London Borough of Sutton Air Quality Annual Status Report for 2018

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

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[1] 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

The London Borough of Sutton operated four automatic monitoring stations in 2018

- two kerbside sites: ST4 Sutton – Wallington and ST6 Sutton - Worcester Park, both measuring NO_2 and PM10;
- two industrial sites: ST8 Sutton - Beddington Lane measuring NO_2 and PM10 and ST5 Sutton - Beddington Lane (north) measuring NO_2, PM10 and PM2.5.

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
ST4	Wallington	528925	163804	Kerbside	Y	5	0.8	*1.5*	NO_2, PM10	Chemiluminescence, BAM
ST5	Beddington Lane (north)	529400	167224	Industrial	Y	6	4.5	*1.5*	NO_2, PM10, $PM_{2.5}$	Chemiluminescence, BAM
ST6	Worcester Park	522557	165787	Kerbside	Y	2	1.3	*1.5*	NO_2, PM10	Chemiluminescence, TEOM/FDMS
ST8	Beddington Lane	529781	166597	Industrial	Y	330	N/A	*1.5*	NO_2, PM10	Chemiluminescence, BAM

In addition, Sutton Council undertook non-automatic monitoring at twenty five locations in 2018, with no additional sites from the previous year.

Long term monitoring, i.e. more than three years has been carried out at only four sites as follows:

- ST32 - Alcorn Close
- ST33 - Carshalton Road
- ST36 - Croydon Rd, Beddington
- ST40 - 38 High Street, Cheam

Map of Non-Automatic Monitoring Sites

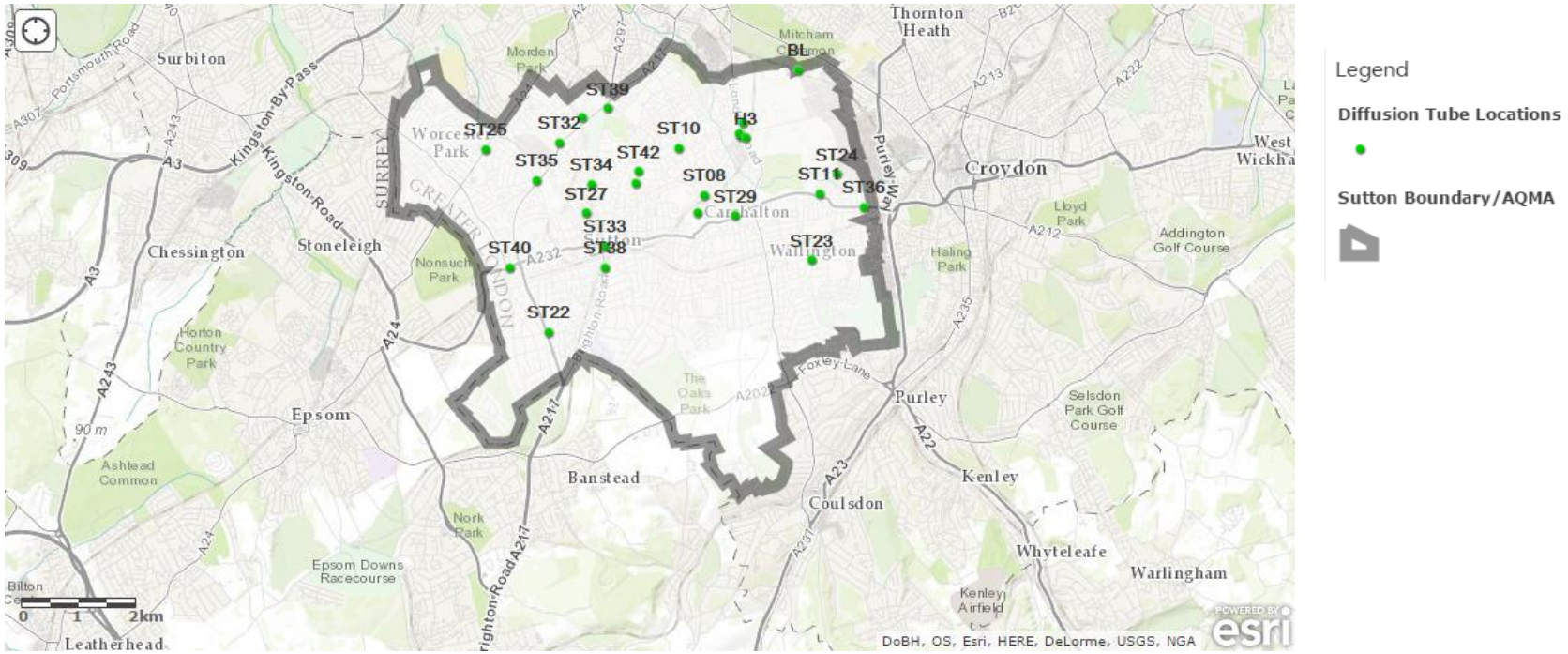


Table C. Details of Non-Automatic Monitoring Sites for 2018

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
ST21	Glastonbury Road	525567	166291	Urban Background	*Y*	*6*	*2*	2	NO_2	*N*
ST22	Dorset Road, Belmont	525063	162474	Roadside	Y	12	2	2	NO_2	N
ST23	Sandy Lane South	529734	163868	Roadside	Y	5	2	2	NO_2	N
ST24	Derry Road	530130	165404	Roadside	Y	7	2	2	NO_2	N
ST25	Staines Avenue	523874	165778	Roadside	Y	15	2	2	NO_2	N
ST26	West Street	527680	164662	Roadside	Y	2	2	2	NO_2	N
ST07	Hackbridge Primary	528401	166038	Urban background	Y	0	56	2	NO_2	N
ST08	Victor Seymour	527788	164982	Urban background	Y	0	33	2	NO_2	N
ST29	Park Lane	528339	164615	Roadside	Y	2	6	2	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
ST10	Muschamp Priory	527299	165789	Urban background	Y	0	20	2	NO_2	N
ST11	Sherwood Park School	529835	165041	Urban background	Y	0	35	2	NO_2	N
ST32	Alcorn Close	525184	165845	Urban background	Y	40	25	2	NO_2	N
ST33	Carshalton Road	526048	164032	Roadside	Y	3	1	2	NO_2	N
ST34	Oakhill Road	525772	165118	Roadside	Y	10	1	2	NO_2	N
ST35	Gander Green Lane	524782	165167	Roadside	Y	10	1	2	NO_2	N
ST36	Croydon Rd, Beddington	530645	164839	Roadside	Y	0	11	2	NO_2	N
ST27	Haddon Road/St Nicholas Way	525691	164599	Roadside	Y	11	2	2	NO_2	N
ST38	Brighton Road, Sutton	526046	163636	Roadside	Y	2	10	2	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
ST39	Rose Hill roundabout	526019	166469	Roadside	Y	6	2	2	NO_2	N
ST40	38 High Street, Cheam	524357	163599	Roadside	Y	2	1	2	NO_2	N
ST42	Royston Park	526605	165364	Urban Background	Y	20	95	2	NO_2	N
H1	Hackbridge Road	528373	166077	Roadside	Y	0.5	17	2	NO_2	N
H2	Clover Way	528437	166275	Urban background	Y	0	25	2	NO_2	N
H3	57 London Rd	528499	166004	Roadside	Y	0	5	2	NO_2	N
BL	Beddington Lane	529781	166597	Roadside	Y	15	2	2	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 D1. 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	2013	2014	2015	2016	2017	2018
ST4	Automatic	99	99	**71.8** (95%)	**69.6**[c] (53%)	**66.6**[c] (20.5%)	**61.4**[c] (59%)	**63** (92%)	**53** (94%)	**47**
ST5	Automatic	96	96	39.0[c] (17%)	-	36.4[c] (42.8%)	32 (95%)	36 (89%)	32 (97%)	29
ST6	Automatic	99	99	**54.5** (97%)	**49.0** (99%)	**53.5** (99%)	**52** (98%)	**57** (50%)	**52** (99%)	**52**
ST8	Automatic	96	96	35.7c (44%)	36.0 (93%)	30.5 (76%)	27 (86%)	30 (89%)	25 (95%)	25
ST21	Urban Background	100	100	-	-	-	27.3	32.1	27.2	29.4
ST22	Roadside	100	100	-	-	-	37.3	37.2	38.6	36.1
ST23	Roadside	100	100	-	-	-	32.2	35.0	33.6	37.0
ST24	Roadside	92	92	-	-	-	26.7	30.6	26.3	28.9
ST25	Roadside	100	100	-	-	-	32.0	34.6	32.6	31.6
ST26	Roadside	100	100	-	-	-	36.6	**41.3**	38.5	38.4

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
				2012	2013	2014	2015	2016	2017	2018
ST07	Urban background	92	92	-	-	22.3	22.0	24.2	22.0	22.4
ST08	Urban background	100	100	-	-	24.9	23.6	28.5	26.3	24.0
ST29	Roadside	100	100	-	-	-	37.9	**41.5**	39.5	38.9
ST10	Urban background	100	100	-	-	23.0	21.1	24.3	21.8	22.7
ST11	Urban background	100	100	-	-	26.6	23.4	26.4	24.4	24.5
ST32	Urban background	100	100	31.5	25.3	27.0	22.4	27.0	22.4	24.3
ST33	Roadside	100	100	36.1	39.6	**42.8**	37.3	38.8	33.2	34.5
ST34	Roadside	100	100	-	-	**48.1**	39.4	**42.8**	**42.3**	38.8
ST35	Roadside	100	100	-	-	**46.3**	31.5	34.1	30.5	31.1
ST36	Roadside	100	100	32.5	34.1	35.9	29.0	32.8	28.8	29.3
ST27	Roadside	100	100	-	-	-	36.8	39.6	36.1	35.6
ST38	Roadside	100	100	-	-	38.9	34.7	36.8	34.6	35.1
ST39	Roadside	92	92	-	-	36.2	37.1	39.3	38.9	**40.7**
ST40	Roadside	92	92	**50.0**	**46.5**	**48.3**	**42.9**	**44.8**	39.8	**41.1**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
				2012	2013	2014	2015	2016	2017	2018
ST42	Urban background	92	92	-	-	24.7	21.0	21.8	23.1	19.9
H1	Roadside	92	92	-	-	33.7	28.9	32.3	29.9	30.0
H2	Urban background	100	100	-	-	29.3	26.5	29.3	25.4	26.8
H3	Roadside	100	100	-	-	36.6	32.9	32.3	**40.3**	**44.1**
BL	Roadside	92	92	-	-	-	-	34.1	32.2	29.0

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

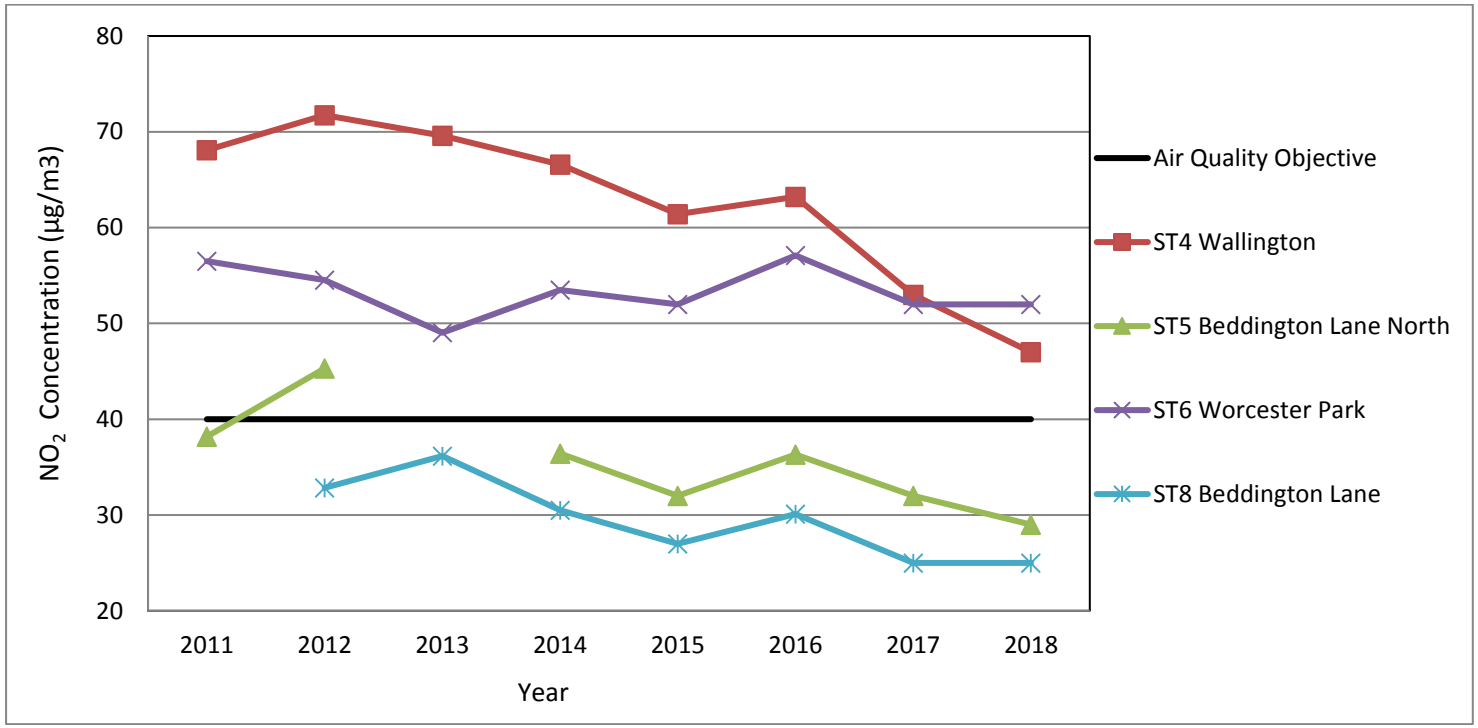
Table D2. Calculation of NO_2 at relevant exposure receptors (µg m^{-3})

The results presented in the table below are after adjustments for distance to a location of relevant public exposure. To estimate the concentration at the nearest receptor, the procedure specified in LLAQM.TG(16) has been applied to all monitoring locations that record an annual mean concentration above the NO2 annual objective of 40µg/m3 . The calculation has been applied also to monitoring locations that record an annual mean concentration that is within 10% of the NO2 annual objective of 40µg/m3 (i.e. above 36µg/m3), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

Site ID	Site Name	X (m)	Y (m)	Site Type	Distance from monitoring site to relevant exposure	Distance to kerb of nearest road (N/A if not applicable)	Distance from kerb to relevant exposure	NO_2 Results 2018	Background NO_2	NO_2 at relevant exposure receptor
ST4	Wallington	528925	163804	Kerbside	5	0.8	5.8	47	17.037075	35.6
ST6	Worcester Park	522557	165787	Kerbside	2	1.3	1.5	52	18.09569	**51.0**
ST22	Dorset Road, Belmont	525063	162474	Roadside	12	2	14	36.1	13.902365	26.0
ST26	West Street	527680	164662	Roadside	2	2	4	38.4	18.691285	35.2
ST29	Park Lane	528339	164615	Roadside	2	6	8	38.9	19.56279	37.1
ST34	Oakhill Road	525772	165118	Roadside	10	1	11	38.8	19.54035	29.5
ST23	Sandy Lane South	529734	163868	Roadside	5	2	7	37.0	16.053055	30.9
ST39	Rose Hill roundabout	526019	166469	Roadside	6	2	8	40.7	19.56279	33.7
ST40	38 High Street, Cheam	524357	163599	Roadside	2	1	3	41.1	15.02483	35.3
H3	57 London Rd	528499	166004	Roadside	5	0.5	4.5	44.1	18.18431	33.5

The diffusion tube monitoring data shows that there are no exceedances of the annual mean objective where there is relevant exposure at these locations. However, the ST6 Worcester Park automatic monitoring site result shows an exceedance of 51 $\mu g\ m^{-3}$ at the relevant exposure receptor.

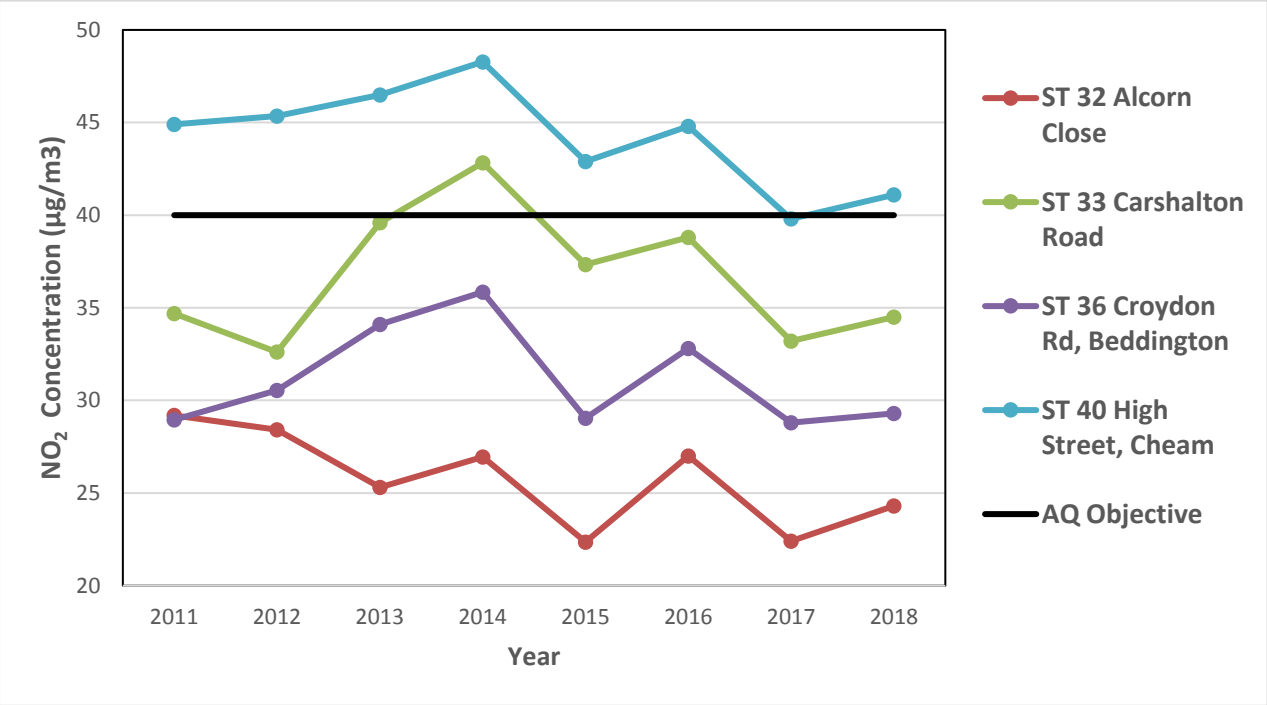
Trends in Annual Mean Nitrogen Dioxide (NO_2) Concentrations measured at the four Continuous Monitoring Sites from 2011.



The graph above shows the trend in annual mean NO_2 concentrations at the continuous monitoring sites between 2011 and 2018. This shows that concentrations have been on a generally downward trend. ST4 and ST6 have exceeded the NO_2 annual mean AQS objective for all monitored years, but all other sites were compliant in 2018. ST4 Wallington has consistently monitored the highest concentrations of all the monitoring sites, but concentrations have been reducing between 2011 and 2018 which may be attributable to the implementation of measures included in the AQAP. In 2018, ST4 Wallington monitoring station has recorded a significant decrease of 6 µg/m3 in comparison with the previous year. The data from ST6 Worcester Park, although showing a slight downward trend over the 7 years, has shown much less change than at other sites.

For 2018, there has been no increase in concentrations at any of the four stations compared to the previous year; 2 sites recorded lower concentrations and 2 recorded the same. However, concentrations can fluctuate from year to year according to external factors. Where this is the case, we would expect the trend to be replicated at other sites. From looking at the diffusion tube monitoring data in a neighbouring borough (RBK), this indicates that the regional trend for 2018 was an increase of an average of 2 µg/m3 in NO_2 concentrations.

Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube long term Monitoring Sites



The NO_2 diffusion tube data are summarised in Table D. The full dataset for 2018 (monthly mean values) is included in Appendix B.
The diffusion tube results for 2018 have been adjusted using the national bias adjustment factor of 0.93; further details are provided in Appendix A.
Many of the indicative monitors have been relocated during recent years so there is less continuity in the data collected than with the automatic monitors. The concentrations recorded by the diffusion tubes also have a lesser degree of accuracy so the results tend to have more fluctuations from one year to the next. For those sites where monitoring has continued for 6 years or more, the concentrations have fluctuated more than at the automatic monitoring sites but these have also seen a slight downward trend over the past 7 years. However, at most of the sites, the concentrations recorded in 2018 were higher than in the previous year. There were three sites where the annual mean AQS objective for NO_2 was exceeded; these were ST39 (Rose Hill roundabout), ST40 (High Street Cheam) and H3 (London Road, Hackbridge). The concentration recorded at H3 has exceeded the AQS objective for NO_2 for the second time as a result of a temporary increase of road traffic in the vicinity. ST39 location has exceeded for the first time since the monitoring began in 2014. ST40 has exceeded

the 40 annual mean AQS objective for NO_2 every year except in 2017. However, it is to be noted that the annual mean objectives have not been exceeded where there is relevant exposure. Overall, there are no sites exceeding 60 µg/m3, which would be an indication of an exceedance of the 1-hour NO2 objective.

Figure 1: Map of NO_2 diffusion tubes monitoring sites in the *London Borough of Sutton*, showing annual mean results for 2018.

Legend

***Diffusion tubes (*<40µg m^{-3})**

***Diffusion tubes (*>40µg m^{-3})**

On this map, the squares represent NO_2 diffusion tubes. The EU limit value for annual mean NO_2 is 40µg m^{-3}. All monitoring sites that recorded NO_2 concentrations above this level are coloured in red and all that are below this level are coloured in green.

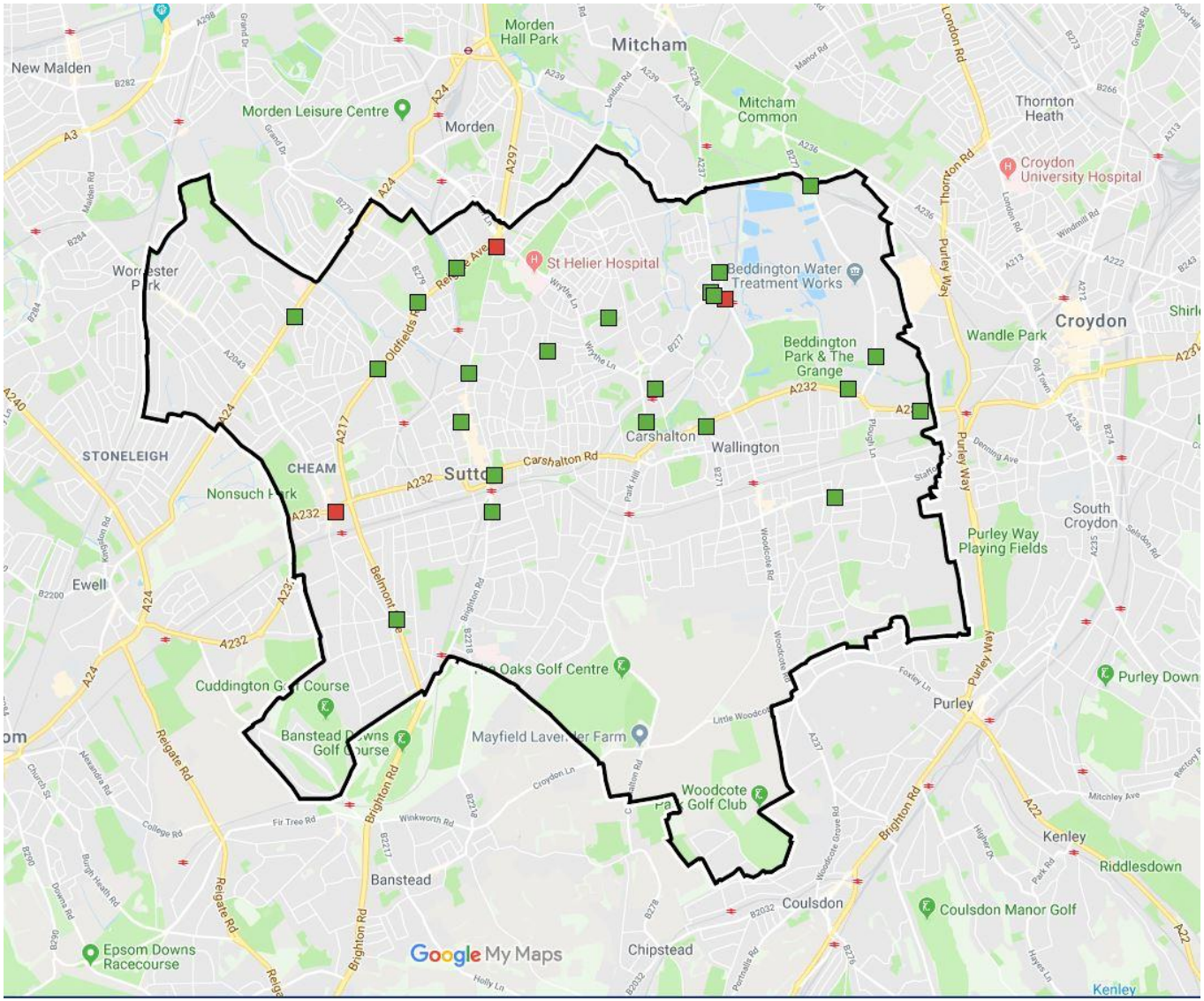


Table E. NO_2 Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 µgm^{-3}						
			2012	2013	2014	2015	2016	2017	2018
ST4 Wallington	*99*	*99*	**133**	**69** (248.7)	10 (227.8)	9 (198.7)	**22**	1	0
ST5 Beddington Lane (north)	*96*	*96*	2 (179.6)	-	0 (99.8)	0	0	0	0
ST6 Worcester Park	*99*	*99*	13	8	3	11	**24**	11	7
ST8 Beddington Lane	*96*	*96*	0 (132.6)	9	0	0	0	0	0

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

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

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

[c] Means have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture was less than 75%

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

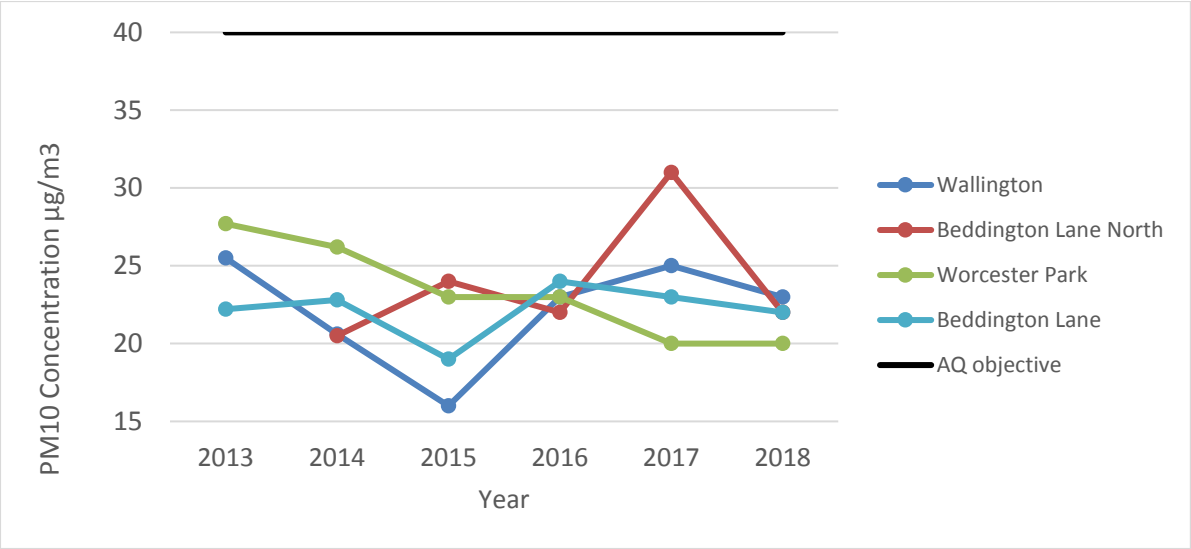
Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µgm^{-3})						
			2012	2013	2014	2015	2016	2017	2018
ST4 Wallington	*97*	*97*	27.2 (99%)	25.5c (57%)	20.6c (21%)	16 (86%)	23 (92%)	25 (82%)	23
ST5 Beddington Lane (north)	*97*	*97*	24.1a (26%)	-	20.5c (36%)	24 (91%)	24 (86%)	31 (93%)	22
ST6 Worcester Park	*99*	*99*	28.3 (98%)	27.7c (73%)	26.2c (41%)	23 (94%)	22 (82%)	20 (84%)	20
ST8 Beddington Lane	*97*	*97*	29.8a (56%)	22.2 (94%)	22.8c (73%)	19c (48%)	23 (94%)	23 (97%)	22

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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture was less than 75%

Trends in Annual Mean PM_{10} Concentrations measured at the Continuous Monitoring Sites



The graph above shows the trend in annual mean PM10 concentrations at the continuous monitoring sites between 2013 and 2018. ST5 Beddington Lane (North) and ST4 Wallington showed a decrease in 2018 respectively of 9µgm^{-3} and 2µgm^{-3} compared to the previous year. A gradual decrease in the last six years has been recorded at Worcester Park monitoring station and in the past three years at the Beddington Lane monitoring station.

The monitored concentrations at all sites are well below the annual mean air quality objective for all years. ST5 Beddington Lane (North) recorded a higher concentration in 2017 than the other sites but in 2018 has recorded similar results to the other 3 sites. Overall the sites have shown a steady decrease in concentrations since 2012.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µgm^{-3}						
			2012 [c]	2013[c]	2014 [c]	2015	2016	2017	2018
ST4 Wallington	*97*	*97*	23	6 (39.3)	0 (27.5)	0 (25.3)	5	6	4
ST6 Worcester Park	*99*	99	21	20 (44.3)	7 (42.4)	13	5 (34)	21	2
ST8 Beddington Lane	*97*	97	10 (43.6)	5	10 (35.9)	3 (33)	8	2	7
ST5 Beddington Lane (north)	*97*	97	17 (59.2)	-	0 (30.4)	8	8 (37)	5	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 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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture was less than 75%

The data shows that the objective was met at all sites in 2018 as in previous years.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (μgm^{-3})						
			2012	2013	2014	2015	2016	2017	2018
ST5 Beddington Lane North	*96*	*96*	-	-	12.7 [c]	14.8	14.4	15.2[c]	12

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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture was 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 Sutton* progress against the Air Quality Action Plan, showing progress made this year.

Table J. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Sustainable Transport Strategy	Develop a strategy for promoting and supporting sustainable transport options within the borough.	A revised Sustainable Transport Strategy was approved in March 2015 and a report is prepared in June each year which includes a summary of the progress against targets for all 7 areas. The most recent report (June 2018) indicated that by last year cycling remained static at 2%. However, the proportion of people using public transport or walking has increased to 17% and 26% respectively (T1). By contrast, the percentage of children travelling to school by sustainable means of transport (T6) has declined from 80% to 75%. Similarly, the percentage of council staff travelling to work by sustainable transport has dropped from 50% to 46.5% (T7). The indicator on bus waiting times (T3) has improved to 0.9 but is still above the target. Targets are also included for air quality which align with the National Air Quality Objectives. The council's first Sustainable Transport Strategy was published in 1999, with the latest version in 2015 complementing the broader approach to sustainability that is embedded throughout the council and reflected in the One Planet Sutton Action Plan, aimed at creating the UK's first sustainable suburb. A	The Sustainable Transport Strategy can be viewed here: https://www.sutton.gov.uk/downloads/file/2339/sustainable_transport_strategy

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		new Sustainable Transport Strategy, incorporating the Mayor's Transport Strategy and London Plan objectives will be published in 2019.	
Delivery and Servicing Plans	Develop and implement a plan for reducing the environmental impact of the Council's delivery and servicing activity.	The council continues to deliver this action via its sustainable purchasing policy. The policy includes a commitment to consider the transportation impacts of purchases and where possible purchase items in bulk and negotiate efficient delivery patterns. Examples of this include the councils stationery contract which delivers on set days of the week (rather than daily). The council in 2018 worked on a new Environment Strategy to be adopted in 2019 and will be part of achieving wider circular economy as well as sustainability principles in the council's procurement. The timescales for this is 19/20-20/21.	
Parking Policy	Have a parking policy in place that ensures consideration of air quality impacts are an inherent part of the decision-making on parking controls.	Parking Strategy was approved at Committee in November 2016 and has been adopted for implementation over a 5 year period. The Strategy includes offering free / discounted parking charges on permits and in Council car parks for electric vehicles. The Strategy also includes implementation of a progressively higher charge for permits for additional vehicles within a household and a tiered charging system for parking permits that is aligned with the DVLA tax bandings. Following a residents' questionnaire in 2017, consultation began in 2018 on proposed changes to parking controls aimed at introducing improved parking management and tackling the issues caused by high levels of car ownership in the borough. Resident permits have a pricing structure based on fuel type, vehicle type and CO_2 emissions with tiered pricing favouring lower CO_2 emitting vehicles. Surface car parks and multi-storey car parks across the Borough have electric charging point facilities where vehicles charging are not required to pay the parking cost.	The Sutton Parking Strategy and Policy can be viewed here: https://drive.google.com/file/d/0B19JvLvJMV1RaTR4TENfWkFIR2M/view
Sutton Transport Plan	To have a Transport Plan in place that supports air quality objectives.	A Transport Plan or LIP is in place which was published in 2011 and covers the period up to 2031. Strategic Objective 14 includes the aim of reducing the impact of air pollution. In 2018, a number of schemes were delivered that	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		aimed to ease traffic flow and improve facilities for pedestrians and cyclists. A number of improvements have taken place in Sutton Town Centre as part of various projects aimed at enhancing the environment for pedestrians and cyclists and thus deterring car use. This included improving the footway, lighting, signage and lane markings on several routes into the town centre. The borough has been working closely with other stakeholders to ensure that proposals to extend the existing Tramlink through the borough are delivered. This has included future-proofing new developments in the town centre so that they incorporate adequate provision for the tram lines / stops. In 2018 a project was delivered on improvements made to 3 access routes into the High St making the environment more conducive to visiting on foot. Sutton's 3rd Local Implementation Plan (LIP), covering the period 2019-2041, was produced in 2018 and following consultation was approved by the Mayor of London. The LIP explains how Sutton will work towards the Mayors Transport Strategy objectives, including reduction in traffic and vehicle pollution. The Council's cycling, sustainable transport, sustainability and parking strategies and air quality targets are referenced in the plan as key strategies to help achieve this.	
Workplace Travel Plans	To promote the uptake of WTPs in workplaces throughout the borough.	By end of 2018 there were 5 businesses within the borough that had active Travel Plans in place: ICR, Royal Marsden, St Helier Hospital, Quadrant House business group and Subsea 7. Details on modal shifts that have occurred at these 5 business places will be made available in 2019. Work / campaigns undertaken to promote Travel Plans to businesses within the borough: Dr Bike events offered at all workplaces with travel plans Workplace Travel Scorecard (travel survey self-assessment resource) sent to all businesses with travel plans.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		Business Engagement Workshops: A series of workshops were held during the period February to October 2018, engaging with businesses that were located on and around Sutton High Street. The purpose of the workshops was to inform and introduce local businesses to the impact of local poor air quality and to provide a variety of interventions that businesses could take both individually and collectively to reduce their impact. The workshops took place in the Sutton High Street area, making them accessible to a variety of local businesses across a number a sectors, including the public sector. In total 56 businesses were approached to participate in the workshops, reflecting the business mix. Outputs: The Workshops provided a platform from which to engage and inform businesses in the impact of their transport – both business and staff commuting generated – on local air quality. It provided participants with tangible evidence of successful projects that had been undertaken and real achievable alternatives to common transport practices including private car commuting. Two of the participants, Sutton College and St Helier NHS Trust put in place actions outside of the immediate area but within the wider Borough.	
Council Employee Travel Plan	To have a Travel Plan in place for Council employees and encourage a reduction in travel by motor vehicles to/from and during work.	The most recent Staff Travel Survey was undertaken in 2017 and showed that 47 per cent of council staff are now travelling to work using sustainable modes of transport. This is a decrease of 4 per cent since 2015. The next Survey will be carried out in Summer 2019. No changes made to permits or parking charges that directly impacted Council employees. All staff who commute to work in the Civic office are liable to pay the same parking charges as any member of the public except some selected staff (mainly in People Directorate) who have their parking pass paid for by their department budgets.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		Cycle to work loan, season tickets loan, bike mileage, showers, lockers and extra parking provision for staff who cycle are incentives for Council employees to use alternative modes of transport. Agreement was reached on the installation and operation of Brompton Bike Hire docking station close to Sutton railway station. The system went live in January 2019 with Council employees being offered a discount on membership as part of the launch alongside those from other local businesses.	
School Travel Plans	To have an active Travel Plan in place at Council schools and encourage a reduction in travel to/from schools by motor vehicles.	The percentage of all schools within the borough that have an active Travel Plan in place has fallen to 47% from the 51% in 2017. According to STARS data, of the schools that have been accredited, 18 have gold status, 2 have silver and 14 have bronze. Engagement with schools has focused on scooting and walking as well as identifying any improvements in street design or traffic schemes that may encourage children and parents to walk more. 20 schools took part in Walk to School month in 2018 and 6 schools participated in Scooter training called CA4S.	
Car Clubs	To promote use of car clubs as an alternative to individual car ownership.	The Council engaged with ZipCar and Enterprise to develop the Car Club network in the borough. - Information on Car Clubs and bays to be included on Council webpage: Car club web content for public and corporate use included on borough website and staff intranet. Staff corporate car club use has doubled in use since 2017. - Number of Car Club bays provided within the borough and details of operators: One new car club bay added in St Nicholas Way in June 2018. 5 car club bays in use across borough. Four are run by Zipcar and one is run by Enterprise. - Number of registered Car Club members in the borough: 1549 - Average number of trips by Car Club member or by vehicle: 163	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Reduction of energy use in Council-owned buildings	To reduce the energy consumption within Council-owned buildings through energy efficiency measures and increased use of renewable energy sources.	The data for this action is collected in a financial year. The latest data available is for the period 2017/18. This indicates that carbon emissions from council buildings and street lighting has reduced by 37.98% since the 2010/11 baseline. In total, electricity consumption has reduced by 15.93% and gas has reduced by 41.5% since the 2010/11 baseline.	
Alternative Refuelling Sites	To promote cleaner vehicles by ensuring infrastructure for refuelling is in place	The Council webpage includes information on LBS publicly available charging points Number of EV Charging Points that are publicly available broken down by type (on or off-street and normal / rapid / fast): 13 charge points in Council off-street car parks (six sites) all with 7kw charging. Latest estimates of growing number of non-Council publicly accessible charge points are that there are 25 in non-Council off-street locations (nine sites) and three TfL rapids on street. Number of registered Source London members in the borough: 89. Frequency of use of charge points: 13 Council off-street car parks had a total of 526 charges during 2018 with an average charge time of 2 hours 58 mins.	
Cleaning Council Fleet	To reduce the emissions to air from Council's own fleet	Sutton Council Fleet Services now have twenty two (22) vehicles. These vehicles are made up of sixteen light goods vehicles, two mini buses, three mini coaches and a pick-up. All vehicles are Euro 6 diesel. The number of vehicles within the Council's fleet has been reduced as contracts to deliver services have been outsourced. Therefore, the focus of this action is to ensure that procurement policies require contractors to use vehicles with lower emissions.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Smoke Control Areas	To ensure emissions from domestic fuel burning are controlled	Historically, a number of Smoke Control Orders were put in place and these cover the whole of the borough. Therefore, we continue to enforce the regulations on emissions from chimneys using these Smoke Control Orders. In 2018, the Council received 14 service requests about smoke from chimneys and multi-fuel burners. These were a mix of complaints and enquiries from people wishing to purchase a stove who wanted to ensure compliance with the regulations. In 2018 we have started to review Smoke Control Orders with the plan of having only one consolidated Smoke Control Order for the whole of the borough.	
Air Quality Management Areas	To ensure that the designated Air Quality Management Areas are appropriate and relevant	The borough continues to keep the designation of its Air Quality Management Area under review based on sources of emissions within the borough and its air quality monitoring data. While exceedances of the Air Quality Objective for nitrogen dioxide continue to be recorded, the designation remains for both nitrogen dioxide and particulate matter. This is due to the health impacts of particulate matter at levels below the objective and that the sources of the pollutants are largely the same.	
Industrial Processes	To ensure that all processes that require an Environmental Permit are permitted and comply with their conditions	All processes were inspected in accordance with the Regulations and at the required frequency. 39 installations had a permit in place at the end of December 2017. In 2018, this had increased to 40 as a new cement batch plant was permitted. No enforcement actions were required in 2018.	
Bonfires & Waste Disposal	To reduce the number of bonfires and ensure waste is disposed of appropriately	Enforcement of dark smoke bonfires is carried out under the Clean Air Act while nuisances arising from bonfires is dealt with under the Environmental Protection Act. The Council received 313 complaints about bonfires in 2017 and 246 in 2018. Information on bonfires is available on the Council website and residents are encouraged to compost their garden waste or subscribe to the Green Waste Collection scheme.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Demolition and Construction	To minimise the dust emissions generated during demolition and construction	For larger developments that have the potential to impact on local air quality, the local authority has requested that mitigation measures are employed to control dust in line with the GLA's Supplementary Planning Guidance. See Table K below for further details.	
Engine Idling	To discourage unnecessary engine idling of vehicles while stationary.	The number of complaints received about engine idling is low compared to other types of complaint. Agreement was reached on the design of No Engine Idling signs and a number were ordered for installation in 2018. Work began to engage schools on the issues of parents switching off their vehicle engines if waiting during school pick-up / drop-off. Advice on reducing emissions when driving is available on the Council website and this includes recommendation to avoid unnecessary engine idling. - 2 no idling campaigns in 2018 at Schools: Cheam Fields Primary Academy and Robin hood School; - In 2018 we have installed 45 'no idling' signage around Sutton at locations close to a number of primary and junior schools and close to areas where idling complaints were received previously. A campaign tailored for Sutton is now being developed and it will take place in 2019, working with colleagues in Parking, Communications, Sustainable Transport and Pollution Control.	
Regulating Waste Sites	To work with the Environment Agency on regulating waste sites to minimise fugitive emissions from sites	The number of complaints received and cases of non-compliance with regulations at waste sites within the borough has significantly reduced. Where complaints have been received, the borough has ensured active communication with the Environment Agency so that the regulatory approach is coordinated. Borough officers and officers from the EA have attended the meetings regularly held at the Viridor landfill site where an Energy Recovery Facility is currently being constructed and it will become operational in 2019.	
Development Control	To minimise impacts on air quality and existing	A webpage has been created on the Council's website providing Information for Developers in relation to air quality. This includes details on when an Air Quality Assessment/Air Quality Neutral Assessment would be required. All relevant	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
	residents from new developments	applications are sent to Environmental Health for comment and mitigation measures have been secured where appropriate. See Table K below for further details.	
Planning Obligations	To secure planning obligations to improve air quality where appropriate.	No s.106 agreements were put in place to secure funding specifically for air quality improvements in 2018. The provision of Car Club facilities were completed in the 2018 and are now operational in St Nicholas Way.	
Low NOx boilers	To promote the use of low NOx boilers where appropriate in new developments	Low NOx boilers have been recommended in new developments through a planning condition where appropriate. See Table K below for further details.	
Air Quality Monitoring	To maintain a network of air quality monitors to provide meaningful air quality data	The borough continued to operate a network of automatic air quality monitoring stations supplemented with a network of passive monitors. There were no changes to the network in 2018. A briefing note providing details of sources of information on air quality monitoring and a step-by-step guide to obtaining data was produced and circulated to Councillors so that they could better answer queries from residents about the borough's air quality.	
AirText	To promote the uptake of airText service to enable people to better manage their exposure to poor air quality	At the request of Public Health Sutton the CCG's Primary Care Team continued to promote AirText to GPs practices and to the Respiratory Clinical Reference Group, which includes respiratory physicians and nurses. By end of 2018, the number of subscribers to AirText registering with Sutton as their home borough was 165.	
Public Health partnership	To work in partnership with Public Health on projects that can improve air quality	Environmental Health has worked closely with Public Health to provide up-to-date information for inclusion in the borough's Joint Strategic Needs Assessment. Following a period of development and consultation, Sutton's Health and Wellbeing Strategy Action Plan 2016-2021 was approved in December 2017 and this includes air quality as one of its themes.	
Beddington Lane	To implement specific measures in the area to	Double Yellow lines and parking restrictions were implemented in the Beddington Industrial area to address pinch-points.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Industrial Area	tackle emissions from industry and fleet	In partnership with Croydon, the "Croydon Sutton Electric Freight" project was launched which offered local firms the opportunity to try out an electric van or truck. This project forms part of London's Go Ultra Low City scheme and funding from the Office for Low Emission Vehicles is being used to support trials of electric vans. Four vans were leased in 2017-2018 on either a six monthly or a yearly basis. Their use is being monitored.	
Beddington Renewal and Regeneration Programme	To complement action 33 with improvements to enhance the environment for pedestrians and other road users	The council is implementing the Beddington North TfL Major Scheme with a total budget of £3.56m. The scheme focuses on delivering improvements for pedestrians and cyclists along Beddington Lane and Hilliers Lane thus providing more travel choices for local businesses and residents. The project will also significantly enhance the appearance of the area and restrict HGV's through the village area to achieve better air quality. The phase 1 works at Beddington village are nearing completion and works in the industrial area are progressing. The Beddington Industrial Area way-finding and signage strategy was granted a planning permission and this is scheduled for implementation by the end of 2019.	

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in London borough of Sutton **in 2018**

Action	Number
a) Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	*14*
b) Number of planning applications required to monitor for construction dust	0 40 requested a Construction Management Plan. None have been asked to carry out continuous dust monitoring
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	0
e) Number of developments required to install Ultra-Low NO_x boilers	3
f) Number of developments where an AQ Neutral building and/or transport assessments undertaken	9
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
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant.	11 NRMM informative conditions were requested along with the construction method statement conditions

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.	Sites Audited in 2018: 11 Compliant 7 Non-Compliant 4 Self-Compliant 0 Cold Engaged 5 Not Cold Engaged 8 Non-Registration 2 Total Visits 13

3.1 New or significantly changed industrial or other sources

For 2018 no new sources have been identified.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

The Council's monitoring stations fall within the LAQN and QA/QC standards are delivered accordingly. This is considered close, if not equal to, AURN standard.

PM_{10} Monitoring Adjustment

The monitoring data for the London Borough of Sutton is part of the London Air Quality Network, managed by ERG (Environmental Research Group).

A.2 Diffusion Tube Quality Assurance / Quality Control

The diffusion tubes are supplied and analysed by Gradko utilising the 20% triethanolamine (TEA) in water preparation method. A bias adjustment factor of 0.93 for the year 2018 (based on 30 studies) has been derived from the national bias adjustment calculator dated March 2019.

Diffusion Tube Bias Adjustment Factors 03/19 Issue of the Spreadsheet				
			New (03/19) Factor	
Laboratory	Method	Year	No. of Studies	Factor
Aberdeen Scientific Services	20% TEA in water	2018	7	0.81
Edinburgh Scientific Services	50% TEA in acetone	2018	2	0.96
Glasgow Scientific Services	20% TEA in water	2018	9	0.86
Gradko	20% TEA in water	2018	30	0.93
Gradko	50% TEA in acetone	2018	8	0.92
Lambeth Scientific Services	50% TEA in acetone	2018	7	1.03
Milton Keynes Council	20% TEA in water	2018	4	0.77
SOCOTEC Didcot	20% TEA in water	2018	2	0.74
SOCOTEC Didcot	50% TEA in acetone	2018	21	0.76
SOCOTEC Glasgow	20% TEA in water	2018	1	0.95
SOCOTEC Glasgow	50% TEA in acetone	2018	1	0.98
Somerset County Council	20% TEA in water	2018	3	0.89
South Yorkshire Air Quality Samplers	50% TEA in acetone	2018	4	0.95
Staffordshire Scientific Services	20% TEA in water	2018	13	0.87
Tayside Scientific Services	20% TEA in water	2018	5	0.80
West Yorkshire Analytical Services	50% TEA in acetone	2018	8	0.80
Number of Studies Included			**125**	

London Borough of Sutton did not conduct any co-location studies in 2018, so it was not possible to calculate a local adjustment factor. As a result, the national adjustment factor of 0.93 is applied to diffusion tube monitoring results in this report.

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. Gradko previously participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis and the Annual Field Inter Comparison Exercise. In April 2014, a new scheme, AIR PT13, was introduced. This is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

Gradko International Ltd's performance for 2018 for 100% of samples submitted by Gradko were deemed satisfactory.

The laboratory has also achieved a "good" precision result for 2018. Tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%.

Appendix B Full Monthly Diffusion Tube Results for 2018

Table M. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data [c]	Annual mean – bias adjusted (0.93) [c]
ST21	100	100	37.09	36.28	34.02	28.83	29.63	23.63	28.26	25.11	29.75	36.79	39.25	30.30	31.58	29.4
ST22	100	100	40.26	41.68	41.23	33.76	34.18	29.12	40.66	35.89	40.64	44.84	44.42	39.20	38.82	36.1
ST23	100	100	32.64	47.97	45.28	34.64	42.10	35.85	39.33	32.84	35.91	47.79	41.62	41.24	39.77	37.0
ST24	92	92	29.02	39.82	32.79	25.49	33.19	30.67	26.82	N/A	25.96	36.69	32.30	28.68	31.04	28.9
ST25	100	100	35.39	40.17	37.65	28.52	30.97	37.35	29.61	27.19	32.06	37.76	36.66	34.58	33.99	31.6
ST26	100	100	41.21	51.29	40.57	37.74	39.80	28.09	43.30	35.38	41.52	46.78	45.22	44.26	41.27	38.4
ST07	92	92	27.16	30.49	N/A	23.29	24.50	20.93	16.03	16.36	20.37	29.22	29.16	26.86	24.03	22.4
ST08	100	100	26.64	33.46	30.20	22.16	24.96	20.58	23.46	18.67	24.84	31.74	29.42	23.95	25.84	24.0
ST29	100	100	36.74	51.16	43.16	39.41	43.91	34.05	43.96	35.02	38.90	49.55	43.60	42.82	41.86	38.9
ST10	100	100	26.43	33.90	26.38	20.64	23.18	20.02	18.08	17.05	21.48	30.83	29.19	25.93	24.43	22.7
ST11	100	100	27.83	29.29	27.70	22.98	23.39	17.94	22.58	20.33	32.98	30.75	31.79	27.98	26.30	24.5
ST32	100	100	24.20	31.57	33.76	21.47	27.27	23.57	22.87	19.84	21.33	30.40	34.79	22.92	26.17	24.3

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data [c]	Annual mean – bias adjusted (0.93) [c]
ST33	100	100	37.29	39.29	38.58	36.54	39.56	28.75	36.69	31.42	35.07	47.81	38.33	35.27	37.05	34.5
ST34	100	100	35.14	44.24	37.71	38.54	38.64	32.41	48.01	38.39	44.51	47.05	48.21	48.37	41.77	38.8
ST35	100	100	39.59	40.94	38.91	31.32	30.42	19.53	31.94	26.32	28.71	36.24	42.73	34.12	33.40	31.1
ST36	100	100	30.36	39.93	30.07	29.25	34.18	25.84	29.65	26.49	28.64	34.01	37.21	32.48	31.51	29.3
ST27	100	100	32.94	46.70	43.47	34.64	38.38	30.45	36.06	29.86	32.84	47.13	45.29	41.54	38.27	35.6
ST38	100	100	33.90	47.48	36.69	33.91	37.28	36.55	38.80	32.79	36.40	45.31	38.95	34.59	37.72	35.1
ST39	92	92	35.02	47.39	43.75	40.16	47.21	35.95	47.89	37.94	45.49	56.92	43.78	N/A	43.77	**40.7**
ST40	92	92	45.23	51.08	40.63	42.62	43.80	42.59	47.58	N/A	37.65	45.80	48.93	40.77	44.24	**41.1**
ST42	92	92	26.06	30.19	25.69	19.31	18.69	N/A	15.54	15.28	7.92	26.43	26.49	23.41	21.36	19.9
H1	92	92	34.30		33.60	29.81	34.45	27.27	30.81	25.90	30.94	38.19	37.15	32.50	32.27	30.0
H2	100	100	31.92	33.03	31.93	27.58	26.57	22.22	24.04	22.85	26.92	34.15	34.48	29.89	28.80	26.8
H3	100	100	50.39	49.38	48.13	45.93	44.24	34.23	49.45	42.78	47.24	50.86	50.99	55.36	47.42	**44.1**
BL	92	92	28.66	32.68	30.13	26.13	26.91	N/A	32.66	28.88	24.36	37.16	37.49	37.80	31.17	29.0

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%