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

Contact details

Juhaina Junaid
Environmental Health
Regulatory Services
London Borough of Brent

Brent Civic Centre
Engineers Way
Wembley
HA9 0FJ

Tel: 02089375252
ens.monitoring@brent.gov.uk

[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). https://www.london.gov.uk/what-we-do/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 μg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 μg m^{-3}	Annual mean	31 Dec 2005
Particles - PM_{10}	50 μg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 μg m^{-3}	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 μg m^{-3}	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020
Sulphur Dioxide (SO_2)	266 μg m^{-3} not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
	350 μg m^{-3} not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 μg m^{-3} mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

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

1. Air Quality Monitoring

The London Borough of Brent operates three automatic monitoring stations situated at roadside (R) sites (BT4, BT6 and BT8) and one at an industrial (I) location (BT5). The Ikea site (BT4)[2] measures NO_2, PM_{10} (by TEOM, Tapered Element Oscillating Microbalances), and $PM_{2.5}$ (by TEOM); the Neasden Lane site (BT5) measures NO_2 and PM_{10} (by TEOM); the John Keble Primary School site (BT6) measures NO_2 and PM_{10} (by TEOM); and Ark Franklin Primary Academy site (BT8) measures NO2, PM_{10} (by TEOM), and $PM_{2.5}$ (by TEOM). All monitoring sites are within the Council's AQMA. The London Borough of Brent monitors annual mean NO_2 concentrations using passive diffusion tubes at 44 sites located throughout the Borough. In 2018, diffusion tubes were setup to include 42 roadside locations and 2 background locations (Site ID 33A and 71). However, in 2018 due to staff shortages NO_2 diffusion tube monitoring was not undertaken most of the year. Therefore, the non-automatic monitoring data presented here for 2018 could not be annualised.

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2018

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
BT4	IKEA	520866	185169	Roadside	Y	38	2	2.5	NO2, PM10, PM2.5, O3	Chemiluminescent, TEOM, VCM method
BT5	Neasden Lane	521511	185204	Industrial	Y	35	4	2.5	NO2, PM10	Chemiluminescent, TEOM

[2] The Ikea site (BT4) is a King's College Supersite and in addition to the pollutants listed above it also measures carbon dioxide (CO_2) and ozone (O_3).

BT6	John Keble Primary School	521619	183554	Roadside	Y	10	2	2.5	NO2, PM10	Chemiluminescent, TEOM
BT8	Ark Franklin Primary Academy	523716	183030	Roadside	Y	10	2	2.5	NO2, PM10, PM2.5	Chemiluminescent, TEOM

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

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
1	Junction of Kenton Rd / Upton Gardens	516929	188560	Roadside	Y	15	2	1.5	NO2	N
2	Harrow Rd, Sudbury Court Drive	515793	186042	Roadside	Y	10	1	1.5	NO2	N
4	Junction of Shaftesbury Avenue / Woodcock Hill	518240	187747	Roadside	N	6	1	1.5	NO2	N
7	Bridgewater Rd / Ealing Road	517942	183721	Roadside	Y	17	2	1.5	NO2	N
9	Junction of East Lane / Wembley Hill Road	518499	186168	Roadside	Y	20	2	1.5	NO2	N
17	Old Church Lane junction with Neasden Lane	520480	186537	Roadside	Y	4	1	1.5	NO2	N
21a	Central Way, Park Royal	520077	182853	Roadside	Y	4	1	1.5	NO2	N
22	Junction of Kingsbury Road / Edgware Road	521447	188730	Roadside	Y	5	1	1.5	NO2	N
23	Junction North Circular Rd / Chartley Avenue	521213	186125	Roadside	Y	10	2	1.5	NO2	N
26	Dudden Hill Lane junction with High Road	522191	184821	Roadside	Y	19	1	1.5	NO2	N
29	Junction Dollis Hill Lane / Cricklewood	523191	186571	Roadside	Y	12	1	1.5	NO2	N
30	Chichele Road near Melrose Ave	523663	185353	Roadside	Y	9.8	1	1.5	NO2	N
33a	Fryent Country Park	519572	187691	Urban background	Y	500	1	1.5	NO2	N
41	R/O 246 Neasden Lane	521455	185920	Roadside	Y	3	4	1.5	NO2	N
48	Kilburn Park Rd near junction with Shirland Rd	525196	182517	Roadside	Y	2	1	1.5	NO2	N
52	IKEA,Hut, North Circular Rd (4 tubes)	520874	185173	Roadside	Y	40	1	1.5	NO2	Y
53	Junction Ealing Road / High Road	518026	185028	Roadside	Y	15	1	1.5	NO2	N
54	Ealing Road/Riverside Gardens	518236	183207	Roadside	Y	4	1	1.5	NO2	N
60	Junction of Bridge Road/Forty Avenue	519475	186557	Roadside	Y	35	1	2	NO2	N
61	Forty Lane, F/O Old Brent Town Hall	519762	186600	Roadside	Y	40	1	2	NO2	N
62	Junction of Kings Drive/Forty Lane	519667	186604	Roadside	Y	40	1	2.5	NO2	N
63	King's Drive, Opposite 37 King's Drive	519703	187007	Roadside	N	7	1	2.5	NO2	N
64	The Paddocks, Opposite 9 The Paddocks	519824	186715	Roadside	Y	20	1	2.1	NO2	N
65	Junction of Aybone Road/ NCR, Next to 517 NCR	521313	186529	Roadside	Y	7	1	2.2	NO2	N
66	Junction of Heather Road/Tanfield Avenue	521912	186514	Roadside	Y	12	1	2.1	NO2	N
67	Dawpool Road, F/O 24 Dawpool Road	521651	186611	Roadside	Y	5	1	2.1	NO2	N

68	Junction of Randall Avenue/NCR, Next to 730 NCR	521448	186626	Roadside	Y	5	1	2.5	NO2	N
69	Wrentham Avenue, F/O 65 Wrentham Avenue	523782	183527	Roadside	Y	8	1	2.1	NO2	N
70	Junction of Peploe Road/Chevening Road	523828	183338	Roadside	Y	5	1	2.1	NO2	N
71	Queens Park recreational area, On CCTV camera post	524179	183232	Urban background	Y	25	45	2.1	NO2	N
72	Harvist Road, F/O 139 Harvist Road	524142	183120	Roadside	Y	5	1	2.1	NO2	N
73	Junction of Harvist Road/Salisbury Road	524607	183267	Roadside	Y	3	1	2.1	NO2	N
74	Junction of Salisbury Road/Chevening Road	524283	183882	Roadside	Y	5	3	2.1	NO2	N
75	Junction of Woodcock Hill/Woodcock Hill	517499	187778	Roadside	Y	15	3	2.2	NO2	N
76	Lindsay Drive, near junction with Branksome way	518430	188406	Roadside	N	5	1	2.2	NO2	N
77	Beverly Drive, near junction of Sandhurst road	519100	189827	Roadside	N	11	2	2	NO2	N
78	Harrow Road junction of Watford Road	516721	185478	Roadside	Y	12	2	2.5	NO2	N
BRT 42	Police Station, Craven Park	521131	183995	Roadside	Y	3	3	1.5	NO2	N
BRT 43	Pitfield Way	520242	184541	Roadside	Y	20	2	1.5	NO2	N
BRT 53	High Road Wembley	518303	185181	Roadside	Y	0	0.5	1.5	NO2	N
BRT 55	High Street, Harlesden	521743	183361	Roadside	Y	3	0.5	1.5	NO2	N
BRT 56	Chamberlayne Road	523635	183153	Roadside	Y	15	0.5	1.5	NO2	N
BRT 57	Kilburn Bridge	525419	183612	Roadside	Y	8	0.5	1.5	NO2	N
BRT 58	51 High Road, Willesden	523031	184655	Roadside	Y	2	0.5	1.5	NO2	N

1.2 Comparison of Monitoring Results with AQOs

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

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

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (μgm^{-3})						
				2012 [c]	2013 [c]	2014 [c]	2015 [d]	2016 [c]	2017 [c]	2018 [d]
BT4	Automatic	90	90	**76.1**	N/A	**79.7**	**41.0**	**76**	**72**	**71**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
				2012 [c]	2013 [c]	2014 [c]	2015 [d]	2016 [c]	2017 [c]	2018 [d]
BT5	Automatic	98	98	**44.0**	38.9	N/A	38.8	**44**	**45**	38
BT6	Automatic	100	100	**41.1**	37.5	N/A	N/A	**45**	**45**	39
BT8	Automatic	96	96	N/A	N/A	N/A	N/A	N/A	**54**	**46**
1	Diffusion tube	60	10	37.9	**41.0**	**41.9**	**40.1**	**41.13**	36.23	LD
2	Diffusion tube	60	10	**42.2**	**46.9**	**46.1**	**41.7**	**51.00**	**41.76**	LD
4	Diffusion tube	60	10	**41.8**	**45.3**	**47.9**	**40.3**	**51.08**	**42.74**	LD
7	Diffusion tube	60	10	**59.7**	**71.2**	**69.4**	**62.3**	**71.65**	**62.79**	LD
9	Diffusion tube	60	10	**46.6**	**50.5**	**53.9**	**47.3**	**57.11**	**49.86**	LD
17	Diffusion tube	60	10	**52.8**	**55.5**	**59.6**	**55.4**	**62.49**	**55.67**	LD
21A	Diffusion tube	60	10	**47.1**	**49.5**	**55.1**	**48.7**	**55.13**	**46.90**	LD
22	Diffusion tube	60	10	**54.1**	**57.9**	**64.7**	**56.7**	**65.05**	**58.14**	LD
23	Diffusion tube	60	10	**92.8**	**104.5**	**108.7**	**93.2**	**115.39**	**93.88**	LD
26	Diffusion tube	60	10	**60.4**	**65.4**	**68.9**	**63.9**	**73.69**	**61.93**	LD
29	Diffusion tube	60	10	**75.8**	**79.0**	**82.7**	**74.1**	**85.97**	**55.58**	LD
30	Diffusion tube	60	10	**64.6**	**62.5**	**58.6**	**52.6**	**62.63**	**51.29**	LD
33A	Diffusion tube	60	10	24.7	26.3	26.1	22.9	29.14	22.21	LD
41	Diffusion tube	60	10	**61.6**	**57.6**	**65.7**	**60.7**	**74.41**	**60.05**	LD

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
				2012 [c]	2013 [c]	2014 [c]	2015 [d]	2016 [c]	2017 [c]	2018 [d]
48	Diffusion tube	60	10	**76.6**	**70.5**	**63.1**	**56.5**	**71.57**	**59.95**	N/A
52	Diffusion tube	60	10	**102.8**	**104.1**	**103.4**	**87.9**	**102.10**	**86.59**	LD
53	Diffusion tube	60	10	**66.9**	**64.4**	**70.0**	**66.6**	**83.85**	**68.34**	LD
54	Diffusion tube	60	10	**49.7**	**47.0**	**50.3**	**47.1**	**52.49**	**46.00**	LD
60	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
61	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
62	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
63	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
64	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
65	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
66	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
67	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
68	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
69	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
70	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
71	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
72	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
				2012 [c]	2013[c]	2014 [c]	2015 [d]	2016 [c]	2017 [c]	2018 [d]
73	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
74	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
75	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
76	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
77	Diffusion tube	60	10	N/A	N/A	N/A	N/A	N/A	N/A	LD
BRT 42	Diffusion tube	60	10	**45.1**	**48.5**	**47.7**	**41.8**	**49.77**	**42.38**	LD
BRT 43	Diffusion tube	60	10	**64.2**	**66.9**	**72.7**	**80.3**	**80.65**	**73.71**	LD
BRT 53	Diffusion tube	60	10	**64.8**	**75.0**	**77.1**	**75.7**	**80.77**	**64.95**	LD
BRT 55	Diffusion tube	60	10	**76.2**	**70.4**	**76.2**	**73.5**	**91.83**	**76.69**	LD
BRT 56	Diffusion tube	60	10	**75.2**	**70.1**	**67.7**	**56.8**	**69.43**	**58.29**	LD
BRT 57	Diffusion tube	60	10	**100.8**	**88.0**	**86.2**	**85.3**	**84.21**	**64.43**	LD
BRT 58	Diffusion tube	60	10	**68.2**	**65.4**	**65.6**	**58.1**	**65.73**	**52.75**	LD

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

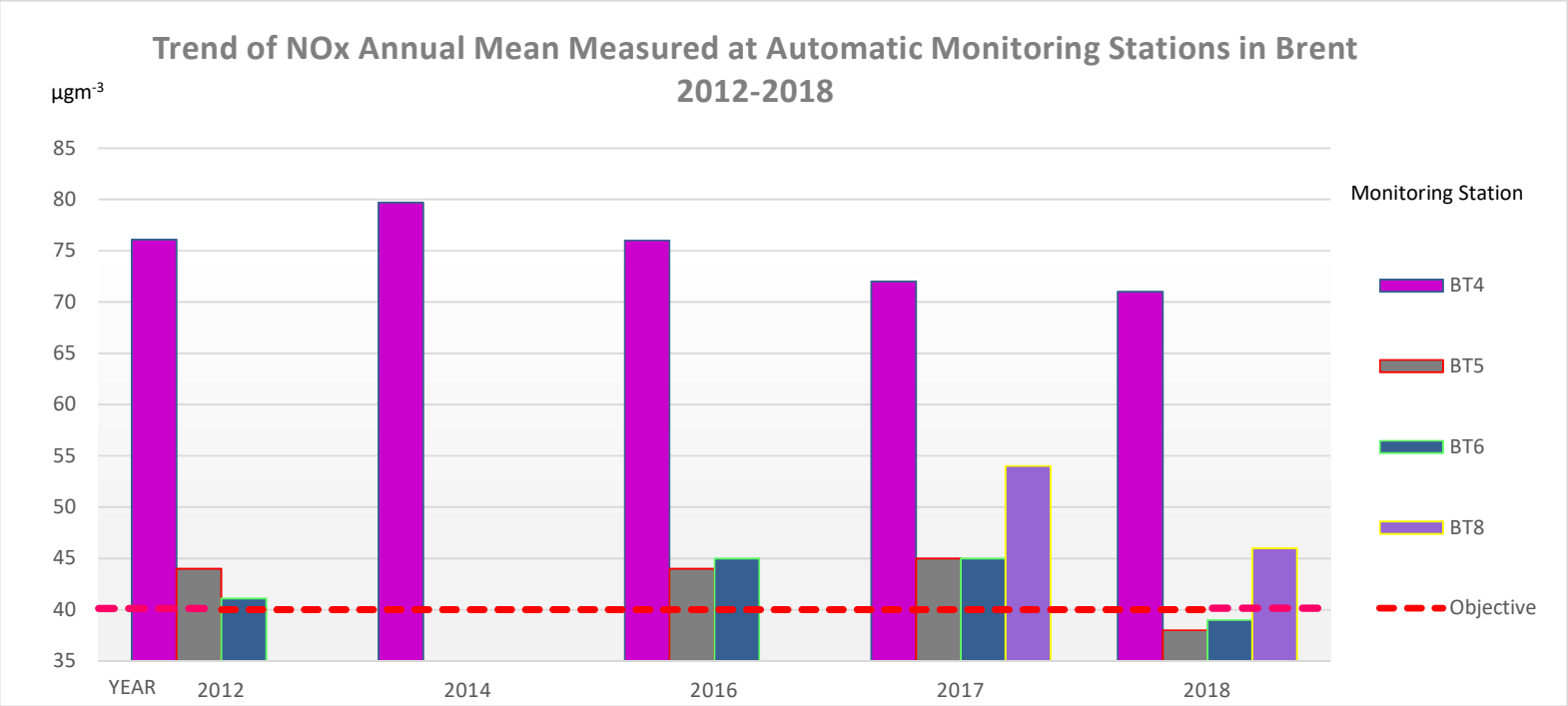
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO^2 hourly mean AQS objective are shown in bold and underlined.

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

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

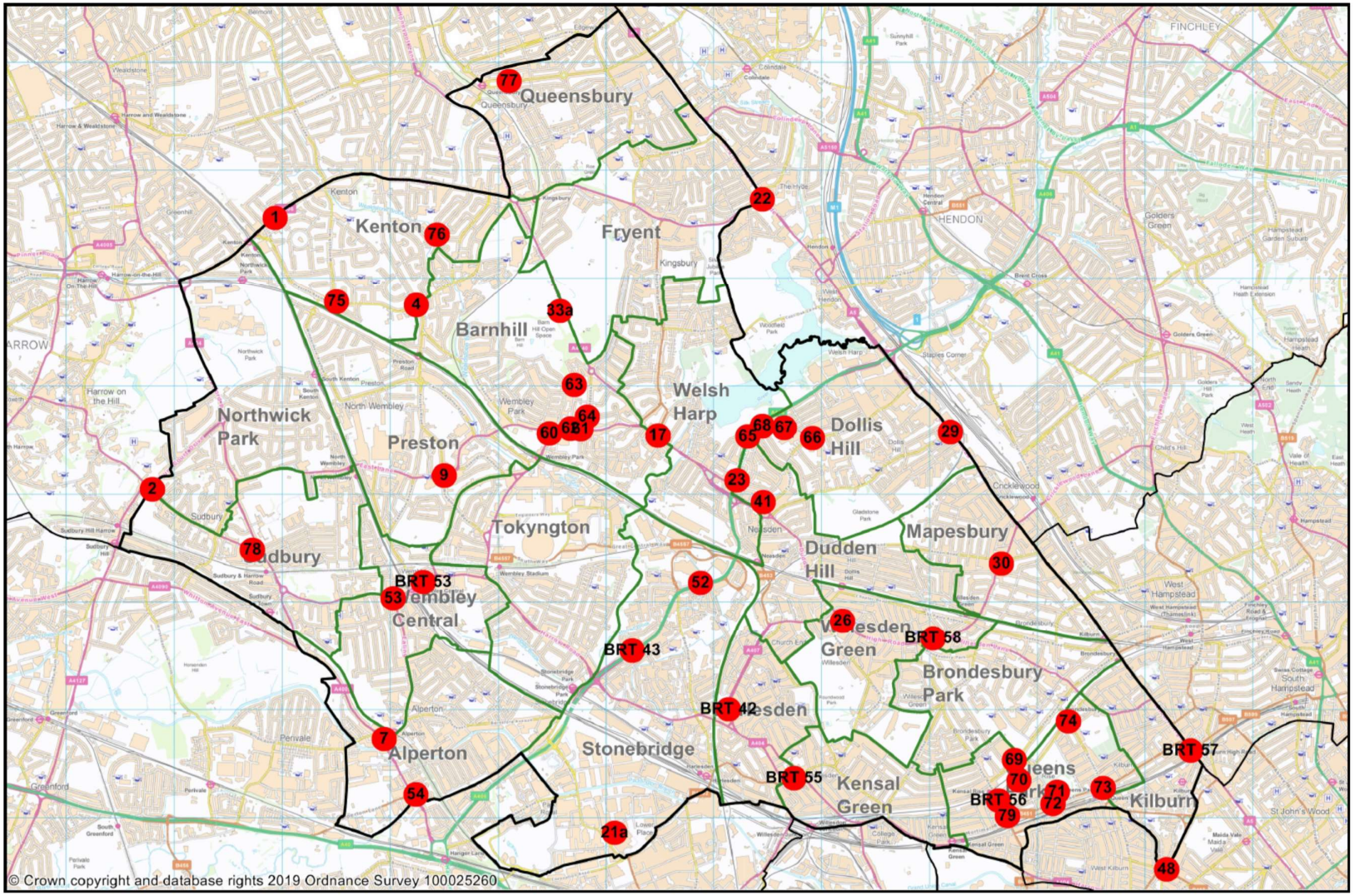
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

[d] LD: Low Data Capture Rate: Therefore Not "annualised" (as per TG16), due to extremely low data capture or unavailability of an appropriate annualisation factor for all diffusion tube sites.



Overall, there appear to be a decline in the annual NOx levels measured in Brent since 2014. This can be observed in all automatic and non-automatic monitored sites. See trend related graphs below. However, the background NOx levels observed at our long-term monitoring sites (33A) do not show much decline overall. During 2018, however, the data collection using the diffusion tubes was poor and therefore further monitoring is needed to confirm the above statements. Although a decline in the annual mean NOx levels are being observed, the pollution levels in Brent is still a serious concern. The automatic monitoring station at IKEA (BT4), is near the North Circular Road and has been measuring high levels of exceedances since 2012. Diffusion tubes located along the North Circular (BRT43, 23 and 52) consistently has measured very high levels of NOx, and has been above 70 μgm^{-3} in 2018 as well (see Table B.1 in Appendix). The diffusion tube network has been extended in comparison to the 2017 network to target residential areas where traffic calming measures are being implemented. Data shows, Annual NOx levels at most of northern part of Brent and at some residential areas at the south which are set back from the major roads, are likely to meet the AQ objectives for NOx.

Brent NO2 Diffusion Tube Locations 2019



16 May 2019

1:47000

0 500 1000 metres

Brent

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 µg m^{-3}						
			2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
BT4	*90%*	*90%*	**32**	**N/A**	10	0	**33**	**33**	1
BT5	*98%*	*98%*	0	0	**N/A**	0	**25**	17	1
BT6	*100%*	*100%*	0	0	**N/A**	**N/A**	0	0	0
BT8	*96%*	*96%*	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	0	0

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

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

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

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

This objective has been met for all sites in 2018 in Brent.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
			2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
BT4	*99%*	*99%*	32.9	34.1	28.6	29.2	33	33	32

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
			2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
BT5	*99%*	*99%*	32.5	26.5	24.1	31.3	31	30	28
BT6	*84%*	*84%*	24.4	25.3	21.2	16.9	20	20	20
BT8	*88%*	*88%*	N/A	N/A	N/A	N/A	N/A	19	19

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

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

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

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

PM10 annual mean concentration objective has been met at all Brent sites in 2018. However, areas along the north circular road still is high compared to rest of London. Also the 7-year trend is not showing any significant decline on the measured levels at BT4. BT5 is located near an industrial area, and some major regulatory interventions during 2007 and 2012 helped reduce the PM10 levels in that area significantly.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µg m^{-3}						
			2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
BT4	*99%*	*99%*	35	**38**	26	23	**45**	**41**	**37**
BT5	*99%*	*99%*	**57**	17	5	15	**37**	29	22
BT6	*84%*	*84%*	11	10	1	1	9	20	1
BT8	*88%*	*88%*	N/A	N/A	N/A	N/A	N/A	0	1

Notes: Exceedance of the PM_{10} short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

This objective remains an issue for BT 4 site. Again this is related to the traffic on the North Circular Road. BT5 also shows a large number of days where 24-Hour mean is above 50 µg m^{-3}. However, this is significantly better that 2016 and measurements are showing a gradual decline.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3}) [$PM_{2.5}$ (not reference equiv.)(FINE)]						
			2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
BT4	*99%*	*99%*	23.7	24	22.9	20.4	23.7	21.4	20
BT8	*97%*	*97%*	N/A	N/A	N/A	N/A	N/A	14.7	14.6

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%

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of London Borough of Brent's progress against the Air Quality Action Plan, showing progress made this year.

Table J. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress
Cleaner Transport – increase provision of sustainable transport and accelerate uptake of new low emission vehicles in borough fleet	Increase modal share for Walking and Cycling	Our Long Term Transport Strategy 2015 – 2035 outlines our objectives for the provision of sustainable transport and includes a commitment reduce air pollution in the borough. 2 core objectives are to increase the uptake of sustainable and active modes of transport such as cycling and walking and reduce exposure to pollution generated by the Brent transport network. Walking accounts for 29% of trips and cycling 1% in Brent. In recognition of the need to increase modal shift from passenger vehicle use to active and sustainable travel modes of transport such as cycling and walking and separate strategies have been created. The Long Term Transport Strategy can be viewed via https://www.brent.gov.uk/media/16403671/transport-strategy-2016.pdf Brent's Walking Strategy was published in 2016. Brent Council offers free cycle training to all residents (adult and children) as well as staff in Brent businesses and have provided cycle training to over 1200 Brent residents. Walking Strategy can be viewed via https://www.brent.gov.uk/media/16407830/brent-walking-strategy-2017-2022.pdf Cycling Strategy can be viewed via https://www.brent.gov.uk/media/16407708/cycle-strategy-updated-april-2017.pdf
	Targeted reduction of vehicle diesel use in Brent	Our charges for resident parking permits reward environmentally responsible behaviour and are designed to encourage residents to consider the contribution their vehicle makes to climate change and local air quality. In 2017/18 the council consulted residents on plans for changes to our parking fees and charges, aiming to further promote the modal shift from passenger vehicle use to active and sustainable travel. Plans included the implementation of increased fees for Essential User permits and residential parking permits for household's second and third vehicles and the introduction of a £50 levy on resident parking permits for diesel vehicles. This was implemented from 1st October 2018 with further increases proposed annually to 2020. Our parking permit charges are based on emissions and more info regarding them can be found at https://www.brent.gov.uk/services-for-residents/parking/parking-permits/parking-charges/

	Increasing access to low emission or alternative fuels, speeding up the introduction of the cleanest vehicles to our fleet by upgrade or replacement	The Edgware Road (Kilburn to Maida Vale) Low Emission Bus Zone, has been estimated to have delivered 90% reduction in NOx emissions from the buses along that section of the road in 2018. That's approximately 39 tonnes NOx less from the year before. The A5 corridor (eastern boundary of Brent) was declared a low emission bus zone in 2018 and resulted in the introduction of Euro VI buses on 5 routes serving this corridor. Low Emission Bus Zone on the A5 – see for more information and a map showing which routes this benefits https://www.brent.gov.uk/your-community/brent-going-green/cleaner-and-greener-bus-routes/
	Encourage Car Clubs to use low emission and alternative fuel vehicles in their fleet	The Long Term Transport Strategy includes a commitment to create a Car Club Management Plan. The council will work with car club operators to identify options for increasing the take-up of car club vehicles and provision of the least polluting vehicles for use. We also identify opportunities for the provision of car clubs in new development schemes, in considering areas for controlled parking provision and in response to requests from residents.
	Cleaning Council Fleet	The council seeks to reduce emissions from our own fleet wherever practicable. This includes the provision and use of electric and hybrid vehicles, the upgrade of all Brent Transport vehicles to Euro 6 and regular review of vehicle provision to identify opportunities for further reduction of vehicles in our fleet. The Council also utilises ZipCar vehicles as part of our fleet, maximising opportunities for the efficient use of vehicles locally whilst reducing our contribution to local congestion and pollution. We continue to review locations to determine where demand is greatest and will factor this into future actions to be defined in the Car Club Management Plan and the emerging Procurement Policy.
	Support the installation of on-street electric vehicle charge points throughout Brent Support the take-up of electric taxis	The council installed 30 active, freestanding charge points and associated parking infrastructure as part of the Source London network. Further 45 Source London to be installed subject to consultation by March 2020. The council has been identifying suitable locations for the installation of London Rapid Chargers for use by residents with no access to off-street charging points, Taxi drivers and other private hire operators in the borough. 50 additional charge points were installed within March 2019. Further 85 lamp column chargers to be installed subject to funding being secured by March 2020. Brent will also install 4 rapid charge points subject to public consultation. We will start trial of 'flush' charge points in September 2019 subject to grant approval.

	and commercial vehicles.	
	Implement a Strategy for Transport Planning that supports air quality objectives	In exercise of our strategic objectives the council regular reviews and updates our Local Transport Plan (as our Local Implementation Plan). A core aim is to reduce the environmental impacts of transport via provision of improved infrastructure for cycling and walking, maintenance, repair and improvements to highways infrastructure to eliminate pinch points and otherwise improve traffic flows.
Cleaner Transport – Tackle unnecessary idling by taxis, coaches and other vehicles	Raising local awareness of idling action	Brent continues to tackle idling near schools via the 'no-idling campaign' in local schools. Further 60 signs in selected locations and hotspots has been installed. The council has recruited Community Air Quality Champions to assist in raising awareness about idling at local taxi ranks, bus stands and schools. The Brent communications team is also working to raise awareness of idling action via a communication strategy for idling action events. These events are published on the Brent website. Air Quality Information leaflets are distributed at events directly to the public which contain information on air quality and what local residents can do to help improve it. For London car free day, Brent transportation department plan to have a clean air fair on Ealing Road, where parts of the major road will be closed during the event.
	Regulation of engine idling Reducing the number of complaints about local idling	Complaints logged with the council regarding engine idling are relatively low compared to others. No formal enforcement action was taken in respect of these complaints in 2018. The council uses complaints and other information to identify idling hotspots which can be targeted for local awareness raising and action. Environmental Enforcement Officers at Brent are now trained and equipped to issue idling FPNs. They have taken part in recent anti-idling events at schools and plans to take part in future events. Brent has signed up to the pan-London anti idling project, where we plan to hold 8 anti-idling events, 6 at schools and 2 at the hospitals in Brent.
Public Health and Community Engagement	Raising awareness in the community	The council publishes information about air quality on our website. We have maintained our membership of the London Air Quality Network annually throughout this time to ensure ready access to current air quality information is available to the public. The Council annually reviews its Air Quality Management Areas using a range of data sources. We make this information available via our web pages and provide additional information upon request. In addition, we regularly attend residents meetings to advise and update about local air quality action.

		The council promotes air quality action via initiatives such as Walk on Wednesdays and Play Streets for schools throughout the year. In addition, we plan local campaigns to raise awareness about local air quality on National action days such as Clean Air Day and Car Free Day.
	Engage with Local Business to reduce local air pollution	The main mechanism for engaging with local businesses is via uptake and implementation of workplace travel plans. We have started work to produce general guidance for local businesses to include opportunities for engaging local businesses in local air quality action. The West London Air Quality Cluster Group working with Global Action Plan will launch the Clean Van Commitment where businesses in target areas will be encouraged and guided to change their fleet or service vehicles to cleaner alternatives.
	Ensure schools join the school travel planning programme	All Brent schools have travel plans and we are currently working with those with existing travel plans to achieve higher levels of compliance, attain STARS accreditation or maintain existing gold accreditation in the same scheme. In Brent 50 schools and 20 nurseries have an active travel plan promoting sustainable and safe ways of travelling. 40% of schools with existing travel plans have attained a higher level of compliance.
Exposure Reduction	School Audit programme	The Mayor of London launched their School Air Quality Audit Programme in 2017. 2 Brent primary Schools, Ark Franklin Primary Academy & John Keble C of E Primary School, participated and the council has provided match-funding to implement action plans devised from each bespoke audit in 2018. The council also identified schools subject to the greatest exposure to pollution based on the principles outlined in the Mayors audit programme. Brent launched the Breathe Clean project to audit all primary schools in November 2018. Total of 66 schools were audited for indoor and outdoor air quality in phase one of the project. In phase two, 23 primary schools will be audited.
	Identify and develop Low Emission Neighbourhood~~s~~ where feasible	The council has begun work to explore options for the provision of measures which will contribute to local low emission neighbourhoods or areas. Initially will target action in four areas – Neasden Town Centre, Church End, Wembley and Tokyngton and the Kilburn Regeneration Area. Two areas were identified for the development of low emission neighbourhoods, however funding for these developments were not awarded through the MAQF. Further funding is currently being sought.

	Reduce emissions to air from industrial installations	The council regulates some polluting processes via the Environmental Permitting Regime to ensure businesses with the greatest polluting potential comply with the law. The council ensures that local emissions from the polluting of these installations are appropriately controlled. Each is inspected in accordance with an agreed regime and the council expects to complete all by the end of the year. No enforcement action was taken in respect of these installations.
	Targeted upgrade of green infrastructure	The council aims to double current planting numbers and has committed to planting around 18000 street trees. We aspire to plant more where we can continually identify opportunities for the enhancement of green infrastructure at appropriate locations, especially in areas where exposure to poor air quality is high and provision of green space is low. In 2018 another 30 trees were planted spring. In addition, the council is committed to encouraging local residents to contribute to identification of new areas, maintenance of green space and, with this aim, endorses community-led programmes such as Adopt-a-Tree so that residents can take ownership of green spaces in their local areas.
	Promote air pollution forecasting and route planner tools	The council is currently a member of the Airtext consortium. We continue to promote the use of the AirText messaging service via our website and community events such as air quality action days. Brent action matrix objective is to promote the airtext service for the uptake of 50 new users in the borough for 2019/ 2020. We also continue to promote route planning applications such as Walkit to allow the community to make informed travel choices on high pollution days. The council ensures air quality impacts are communicated when promoting initiatives such as Walk and Stride and during public consultation of key documents such as the Cycling strategy and Long Term Transport Strategy.
Emissions from Developments and Buildings	Reduce construction emissions	The council reviews potential air quality impacts from all major development and, in accordance with local- and regional policy (and the GLAs Supplementary Planning Guidance) requires developers to mitigate impacts from construction dust and plant / vehicle emissions. In 2018 Construction Management Plan were reviewed and agreed for 15 development sites. Where appropriate, controls are implemented to ensure that development is air quality neutral. The council is currently a member of the London Low Emission Construction Partnership (LLECP) and has just begun work to inspect sites in the Borough to determine compliance with the Non-Road Mobile Machinery (NRMM) regulations. To date we have conducted 20 proactive inspections.

	Limit impact of new development using planning controls	The council reviews all new planning applications for potential air quality impacts and requires all new development have no additional impact on local air pollution as a minimum requirement. The council undertakes proactive assessment of the air quality impacts of new development, reviews construction method statements, enforces planning and environmental legislation and requires all new development to be air quality neutral or better.
	Enforce Combined Heat and Power and biomass air quality policies	No requests for agreements under Section 106 or via the Community Infrastructure Levy were made in 2018 to secure air quality improvements.
	Promote energy efficiency retrofitting projects in workplaces and homes	The council requires all new major developments use low and ultra-low emission as standard practice, via the planning regime. The council reviews all applications to ensure that all energy generating equipment such as boilers achieve the highest emission standards. The council proactively promotes initiatives to cut energy use, signpost commercial and residential building owners to assist them to replace old boilers and encourage them to adopt other measures to get the most out of energy they use. An example of this is Brent current partnership with the Mayor of London on an innovative new scheme offering high-quality solar photovoltaic (PV) panels to help deliver the Mayor's vision of a zero-carbon city. In 2018 Brent helped install PV panels at approx. 70 local residential properties, resulting in more than 180 KW green energy generation and a CO_2 saving of just under 50 tonnes.
	Promote and enforce Smoke Control Zones	Brent is entirely a smoke control zone and the council control the types of fuels that should be used in commercial and domestic buildings by enforcement of the Clean Air Act. The council issues guidance to assist businesses and residents to make informed choices about the least polluting fuels and equipment they can use.
	Reduce emissions from the burning of waste and from waste facilities	The council actively discourages the domestic burning of waste and provides alternatives such as green waste collection service. Burning of waste on commercial premises and at waste facilities is prohibited. The council received 4 complaints in 2018 in relation to waste sites within the borough. The council effectively managed this via liaison with the regulatory authority, the Environment Agency, where appropriate. No formal enforcement action was required.

	Improve energy efficiency in council buildings	A district heating system is being introduced to buildings within South Kilburn Regeneration zone. Also cleaner and greener energy sources are being used and some fuel cells are being installed to reduce total emissions from the system. Brent council is also streamlining all its energy usage and supplies to create a more efficient system for all Brent owned and operated buildings. Supplier contract renewals are also going to include requirements for greener energy sources this year. Our Civic Centre is officially recognised as the greenest public building in the UK, through its BREEAM Outstanding accreditation. Information about the sustainable elements of the Centre can be found in the building case study which formed part of the BREEAM assessment. The council is currently reviewing energy use in Brent-owned buildings and associated operations to determine options for reducing emissions. We signpost commercial and residential building owners to initiatives such as the GLA-led RE:NEW and RE:FIT programmes. In 2018 the council replaced approx. 21,000 street lights with new, energy efficient LED (Light Emitting Diode) lights. A reduction in energy cost of approximately £850,000 per year as well as carbon emissions.
Delivery Servicing and Freight	Update our procurement policies	The council's procurement policy is scheduled for review this year. Environmental performance of suppliers in all new contracts and this is a key selection criterion in our tendering process. We are also committed to reviewing existing contracts to ensure that opportunities for improvements are identified and will set out our environmental standards in our updated policies.
	Investigate options for less polluting deliveries	Since October 2017 the council has been supporting projects related to re-timing commercial deliveries to help reduce local vehicle emissions and congestions.

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in LB of Brent in 2018

Action	Number
a) Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	*35*
b) Number of planning applications required to monitor for construction dust	2
c) Number of CHPs/Biomass boilers refused on air quality grounds	0
d) Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	2
e) Number of developments required to install Ultra-Low NO_x boilers	18
f) Number of developments where an AQ Neutral building and/or transport assessments undertaken	15
g) Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	2
h) 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
i) NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	N/A
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.	5 conditions included

All Planning cases are assessed for potential environmental risk factors including air quality issues especially if they fall within or are adjacent to the AQMA in Brent. All major developments within the borough are subject to review at the pre-application stage as well as during the application process. A desk based assessment is carried out by the relevant officer and if necessary air quality assessments or additional actions are required using planning conditions. Mitigation or modifications of plans are often required following assessments where poor air quality or high exposure levels are highlighted.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

QA/QC for Brent's automatic monitoring stations is provided by ERG King's College London. These stations are calibrated fortnightly by local site operator LSO, with audits every 6 months. Calibrations are carried out by the Local Authority, EnviroTechnology and ERG King's College London. Audits are carried out by the National Physics Laboratory and are UKAS accredited.

A.2 Diffusion Tube Quality Assurance / Quality Control

All diffusion tubes are collected and set up by the local site operator (LSO) and analysed by Gradko International Ltd Laboratories (UKAS Accredited Methods) using the preparation method 20% Triethanolamine (TEA) in De-ionised Water absorbent. Blanks are subtracted for each exposure period prior to averaging to obtain the NO_2 annual average data. Annual averages have been bias adjusted using the bias adjustment factor for 2018 from the national database available on the LAQM website at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html .

For the 2018 data a bias adjustment factor of 0.93 was used which is derived from 30 studies nationwide for similar tubes.

Short-term to Long-term Data Adjustment

A final measurement data set was produced by King's College following retrospective ratification of the measurements using procedures which exceed the requirements given by LLAQM.TG(16). During ratification, information from regular calibrations, audits and daily manual validation were used to establish an operational and calibration history of the instruments. The pollution measurements were then corrected to establish traceability to National Meteorological Standards. Details of the monitoring site and the final dataset can be found at www.londonair.org.uk.

Appendix B Full Monthly Diffusion Tube Results for 2018

Table B.1. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data [d]	Annual mean – bias adjusted [c]
1	60	10		39.5	39.5										39.5	N/A
2	60	10		**44.3**	**44.3**										**44.3**	N/A
4	60	10		**53.2**	**53.2**										**53.2**	N/A
7	60	10		**56.1**	**56.1**										**56.1**	N/A
9	60	10		**49.8**	**49.8**										**49.8**	N/A
17	60	10		**46.9**	**46.9**										**46.9**	N/A
21A	60	10		**44.7**	**44.7**										**44.7**	N/A
22	60	10		**58.5**	**58.5**										**58.5**	N/A
23	60	10		**70.8**	**70.8**										**70.8**	N/A
26	60	10		**56.4**	**56.4**										**56.4**	N/A
29	60	10		38.5	38.5										38.5	N/A
30	60	10		**41.6**	**41.6**										**41.6**	N/A

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data [d]	Annual mean – bias adjusted [c]
33A	60	10		23.5	23.5										23.5	N/A
41	60	10		**48.6**	**48.6**										**48.6**	N/A
52	60	10		**80.2**	**80.2**										**80.2**	N/A
53	60	10		**56.7**	**56.7**										**56.7**	N/A
54	60	10		**40.1**	**40.1**										**40.1**	N/A
60	60	10		**56.5**	**56.5**										**56.5**	N/A
61	60	10		**68.0**	**68.0**										**68.0**	N/A
62	60	10		**53.0**	**53.0**										**53.0**	N/A
63	60	10		31.3	31.3										31.3	N/A
64	60	10		35.4	35.4										35.4	N/A
65	60	10		**61.9**	**61.9**										**61.9**	N/A
66	60	10		**47.1**	**47.1**										**47.1**	N/A
67	60	10		35.0	35.0										35.0	N/A
68	60	10		**46.1**	**46.1**										**46.1**	N/A
69	60	10		32.6	32.6										32.6	N/A

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data [d]	Annual mean – bias adjusted [c]
70	60	10		33.6	33.6										33.6	N/A
71	60	10		32.4	32.4										32.4	N/A
72	60	10		37.0	37.0										37.0	N/A
73	60	10		37.6	37.6										37.6	N/A
74	60	10		38.8	38.8										38.8	N/A
75	60	10		36.8	36.8										36.8	N/A
76	60	10		38.4	38.4										38.4	N/A
77	60	10		37.2	37.2										37.2	N/A
BRT 42	60	10		**41.0**	**41.0**										**41.0**	N/A
BRT 43	60	10		**74.3**	**74.3**										**74.3**	N/A
BRT 53	60	10		**61.8**	**61.8**										**61.8**	N/A
BRT 55	60	10		**62.2**	**62.2**										**62.2**	N/A
BRT 56	60	10		**50.8**	**50.8**										**50.8**	N/A
BRT 57	60	10		**54.9**	**54.9**										**54.9**	N/A
BRT 58	60	10		**49.4**	**49.4**										**49.4**	N/A

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

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

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

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

[d] Arithmetic Means only: Not "annualised" (as per TG16), due to extremely low data capture or unavailability of an appropriate annualisation factor for all diffusion tube sites.