Hammersmith and Fulham Air Quality Annual Status Report for 2020

Date of publication: August 2021

This report provides a detailed overview of air quality in Hammersmith and Fulham during 2020. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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

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Abbreviations

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

Table A.   Summary of National Air Quality Standards and Objectives

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

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

Figure 1. AQMA Boundary (Entire borough)

Legend

☐ AQMA/Borough Boundary
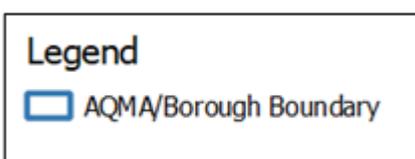
1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
HF4	Shepherd's Bush	523313	179900	Roadside	Y	6	2	2	NO_2, PM_{10}	Chemiluminescent; TEOM
HF5	Hammersmith Town Centre	523343	178567	Roadside	Y	3.7	1.2	2.3	NO_2, PM_{10}, $PM_{2.5}$, O_3	Chemiluminescent; Continuous Betaattenuation Particulate Monitor (BAM) for PM10 and PM2.5, UV absorption

Figure 2. Shepherds Bush Automatic Monitoring Site
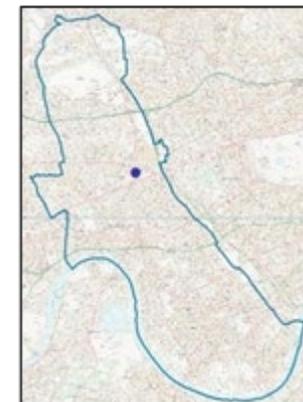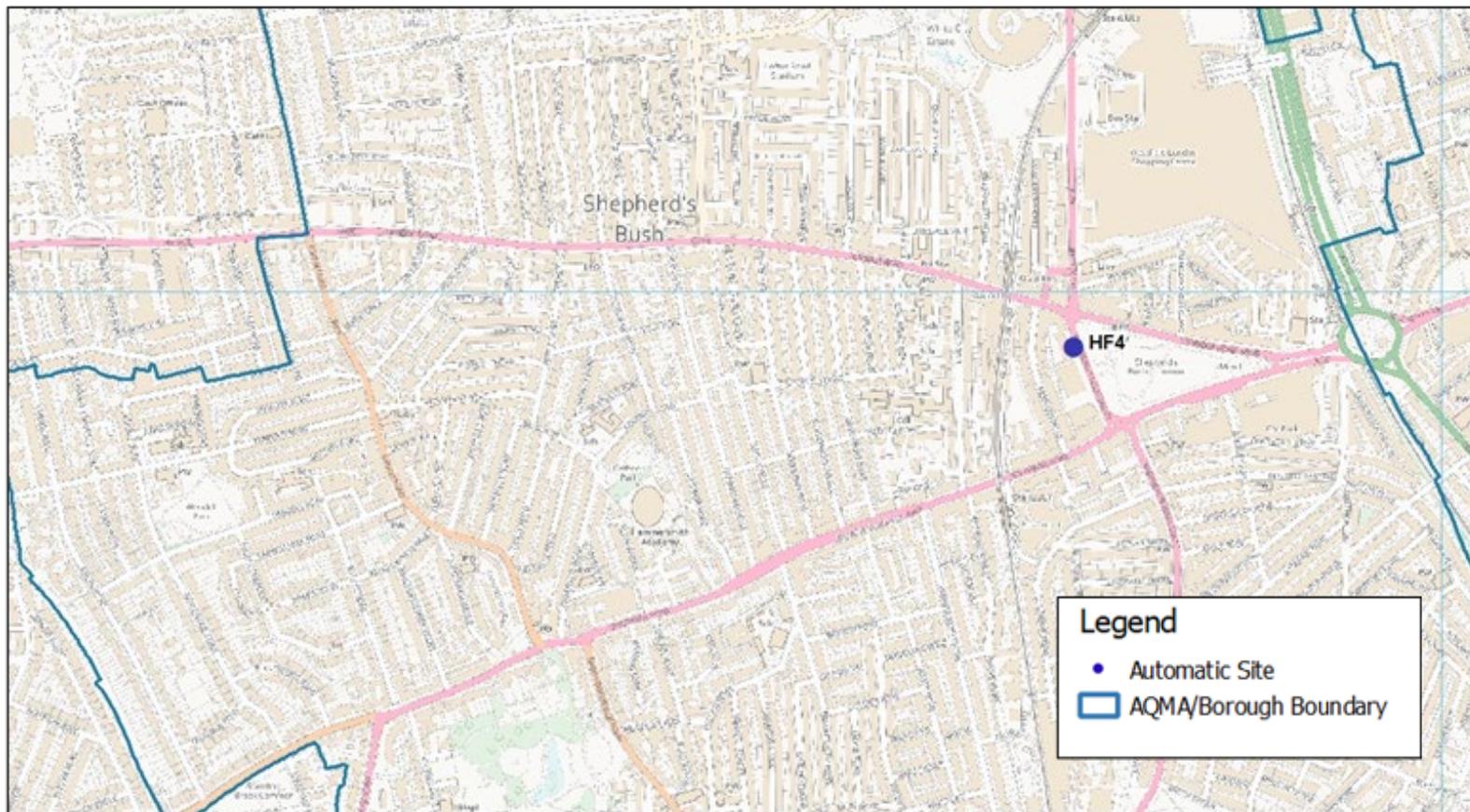
Figure 3. Hammersmith Town Centre Automatic Monitoring Site
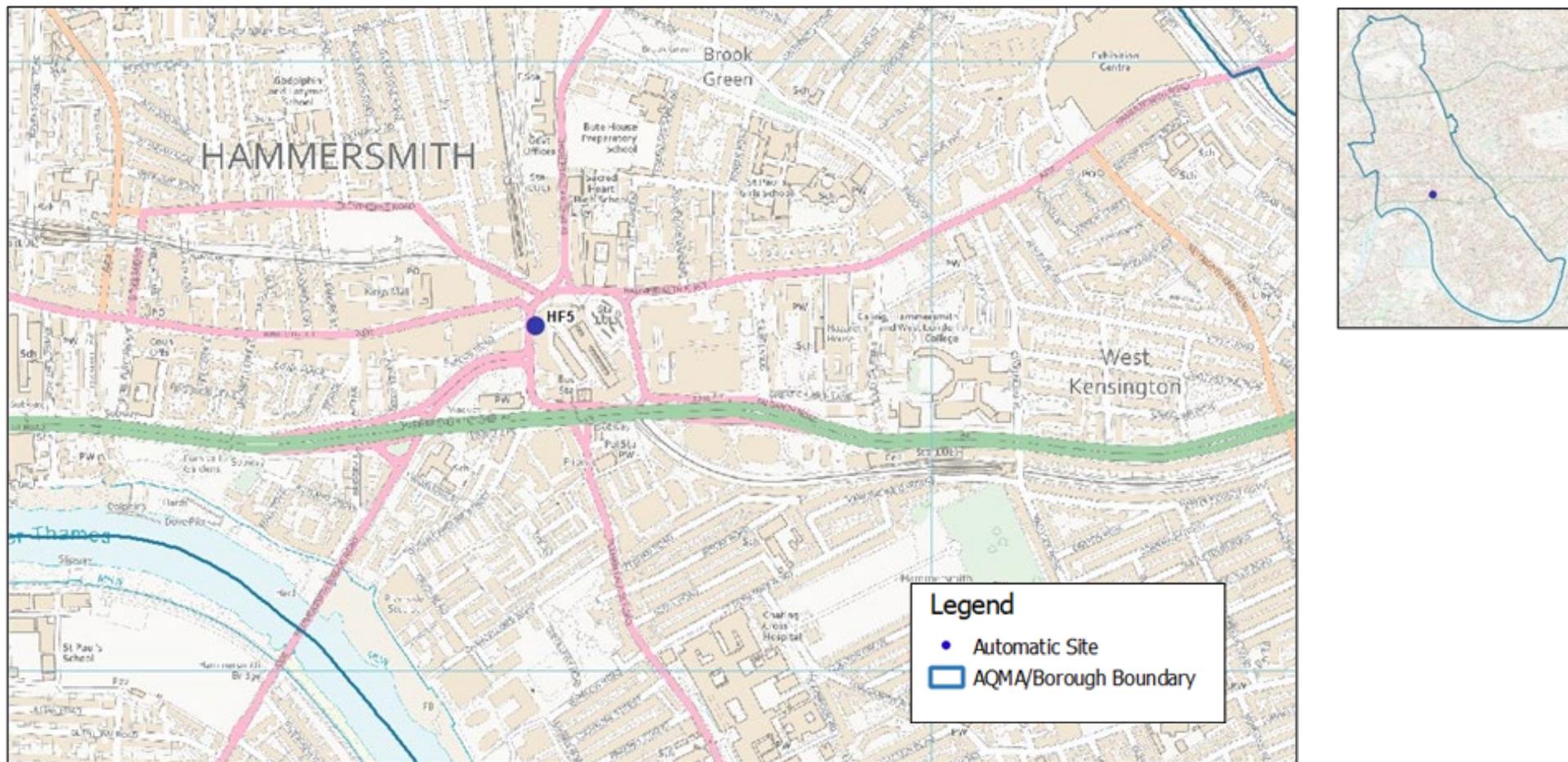
Table C. Details of Non-Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
HF01	Bagleys Lane	525760	176732	Roadside	Y	5	1	2.5	NO_2	N
HF02	Townmead Road	526146	176205	Roadside	Y	5	1	2.5	NO_2	N
HF03	Wandsworth Bridge Road	525819	175810	Roadside	Y	5	1	2.5	NO_2	N
HF04	Hugon Road	525652	175821	Urban Background	Y	3	1	2.5	NO_2	N
HF05	Fulham High Street	524406	175969	Roadside	Y	5	2	2.5	NO_2	N
HF06	New Kings Road	524846	176325	Roadside	Y	5	1	2.5	NO_2	N
HF07	Fulham Road	524633	176585	Roadside	Y	3	1	2.5	NO_2	N
HF08	Lysia Street	523595	177206	Urban Background	Y	5	1	2.5	NO_2	N
HF09	Paddenswick Road	522606	179008	Roadside	Y	5	1	2.5	NO_2	N
HF10	Brook Green Road	523856	178863	Roadside	Y	5	1	2.5	NO_2	N
HF11	Hammersmith Road	523436	178632	Roadside	Y	0	5	2.5	NO_2	N
HF12	Greyhound Road	524200	177875	Roadside	Y	5	1	2.5	NO_2	N
HF13	Hammersmith Bridge Road	523129	178331	Roadside	Y	21	3	2.5	NO_2	N
HF14	King Street	522777	178551	Roadside	Y	3	1	2.5	NO_2	N
HF15	Hemlock Road	522024	180896	Roadside	Y	5	1	2.5	NO_2	N
HF16	Wood Lane	523305	180176	Roadside	Y	5	1	2.5	NO_2	N
HF17	Coningham Road	522693	179595	Roadside	Y	5	1	2.5	NO_2	N
HF18	Goldhawk Road	522220	179281	Roadside	Y	5	1	2.5	NO_2	N
HF19	Askew Road	522006	179760	Roadside	Y	5	1	2.5	NO_2	N

HF20	Lefroy Road	521564	179685	Urban Background	Y	3	1	2.5	NO_2	N
HF 21/22/23	Shepherd's Bush AQMS	523313	179900	Roadside	Y	6	2	2.5	NO_2	Y – Triplicate co-location
HF24 (HF32)	Queen Caroline Street	523329	178484	Roadside	Y	5	1	2.5	NO_2	N
HF 25 (HF44)	Eel Brook Common	525386	176816	Urban Background	Y	45	32	2.5	NO_2	N
HF 26 (HF45)	Bryony Road	522480	180655	Urban Background	Y	8	1	2.5	NO_2	N
HF27 (HF47)	Wulfstan Street	522013	181106	Roadside	Y	3	1	2.5	NO_2	N
HF28 (HF48)	Lillie Road	524647	177657	Roadside	Y	3	1	2.5	NO_2	N
HF29 (HF50)	Fulham Broadway	525273	177273	Roadside	Y	3	4.7	2.5	NO_2	N
HF30 (HF53)	Addison Gardens	523801	179498	Urban Background	Y	5	1	2.5	NO_2	N
HF31 (HF54)	Bloemfontein Road	522550	180963	Roadside	Y	5	3	2.5	NO_2	N
HF32 (HF60)	Waldo Road	522550	182790	Urban Background	Y	4	1	2.5	NO_2	N
HF33 (HF61)	Uxbridge Road	522850	180060	Roadside	Y	3	1	2.5	NO_2	N
HF34 (HF62)	Cardross Street	522745	179179	Urban Background	Y	3	1	2.5	NO_2	N
HF35 (HF63)	Talgarth Road	524148	178358	Roadside	Y	5	1	2.5	NO_2	N
HF36 (HF64)	North End Road	524747	178158	Roadside	Y	3.7	1	2.5	NO_2	N
HF37 (HF65)	Fulham Palace Road	523926	176940	Roadside	Y	5	1	2.5	NO_2	N
HF38 (HF66)	Radipole Road	524680	176880	Urban Background	Y	5	1	2.5	NO_2	N
HF39	Butterwick (a)	523529	178470	Roadside	Y	5	1	2.5	NO_2	N

Site ID	Location	X OSGR	Y OSGR	Site Type	In AQMA?				Pollutants Monitored	Is Monitoring Co-located with a Continuous Analyser?
HF40	Hammersmith Grove	523050	179549	Roadside	Y	8	1	2.5	NO$_2$	N
HF41/42/43	Hammersmith Town Centre (AQMS)	523343	178567	Roadside	Y	1.5	1.5	2.3	NO$_2$	Y – Triplicate co-location
HF44	Shepherds Bush Road	523687	178446	Roadside	Y	3	1	2.5	NO$_2$	N
HF45	Maclise Road	523705	178448	Roadside	Y	3	1	2.5	NO$_2$	N
HF46	Hammersmith Road (b)	524339	178914	Roadside	Y	3	1	2.5	NO$_2$	N
HF47	Harrow Road	522437	182947	Roadside	Y	2	1	2.5	NO$_2$	N
HF48	Scrubs Lane	522444	182573	Roadside	Y	3	1	2.5	NO$_2$	N
HF49	Old Oak Common Lane	521511	181302	Roadside	Y	3.5	1.5	2.5	NO$_2$	N
HF50	Munster Road	524453	176796	Roadside	Y	2	1	2.5	NO$_2$	N
HF51	Dawes Road	524652	177283	Roadside	Y	4	1	2.5	NO$_2$	N
HF52	Harwood Road	525417	177168	Roadside	Y	5	1	2.5	NO$_2$	N
HF53	Imperial Road	525856	176763	Roadside	Y	5	1	2.5	NO$_2$	N
HF54	Waterford Road	525827	176921	Roadside	Y	2	1	2.5	NO$_2$	N
HF55	Hurlingham Road	524659	176050	Roadside	Y	5	1	2.5	NO$_2$	N
HF56	Parsons Green Lane	525062	176623	Roadside	Y	1.5	1	2.5	NO$_2$	N

During 2018 a number of the diffusion tube monitoring sites were re-named to provide consistency within the current network, where Site ID's were updated the sites previous Site ID (as was presented within the 2018 ASR are provided in brackets).

Figure 4. Non-Automatic Monitoring Sites
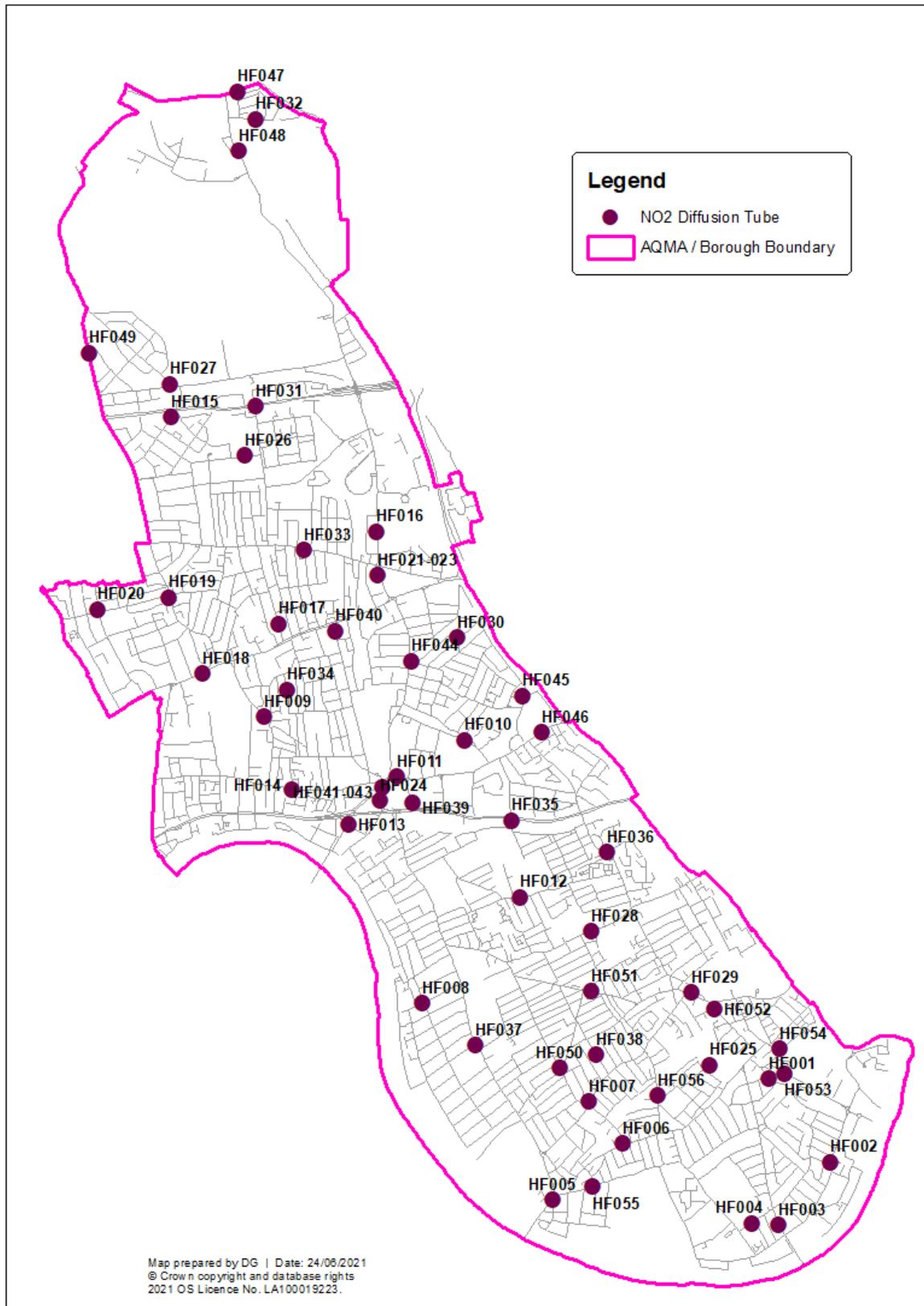
1.2 Comparison of Monitoring Results with AQOs

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

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

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020	2020 distance corrected
HF4	Automatic	76.7	76.7	**80.3**	**76.0**	**78.9**	**77.0**	**71.0**	**60**	43	38.2
HF5	Automatic	89.2	89.2	-	-	-	-	-	**53**	37	35.8
HF01	Diffusion tube	100	100	-	-	-	37.4	33.1	36.7	22.7	-
HF02	Diffusion tube	92	92	-	-	-	**47.5**	**46.9**	**49.2**	28.9	-
HF03	Diffusion tube	100	100	-	-	-	**87.1**	**74.3**	**76.9**	54.7	44.8
HF04	Diffusion tube	100	100	-	-	-	30.0	27.6	28.3	18.6	-
HF05	Diffusion tube	100	100	-	-	-	**54.3**	**53.1**	48.8[c]	38.6	33.8
HF06	Diffusion tube	100	100	-	-	-	**56.3**	**45.5**	**46.8**	28.9	-
HF07	Diffusion tube	100	100	-	-	-	**61.0**	53.4	**59.6**	39.8	35.2
HF08	Diffusion tube	100	100	-	-	-	27.9	27.1	27.4	16.9	-
HF09	Diffusion tube	100	100	-	-	-	**44.4**	**42.2**	35.5	25.5	-
HF10	Diffusion tube	100	100	-	-	-	35.7	32.0	31.3	20.2	-
HF11	Diffusion tube	100	100	-	-	-	**78.6**	**74.8**	**69.1**	43.1	43.1

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020	2020 distance corrected
HF12	Diffusion tube	75	75	-	-	-	34.2	32.2	32	21.2	-
HF13	Diffusion tube	100	100	-	-	-	**64.1**	**48.4**	35.8	27.5	-
HF14	Diffusion tube	92	92	-	-	-	**60.1**	**51.9**	**53.8**	38.8	35.6
HF15	Diffusion tube	100	100	-	-	-	35.1	31.1	31	19.3	-
HF16	Diffusion tube	100	100	-	-	-	**58.9**	**51.5**	**51.2**	33.2	-
HF17	Diffusion tube	100	100	-	-	-	**40.2**	35.3	36.1	22.6	-
HF18	Diffusion tube	92	92	-	-	-	**60.8**	**49.3**	38.6	24.2	-
HF19	Diffusion tube	100	100	-	-	-	**57.5**	**50.1**	**49.7**	32.5	-
HF20	Diffusion tube	92	92	-	-	-	31.4	30.3	32.2	18.4	-
HF 21/22/23	Diffusion tube	100	100	-	-	-	-	**64.4**	58.1	38.6	35.2
HF24 (HF32)	Diffusion tube	100	100	**78.8**	**77.5**	**79.9**	**72.9**	**62.2**	**55.6**	34.4	-
HF 25 (HF44)	Diffusion tube	92	92	29.6	28.5	32.7	31.9	26.2	26.7	17.5	-
HF 26 (HF45)	Diffusion tube	100	100	35.1	34.1	39.6	36.7	31.2	32.4	18.3	-
HF27 (HF47)	Diffusion Tube	100	100	**46.0**	**45.4**	**46.9**	**46.6**	39.8	39	25.3	-
HF28 (HF48)	Diffusion Tube	100	100	**49.1**	**44.5**	**52.3**	**44.8**	**41.7**	**40.5**	25.8	-
HF29 (HF50)	Diffusion Tube	92	92	**65.0**	**60.3**	**68.3**	56.3	47.8	**53.9**	34.5	-

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020	2020 distance corrected
HF30 (HF53)	Diffusion Tube	100	100	32.5	32.6	38.2	**42.1**	31.5	34.3	22.3	-
HF31 (HF54)	Diffusion Tube	75	75	<u>**80.7**</u>	<u>**76.6**</u>	<u>**84.3**</u>	<u>**76.8**</u>	<u>**68.1**</u>	**59.6**	38.3	35.2
HF32 (HF60)	Diffusion Tube	100	100	39.2	37.6	**40.8**	**40.6**	34.5	36.7	23.1	-
HF33 (HF61)	Diffusion Tube	100	100	**45.8**	**45.9**	**49.4**	**42.6**	38.7	37.3	23.1	-
HF34 (HF62)	Diffusion Tube	100	100	31.8	30.7	34.4	37.0	27.4	28.2	17.9	-
HF35 (HF63)	Diffusion Tube	100	100	**56.1**	**49.8**	**59.8**	**50.9**	**47.4**	**44.2**	27.5	-
HF36 (HF64) [e]	Diffusion Tube	75	75	-	-	-	**58.8**	**54.2**	**51.8**	**41.1**	37.5
HF37 (HF65)	Diffusion Tube	100	100	**57.7**	**57.1**	<u>**68.6**</u>	**53.0**	**48.3**	**50.8**	32.0	-
HF38 (HF66)	Diffusion Tube	100	100	33.2	31.5	34.6	32.9	31.2	30.3	19.2	-
HF39	Diffusion Tube	100	100	-	-	-	-	<u>**69.4**</u>	<u>**60.5**</u>	37.6	35.6
HF40	Diffusion Tube	75	75	-	-	-	-	-	<u>-</u>	22.4	-
HF41/42/43	Diffusion Tube	100	100	-	-	-	-	-	<u>-</u>	**43.8**	**42.0**
HF44	Diffusion Tube	100	100	-	-	-	-	-	<u>-</u>	23.2	-
HF45	Diffusion Tube	100	100	-	-	-	-	-	<u>-</u>	22.7	-
HF46	Diffusion Tube	92	92	-	-	-	-	**-**	**-**	**41.3**	38.1
HF47	Diffusion Tube	100	100	-	-	-	-	**-**	**-**	25.4	-

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020	2020 distance corrected
HF48	Diffusion Tube	83	83	-	-	-	-	-	-	31.4	-
HF49	Diffusion Tube	100	100	-	-	-	-	-	-	25.9	-
HF50	Diffusion Tube	100	100	-	-	-	-	-	-	26.4	-
HF51	Diffusion Tube	92	92	-	-	-	-	-	-	26.8	-
HF52	Diffusion Tube	100	100	-	-	-	-	-	-	**50.8**	38.1
HF53	Diffusion Tube	42	42	-	-	-	-	-	-	21.61[a]	-
HF54	Diffusion Tube	100	100	-	-	-	-	-	-	22.4	-
HF55	Diffusion Tube	92	92	-	-	-	-	-	-	18.4	-
HF56	Diffusion Tube	75	75	-	-	-	-	-	-	24.8	-

Notes:

The location of tubes HF40-45 was changed in 2020 so results from previous years for these tube numbers are not included.

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

Exceedances of the NO_2 annual mean AQO of 40 $\mu g\ m^{-3}$ are shown in **bold**.

NO_2 annual means in excess of 60 $\mu g\ m^{-3}$, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias.

[a] All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 33%.

Results have been distance corrected where applicable.

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

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

Reported concentrations at the automatic monitoring stations HF4, Shepherd's Bush and HF5, Hammersmith. between 2019 and 2020 showed a decrease, for HF4 this continues the general trend of decreasing concentrations between 2014 and 2020. There was a 28.3% decrease for HF4 between 2020 to 2019 and a 15.5% decrease 2018 to 2019, suggesting acceleration of decreasing concentration of nitrogen dioxide which may be related to the Covid-19 pandemic and associated changes in driver behaviour. Concentrations at both automatic monitoring stations were below the objective after distance correction was applied.

After distance corrections were applied to applicable diffusion tubes the annual air quality objective was exceeded at three locations: HF03, Wandsworth Bridge Road, HF11 Hammersmith Road and the triplicate tube HF41/ 42/43 located at Hammersmith Town Centre Analyser. HF03 and HF11 were present in 2019 and were some of the highest results for diffusion tube, so this trend continues for 2020 and shows that despite large changes in driver behaviour due to the pandemic, exceedances in the borough still occurred.

Table E.   NO$_2$ Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m^{-3}

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020
HF4	76.68	76.68	0(179.1)	**19**	**33**	**20**	8	4	0
HF5	89.16	89.16	-	-	-	-	-	2	1

Notes

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

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

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

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

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

The overall trend of decreasing exceedances of the 1 hour mean objective continued at HF4. A decrease between 2019 and 2020 was observed at both automatic monitoring stations, there was one exceedance of the 1 hour mean at HF5.

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

Site ID	Valid data capture for monitoring period %(^{a})	Valid data capture 2020 %(^{b})	2014	2015	2016	2017	2018	2019	2020
HF4	81.53	81.53	26.5	25.0	27.4	38.0	26.4	25	28
HF5	99.25	99.25	-	-	-	-	-	22	19

Notes

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

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

All means have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 33%.

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

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

At HF4 concentrations of PM10 rose to 28 ug m3, an increase of three on 2019 concentration, despite significant differences in traffic due to the pandemic. This continues the trend at HF4 of no clear sustained decrease in concentrations at this site.

Table G.   PM$_{10}$ Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM$_{10}$ 24-Hour Means > 50 µg m^{-3}

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020
HF4	81.53	81.53	0 (38.2)	10	17	14	4	11	13
HF5	99.25	99.25	-	-	-	-	-	5	5

Notes

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

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

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

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

Both sites met the 24 hour objective, with no sites reporting more than 35 occurrences of a 24 hour mean over 50ug m3. At HF4 there is no clear sustained trend of decreasing exceedances between 2014 and 2020. Exceedances of the 24 hour mean were the same for 2020 as for 2019 at HF5, for HF4 exceedances increased by two from 11 to 13 between 2019 and 2020.

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 2020 %$^{(b)}$	2014	2015	2016	2017	2018	2019	2020
HF5	94.71	94.71	-	-	-	-	-	15	14

Notes

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

Exceedances of the PM$_{2.5}$ annual mean AQO of 25 µg m^{-3} are shown in **bold**.

All means have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 33%.

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

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

The annual mean objective for PM2.5 was met at HF5 for a second year, with a 1ug m3 decrease between 2020 and 2019.

Table I.   2020 O$_3$ Automatic Monitoring Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2020 % [b]	8 hour running mean > 100 µg m-3 2019	8 hour running mean > 100 µg m-3 2020
HF5	99.18	99.18	0	2

Notes

Exceedances of the O$_3$ AQOs are shown in bold (8 hour running mean >100 -10 allowed a 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%

Exceedance of the 8-hour running mean occurred two times at HF5 in 2020, an increase of two on 2019 when monitoring

commenced at Hammersmith Town Centre.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of Hammersmith and Fulham's progress against the Air Quality Action Plan, showing progress made this year.

Table J. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
1	Cleaner Transport	Reducing Emissions at its source Encourage improved availability of alternative fuels	a) The Council has 145 Source London on-street electric vehicle charge points. 129 of which are 7kWH and 16 22kWH. 10 22 kWh Source London charge points were added in 2020. These generated more than 33,000 activated sessions in H&F in 2020. b) The council installed 5 rapid charge points in 2020. Taking the total number of rapid charge points in the borough to 10. c) Supporting EV ownership growth in the borough the Council, working closely with residents, has installed a further 94 lamp column charge points for residential use in 2020. With GULCS funding secured the network expanded by another 138 charge points by April 2021. Taking the current total to 305 lamp column charge

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			points. The Council will increase the total number of residential charge points to 1000 by December 2021. d) The council are also working on an initiative to provide up to 50 dual purpose charge points to facilitate street and market trader switch from diesel generated power to electric, whilst providing overnight charging facilities for residents, through 2021. Hammersmith Flyover BP awarded best EV charging destination 2020, more than 100 electric vehicles charging every day. bp retail site celebrated as UK's best EV charging destination | News | Home
2	Cleaner Transport	Reducing Emissions at its source Provide incentives for use of alternative fuels	Emissions based charging for pay and display was introduced in March 2021. This included a diesel surcharge of £1. The charges are shown at website Emissions based parking charges | LBHF Free resident parking permits continue to be provided for fully electric vehicles and publicised at the webpage Green vehicle permits | LBHF.
3	Delivery Servicing and Freight	Reducing Emissions at its source Promote travel plans to encourage a switch to low emission vehicles	As part of Hammersmith BID MAQF business LEN Project the Council engaged with businesses, on developing last mile zero emission delivery schemes. In 2019 H&F launched 'Parcels Not Pollution' a ground-

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			breaking scheme that reduces the number of goods vehicles travelling into and within our town centres. Goods are redirected from source to a freight hub outside of the borough, consolidated and re-delivered by ecargo-bike for the last mile to customers across the borough. A number of the council's services use the service with plans to support more services, reducing the council's direct emissions. In January 2021 local businesses, charities, organisations and market stall holders were eligible to apply for £250 of vouchers for Parcels Not Pollution cargo bike scheme, one hundred vouchers were available on a first come first served basis. The council has worked with Zipcar and Fulham Broadway BID to launch the first electric van service for small businesses in Fulham in March 2021, which aims to reduce air pollution from local businesses. The new electric van is free to use for qualifying businesses based in Fulham including market traders on North End Road Market. Additional free-to-use electric vans for businesses in other parts of the borough will be launched later in 2021.
4	Borough Fleet	Reducing Emissions at its source Reduce emissions from the Council fleet	As detailed in action 3 response, Hammersmith BID MAQF business LEN Project involved the Council engaging with businesses, on developing last mile zero emission delivery schemes. H&F launched 'Parcels Not Pollution' a ground-breaking scheme that reduces the number of goods vehicles travelling into and within our town centres. A number of the council's services use

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			the service with plans to support more services, reducing the council's direct emissions. This includes placing and collecting the council's air quality nitrogen dioxide diffusion tubes from 2020. The Councils fleet and waste contractors' fleet have implemented the following measures: • Six electric scooters now on Fleet. Work continues to replace existing fleet with electric or zero carbon alternatives • 14 upgraded charge points for light vehicles and 3 charge points for HGV now installed at Bagley's Lane depot. Site survey being conducted to install a further 20 charge points in depot (for a mixture of light vehicles & HGV) • Taking the old enforcement fleet vehicles (9) off fleet and replacing with electric vans. • Council fleet LEZ and ULEZ compliant. • Contractor supervisor vans (8) replaced with electric vans. • Negotiations ongoing with contractor for the provision of 6 x electric 3.5 ton cage vehicles (to replace existing diesel). • Contractor requested to have all vehicles ULEZ compliant as soon as practicable. • Council seeking to partner with future waste contactors to control fleet purchase and ensure low emission greener alternatives procured as soon as affordable and practicable

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			Dr Bike sessions were not run this year due to the Covid pandemic.
5	Cleaner Transport	Reducing Emissions at its source Seek a reduction in emissions from the bus fleet	There was no update this year on the bus fleet.
6	Cleaner Transport	Reducing Emissions at its source Encourage the use of vehicles with smaller, more efficient engines	As discussed in Action 2 emissions-based charging for pay and display was introduced in March 2021. This included a diesel surcharge of £1. The charges are shown at website Emissions based parking charges | LBHF Free parking permits continue to be provided for fully electric vehicles, details can be found at the webpage Green vehicle permits | LBHF.
7	Delivery Servicing and Freight	Reducing Emissions at its source Seek to reduce emissions from larger vehicles (Low Emission Zone)	South Fulham TCPR (Traffic, Congestion and Pollution Reduction Scheme) introduced in July 2020, traffic reduced by 75% on streets east of Wandsworth Bridge Road and by 12% on Wandsworth Bridge Road. Additionally, H&F were successful in their joint bid with other London Boroughs and Business Improvement Districts (BIDs) for DEFRA funding for CAV4., submitted by Cross River Partnership. This is an expansion on Clean Air Village 1,2 and 3 Projects - engagement and behavioural change project to reduce emissions from the delivery of goods and services for businesses, hospitals and communities. Clean Air

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			Villages 4: Coming Soon to a Borough Near You! - Cross River PartnershipThis project will focus on hospital emissions in Hammersmith and Fulham. As part of Clean Air Villages 2, The council has worked with Zipcar, Fulham Broadway BID and Cross River Partnership to launch the first electric van service for small businesses in Fulham in March 2021, which aims to reduce air pollution from local businesses. The new electric van is free to use for qualifying businesses based in Fulham including market traders on North End Road Market. Additional free-to-use electric vans for businesses in other parts of the borough will be launched later in 2021. Additionally, as included in a previous action, Parcels not pollution scheme, an emissions free delivery service, which results from a partnership between Hammersmith and Fulham Council, Hammersmith BID, Transport for London and e-cargobikes operates across the borough. In January 2021 local businesses, charities, organisations and market stall holders were eligible to apply for £250 of vouchers for Parcels Not Pollution cargo bike scheme, one hundred vouchers were available on a first come first served basis.
8	Public Health and awareness raising	Reducing Emissions at its source Seek to reduce emissions from badly maintained vehicles	For 20/21 Community enforcement officers served 7 notices for idling. 7 drivers spoken to regarding idling. 208 complaints received regarding idling. There are 59 enforcement officers.

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
9	Public Health and awareness raising	Reducing Emissions at its source Encourage more environmentally friendly driving behaviour	The Council continue in addressing speeding concerns across the borough with the aim to ensure compliance at locations where there has been highest exceedance of the speed limit, where there is a continuing record of collisions, and where residents have complained. This work has mainly consisted of converting speed "cushions" to more effective sinusoidal humps or the installation on speed humps following interest or requests received from residents. A minimum of 600 anti-idling signs were erected around the borough in 2019. All schools in the borough now have anti-idling signage. The amount of signs at each school is dependent on how many roads around it would allow waiting/parking. Signs were not placed where a school borders an A road with no wait/no load at any time restrictions are in force, because traffic are not allowed to stop there anyway. The Council continues to participate in the three-year MAQF 3 No Idling project during the period 2019 to 2022. During the pandemic this consisted of helping to share the messages through the council's website and twitter of the idling action London project Idling Action London — Reducing engine idling to help clear London's air
10	Emissions from developments and buildings	Reducing Emissions at its source Seek a reduction in emissions of small particles from construction sites	The Council continues to require demolition and construction management plans for major development sites, including the submission of a AQDMP (Air Quality Dust Management Plan) that includes a dust risk assessment as well as measures to minimise dust

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			emissions and are required to follow the London Mayor's "The Control of Dust and Emissions During Construction and Demolition SPG, 2014.' This includes the requirements to meet NRMM criteria. Complaints of dust nuisance investigated as and when reported. 116 complaints were received in 2020 about construction/ demolition dust. This is a significant increase in complaints from last year, likely associated with increased home working due to covid-19. For covid safety reasons, officers were not going into residents premises unless it was absolutely necessary and covid safe and as a result officers engaged with the complainants and sought to resolve issues through advice and education The Stage IV NRMM emission standard was required by planning condition on 51 sites during 2020. The Council were part of the MAQF3 NRMM compliance project during 2020/21: 35 sites were registered on the NRMM website; 17 site Audits were undertaken, 1 sites were self-compliant, 6 sites worked towards and achieved Compliance. 1 site failed to achieve compliance; 6 were completed sites or had no NRMM. The London Borough Hammersmith & Fulham achieved a Total Compliance status of 87.5% of those sites audited under the NRMM project. The Council will continue to participate in the MAQF3 NRMM compliance project for the three year period from 2019 to 2022.

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
11	Emissions from developments and buildings	Reducing Emissions at its source Seek a reduction in emissions from domestic and commercial properties	Policy CC1 of the Local Plan requires sustainable energy measures to be included in major developments and encourages these measures in all other developments. Minimising energy use helps to not only reduce CO2 emissions from buildings but also other pollutants as well. On-site renewable energy use is also promoted in new developments and the most frequent technology deployed is PV panels and heat pumps which generate no local emissions. Use of Combined Heat and Power (CHP) units are only accepted where they can be used without having an unacceptable impact on air quality. In terms of the council's buildings, over the last year, Covid-19 had a massive impact on the corporate estate as 90% of the estate was shut down for months, so had little to no usage. At present building usage has only crept up to about 50% utilisations for the number of buildings open yet staff numbers are still kept low with only 20% workforce throughout the council returning to offices else all working from home. Likely over the months only maximum of 1/3 of workforce will likely return until the Town Hall redevelopment project is completed. H&F will be disposing most of its large buildings. The Kings street redevelopment is going well. The town hall extension and surrounding buildings have been handed over in September 2020 and now are demolished with only the Town Hall remaining which is with the developer undergoing a massive multi million-

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			pound redevelopment to make it a new Breeam awarded building as its future flagship building. As of 1st October 2020, all of Corporate's estate electricity is coming from a REGO green energy tariff. It is envisaged in next 12 months to change its basket option to a fixed green supplier to guarantee zero carbon electric. There are further plans to invest in a PPA as well and pledge a fixed amount of energy usage direct to a green generator. Finally, on the grounds of receiving green electrical energy, part of Hard Services plan is to now replace all its end of life gas boilers with either electric or if costs effective to install heat source pumps. Less residual waste produced per household results in less waste to be collected and less waste incinerated. Christmas tree recycling for 2020/2021 was 93.38 tonnes. Residual waste per household per year (Kg) (kg/hh/yr) has again declined during the year ending 2020/21: • 2017/18 = 419.60 kg/hh/yr • 2018/19 = 407.00 kg/hh/yr • 2019/20 = 378.2 kg/hh/yr • 2020/21 provisional 360.79 (provisional)

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			The council started collecting food waste from selected streets from November 2020, 243560kg has been collected so far. In 2020 there have been 24 bonfire complaints these were addressed by the Council's Environmental Health team and provide an opportunity for the council to engage with residents on the issue of air quality. In 2020 in private homes 387 energy efficiency and insulation measures were implemented as detailed below: _(see table below)_

Light bulbs installed	160
Power-down devices installed	27
Radiator panels installed	77
Shower heads installed	60
Save-a-flush bags installed	10
Shower timers installed	48
Swivel taps installed	2

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints	
3			Tap aerators installed	3
12	Monitoring and other core statutory duties	Reducing Emissions at its source Seek to control and minimise emissions from industrial premises	Regulation duties continued in line with the LAPPC requirements. No complaints were received in 2020/21 regarding emissions from industrial sites regulated by the Council. No notices were served. Routine inspections were undertaken to ensure compliance with permits wherever possible in line with COVID.	
13	Cleaner Transport	Reducing the Need to Travel Sustain and improve town & local centres, facilities and employment areas	The 2018 Local Plan is still in place and policies that improve town centres etc are still being implemented to help provide facilities locally and discourage the need for people to travel to do shopping, for entertainment and recreation purposes etc. The council will begin a review of its Planning Guidance SPD document in summer 2021 and will be able to consider whether additional guidance should be provided on reducing the need to travel. The Council's Local Implementation Plan (LIP3) for Transport was agreed by Cabinet in November 2018 was approved by the Mayor of London in February 2019. The LIP's key principles and projects include ensuring that sustainable modes (walking, cycling and public transport) are the main choice in the borough's regeneration areas, "Filtered permeability" in residential areas to prevent rat running and encourage walking and cycling, a TFK funded "Liveable Neighbourhoods project	

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			to reduce the dominance of motor traffic in North End Road, and longer term aspirations to replace Hammersmith Flyover with a tunnel, provide a new pedestrian/cycle bridge over the Thames at Imperial Wharf, and remove general traffic from the north side of Shepherds Bush Green. TCPR South Fulham South Fulham TCPR (Traffic, Congestion and Pollution Reduction Scheme) introduced in July 2020, traffic reduced by 75% on streets east of Wandsworth Bridge Road and by 12% on Wandsworth Bridge Road. The council is now developing a borough wide strategy for TCPR. More than 2 miles of Temporary cycle lanes and footway extensions installed for covid response, this supported walking and cycling during period in which travel by public bus was advised against by government. Safer, segregated cycle lanes pop up in Hammersmith | LBHF Our Space is your space, which allows businesses to use highway space for outdoor seating etc, which has been more necessary during pandemic, Local businesses – Our space is your space | LBHF
14	Emissions from developments and buildings	Reducing the Need to Travel	2018 Local Plan is still in place and policies that help reduce the need to travel and promote sustainable forms

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Seek to reduce the air quality impact of new development	of transport are still being implemented to help reduce emissions. There is also an emerging trend for major developments in particular to include on-site energy generation technologies such as Heat Pumps that produce no local emissions. Some developments are starting to install electric boilers instead of gas fired boilers which also help to reduce emissions and improve local air quality. In 2020 as detailed in section 3 of the ASR the following number of sites were required to implement air quality mitigation via the development control process: 204 development sites with Mechanical Ventilation to reduce indoor exposure to poor air quality, 581 sites with zero emission plant , 51 sites with Air Quality Dust Management Plan (AQDMP) with stage IV NRMM emission standards (instead of the standard Stage IIIA, a greater London requirement) and the use of ULEZ compliant vehicles, 37 sites with Low Emission Strategies, 16 sites with stricter diesel emergency generator emission standards. SPD Key Principle TR21 requires that all new developments that have the potential to have a detrimental impact during the demolition and construction phase will require a Construction Logistics Plan (CLP). The Council will apply a condition to the planning consent to ensure that a Construction Logistics Plan (CLP) and Demolition Logistics Plans(DLP) are submitted and approved before a planning permissions is implemented. The Construction Logistics Plan will be

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			secured by condition or Section 106 agreement depending on the scale of the development. The Council's SPD requires that the CLP is in line with the Mayor's Construction Logistics Plan (2017) and requires how the development will: • Minimise the impact of construction traffic on nearby roads • Restrict construction trips to off peak hours only • Reduce the number of stationary vehicles on the highway and potential for idling vehicles, the need for control measures for stationary vehicles and potential idling. Over 250 CLPs secured through the planning process during 20/21.
15	Cleaner Transport	Encouraging a Switch to Less Polluting Forms of Transport Promotion of bus services	Promotion of bus services not possible during pandemic as government advised against non-essential use of public transport.
16	Cleaner Transport	Encouraging a Switch to Less Polluting Forms of Transport Promotion of other forms of public transport	Significant planning for implementation of e-scooter scheme completed for launch of this June 21. Electric scooter rental scheme launches in H&F	LBHF Hammersmith and Fulham one of only five boroughs to offer e scooter scheme which is currently the only way to legally use electric scooters.
17	Cleaner Transport	Encouraging a Switch to Less Polluting Forms of Transport	Development of an interim scheme for Safer Cycle Pathway (SCP) 9 and 10. Over 2 miles of temporary cycle lanes for covid response implemented.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Promotion of cycling	Council maintains a waiting list for cycle stands and hangers and looks for funding opportunities to install these Cycle parking | LBHF As discussed previously TCPR implemented in south Fulham in 2020, which supports cycling through reduction in traffic recorded. Cycle hub planning for underneath the fly over continued in 2020. As part of the MAQF CABB project in 2018 an air quality and journey planner widget to promote active travel was produced for the H & F and can found on the Council website https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality-forecast-and-cleaner-air-route-finder. The page had 131 unique page views in 2020
18	Cleaner Transport	Encouraging a Switch to Less Polluting Forms of Transport Promotion of Walking	Footpath widening completed as part of covid response H&F to introduce temporary wider pavements to help shoppers with social distancing | LBHF TCPR scheme implemented in South Fulham supports walking through reduction in traffic. Art installed at North End Road Crossing in 2020. Fruit-tastic! Local artists brighten up North End Road with new market-inspired crossing | LBHF

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
			As part of the MAQF CABB project in 2018 an air quality and journey planner widget to promote active travel was produced for the H&F and can be found on the Council website. (See https://www.lbhf.gov.uk/environment/pollution-and-air-quality/air-quality-forecast-and-cleaner-air-routefinder). Also, as part of the MAQF CABB during 2018 four clean air walking routes were produced for walking routes within the borough and can be seen at the journey planner webpage. The page had 131 unique page views in 2020.
19	Public Health and awareness raising	Encouraging a Switch to Less Polluting Forms of Encourage a reduction in car use for the journey to school	106 children and 223 adults were given Bikeability and adult cycle training in the borough throughout the 20/21. These numbers were from August 2020 to present although cycle training data is only from the months of September, October, November, December 2020 and April 2021 due to the training being stopped during periods of lockdown. 45 schools have completed School Travel Plans, few schools have yet to submit their Hands Up Surveys but these have been impacted due to the pandemic. Under the TFL STARS (Sustainable Travel: Active Responsible Safe) accreditation scheme, 13 have achieved Gold , 7 Silver, and 4 bronze.
20	Cleaner Transport	Encouraging a Switch to Less Polluting Forms of Transport	Work on this action has been limited by the Covid pandemic with all but essential use of public transport requested by central Government. The council also supported key worker parking during the pandemic.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Encourage a reduction in car use for the journey to work and business trips	However, temporary cycle lanes were implemented and planning for electric scooter scheme completed for Launch June 21. South Fulham TCPR scheme also led to reduction in traffic.
21	Cleaner Transport	Encouraging a Switch to Less Polluting Forms of Transport Control provision of on and off street parking to deter car commuting into and within the borough	Emissions based charging for pay and display was introduced in March 2021. This included a diesel surcharge of £1. The charges are shown at website Emissions based parking charges | LBHF Free parking permits continue to be provided for fully electric vehicles Green vehicle permits | LBHF.
22	Delivery Servicing and Freight	Encouraging a Switch to Less Polluting Forms of Transport Encourage freight to be transported in a sustainable manner	As part of Clean Air Villages 2, The council has worked with Zipcar, Fulham Broadway BID and Cross River Partnership to launch the first electric van service for small businesses in Fulham in March 2021, which aims to reduce air pollution from local businesses. The new electric van is free to use for qualifying businesses based in Fulham including market traders on North End Road Market. Additional free-to-use electric vans for businesses in other parts of the borough will be launched later in 2021. Additionally, as included in a previous action, Parcels not pollution scheme, an emissions free delivery service, which results from a partnership between Hammersmith and Fulham Council, Hammersmith BID, Transport for London and e-cargobikes operates across

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			the borough. In January 2021 local businesses, charities, organisations and market stall holders were eligible to apply for £250 of vouchers for Parcels Not Pollution cargo bike scheme, one hundred vouchers were available on a first come first served basis.
23	Cleaner Transport	Make a More Efficient Use of Road Transport Encourage car sharing	The Council continue to actively work with car club operators - Zipcar and City Car Club - to develop their existing network, in January 2020 the council successfully tendered and subsequently awarded a contract to ZipCar UK for the operation of a Free Floating Car Sharing (FFCS) service in the Borough. The FFCS service is recognised (by authorities and academia) as a key tool in providing for Londoners' urban mobility needs by offering a realistic and economical alternative to private car ownership. Introducing a FFCS service will directly contribute to the administration's objective to be the greenest borough helping support both reduced car ownership and usage and more efficient movement of people
24	Cleaner Transport	Make a More Efficient Use of Road Transport Discourage short journeys	There was no further work in this area due to covid pandemic.
25	Cleaner Transport	Other Measures to Reduce Road Traffic Emissions Reduce the amount of road traffic in residential areas and town centres	The 2018 Local Plan is still in place and policies that help reduce the need to travel and promote sustainable forms of transport are still being implemented to help reduce emissions.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			Developments in areas well connected by public transport are expected to be car-free, with no parking provided, other than for disabled people. Where appropriate and in accordance with the aims of the London Plan the Council also encourages the provision of car club bays, especially those with restricted parking. Planning policies also require electric vehicle parking spaces for both residential and commercial uses – e.g. the requirement for residential developments is that 20% of all spaces must be for electric vehicles with an additional 20% passive provision for electric vehicles in the future. Cycling and walking are also encouraged by planning policies which require improvements to the environment and provision of facilities such as cycle parking and provision of support for cycle hire schemes. The council will begin a review of its Planning Guidance SPD document in summer 2021 and will be able to consider whether additional guidance should be provided on reducing traffic levels in residential areas and town centres. LTNs were not supported by residents, so there is a move to co-produced Traffic Congestion and Pollution Reduction scheme and the council is working on a borough wide strategy for TCPRs.

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
26	Localised solutions	Other Measures to Reduce Road Traffic Emissions Promote the use of trees to help improve local air quality	In 2020/21 the Council planted 39 new trees on the public highway and replaced 157 street trees. For Parks, Open Spaces and Cemeteries in 2020, 26 standard sized trees at 2-3 metres high and 781 whips at 1 metre or less in the form of saplings were planted. The Council pruning programme which began in 2019, to spread the pruning of trees in large roads over several years, also continues.
27	Localised solutions	Other Measures to Reduce Road Traffic Emissions Reduce the amount of traffic on the A4 and A40	Work continues on the Hammersmith SPD which is now expected to be consulted on before the end of 2021.
28	Public health and awareness raising	Raise Awareness of the Links Between Air Quality and Health Provide information to allow people to make informed choices about travel behaviour	The Council continue to support airTEXT and promote it to the public on our website and at events. There were 44 additional subscribers to airTEXT pollution alerts from January 2020. Subscribers receive alerts by text message (233 people) and voicemail (30 subscribers).
29	Emissions from developments and buildings	Provide information so people can make informed choices about reducing pollution from domestic activities	There was a complete update of the council's air quality webpages, which included updates related to wood burning stoves including the clearskies stove accreditation scheme and links to the Woodsure ready to burn guidance.
30	Monitoring and other core statutory duties	Raise Awareness of the Links Between Air Quality and Health	The Breathe London AQMesh monitor located at Melcombe Primary School was retained after transition of the Breathe London Programme from EDF to

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Continue to monitor air quality and make information available	Imperial college London In December 2020. A sensor was deployed at a new location, Charing Cross Hospital in March 2021. Monitoring at Blomfontein Road ended March 21. Information and data from the monitors is available at Breathe London . The council supported the scheme providers in identifying suitable locations for the low-cost monitors and information on available electrical infrastructure to support sensor deployment. Provisional data from Breathe London, downloaded from Breathe London Pilot – Breathe London Pilot air pollution data for 2020 suggests Annual Average Fulham Palace road (NO2) urban background location was 11.51 ug m3 and roadside location was 24.12 ug m3 and Bloemfontein 37.44 ug m3. PM2.5 data at Bloemfontein Road suggests an annual average of 7.45 ug m3. Fulham Palace Road urban background was 5.63 ug m3 and Fulham Palace Road roadside was 6.61 ug m3. Live access to the real time air quality monitoring stations is available on-line (See London Borough of Hammersmith & Fulham - Air Quality monitoring service (airqualityengland.co.uk)) and links to this are provided on the Council website (See Air quality | LBHF) The council continued to maintain two automatic monitors and its network of diffusion tubes. Full year's data from the automatic monitor installed at Hammersmith town centre in March 2019 is reported for the first time this year. A second co-location study also

Measure	LLAQM Action Matrix Theme	Action	**Progress** • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			began at Hammersmith Town Centre analyser, which will support use of best bias adjustment factors to diffusion tube data as detailed in the appendix. Low-cost sensors were installed to monitor the impact on air quality as as part of the SW6 TCPR scheme in July 2020. South Fulham Traffic, Congestion and Pollution Reduction scheme | LBHF

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in Hammersmith and Fulham in 2020

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	25
Number of planning applications required to monitor for construction dust	53
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	2
Number of developments required to install Ultra-Low NO_x boilers	10
Number of developments where an AQ Neutral building and/or transport assessments undertaken	25
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	25
Number of planning applications with S106 agreements including other requirements to improve air quality	0
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Central Activity Zone 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 with the GLA through the relevant NRMM website and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	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 Register - NRMM | London City Hall and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.	51 conditions included requiring compliance with Stage IV of the Directive 35 registered and compliant 1 unregistered/uncompliant and being chased.

Air Quality Officers review weekly list of planning applications to ensure air quality conditions are requested on all relevant applications. In addition, consultation requests are sent out to air quality officers from the council's planning department on major developments.

Conditions for Air Quality Dust Management Plan are not recommended to be discharged until a development has registered on the GLA NRMM website. Hammersmith and Fulham council continue to participate in the Mayors Air Quality Fund 3 (MAQF3) NRMM compliance project for the three-year period from 2019 to 2022.

3.1   New or significantly changed industrial or other sources

No new sources identified.

Appendix A   Details of Monitoring Site Quality QA/QC

A.1   Automatic Monitoring Sites

Data management and Local Site Operator (LSO) duties for Hammersmith & Fulham's automatic monitoring station have been completed by Ricardo Energy and Environment since November 2017. All real-time data from the monitoring station is independently collected and validated on a daily basis. A combination of automatic and manual checks is used to assess data, identify and diagnose potential equipment faults and adjust data to take account of calibration tests. Automatic overnight calibrations are supplemented with regular manual calibrations of analysers, every two weeks. The procedures used conform to the EU standards that are a requirement of the AURN.

All data is formally ratified and is available online by accessing the Air Quality England Website and selecting Hammersmith & Fulham within the 'Select local authority' menu bar. During this process the validation decisions can be ratified with the benefit of hindsight and using greater information, such as service records, calibration records and the results of station audits. Station audits are carried out by Ricardo Energy and Environments in house audit team every six months.

<u>PM$_{10}$ and PM$_{2.5}$ Monitoring Adjustment</u>

PM10 data from HF4 Shepherd's Bush presented in this report has been corrected to gravimetric equivalent using the Volatile Correction Model (VCM). The application of the VCM to the raw data is completed by Ricardo Energy and Environment through the current data management contract, therefore this is also true of any data that is presented on the Air Quality England website.

At Hammersmith Town Centre HF5 the equipment for monitoring PM is an unheated PM10 BAM and a smart heated PM2.5 BAM. Therefore, the corrections set out in LLAQM TG19 for the MetOne BAM will be applied (sections 4.43 to 4.47) and the PM10 data will be multiplied by 0.833 and no correction is applied to the PM2.5.

A.2   Diffusion Tubes

The diffusion tubes for January-April 2020 were supplied and analysed by Gradko International, with the 50% Triethanolamine (TEA) in acetone preparation method utilised. During the onset of the initial pandemic the laboratory closed, this led to a change in supplier to UKAS accredited Socotec. The diffusion tubes for May-December 2020 were supplied by Socotec, again with the 50% Triethanolamine (TEA) in acetone preparation method utilised.

Gradko and Socotec are UKAS accredited laboratories that follow the procedures set out by Defra within Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users, and strict internal QA/QC procedures to ensure that concentrations reported are as accurate as possible. For Laboratory precision results available at the Defra webpages for precision and accuracy for diffusion tubes https://laqm.defra.gov.uk/diffusion-tubes/precision.html ,Socotec has good results across 2020 and Gradko has just one poor result across 2020. In addition, Gradko and Socotec participate in two independent QA/QC schemes to ensure their performance is constantly independently reviewed.

1) AIR-PT (Gradko and Socotec)

AIR is an independent proficiency-testing (PT) scheme that is operated by LGC standards and supported by the Health and Safety Laboratory (HSL). AIR-PT began in April 2014 and combined two long running PT schemes: LGC Standards STACKS PT scheme, and the HSL WASP PT scheme. AIR is a recognised performance-testing programme for labs undertaking NO_2 diffusion tube analysis as part of a wider UK NO_2 monitoring network. The AIR-PT results for Gradko and SOCOTEC during 2020 are presented in Table M below, two rounds 37 and 39 were cancelled due to covid.

Further information on proficiency testing can be found at Defra's Local Air Quality Management webpages under QA/QC framework for NO_2 diffusion tube monitoring.

Table L.   Gradko and Socotec Performance within AIR-PT for NO2 Diffusion Tubes-2020

Laboratory	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040
	January – February 2020	May – June 2020	July – August 2020	September – October 2020
Gradko	75%	NR	NR	75%
SOCOTEC	100%	NR	NR	100%

2) Network Field Inter-Comparison Exercise (Gradko and SOCOTEC)

Gradko International and Socotec take part in the NO_2 Network Field Inter-Comparison Exercise, operated by the National Physical Laboratory (NPL), which complements the AIR-PT scheme in assessing sampling and analytical performance of diffusion tubes under normal operating conditions. This involves the regular exposure of a triplicate set of tubes at an Automatic Urban Network site (AURN) site where continuous chemiluminescent analysers measure NO_2 concentrations.

The inter-comparison exercise is completed at the Marylebone AURN monitoring station. Of particular interest is the bias of the diffusion tube measurement relative to the automatic analyser that gives an indication of accuracy. Performance criterion have been established for participating laboratories in line with the Air Quality Directive 2008/50/EC requirement for indicative monitoring techniques, as the 95% confidence interval of the annual mean bias which should not exceed ±25%.

In conjunction with this, a measure of precision is determined by comparing the triplicate co-located tube measurements, commonly referred to as the coefficient of variation (CoV). This value is useful for assessing the uncertainty of results due to sampling and analytical techniques. The NPL performance criterion for precision is that the mean coefficient of variation for the full year should not exceed 10%, should this be achieved the precision is given a score of 'good'.

The 50% TEA with acetone diffusion tubes manufactured and provided by both Gradko and Socotec were within the performance targets for precision, as shown by the results presented in Table M below. Additionally, both labs also currently hold the highest rank of a Satisfactory laboratory, as per the AIR-PT results.

This year neither laboratory was within the performance targets for bias, both reporting higher than the target of +25%, therefore indicating that both laboratories over-predicted at the Marylebone location. For 2019 Gradko recorded an annual mean bias of +6.5%. The over-prediction of the diffusion tubes could be caused by a number of factors, including the changes associated with the Covid-19 pandemic. Over-prediction by diffusion tubes can be addressed for by applying a national or local bias adjustment factor.

Table M.   Gradko and Socotec NO2 Network Field Inter-Comparison Results for 2020

Laboratory	Annual Mean Bias		Precision	
	Performance Target	Gradko Annual Mean Bias	Performance Target	Gradko Precision
Gradko	±25%	+ 33%	10%	Good
Socotec	±25%	+ 38%	10%	Good

Factor from Local Co-location Studies

Annual means and bias for both of Hammersmith and Fulham's co-location studies are included below. In 2020 a second co-location study started at the new Hammersmith Town centre analyser, co-location at Shepherd's Bush has been completed since 2018. The monitoring locations at both Shepherd's Bush (HF4) and Hammersmith Town Centre (HF5) are classified as Urban Traffic sites.

Hammersmith & Fulham are part of the London Wide Environmental Programme (LWEP) for which a number of co-location studies are completed across six London Boroughs. During 2020 triplicate diffusion tube monitoring was completed at the HF4 and HF5 automatic monitoring stations. This year the co-location studies in Hammersmith and Fulham did not contribute to a overall LWEP bias adjustment as an overall factor was not deemed to be appropriate due to large variations between

the boroughs in the diffusion tube studies due to circumstances related to the pandemic. Therefore, the decision of which bias adjustment factor to apply was limited to either the national factor or a local factor.

Table N.   Precision and Accuracy of Triplicate Tubes Hammersmith Town Centre (Urban Traffic Site)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

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	07/01/2020	03/02/2020	71.5	64.5	61.9	66	5.0	8	12.4	40.15208	41.2037037	Good	or Data Capture
2	03/02/2020	06/03/2020	60.7	53.5	51.0	55	5.1	9	12.5	34.90893	90.75520833	Good	Good
3	05/03/2020	06/04/2020	55.9	52.5	58.5	56	3.0	5	7.6	43.86818	99.73958333	Good	Good
4	08/04/2020	06/05/2020	59.8	59.2	58.1	59	0.9	1	2.1	46.5072	99.70238095	Good	Good
5	06/05/2020	03/06/2020		50.0	57.9	54	5.6	10	50.2	37	99.65789082	Good	Good
6	03/06/2020	01/07/2020	56.6	52.8	54.1	55	1.9	4	4.8	33	100.1011871	Good	Good
7	01/07/2020	30/07/2020	38.0	34.5	33.1	35	2.5	7	6.3	22	99.3887091	Good	Good
8	30/07/2020	01/09/2020	62.2	61.3	66.7	63	2.9	5	7.2	41	99.80554616	Good	Good
9	01/09/2020	30/09/2020	64.3	57.5	59.5	60	3.5	6	8.7	34	96.0506135	Good	Good
10	30/09/2020	03/11/2020	55.4	39.2	52.7	49	8.7	18	21.6	31	73.32696179	Good	or Data Capture
11	03/11/2020	02/12/2020	67.4	66.0	51.4	62	8.9	14	22.0	38.14573	71.89165826	Good	or Data Capture
12	02/12/2020	06/01/2021	63.1	58.4	60.4	61	2.4	4	5.9	42.55494	97.17370594	Good	Good
13													

Diffusion Tubes Measurements · **Automatic Method** · **Data Quality Check**

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

Overall survey --> | Good precision | Poor Overall DC

Site Name/ ID:

Precision   12 out of 12 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 9 periods of data
Bias factor A   0.67 (0.62 - 0.74)
Bias B   49% (36% - 61%)
Diffusion Tubes Mean: 55 μgm^{-3}
Mean CV (**Precision**):   6
Automatic Mean: 37 μgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 37 (34 - 41) μgm^{-3}

Accuracy   (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 9 periods of data
Bias factor A   0.67 (0.62 - 0.74)
Bias B   49% (36% - 61%)
Diffusion Tubes Mean: 55 μgm^{-3}
Mean CV (**Precision**):   6
Automatic Mean: 37 μgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 37 (34 - 41) μgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Table O. Precision and Accuracy of triplicate Tubes Shepherds Bush (Urban Traffic Site)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

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
										Automatic Method		Data Quality Check	
1	07/01/2020	03/02/2020	57.4	59.4	50.0	56	5.0	9	12.3	57.10726	99.69135802	Good	Good
2	03/02/2020	06/03/2020	51.9	56.3	60.2	56	4.2	7	10.4	53.62224	99.73958333	Good	Good
3	05/03/2020	06/04/2020	42.9	42.4		43	0.3	1	2.8	41.73699	99.73958333	Good	Good
4	07/04/2020	06/05/2020	34.9	36.8	40.2	37	2.7	7	6.7	35.65536	99.13793103	Good	Good
5	06/05/2020	03/06/2020	43.0	45.6	42.6	44	1.6	4	4.0	33	99.99261502	Good	Good
6	03/06/2020	01/07/2020	51.4	56.3		54	3.5	6	31.1	35	59.10083366	Good	or Data Captu
7	01/07/2020	30/07/2020		54.3	48.9	52	3.8	7	34.3	39	55.06697659	Good	or Data Captu
8	30/07/2020	01/09/2020	42.9	50.1	45.3	46	3.7	8	9.1	42	97.3980681	Good	Good
9	01/09/2020	30/09/2020	47.9	52.8	45.9	49	3.6	7	8.8	37	82.26073201	Good	Good
10	30/09/2020	03/11/2020	42.2	48.9	48.3	46	3.7	8	9.2	0		Good	or Data Captu
11	03/11/2020	02/12/2020	59.5	65.7	60.2	62	3.4	5	8.4	44.45074	31.22751475	Good	or Data Captu
12	02/12/2020	06/01/2021	45.9	57.9	46.3	50	6.8	14	16.9	40.3577	100.011892	Good	Good
13													

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

Overall survey --> | Good precision | Poor Overall DC

Site Name/ ID:

Precision — 12 out of 12 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 8 periods of data
Bias factor A   0.9 (0.81 - 1)
Bias B   12%   (0% - 23%)
Diffusion Tubes Mean: 48 μgm^{-3}
Mean CV (Precision):   7
Automatic Mean: 43 μgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 43 (39 - 48) μgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 8 periods of data
Bias factor A   0.9 (0.81 - 1)
Bias B   12%   (0% - 23%)
Diffusion Tubes Mean: 48 μgm^{-3}
Mean CV (Precision):   7
Automatic Mean: 43 μgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 43 (39 - 48) μgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Table P. Bias Adjustment Factor and % Bias of all LWEP Monitored Co-Location Studies 2020

London Borough	Site Location	Diffusion Tube	Continuous Analyser	Correction Factor (A)	% Bias based on continuous monitor (B)
Kensington	North Kensington	22	21	0.94	6
LWEP	Bloomsbury	32	29	0.91	10
Hammersmith & Fulham	Shepherds Bush	48	43	0.90	12
Hammersmith & Fulham	Town Centre	56	37	0.67	49
Croydon	Park Lane	50	Low DC	N/A	N/A
Croydon	London Road	48	36	0.75	34
Greenwich	Eltham	18	14	0.82	22
Greenwich	Blackheath	36	29	0.80	25
Greenwich	Westhorne Av	30	24	0.80	24
Greenwich	Burrage	29	26	0.90	11
Greenwich	John Harrison Way	32	28	0.88	13
Greenwich	Woolwich Flyover	60	46	0.76	31
Greenwich	Bexley Falconwood	37	28	0.75	33
Newham	Cam Road	29	24	0.84	19

<u>Discussion of Choice of Factor to Use</u>

This year we considered use of a combined local factor from using the co-location studies at Shepherd's Bush and Hammersmith Town Centre, this would have resulted in a bias adjustment factor of 0.77. However this approach has been discounted as percentage data capture for both these automatic analysers was less than 90%, LLAQM.TG(19) suggests use of a national factor may be preferable in this situation. For this year the national factor, weighting the factor to account for 4 months of Gradko tubes and 8 months of Socotec diffusion tubes has been utilised, with a factor of 0.78. This approach also ensures that the results of diffusion tube monitoring are conservative, as the national factor is slightly higher than the combined local bias adjustment factor. Please see below table Q for calculation:

Table Q. Weighted National Bias Adjustment Factor

Laboratory	Bias adjustment factor from national factor spreadsheet	Months of tubes for which to multiply the laboratory bias adjustment factor	Bias adjustment factor multiplied by months of diffusion tubes utilised
Gradko	0.83	4	3.32
Socotec	0.76	8	6.08
		Overall adjustment factor	9.4/12= 0.78

The table of adjustment factors applied in Hammersmith from 2009 are shown below, the adjustment factor for 2020 is considerably lower than adjustment factors for previous years. From 2013, a local factor has been applied, initially from North Kensington and then from Shepherd's Bush in 2019.

Table R.   Bias Adjustment Factor 2009-2020

Year	Local or National (if known)	If Local, Version of National Spreadsheet	Adjustment Factor
2020	National	06/21	0.78
2019	Local-Shepherds Bush HF4	-	1.02
2018	Local- North Kensington	-	0.98
2017	Local-North Kensington	-	1.15
2016	Local-North Kensington		1.15
2015	Local-North Kensington		1.07
2014	Local-North Kensington		1.03
2013	Local-North Kensington		1.14
2012	-		1.01
2011	-		0.94
2010	-		0.93
2009	-		0.92

A.3   Adjustments to the Ratified Monitoring Data

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

Where data capture for automatic and non-automatic results is less than 75% and greater than 33% of a full calendar year (between 3 and 9 months), the mean has been "annualised", adjusted using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives. For 2020 this was completed for one tube, HF53.

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

Diffusion Tube ID	Annualisation Factor Putney Urban Background - rat	Annualisation Factor Wandsworth Town Hall	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m3)	Annualised Data Simple Annual Mean (µg/m3)
HF53	1.1344	1.1098	1.1221	24.7	27.7

Distance Adjustment

For monitoring sites where the concentration is greater than 36µg m^{-3} , and which are not representative of public exposure, the procedure specified in LLAQM.TG(19) to estimate the concentration at the nearest receptor has been followed using the tool available at Air Quality Assessment | LAQM (defra.gov.uk). The outputs from the spreadsheets are included in Table N below.

To complete the NO2 fall off with distance calculations a background value for each monitoring location is required. Background NO2 concentrations for 2020 have been derived from the Defra Background Map database that has a current baseline of 2018. Results have been distance corrected where applicable, distance correction has been completed for all roadside monitoring locations and not the Urban Background locations.

Table T.   NO$_2$ Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
HF4	2	8	43.0	28.1	38.2	
HF5	1.2	3.7	37	32.0	35.8	
HF03	1	6	54.7	23.0	44.8	
HF05	2	7	38.6	22.4	33.8	
HF07	1	4	39.8	23.5	35.2	
HF11	5	5	43.1	32	43.1	
HF14	1	4	38.8	27.3	35.6	
HF21/22/23	2	8	38.6	28.1	35.2	
HF31	3	8	38.3	26.0	35.2	

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
HF36	1	4.7	41.05	29.8	37.5	Predicted concentration at Receptor within 10% the AQS objective.
HF39	1	6	37.6	32.0	35.6	
HF41/42/43	1.5	3	43.8	32.0	42.0	Predicted concentration at Receptor above AQS objective.
HF46	1	4	41.3	29.8	38.1	Predicted concentration at Receptor within 10% the AQS objective.
HF52	1	6	50.8	26.8	42.1	Predicted concentration at Receptor above AQS objective.

Appendix B　　Full Monthly Diffusion Tube Results for 2020

Table U.　NO₂ Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
HF1	100	100	35.49	43.90	27.77	23.05	19.80	22.60	18.50	22.40	28.40	28.90	41.50	36.10	29.03	22.65
HF2	92	92	50.30	NR	32.50	24.87	26.20	27.30	25.70	31.30	41.10	53.00	55.50	40.20	37.09	28.93
HF3	100	100	75.57	63.63	53.64	50.45	63.90	70.00	64.60	83.40	79.00	79.10	79.40	79.30	70.17	**54.73**
HF4	100	100	32.13	23.24	20.30	23.21	17.30	18.80	13.20	22.70	24.10	24.60	35.10	31.90	23.88	18.63
HF5	100	100	58.05	48.63	41.17	44.18	46.00	45.00	37.40	58.00	56.50	52.30	57.40	48.70	49.44	38.57
HF6	100	100	46.05	34.18	33.93	30.36	27.80	33.70	30.10	37.50	45.70	39.20	45.90	39.90	37.03	28.88
HF7	100	100	61.88	55.61	48.14	39.23	39.60	44.80	43.30	55.10	64.00	56.00	58.80	45.90	51.03	39.80
HF8	100	100	25.51	22.54	18.17	20.49	15.80	15.40	11.50	19.10	23.10	24.70	32.30	31.30	21.66	16.89
HF9	100	100	40.87	33.03	28.70	34.08	26.80	25.80	21.10	31.00	31.60	30.40	48.40	39.70	32.62	25.45
HF10	100	100	37.69	30.46	23.25	22.68	17.00	19.50	16.00	25.30	26.80	27.30	37.80	26.40	25.85	20.16
HF11	100	100	73.45	53.64	47.39	49.32	48.20	47.90	43.80	61.00	64.00	57.30	60.00	57.40	55.28	**43.12**
HF12	75	75	30.52	27.98	NR	29.22	23.00	19.60	NR	21.40	NR	24.30	36.60	32.40	27.22	21.24
HF13	100	100	43.13	39.44	34.15	22.10	32.00	30.70	30.60	34.70	40.00	36.40	41.60	38.30	35.26	27.50
HF14	92	92	65.42	75.55		39.01	33.80	38.30	35.20	40.00	52.60	53.20	61.00	52.70	49.71	38.77
HF15	100	100	28.57	26.94	21.32	23.20	20.30	15.90	17.40	20.80	28.00	26.50	35.70	31.60	24.69	19.25
HF16	100	100	50.96	45.67	36.64	37.73	34.90	37.20	34.40	43.50	43.60	45.80	54.50	46.20	42.59	33.22
HF17	100	100	33.90	30.49	25.28	28.21	22.80	23.80	16.60	26.30	30.70	32.50	40.10	36.60	28.94	22.57
HF18	92	92	38.21	<0.66	27.43	27.08	24.10	27.70	23.30	35.50	37.40	32.50	38.30	29.70	31.02	24.20
HF19	100	100	52.10	47.17	35.15	28.63	33.70	32.30	36.20	38.10	45.70	43.40	58.60	49.30	41.70	32.52
HF20	92	92	33.86	27.46	23.16	20.01	17.50	17.70	13.90	20.50	25.60	25.10	NR	34.80	23.60	18.41
HF21	-	-	57.44	51.88	42.85	34.92	43.00	51.40	NR	42.90	47.90	42.20	59.50	45.90	-	-
HF22	-	-	59.38	56.27	42.41	36.80	45.60	56.30	54.30	50.10	52.80	48.90	65.70	57.90	-	-
HF23	-	-	49.97	60.21	NR	40.22	42.60	NR	48.90	45.30	45.90	48.30	60.20	46.30	-	-
HF24	100	100	49.73	45.53	41.37	41.46	38.10	41.60	23.90	41.20	49.40	44.60	58.30	53.90	44.09	34.39

HF 25	92	92	28.65	20.94	21.52	19.38	16.00	18.00	11.60		22.90	23.50	35.10	29.30	22.44	17.51
HF 26	100	100	32.30	24.61	22.38	22.62	17.20	15.10	14.40	18.90	25.00	24.20	32.80	31.20	23.39	18.25
HF27	100	100	41.35	39.18	30.51	31.20	24.00	23.90	22.30	28.70	33.90	33.10	42.90	38.30	32.44	25.31
HF28	100	100	41.46	33.61	28.09	30.05	23.90	24.10	19.80	32.80	37.00	34.00	48.70	43.70	33.10	25.82
HF29	92	92	60.26	54.19	39.86	38.76	38.10	39.40	35.50	42.90	42.10	42.20	53.40	NR	44.24	34.51
HF30	100	100	40.20	32.54	28.63	23.41	18.80	18.90	15.70	24.60	30.10	37.10	33.40	39.60	28.58	22.29
HF31	75	75		NR		41.66	46.50	47.10	35.30	52.40	61.60	42.70	59.00	55.80	49.12	38.31
HF32	100	100	42.53	36.97	26.93	21.37	20.50	20.60	21.10	25.00	30.30	33.50	38.00	38.40	29.60	23.09
HF33	100	100	37.50	31.04	25.78	27.19	23.90	24.10	21.00	25.60	29.40	31.20	40.80	37.80	29.61	23.09
HF34	100	100	30.95	24.39	23.13	20.93	15.60	15.40	12.70	20.30	25.30	25.50	28.10	33.50	22.98	17.93
HF35	100	100	42.07	36.33	31.71	30.87	31.80	31.40	25.50	39.10	31.50	34.00	44.00	45.40	35.31	27.54
HF36	75	75	NR	NR		41.61	49.00	52.40	46.50	53.30	58.50	51.90	56.50	64.00	52.63	**41.05**
HF37	100	100	51.19	45.03	38.16	33.54	30.00	34.90	30.60	42.00	42.70	41.90	53.50	48.20	40.98	31.96
HF38	100	100	27.73	23.71	24.69	24.42	18.60	19.80	14.00	21.20	27.20	24.60	37.80	32.20	24.66	19.24
HF39	100	100	54.36	49.55	39.25	32.62	42.70	40.30	36.30	51.60	61.10	53.10	66.50	51.60	48.25	37.63
HF40	75	75	NR	NR		26.48	22.70	22.50	20.20	27.70	31.80	29.10	39.20	38.70	28.71	22.39
HF41	-	-	71.55	60.72	55.93	59.77	NR	56.60	38.00	62.20	64.30	55.40	67.40	63.10	-	**-**
HF42	-	-	64.49	53.45	52.47	59.24	50.00	52.80	34.50	61.30	57.50	39.20	66.00	58.40	-	**-**
HF43	-	-	61.86	51.01	58.55	58.09	57.90	54.10	33.10	66.70	59.50	52.70	51.40	60.40	-	**-**
HF44	100	100	36.52	33.02	29.67	22.32	22.80	21.20	21.40	27.70	31.90	31.80	41.30	37.40	29.75	23.21
HF45	100	100	38.67	32.27	28.63	26.84	20.50	23.60	18.40	26.80	31.60	21.20	42.80	37.70	29.08	22.69
HF46	92	92	75.21	65.07	NR	43.52	46.90	49.20	43.90	56.20	54.30	33.90	64.40	50.00	52.96	**41.31**
HF47	100	100	42.05	35.84	30.03	23.90	25.40	27.50	27.90	29.20	37.00	24.90	47.20	39.60	32.54	25.38
HF48	83	83	NR	NR	36.64	31.28	34.20	39.70	29.50	41.50	43.20	45.80	54.00	46.40	40.22	31.37
HF49	100	100	29.23	32.43	30.98	27.87	31.80	25.90	23.10	33.10	39.00	35.40	48.00	40.90	33.14	25.85
HF50	100	100	47.94	38.60	30.65	24.29	22.40	28.00	23.40	29.30	35.90	36.20	47.30	42.60	33.88	26.43
HF51	92	92	44.17	34.42	NR	29.87	27.00	25.90	21.30	31.20	38.50	34.60	50.20	40.20	34.31	26.76
HF52	100	100	84.30	73.55	53.96	44.39	53.50	71.70	61.70	65.60	72.10	68.60	66.30	65.60	65.11	**50.78**
HF53[a]	42	42	NR	NR		23.72	28.60	21.00	13.70	NR	NR	NR	NR	36.40	27.7[a]	21.61[a]
HF54	100	100	35.11	25.75	27.43	25.55	19.90	24.40	18.50	28.00	34.10	28.90	43.20	34.10	28.75	22.42
HF55	92	92	31.43	NR	23.31	20.20	17.30	16.50	15.50	20.80	26.90	23.30	32.50	31.50	23.57	18.38
HF56	75	75	35.49	32.63	32.14	23.05	25.80	30.40	17.30	34.40	35.20	38.90	NR	39.80	31.84	24.84
HF 21/22/23	100	100	55.60	56.12	42.63	37.31	43.73	53.85	51.60	46.10	48.87	46.47	61.80	50.03	49.51	38.62
HF 41/42/43	100	100	65.96	55.06	55.65	59.03	53.95	54.50	35.20	63.40	60.43	49.10	61.60	60.63	56.21	**43.84**

Notes

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

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

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

[a] All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 33%.

HF53 Raw annual result of 24.7 ug m3 annualised to 27.7 using average annualization factor of 1.12 see table S.

(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%).

NR= No result

Erroneous Result- extreme low concentration excluded from calculation

Triplicate Tube

Contaminated Result

Exposure time of tube too long