Royal Borough of Greenwich - Air Quality Annual Status Report for 2016
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This report provides a detailed overview of air quality in the Royal Borough of Greenwich during 2016. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). https://www.london.gov.uk/what-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

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2016

Site ID	Site Name	Easting	Northing	Site Type	In AQMA?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Inlet height (m)	Pollutants Monitored	Monitoring Technique
GR4	Eltham GR4	543978	174655	Suburban	Y	Y (0)	N/A	3m	NO_2 PM_{10} $PM_{2.5}$ SO_2 (and O_3)	FDMS
GR5	Trafalgar Road	538960	177954	Roadside	Y	Y (0)	5	3m	NO_2 PM_{10}	TEOM
GR7	Blackheath Hill	538141	176710	Roadside	Y	Y (0)	20	3m	NO_2 PM_{10}	FDMS
GR8	Woolwich Flyover	540200	178367	Roadside	Y	Y (0)	3	3m	NO_2 PM_{10} $PM_{2.5}$ (and O_3)	TEOM
GR9	Westhorne Avenue	541879	175016	Roadside	Y	Y (0)	12	3m	NO_2 PM_{10} $PM_{2.5}$ (and O_3)	FDMS
GNO Note- previously GR10	Burrage Grove	544084	178881	Roadside	Y	Y (1)	3	3m	NO_2 PM_{10} $PM_{2.5}$	FDMS

GN2 note - previously GR12	Millennium Village	540169	178999	Background	Y	Y (0)	N/A	3m	NO_2 PM_{10} $PM_{2.5}$	FDMS
GN3 note - previously GR13	Plumstead High St	545560	178526	Roadside	Y	Y (0)	5	3m	NO_2 PM_{10} $PM_{2.5}$ (and O_3)	FDMS
GB6	Falconwood	544997	175098	Roadside	Y	Y (5)	12	3m	NO_2 PM_{10} $PM_{2.5}$ O_3	TEOM
GN4	Fiveways Sidcup Rd	543582	172653	Roadside	Y	Y (5)	2	3m	NO_2 PM_{10}	FDMS
BX3	Thamesmead	547323	181231	Suburban	Y	Y (0)	N/A	3m	$PM_{2.5}$	TEOM

Changes to the Greenwich Real Time Monitoring Stations

At the end of 2015, station GR5 on Trafalgar road was shut down. This was due to the sale by the Council of the Arches Leisure Centre where the station was located. A new site on Trafalgar Road at the junction with Hoskins St has been identified and the station is due to be relocated to this site shortly

In October 2016, contractors working on an adjoining site damaged the power supply to station GN2 (Millennium Village). As the site on which the station was currently located was due to be redeveloped the decision was taken not to repair the power supply but to seek a new location for the station. A new site has been identified on John Harrison Way. Planning permission will be sought for the site and it is hoped that the station will be up and running again by the end of 2017

The air quality monitoring station BX3 was acquired from the London Borough of Bexley when Bexley Council reduced its air quality monitoring programme. The station only monitors $PM_{2.5}$. It is currently located in Thamesmead but within Bexley. A decision was made to both upgrade the station and find a new site for in Thamesmead but within the Royal Borough of Greenwich. A new site is being sought in Thamesmead. It is intended that the relocated station will monitor PM_{10}; $PM_{2.5}$; NO & O_3. It is hoped that the relocation will be complete by early 2018.

Finally, as part of the Enderby Wharf redevelopment, the Council made a commitment to install an additional real time air quality monitoring station. This station proposed to be located on Tunnel Avenue and will monitor PM_{10}; $PM_{2.5}$; NO & SO_2. It is hoped that the new station will be in place by the end of 2017.

The Council has had the sites of all the new and relocated air quality monitoring stations assessed by the Environmental Research Group of Kings College London who run the London Air Quality Network

Table C. Details of Non-Automatic Monitoring Sites for 2016

Site ID	Site Name	Easting	Northing	Site Type	In AQMA?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
GW23 (1)	Siebert Rd	540420	177706	Roadside	Y	Y	17.2		NO_2	N
GW24 (2)	Plumstead Common Rd	543806	177951	Roadside	Y	Y	3.0		NO_2	N
GW25 (3)	Eltham Rd	540099	174881	Roadside	Y	Y	3.0		NO_2	N
GW26 (4)	Foots Cray Rd	544015	173139	Roadside	Y	Y	0.5		NO_2	N
GW27 (5)	Charlton Village	541645	177874	Roadside	Y	Y	0.5		NO_2	N
GW28 (58)	Dunblane Rd	542656	176207	Roadside	Y	Y	7.5		NO_2	N
GW29 (6)	Woolwich Rd Charlton	541167	178512	Roadside	Y	Y	1.5		NO_2	N
GW30 (53)	Indus Rd	541372	177070	Roadside	Y	Y	5.0		NO_2	N
GW31 (57)	Deansfield School	543383	175664	Roadside	Y	Y	3.0		NO_2	N
GW32 (7)	Banchory Rd	540664	177235	Roadside	Y	Y	17.1		NO_2	N
GW33 (8)	Blackheath Hill	537971	176776	Roadside	Y	Y	1.5		NO_2	N

GW34 (9)	Bannockburn School	545490	178543	Roadside	Y	Y	3.0		NO_2	N
GW35 (10)	Woolwich Rd Greenwich	539527	178281	Roadside	Y	Y	1.5		NO_2	N
GW36 (11)	Boord St	539320	179234	Roadside	Y	Y	30.0		NO_2	N
GW37 (12)	De Lucy School	546630	179557	Background	Y	Y	215.0		NO_2	N
GW38 (13)	Westhorne Avenue	541885	175045	Background	Y	Y	30.0		NO_2	N
GW39 (14,15,16)	Bexley Rd ECC (Triplicate co-located site)	543986	174660	Background	Y	Y	65.0		NO_2	Y
GW40 (17)	Shrewsbury House	544065	176996	Background	Y	Y	575.0		NO_2	N
GW41 (18)	Sidcup Rd	543391	172765	Roadside	Y	Y	3.0		NO_2	N
GW42 (19)	Greenwich Church St	538317	177652	Roadside	Y	Y	2.0		NO_2	N
GW43 (20)	Creek Rd	537353	177632	Roadside	Y	Y	2.0		NO_2	N
GW44 (21)	Eltham High St	543096	174439	Roadside	Y	Y	3.6		NO_2	N
GW48 (23)	Greenwich South St	538044	176960	Roadside	Y	Y	2.5		NO_2	N
GW49 (24)	Woolwich High St	543472	179217	Roadside	Y	Y	1.0		NO_2	N
GW50 (25,26,27)	Woolwich Flyover (Triplicate co-located site)	540203	178367	Roadside	Y	Y	3.5		NO_2	Y
GW51 (28)	Bugsbys Way	539638	179024	Roadside	Y	Y	2.0		NO_2	N
GW52 (29)	Woolwich High St	542842	179108	Roadside	Y	Y	1.5		NO_2	N
GW53 (30)	Shooters Hill Rd	542181	176878	Roadside	Y	Y	1.5		NO_2	N
GW54 (31)	Westhorne Av	541915	175039	Roadside	Y	Y	2.5		NO_2	N

GW55(32,33,34)	Crown Woods Way (Triplicate site)	545005	175097	Roadside	Y	Y	1.5		NO_2	Y
GW56 (35)	Sidcup Rd	543679	172598	Roadside	Y	Y	1.5		NO_2	N
GW57a (36)	Trafalgar Rd	538968	177955	Roadside	Y	Y	7.0		NO_2	Y
GW58 (39,40,41)	Blackheath Hill (Triplicate co-located site)	538143	176712	Roadside	Y	Y	4.0		NO_2	Y
GW59 (42,43,44)	Westhorne Av (Triplicate co-located site)	541883	175016	Roadside	Y	Y	13.0		NO_2	Y
GW60 (45,46,47)	Burrage Grove (Triplicate co-located site)	544086	178882	Roadside	Y	Y	16.9		NO_2	Y
GW61 (50,51,52)	Millennium Village (Triplicate co-located site)	540175	179000	Background	Y	Y	n/a		NO_2	Y
GW101 (48)	Plumstead Rd	544727	178884	Roadside	Y	Y	1.0		NO_2	N
GW102 (49)	Plumstead Rd	544075	178898	Roadside	Y	Y	1.0		NO_2	N
GW103 (54)	Wricklemarsh Rd	540935	176575	Roadside	Y	Y	9.0		NO_2	N
GW104 (55)	Sun Lane	540743	177072	Roadside	Y	Y	12.5		NO_2	N
GW105 (56)	Cliftons Roundabout	541143	174294	Roadside	Y	Y	5.0		NO_2	N
GW106 (22)	Grand Depot Rd	543505	178576	Roadside	Y	Y	1.0		NO_2	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 period of monitoring %	Valid Data Capture 2016 %[a]	Annual Mean Concentration μg m^{-3}						
				2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GR4 Eltham	Automatic	N/a	99	24	23	22	21	20 (20.5)	20	21
GR5 Trafalgar Road	Automatic			**47**	**47**	**44**	**41**	**38**	36	Closed
GR7 Blackheath Hill	Automatic	N/a	98	**43**	**48**	**48**	**48**	**44**	39	**46**
GR8 Woolwich Flyover	Automatic	N/a	97	**73**	**67**	**71**	**64**	**75**	**66**	**64**
GR9 Westhorne Av	Automatic	N/a	95	**46**	**43**	**44**	**46**	**43**	**40**	**42**
GN0 Burrage Grove	Automatic	N/a	99	**53**	**43**	**45**	**45**	38	35	39
GN2 Millennium Village	Automatic	N/a	75	36	33	37	38	36	28	30
GN3 Plumstead High St	Automatic	N/a	94	**42**	**42**	39	37	37	34	36
GB6 Falconwood	Automatic	N/a	98	**51**	**42**	**47**	**51**	**45**	**41**	**45**

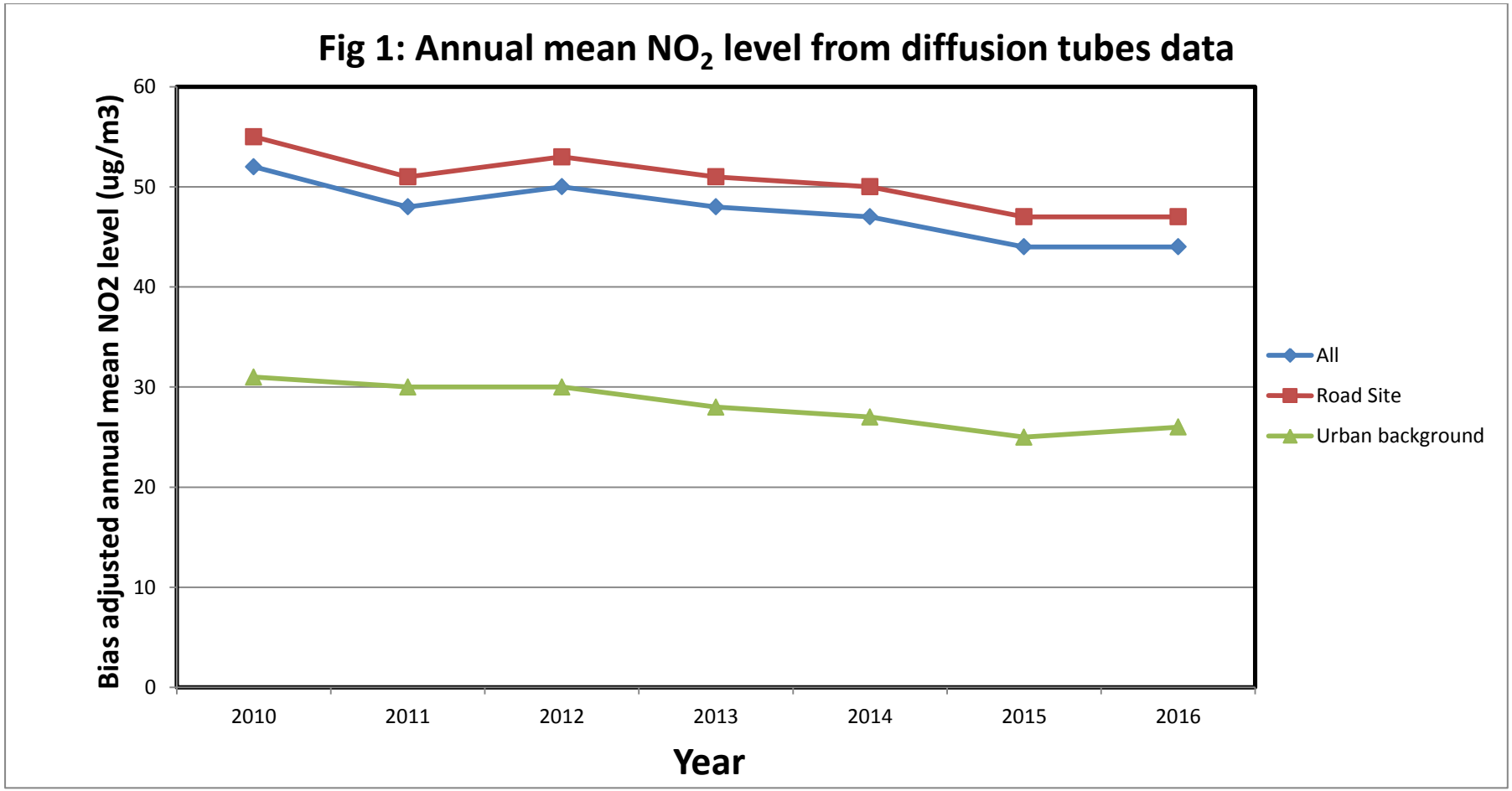
Site ID	Site Type	Valid Data Capture for period of monitoring %	Valid Data Capture 2016 %[a]	Annual Mean Concentration µg m^{-3}						
				2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GN4 Fiveways	Automatic	N/a	99	-	*47*	**52**	**58**	**53**	**44**	**46**
GW23	Diffusion tube	n/a	100	**48.6**	39.4	**42.2**	**46.0**	**42.7**	**41.5**	**41.43**
GW24	Diffusion tube	n/a	92	**58.3**	**53.1**	**54.9**	**58.3**	**54.8**	**53.5**	**54.95**
GW25	Diffusion tube	n/a	92	**55.5**	**48.0**	**47.1**	**48.9**	**45.2**	**38.4**	**38.79**
GW26	Diffusion tube	n/a	100	37.5	32.5	31.6	32.2	31.2	**28.6**	28.26
GW27	Diffusion tube	n/a	100	**53.8**	**46.1**	**51.1**	**49.8**	**43.7**	**39.7**	**41.48**
GW28	Diffusion tube	n/a	100	**40.8**	37.8	39.7	36.4	36.9	**35.8**	**41.03**
GW29	Diffusion tube	n/a	100	**70.7**	**65.0**	**66.6**	**65.2**	**61.8**	**62.3**	**58.14**
GW30	Diffusion tube	n/a	100	**41.7**	37.9	**52.0**	39.3	38.3	**35.0**	**40.47**
GW31	Diffusion tube	n/a	92	35.1	34.5	37.9	37.9	37.5	**35.7**	**40.37**
GW32	Diffusion tube	n/a	100	**50.9**	**47.8**	**50.1**	**48.5**	**51.9**	**49.6**	**47.42**
GW33	Diffusion tube	n/a	92	**67.1**	**59.2**	**64.1**	**62.7**	**63.4**	**60.8**	**60.96**

Site ID	Site Type	Valid Data Capture for period of monitoring %	Valid Data Capture 2016 %[a]	Annual Mean Concentration µg m^{-3}						
				2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GW34	Diffusion tube	n/a	100	**52.1**	**48.2**	**48.3**	**45.1**	**44.0**	38.9	39.11
GW35	Diffusion tube	n/a	100	**73.8**	**71.5**	**73.2**	**72.3**	**69.4**	**59.1**	**56.01**
GW36	Diffusion tube	n/a	100	**46.0**	**52.6**	**54.5**	**55.2**	**60.1**	**57.2**	**58.13**
GW37	Diffusion tube	n/a	100	26.5	28.9	24.6	22.7	23.6	21.8	22.91
GW38	Diffusion tube	n/a	100	38.6	36.2	37.6	37.0	35.9	34.2	34.92
GW39	Diffusion tube	n/a	100	25.4	23.1	23.8	22.0	20.0	19.1	19.17
GW40	Diffusion tube	n/a	100	25.4	22.6	25.4	21.3	19.4	18.8	19.19
GW41	Diffusion tube	n/a	100	**47.2**	**48.5**	**47.8**	**43.3**	**44.7**	**50.0**	**55.56**
GW42	Diffusion tube	n/a	100	**59.8**	**56.0**	**52.5**	**53.1**	**52.8**	**49.9**	**48.90**
GW43	Diffusion tube	n/a	100	**61.6**	**62.3**	**66.8**	**60.4**	**57.0**	**57.3**	**56.30**
GW44	Diffusion tube	n/a	100	**70.5**	**48.4**	**50.4**	**55.6**	**50.7**	**48.9**	**48.84**
GW48	Diffusion tube	n/a	92	**49.2**	**47.4**	**47.6**	**45.6**	**42.0**	**42.2**	**38.24**

Site ID	Site Type	Valid Data Capture for period of monitoring %	Valid Data Capture 2016 %[a]	Annual Mean Concentration µg m^{-3}						
				2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GW49	Diffusion tube	n/a	92	**46.3**	**43.7**	**48.5**	**43.4**	**44.6**	**44.2**	**54.80**
GW50	Diffusion tube	n/a	100	**72.6**	**75.5**	**75.9**	**67.5**	**73.9**	**70.7**	**67.11**
GW51	Diffusion tube	n/a	92	**47.1**	**41.9**	**49.3**	**43.3**	**46.9**	**44.9**	**45.80**
GW52	Diffusion tube	n/a	60	**54.4**	**48.5**	**45.7**	**44.9**	**43.9**	39.6	39.03
GW53	Diffusion tube	n/a	100	**44.9**	**43.3**	**41.8**	34.2	37.0	36.1	37.08
GW54	Diffusion tube	n/a	100	**61.2**	**60.8**	**63.6**	**57.5**	**56.4**	**52.5**	**52.08**
GW55	Diffusion tube	n/a	92	**58.8**	**53.2**	**58.1**	**60.8**	**57.6**	**51.7**	**58.78**
GW56	Diffusion tube	n/a	100	**64.2**	**53.5**	**56.2**	**56.1**	**56.7**	**51.0**	**51.31**
GW57a	Diffusion tube	n/a	100	**46.7**	**43.1**	**41.9**	39.7	36.4	35.0	36.02
GW58	Diffusion tube	n/a	100	**52.3**	**50.7**	**48.5**	**49.4**	**48.5**	**46.3**	**43.86**
GW59	Diffusion tube	n/a	100	**54.8**	**44.3**	**44.6**	**43.9**	**44.7**	**40.8**	**38.12**
GW60	Diffusion tube	n/a	100	**46.4**	**41.3**	39.0	38.0	32.7	31.6	40.04

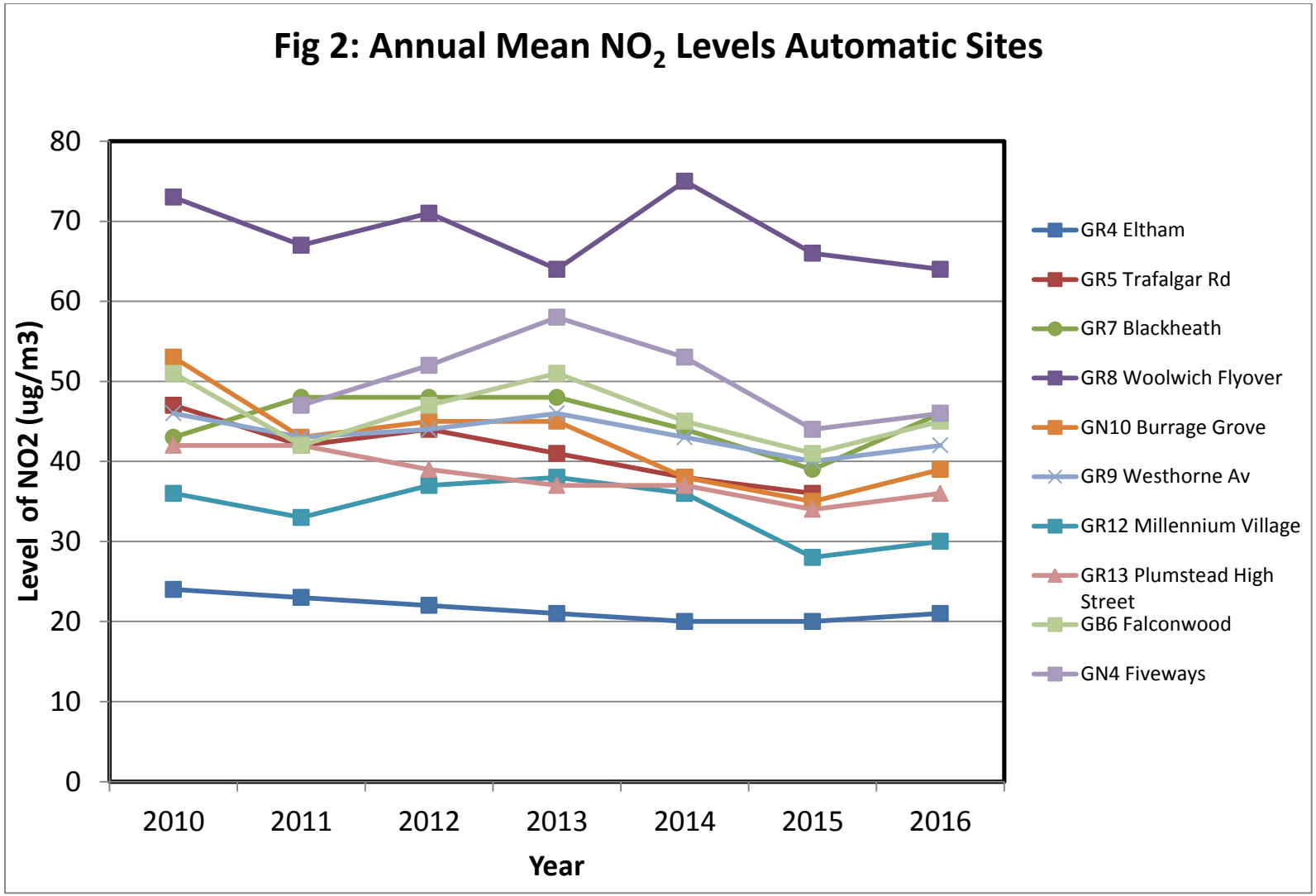
Site ID	Site Type	Valid Data Capture for period of monitoring %	Valid Data Capture 2016 %[a]	Annual Mean Concentration µg m^{-3}						
				2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GW61	Diffusion tube	n/a	100	**41.0**	**40.7**	**40.0**	39.1	35.2	30.5	32.12
GW101	Diffusion tube	n/a	92	**79.8**	**85.3**	**78.8**	**79.5**	**81.8**	**68.1**	**50.03**
GW102	Diffusion tube	n/a	100	**68.5**	**65.3**	**70.2**	**66.2**	**67.1**	**57.7**	**43.76**
GW103	Diffusion tube	n/a	83	**45.8**	**47.7**	**52.8**	**46.3**	**47.3**	**48.9**	**43.87**
GW104	Diffusion tube	n/a	83	**50.4**	**55.2**	**58.5**	**50.5**	**52.0**	**53.1**	**48.96**
GW105	Diffusion tube	n/a	100	**72.4**	**51.0**	**55.7**	**53.9**	**55.7**	**52.2**	**46.79**
GW106	Diffusion tube	n/a	92	**45.0**	**43.8**	**41.9**	**47.5**	**45.4**	39.9	43.44

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%



Comment

Results from Greenwich's diffusion tube sites show that roadside sites are persistently above the levels set in the Air Quality Objectives.



Comment

A significant number of sites remain above the level of 40ug/m^3 set in the Air Quality Objectives

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

Site ID	Valid Data Capture for period of monitoring %	Valid Data Capture 2016 %[a]	Number of Hourly Means > 200 µgm^{-3}						
			2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GR4 Eltham	N/a	99	4	0	0	0	0 (86.1)	0	0
GR5 Trafalgar Road			0	0	0	0	5	0	Closed
GR7 Blackheath Hill	N/a	98	0	1	0	1	0	0	0
GR8 Woolwich Flyover	N/a	97	**38**	6	**27**	8	**26**	6	24
GR9 Westhorne Av	N/a	95	0	0	0	4	1	0	9
GN0 Burrage Grove	N/a	99	1	1	1	0	0	0	1
GN2 Millennium Village	N/a	75	0	0	2	2	0 (151.5)	0	0
GN3 Plumstead High St	N/a	94	1	0	0	0	0 (120.7)	0	0
GB6 Falconwood	N/a	98	5	7	21	11	10	2	3
GN4 Fiveways	N/a	99	-	0	1	7	2	1	0

Notes: Exceedance of the NO_2 short term AQO of 200 µgm^{-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%

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

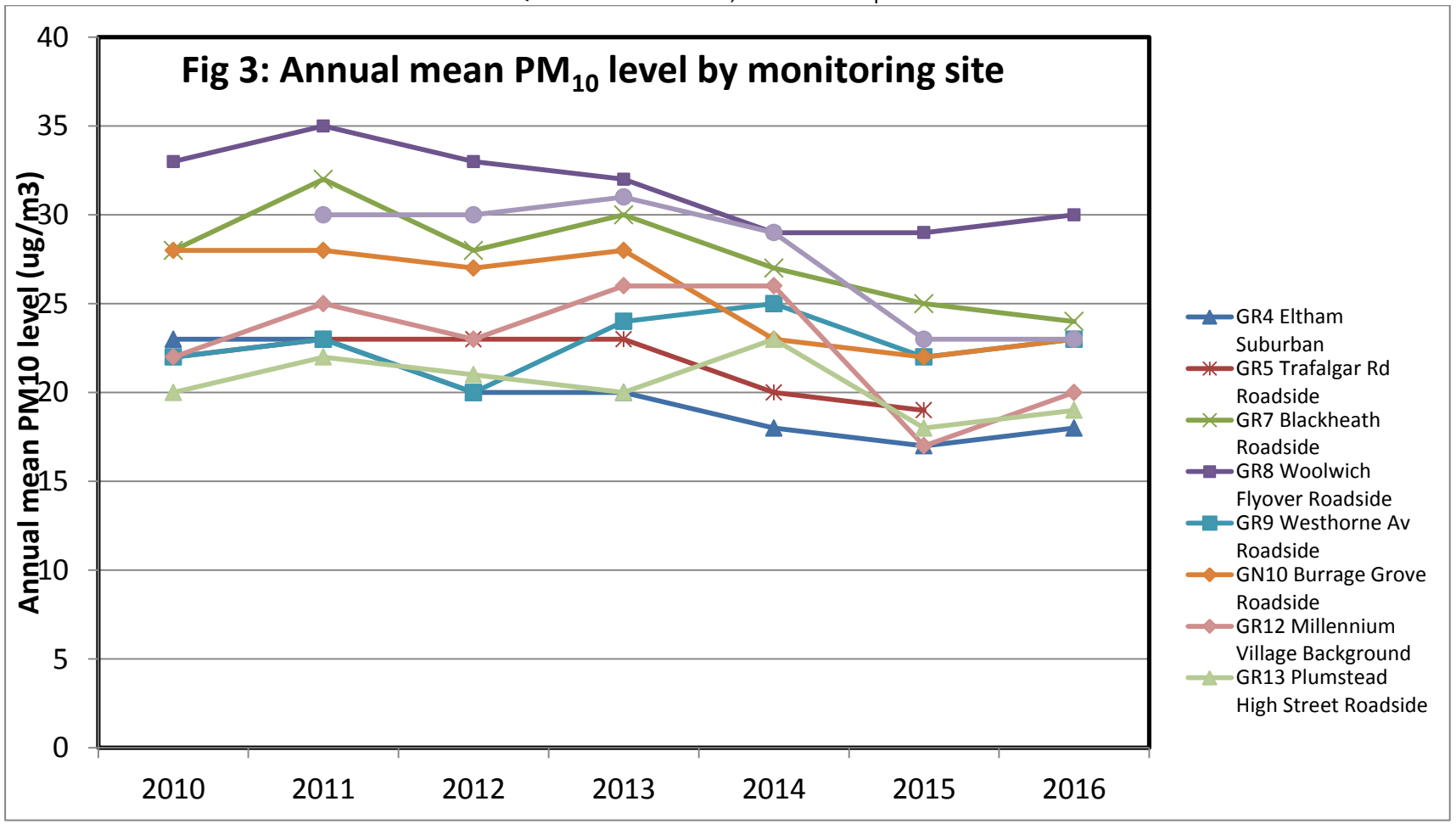
Site ID	Valid Data Capture for monitoring Period %	Valid Data Capture 2016%[a]	Annual Mean Concentration µg m^{-3}						
			2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
GR4 Eltham	N/a	82	*23*	23	20	20	18	17	18
GR5 Trafalgar Road			*22*	23	23	23	20	19	Closed
GR7 Blackheath Hill	N/a	99	28	32	28	30	27	25	24
GR8 Woolwich Flyover	N/a	88	33	35	33	32	29	29	30
GR9 Westhorne Av	N/a	95	22	23	20	24	25	22	23
GN0 Burrage Grove	N/a	95	28	28	27	*28 (30)*	23 (23.1)	22	23
GN2 Millennium Village	N/a	67	*22*	25	23	26	26 (25.5)	17	20
GN3 Plumstead High St	N/a	92	20	22	21	*20 (18)*	23	18	19
GB6 Falconwood	N/a	96	27	27	26	*30 (28)*	25 (22.7)	17	18
GN4 Fiveways	N/a	11	-	30	30	*31 (33)*	29	23	23

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

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

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

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



Comment

PM_{10} levels at all stations in Greenwich meet National Air Quality Objectives

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

Site ID	Valid Data Capture for monitoring Period %	Valid Data Capture 2016 %[a]	Number of Exceedences of 24-Hour Mean (50 µg m^{-3})						
			2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]	2016[c]
Eltham (GR4)	N/a	82	*4*	22	9	5	7 (28.12)	4	6
Trafalgar Road (GR5)	N/a		2	18	16	8	5	2	Closed
Blackheath Hill (GR7)	N/a	99	20	**41**	26	29	18	12	14
Woolwich Flyover (GR8)	N/a	88	33	**42**	33	26	17 (45.8)	18	22
Westhorne Avenue (GR9)	N/a	95	9	25	16	17	19	9	15
Burrage Grove (GN0)	N/a	95	18	32	28	*18 (**50**)*	15 (37.3)	5	10
Millennium Village (GN2)	N/a	67	9	25	20	*20 (46)*	16 (48.36)	1	6
Plumstead High St (GN3)	N/a	92	7	16	8	*3 (34)*	14 (38.24)	3	8
Falconwood (GB0)	N/a	96	16	*25 (47)*	27	*28 (**52**)*	13 (43.92)	1	1
Fiveways Sidcup Rd (GN4)	N/a	11	-	*26 (49)*	*24 (**54**)*	*31 (**53**)*	25	3	2

Notes: Exceedance of the PM_{10} short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 90% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.

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

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

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

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

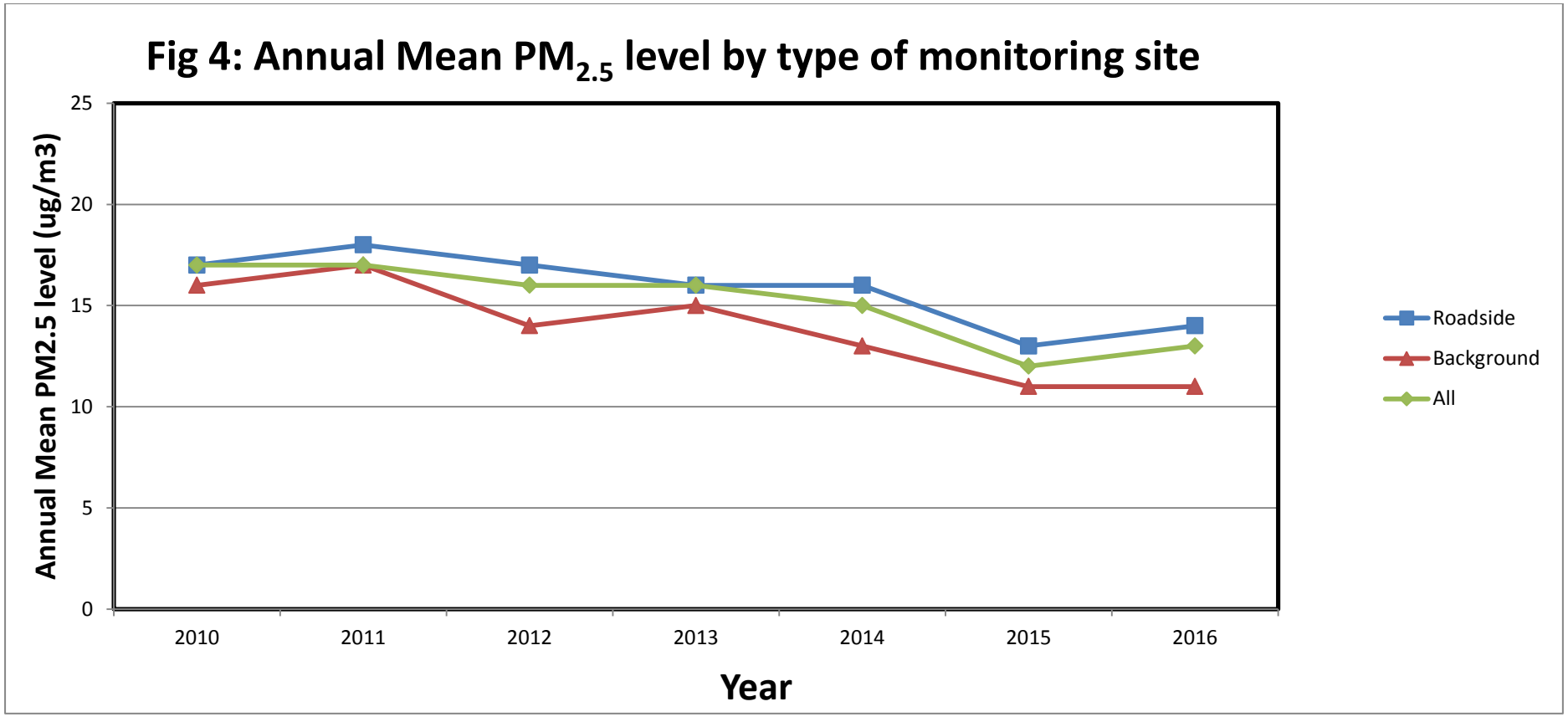
Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3})						
			2010[c]	2011 [c]	2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]
Eltham GR4	N/a	88	16.6	16.1	13.3	15.2	*11.5*	10.6	11.7
Woolwich Flyover GR8	N/a	92	16.4	17.2	15.4	14.9	14.6	12.2	13.4
Westhorne Avenue GR9	N/a	94	17.1	17	15.8	17.2	15.8	12.7	12.9
Burrage Grove GN0	N/a	81	19.7	24.5	18.1	17.5	*17.1*	12.1	14.5
Millennium Village GN2	N/a	76	16.4	19.1	15.2	15.4	*15.5*	11.5	11.4
Plumstead High St GN3	N/a	98	15.1	18.7	19.1	15.3	16.3	14.7	14
Falconwood GB0	N/a	43	18.2	17.8	18.6	16.4	*14.4*	14.3	15.3

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

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

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

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



Comment

$PM_{2.5}$ levels at all stations in Greenwich meet National Air Quality Objectives

Table I. SO_2 Automatic Monitor Results for 2016: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Number of: [c]		
			15-minute means > 266 µgm^{-3}	1-hour mean > 350 µgm^{-3}	24-hour mean > 125 µgm^{-3}
Eltham (GR4)	89	89	0	0	0

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

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

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

[c] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

2. Action to Improve Air Quality

Table J. Commitment to Cleaner Air Borough

Theme	Criteria		Evidence
1. Political leadership	***1.a***	Pledged to become a Cleaner Air for London Borough (at cabinet level) by taking significant action to improve local air quality and signing up to specific delivery targets.	*No evidence required*
2. Taking action	**2.a**	Taken decisive action to address air pollution, especially where human exposure and vulnerability (e.g. schools, older people, hospitals etc) is highest.	*In 2016 we took decisive action by identifying an area with the highest exposure, bidding for and securing a total package of over £2m to deliver a wider ranging set of actions to mitigate and reduce harmful pollutants in this area. The work, covering schools and workplaces, residential properties and other areas in Greenwich West/Peninsula Wards, will reduce harmful traffic emissions in particular through electric vehicle schemes, more walking and cycling routes, bus priority programmes and more. This will be used as a pilot from which to learn and roll out to other areas of the Borough if successful'*
	2.b	Developed plans for business engagement (including optimising deliveries and supply chain), retrofitting public buildings using the RE:FIT framework, integrating no engine idling awareness raising into the work of civil enforcement officers, (etc etc).	*Greenwich funds the EcoStars scheme for lorry fleets based or operating in the Royal Borough. The scheme promotes fuel efficiency and the reduction of pollution*
	2.c	Integrated transport and air quality, such as: improving traffic flows on borough roads to reduce stop/start conditions, improving the public realm for walking and cycling, and introducing traffic reduction measures.	*A £1.2m scheme in Plumstead Road – created new bus lane without taking away general traffic lanes; improved public realm, footways and segregated cycle tracks. Helping to facilitate cycle/pedestrian movements whilst improving traffic flow and bus priority.*
	2.d	Made additional resources available to improve local air quality, including by pooling its collective resources (s106 funding, LIPs, parking revenue, etc).	*The Council has an extensive S106 budget which is used to fund air quality projects. Specific examples include participation in the GLA freight consolidation project headed by LB Lambeth and funding relocating real time monitoring stations (see 3b below)*
3. Leading by example	**3.a**	Invested sufficient resources to complement and drive action from others.	*One full time equivalent AQ officer plus one part time monitoring officer*
	3.b	Maintained an appropriate monitoring network so that air quality impacts within the borough can be properly understood	*The Council operates 11 real time monitoring stations and an extensive nitrogen dioxide diffusion tube network. Three real time stations are being relocated due to redevelopment. Funding for a further real time station in*

			the East Greenwich area has been obtained. The station is expected toi be operational in the financial year 2017-18.
	3.c	Reduced emissions from council operations, including from buildings, vehicles and all activities.	*The Council fleet has achieved EcoStars Bronze status*
	3.d	Adopted a procurement code which reduces emissions from its own and its suppliers activities, including from buildings and vehicles operated by and on their behalf (e.g. rubbish trucks).	*The Council's light duty fleet of diesel powered vehicles is being replaced on a rolling basis starting in 2017-18 which electric powered vehicles where suitable vehicles are available*
4. Using the planning system	**4.a**	Fully implemented the Mayor's policies relating to air quality neutral, combined heat and power and biomass.	*All relevant approved planning applications must meet the Mayor's requirements relating to AQ neutral and CHPs.*
	4.b	Collected s106 from new developments to ensure air quality neutral development, ***where possible*** .	*S106 & CIL money is collected from qualifying developments*
	~~4.c~~	Provided additional enforcement of construction and demolition guidance, with regular checks on medium and high risk building sites.	*Planning is in the process of revising all its planning conditions to ensure full compliance with this requirement*
5. Integrating air quality into the public health system	**5**	Included air quality in the borough's Health and Wellbeing Strategy and/or the Joint Strategic Needs Assessment.	*A JSNA specifically in outdoor air quality was published in 2016 and is available at http://www.greenwichjsna.org/app/uploads/2015/08/AirQuality_Nov2016.pdf*
6. Informing the public	**6.a**	Raised awareness about air quality locally.	*The Council subscribes to the. AirText promotion*.

2.1 Air Quality Action Plan Progress

Table K. Delivery of Air Quality Measures

The Council's air quality action plan is in the course of being updated. An extensive public consultation on the updated plan was carried out during 2016. This updated plan has not yet been formally adopted . Key achievements of 2016 are reported below.

Measure	Action	Progress	Further information
	Installation of 20 electric vehicle charging points at Birchmere depot	Charging points purchased and money for connecting them to the grid found	Installation to be completed in 2017
	Replacement of diesel light duty vehicles (LDV) with electric where equivalents available	LDV purchase to start in 2017	Fleet will be progressively up graded to electric at the rate of approximately 5 vehicles/year. LDV vehicle life 6 years so fleet should be all electric (where compatible vehicles available) by 2023.
	30/40 refuse collection vehicles (RCV) are currently Euro VI		The 10/40 remaining RCV's are Euro V and will all be replaced over the next 3 years Project to convert one existing RCV to full electric in 2017 for trial deployment in 2018
	Other heavy duty vehicles (HDV)	Two Euro VI 18t tipper trucks and a 7.5t Access Platform were purchased in 2016 and a Euro VI Gulley vehicle replaced an older model. Three other vehicles 7.5t and over will also be replaced for Euro VI model in 2017.	
	Plumstead Road – created new bus lane without taking away general traffic lanes, plus improved public realm, footways and segregated cycle tracks. Helps facilitate cycle/pedestrian movements whilst improving	Scheme complete	

	traffic flow and bus priority. £1.2m scheme		
	Participate in freight consolidation partnership lead by L B Lambeth	Joined scheme end 2016 meetings to be arranged with RBG Procurement and L B Lambeth lead officers	
	The Royal Borough is a partner in a successful bid under the European Commission Horizon2020 call for Smart Cities & Communities. The programme commenced in January 2016, and will last five years to December 2020. Royal Greenwich is the only London Borough in the programme, which will see East Greenwich and Peninsula wards become the demonstrator area for London, where smart city activities will be focused. This will establish Greenwich as a leading smart city 'lighthouse' demonstrator along with Milan and Lisbon	Smart city solutions will be focused on creating low energy districts, and sustainable urban mobility. For example such as smart parking to minimise wasted journeys, and electric e-bikes and docking stations to link with main public transport interchanges to reduce car journeys. In addition, this project will include the extension of air quality monitoring infrastructure, through the deployment of sensors on lamp posts across the demonstrator area; and mobile units are also being explored.	
	In July 2016 the Royal Borough was successful in its bid to the Mayor of London for funding to implement a Low Emission Neighbourhood (LEN) scheme in the Greenwich Town Centre and Trafalgar road area. The LEN will bring £2m of investment to the area over the next three years, with the aim of improving local air quality along this busy corridor.	The LEN will be delivered through three approaches 1) targeted measures to reduce transport derived emissions 2) creating more human friendly streets for walking and cycling 3) increasing access to more sustainable transport modes. for example: Bus priority along Trafalgar Road Better freight management Roll out of 20mph speed limits Car Free Days Creating more 'human friendly' neighbourhoods with community focused	

		play streets and pocket parks Public realm improvements Targeted travel planning with residents, schools and businesses Implementing electric car clubs and an e-bike sharing scheme Installing up to 15 new electric vehicle charging points incentivizing the uptake and use of lower emission vehicles’	

3. Planning Update and Other New Sources of Emissions

Table L. Planning requirements met by planning applications in The Royal Borough of Greenwich in 2016

Condition	**Number** *Please complete all fields in this column with the total numbers*
Number of planning applications reviewed for air quality impacts	42
Number of planning applications required to monitor for construction dust	62
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	1
Number of AQ Neutral building and/or transport assessments undertaken	1
Number of AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0
Number of planning applications with S106 agreements including other requirements to improve air quality	1
Number of planning applications with CIL payments that include a contribution to improve air quality	49 applications have made a borough CIL payments in the last FY. Due to the nature of CIL, none of these payments have been collected for air quality, but are collected into a central pot to be spent in accordance with the Regulation 123 list.
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.	1 application with 1 condition included

3.1 New or significantly changed industrial or other sources

Silvertown Tunnel

At the end of 2016, an application was made by Transport for London to construct a relief tunnel for the Blackwall Tunnel between the Greenwich peninsula and Silvertown in the London Borough of Newham. The capacity of the new tunnel will be more than double the capacity of the existing Blackwall Tunnel and therefore has the potential to generate significant additional traffic. The Environmental Impact Assessment which accompanied the submission to the Public Inquiry stated that significant numbers of job opportunities would be made available for residents of SE London to drive to these new jobs. The EIA also stated that there would be a small reduction in the number of private motor vehicles using the combined crossing and that on the basis of Transport for London's Traffic forecasts there would be no significant increase in air pollution in the Royal Borough due to the new tunnel. The Royal Borough has been represented at the Public Inquiry and has raised concerns about the validity of the traffic projections on which Transport for London's air pollution projections are based. At the time of writing, the outcome of the Public Inquiry is awaited.

Greenwich Power Station

Greenwich Power Station is operated by Transport for London. It provides emergency back up power for the London Underground to enable the network to be shut down safely in the event of a major power failure. The power station has existing use planning consent and is operated under an Environmental Permit issued by the Environment Agency. Transport for London made a proposal to upgrade the power station to provide additional generating capacity for the operation of the Underground network. This would have involved installing additional gas powered engines within the existing power station. As Greenwich Power Station already has planning consent and no external alterations are proposed, planning consent was not required. A submission was made by Transport for London to the Environment Agency but was subsequently withdrawn. A new application may be made in 2017.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

Local Site Operator (LSO) visits the monitoring site every two weeks to visually inspect and check the site operation and to carry out zero/span calibration of the gas analysers. Six monthly UKCAS accredited independent equipment audits are carried out by the National Physical Laboratory (NPL) which also carry out on-site certification of gas cylinders. Additional six monthly equipment service visits by Enviro Technology Services Plc

PM_{10} Monitoring Adjustment
PM10 measurements are automatically recalculated as EU reference equivalent using the Volatile Correction Model (VCM) – Correction applied to TEOM measurements

A.2 Diffusion Tube Quality Assurance / Quality Control

- Diffusion Tubes are prepared and analysed by UKAS accredited Gradko International Ltd
- Diffusion Tubes are prepared using 50% triethanolamine with acetone method and analysed using UV spectrometry
- The lab follows the procedures set out in the Defra Technical Guidance for LAQM TG(09)
- For details attaining to 'results' – precision, bias adjustment factors; and reference methods please refer to - 'London Wide Environment Program Nitrogen Dioxide diffusion tube survey report,2016: http://www.royalgreenwich.gov.uk/downloads/download/183/air_quality_reports

Factor from Local Co-location Studies
For details attaining to Local Co-location Studies please refer to - 'London Wide Environment Program Nitrogen Dioxide diffusion tube survey report, 2016:
http://www.royalgreenwich.gov.uk/downloads/download/183/air_quality_reports

Discussion of Choice of Factor to Use
For details attaining to choice of adjustment factors please refer to - 'London Wide Environment Program Nitrogen Dioxide diffusion tube survey report, 2016:
http://www.royalgreenwich.gov.uk/downloads/download/183/air_quality_reports

A.3 Adjustments to the Ratified Monitoring Data

For details attaining to choice of adjustments to the Ratified Monitoring Data please refer to - 'London Wide Environment Program Nitrogen Dioxide diffusion tube survey report, 2016:
http://www.royalgreenwich.gov.uk/downloads/download/183/air_quality_reports

Appendix B Full Monthly Diffusion Tube Results for 2016

For details to "full monthly diffusion tube results" – see Appendix A – Monthly and Annual Mean NO2 Concentrations : All Sites, "2016: "London Wide Environment Program Nitrogen Dioxide diffusion tube survey report, 2016:
http://www.royalgreenwich.gov.uk/downloads/download/183/air_quality_reports