67.29	59.83	65.34	51.46	70.23	46.37	66.06	58.91
BREN B	100.0%	100.0%	107.66	55.80	71.06	62.44	68.64	67.32	66.23	60.06	68.62	36.30	75.87	49.75	65.81	58.69
BREN C	100.0%	100.0%	101.65	54.90	72.02	61.06	69.36	63.51	64.91	62.37	67.39	57.20	37.97	59.75	64.34	57.38
CHIS A	100.0%	100.0%	86.22	55.71	59.02	42.39	59.67	59.37	54.39	53.20	59.33	45.88	70.33	54.53	58.34	52.02
CHIS B	100.0%	100.0%	105.44	61.81	59.33	49.83	62.25	62.26	55.96	53.97	60.04	47.71	49.81	46.74	59.60	53.15
CHIS C	100.0%	100.0%	100.03	53.54	62.18	50.60	61.09	60.99	53.67	52.38	59.87	48.91	53.63	46.88	58.65	52.30
CRAN A	91.7%	91.7%	47.38	32.51		25.03	12.61	25.25	21.45	26.78	27.87	24.62	26.91	27.26	27.06	24.13
CRAN B	100.0%	100.0%	44.46	33.13	32.73	20.29	24.68	23.76	21.76	26.85	26.19	19.82	26.91	34.38	27.91	24.89
CRAN C	100.0%	100.0%	46.61	31.80	32.40	25.45	25.68	24.14	21.17	25.96	26.76	28.30	35.03	28.46	29.32	26.14
FELT A	91.7%	91.7%	80.75	43.76	42.18	42.18	39.40	37.12	36.43	40.06	36.97	33.49	42.50		43.17	38.49
FELT B	91.7%	91.7%	69.47	51.00	45.75	37.59	46.12	35.65	38.39	39.15	36.01	33.62	44.12		43.35	38.66
FELT C	91.7%	91.7%	79.82	43.01	45.33	41.76	42.11	35.40	36.17	38.92	38.17	33.89	43.66		43.48	38.77
HAT A	100.0%	100.0%	56.24	39.35	40.69	41.76	33.64	29.76	31.73	37.67	34.80	33.04	47.84	42.73	39.10	34.87
HAT B	100.0%	100.0%	59.10	34.63	42.02	50.75	32.96	28.75	31.03	33.16	40.62	31.68	45.75	39.44	39.16	34.92
HAT C	100.0%	100.0%	53.71	41.40	40.22	44.76	37.36	31.50	33.54	31.18	38.64	5.05	43.31	30.78	35.95	32.06
HEST A	100.0%	100.0%	108.41	49.65	55.25	51.12	56.01	48.96	50.03	48.89	55.69	41.59	78.05	38.13	56.81	50.66
HEST B	100.0%	100.0%	103.88	55.34	56.47	50.28	57.04	50.96	47.51	48.62	52.71	46.29	41.91	53.68	55.39	49.39

HEST C	100.0%	100.0%	109.82	52.57	58.45	49.25	55.83	50.25	49.68	45.80	55.17	53.93	54.12	45.52	56.70	50.56
HS32	100.0%	100.0%	93.62	53.81	64.58	52.26	63.30	66.00	58.92	57.54	60.45	13.01	45.96	46.82	56.36	50.26
HS33	91.7%	91.7%	84.80		64.86	59.54	54.45	62.01	55.14	59.46	59.60	47.58	81.49	48.36	61.57	54.91
HS34	91.7%	91.7%	51.73	35.17	34.10	28.48	30.65	26.06	25.36	28.14	32.67	28.31	36.64	29.75	32.25	28.76
HS35	91.7%	91.7%	71.83	38.92	38.05	27.84	28.85	30.21	25.76	27.78	36.74	29.35	41.44	37.40	36.18	32.26
HS41	91.7%	91.7%	93.74	60.36	46.96	49.79	51.47	58.89	57.66	57.40	59.49	54.32	53.06	50.01	57.76	51.51
HS42	83.3%	83.3%	58.23	39.13	41.41	26.04	31.75	30.98		36.18	35.19		40.19	32.93	37.20	33.17
HS43	100.0%	100.0%	57.60	37.68	40.70	44.50	41.50	31.58	33.43	34.91	39.96	36.16	44.26	34.67	39.74	35.44
HS51	100.0%	100.0%	51.59	34.06	29.88	34.42	25.73	22.28	23.55	25.40	28.41	27.51	37.38	39.59	31.65	28.22
HS52	100.0%	100.0%	48.18	30.37	26.79	30.46	25.32	19.53	20.88	24.02	25.55	26.94	35.23	25.33	28.22	25.16
HS53	100.0%	100.0%	82.79	35.35	35.51	36.98	29.54	29.46	29.13	32.74	34.86	31.25	40.67	32.28	37.55	33.48
HS54	83.3%	83.3%		48.31	54.54	42.43	42.83	47.20	43.17	49.31	50.20	44.23	43.70	38.90	45.89	40.93
HS55	100.0%	100.0%	90.05	45.29	52.05	53.40	46.21	46.07	43.43	40.93	44.74	36.89	47.92	42.09	49.09	43.78
HS61	91.7%	91.7%	46.57	44.54	40.95	34.98	31.02	37.11	35.31	36.76	41.49	41.98	39.68		39.12	40.02
HS62	100.0%	100.0%	80.57	46.73	46.95	35.60	39.05	36.91	33.30	36.05	40.48	34.17	38.68	37.05	42.13	37.57
HS63	100.0%	100.0%	61.51	44.20	41.76	40.11	42.49	36.47	32.62	36.79	38.47	35.70	44.42	48.00	41.88	37.35
HS64	100.0%	100.0%	58.31	56.19	36.01	34.13	35.96	27.88	27.90	27.88	34.93	27.68	41.37	38.28	37.21	33.18
HS65	100.0%	100.0%	49.89	37.58	34.07	28.42	29.37	26.09	23.20	27.55	31.99	27.54	33.52	31.89	31.76	28.32
HS66	100.0%	100.0%	91.56	48.42	48.16	52.49	44.65	37.86	37.24	45.00	47.91	38.37	55.13	46.65	49.45	44.10
HS67	100.0%	100.0%	115.03	60.67	65.88	63.26	59.85	67.02	64.07	61.37	60.44	48.40	75.98	59.60	66.80	59.57
HS68	100.0%	100.0%	95.93	49.77	54.73	42.94	44.52	0.41	42.64	47.05	50.66	42.69	75.96	41.83	49.09	43.78
HS69	91.7%	91.7%	89.89		49.02	49.34	51.92	52.11	46.11	44.35	49.99	36.11	81.09	42.67	53.87	48.04
HS70	100.0%	100.0%	114.10	65.65	66.26	43.90	74.43	73.79	61.14	56.30	70.87	51.39	72.71	54.93	67.12	59.86
HS71	100.0%	100.0%	98.74	53.63	57.95	49.77	46.25	50.40	48.36	51.03	54.65	44.15	52.84	42.82	54.22	48.35
HS72	91.7%	91.7%	101.96	56.19	59.51	51.00	43.27	49.28	48.29	46.61	51.83	45.39		47.93	54.66	48.74
HS73	91.7%	91.7%	52.62	34.75		33.17	28.93	30.38	28.91	31.38	34.39	29.03	34.25	29.28	33.37	29.76

HS74	100.0%	100.0%	87.13	46.65	56.77	30.02	37.39	33.74	33.22	34.45	40.54	38.48	41.35	37.49	43.10	38.44
HS76	100.0%	100.0%	56.50	37.22	34.44	32.41	26.79	28.15	0.18	4.71	36.58	32.63	38.72	32.58	30.08	26.82
HS77	75.0%	75.0%	55.29	34.53	30.78	31.31		22.15	18.90		24.73		34.72	29.75	31.35	27.96
HS78	91.7%	91.7%	102.38	38.22	54.18	48.50	55.80	52.51	50.98	50.35	50.54	42.61	47.10	46.54	53.31	47.54
HS79	91.7%	91.7%	57.67	42.95	36.56	35.67	32.12	27.92	28.97	32.16	35.98	31.37	46.73	38.80	37.24	33.21
HS80	83.3%	83.3%	111.65	63.56	75.23	51.61	60.74	71.20	58.96	59.53	56.07	61.43			67.00	71.11
HS81	100.0%	100.0%	48.96	32.42	28.67	22.14	20.26	18.71	16.93	20.52	23.76	17.45	32.27	27.43	25.79	23.00
HS82	100.0%	100.0%	77.20	30.11	27.90	25.24	23.00	20.69	16.96	21.99	25.36	24.07	32.50	27.57	29.38	26.20
HS83	75.0%	75.0%	49.66	6.74		20.78	19.50	20.65	18.16	18.59	20.25		26.83		22.35	24.82
HS84	100.0%	100.0%	92.67	46.86	48.52	34.28	40.37	40.35	39.80	41.31	46.55	39.24	45.88	19.63	44.62	39.79
HS85	91.7%	91.7%	93.68		50.29	45.38	45.38	53.76	48.74	53.93	48.03	48.66	52.65	48.03	53.50	47.71
HS86	91.7%	91.7%	93.12		67.16	57.04	53.18	56.41	53.23	52.12	59.21	37.96	77.61	53.09	60.01	53.52
HS87A	91.7%	91.7%	105.51	64.54	78.07	57.92	56.37	73.45	69.72	68.60	72.97	59.28	105.93		73.85	62.71
HS88	100.0%	100.0%	52.39	29.73	27.86	25.67	22.99	19.16	18.13	21.42	22.34	19.43	28.50	26.97	26.22	23.38
HS89	100.0%	100.0%	58.57	39.05	39.77	29.10	38.60	29.91	28.73	30.57	33.77	34.16	36.32	33.70	36.02	32.12
HS90	100.0%	100.0%	50.55	36.61	34.06	26.23	26.71	22.37	19.79	25.45	28.71	27.72	30.72	28.34	29.77	26.55
HS91	83.3%	83.3%	58.79	41.01	90.66	64.19	85.08	82.36		79.43	87.12	51.64		56.10	69.64	62.10

Exceedance of the NO_2 annual mean AQO of 40 μgm^{-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%

Appendix C Air Quality Action Plan Matrix (Table 10)

See separate document (due to be submitted once approved by Lead Cabinet Member).