London Borough of Barnet Air Quality Annual Status Report for 2017
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This report provides a detailed overview of air quality in the London Borough of Barnet during 2017. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

Contact details

Local Authority Officer	Lucy Robson
Department	Environmental Health, Department of Regulatory Services
Address	Environmental Health, Barnet House 1255 High Road Barnet, N20 0EJ
Telephone	020 8359 7995
E-mail	scientificservices@barnet.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

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2017

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
ABN1	Tally Ho	526344	192219	Kerbside	Y	5	0.5	3	NO_2, PM10	Chemiluminescent ; TEOM
ABN2	Chalgrove School	524374	189642	Urban Background	Y	0	N/A	2.5	NO_2, PM10	Chemiluminescent ; TEOM

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

Site ID:	Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Distance from monitoring site to relevant Exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet Height	Tube co-located with an automatic monitor (Y/N)
PBN1	1 Pointalls Close	Roadside	X526278 Y190444	NO_2	Y	6	13	2.5	N

PBN2	71 Ballards Lane	Urban Centre	X525410 Y190980	NO_2	Y	0 [1]	4	2.5	N
PBN3	Sanders Lane Allotments	Urban background	X523754 Y191588	NO_2	Y	N/A	N/A	2.0	N
PBN5	St James Catholic High School	Urban background	X521885 Y190489	NO_2	Y	5	2	2.5	N
PBN6	347 Hendon Way	Roadside	X523127 Y188183	NO_2	Y	10	1.0	2.5	N
PBN8	Tally Ho monitoring station	Urban Centre	X526346 Y192224	NO_2	Y	5 [1]	0.5	2.5	Y
PBN9	52 Golders Green Road	Urban Centre	X524965 Y187505	NO_2	Y	0 [1]	5	2.5	N
PBN10	High Street, Barnet	Urban Centre	X524496 Y196615	NO_2	Y	0 [1]	3	2.5	N
PBN12	1295 High Road Whetstone	Urban Centre	X526381 Y194059	NO_2	Y	0 [1]	10	2.5	N
PBN13	Courtland Avenue, A1	Roadside	X520968 Y193457	NO_2	Y	6	22	2.5	N
PBN14	William Hill, Station Road Edgware	Urban Centre	X519497 Y192075	NO_2	Y	0 [1]	5	2.5	N
PBN17	National Express Bus Stop, Golders Green Bus Station	Bus station	X525207 Y187425	NO2	Y	0 [1]	N/A	2.5	N
PBN18	Rear of GG Bus Station	Bus station	X525278 Y187444	NO_2	Y	0 [1]	N/A	2.0	N
PBN19	Rear of 7-12 Dyson Court, Tilling Road	Roadside	X523348 Y187589	NO_2	Y	0 (façade of residential building)	10	2.5	N
PBN20	Flats above 16 Cricklewood Lane	Urban Centre	X523885 Y185764	NO_2	Y	0 (façade of residential building)	6	6	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.

The data for the following sites needed to be annualised: ABN1, ABN2
The site at PBM20 was not in operation in 2017 due to building work on the flats.

The data for the following sites needed to be distance corrected to a location of relevant public exposure: ABN1, PBN6, PBN8. The calculations are shown in full in Appendix A. Data capture was poor for both of the two automatic monitoring sites. This was due to issues with the telephone lines.

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 2017 % [b]	Annual Mean Concentration (μgm^{-3})						
				2011	2012	2013	2014	2015	2016	2017
ABN1	Automatic	74	74	**55.3**	**51.8**	**49.3**	**57**	**46.2**	38.8	**50**
ABN2	Automatic	69	69	31	32	32	27	23	28	29
PBN1	Diffusion tube	100	100	38.5	36	**42.2**	**52.5**	37.1	38.9	34.9
PBN2	Diffusion tube	100	100	**47.9**	**47.7**	**52.5**	**50.0**	**43.7**	**46.7**	**40.5**
PBN3	Diffusion tube	83	83	24.2	20.1	24.1	27.3	21.5	22.3	21.0
PBN5	Diffusion tube	83	83	34.9	30.1	31.6	33.2	27.9	30.5	27.7
PBN6	Diffusion tube		100	**46.5**	**49.2**	**50.5**	**50.7**	**41.7**	**50.6**	**49.5**
PBN8	Diffusion tube		100	**43.6**	**47.0**	**46.7**	**49.6**	**41.7**	**45.1**	**41.25**
PBN9	Diffusion tube		92	**48.7**	**49.7**	**56**	**51.9**	**48.4**	**53.5**	**43.8**
PBN10	Diffusion tube		92	**47.9**	**51.4**	**51**	**53.8**	**51.0**	**55.7**	**51.1**
PBN12	Diffusion tube		100	**48.8**	**51.9**	**53**	**52.4**	**47.0**	**50.8**	**46.3**
PBN13	Diffusion tube		92	32.7	35.2	37.3	37.6	36.7	34.2	30.1

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
				2011	2012	2013	2014	2015	2016	2017
PBN14	Diffusion tube		100	**50.7**	**53.5**	**58.9**	**56.5**	**55.7**	**54.7**	**50.9**
PBN17	Diffusion tube		83	**67.8**	**68.5**	**80.9**	**78.4**	**64.5**	**58.4**	**50.8**
PBN18	Diffusion tube		100	**49.5**	**54.7**	**55.6**	**54.5**	**51.8**	**50.3**	**50.4**
PBN19	Diffusion tube		100	**49.5**	**51.2**	**55.5**	**54.8**	**52.3**	**52.2**	**49.1**
PBN20	Diffusion tube		25	**55.9**	**54.3**	**57.1**	**62.3**	**54.6**	**55.3**	

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

Discussion of data

Prior to annualisation, the annual mean at Tally Ho was 50µg m^{-3}, and the annual mean at Chalgrove was 29µgm^{-3}. Annualisation was done using the method given in LLAQM Technical Guidance Box 4.8. Full details are given in Appendix A. This gave results of 52.0µg m^{-3} and 27.2µg m^{-3} for Tally Ho and Chalgrove respectively. It is important to note that ABN1 (Tally Ho monitoring station) was then distance corrected to relevant exposure, giving a figure of 44.0µg m^{-} at 5m distance from tube. Similarly, PBN8 (Tally Ho tube) was adjusted from 48µgm^{-3} to 41.25µgm^{-3}, and PBN6 (347 Hendon Way) was adjusted from 68.8µgm^{-3} to 49.49µgm^{-3}. Full details of how results were adjusted for distance are also in Appendix A.

Discussion of data trends

The graph on the following page shows the seven-year trend in nitrogen dioxide (NO2) concentrations for monitoring sites in Barnet. Most sites are showing a large reduction in NO2 levels in 2017, compared to 2016, which looks to have been a peak year. The lowest levels of NO2 are at Sanders Lane Allotments, a background site far from any minor or major roads. Concentrations here are very slowly decreasing over time, but are still at the same level as they were in 2012. At St James School, another background site, concentrations are also slowly decreasing with time.

There are two sites that are within 10m of very busy roads – PBN1, close to the A406, and PBN13, close to the A1. Both sites are showing a strong reduction in nitrogen dioxide levels over time, and are now well below (comfortably meeting) the annual mean objective.

Golders Green Bus Station

Some sites had monitoring initiated with the intention of assessing if the hourly mean was being exceeded. This includes PBN17 and PBN18 at Golders Green Bus Station. PBN17 which is next to the National Express bus stop has seen a very large decrease of 30µg/m^3 in NO_2 levels from a peak of 80µg/m^3 in 2013 to 50.8µg/m^3 in 2017. This indicates that the hourly mean is being met and if the trend continues then the Air Quality Management Area (AQMA) for the one hour mean for the bus station could be revoked. NO_2 levels to the rear of the bus station (PBN18) have not decreased so rapidly but are consistently well below 60µg/m^3, the indicative measurement for exceedence of the hourly mean. The trend for the National Express Stop could be explained by newer cleaner coaches and by more effective management requiring engines to be turned off whilst waiting.

High Street Locations

Monitoring is being done at 5 High Street (town centre) locations for both assessment against the annual mean (residents live above the shops), and for the hourly mean (people can reasonably be expected to spend an hour in the locations shopping or sitting at pavement cafes. PBN2 is in Ballards Lane, Finchley, and concentrations in 2017 (40.5µg/m^3) were significantly below those in 2016 and over the longer term have decreased steadily since the highest levels in 2013. PBN8 is in North Finchley High Road, and has been distance corrected. The concentration of 41.25µg/m^3 in 2017 remains above the annual mean objective; however, it has decreased significantly since a peak of 49µg/m^3 in 2014. The hourly mean is not being exceeded in North Finchley. PBN9 is in Golders Green Road, a busy high street location. Here, nitrogen dioxide levels also remain above the annual mean but not the hourly mean. Concentrations in Golders Green Road have decreased significantly since 2013, and the peak in 2016 to 43.8µg/m^3 in 2017. PBN10 is a busy High Street location in High Barnet. Here the NO2 levels have gone down compared to the high levels of 2016; however, the trend over time shows no significant decrease and the annual mean objective is still being greatly exceeded with a concentration of 51.1 µg/m^3 in 2017. The High Street Barnet location is a key through route (A1000) and is also heavily congested. PBN12 in Whetstone High Road town centre shows a slow decrease in concentrations over time, with 46.3µg/m^3 in 2017. The tube here is 10m from the kerb but it is close to a very busy junction, and there is a bus stop on road within 12m. However, there are many residents living along this stretch of high street. At PBN14 in Station Road Edgware, the annual mean was 50.9µg/m^3 in 2017, a large decrease since 2013 but remaining significantly above the annual mean. This location does suffer from some congestion. There is also a taxi rank in middle of the road and a high proportion of buses.

The hourly mean is being achieved at all High Street locations and provided the trend continues in 2018, the AQMA for the hourly mean could be revoked.

The annual mean continues to be exceeded in all High Street locations, but is particularly high in High Barnet, Edgware and Whetstone. Not only do these locations suffer from high vehicle numbers and congestion, but there is also a high number of buses and in Edgware, taxis. There still needs to be action to address poor air quality where residents are living in these busy high streets above shops. New residential developments in High Streets should still employ mitigation for instance in the form of mechanical ventilation with air drawn in at height or to the rear of the building. This is pertinent in Whetstone where there are several examples of offices becoming residential properties as part of the Government's policies to increase the number of homes. This type of conversion does not go through a full planning process; only "prior notification" and air quality is not a material consideration.

Residential properties on major roads

PBN6 is on Hendon Way, which is the A41 close to Brent Cross shopping centre and junction with the A406 North Circular Road. It is one metre from the road and was distance corrected to 10m for the nearest residential exposure. Here, NO2 concentrations show no significant decrease over time and remain around 50µg/m^3, significantly above the annual mean. Traffic does not tend to be congested here, but it is a dual carriage way with 3 lanes each side and very high vehicle numbers.

PBN19 is on a residential building, 10m from the A406, to the South of Brent Cross Shopping Centre. Similarly to PBN6, NO2 levels are not showing any significant decrease over time and remain at 49.1µg/m^3 in 2017. This residential building is part of the redevelopment of the wider area and will probably be demolished. This will be a good opportunity to build in air pollution mitigation for replacement residential buildings.

The general trend of steady decreases in NO2 levels is probably due to cleaner engines. There has not been any decline in congestion or vehicle numbers. 2016 looks to have been a "poor air quality year". It was worse than preceding years and 2017. Air quality has not seen a similar improvement on the Borough's dual carriageways, and this might be due to the higher percentage of HGVs.

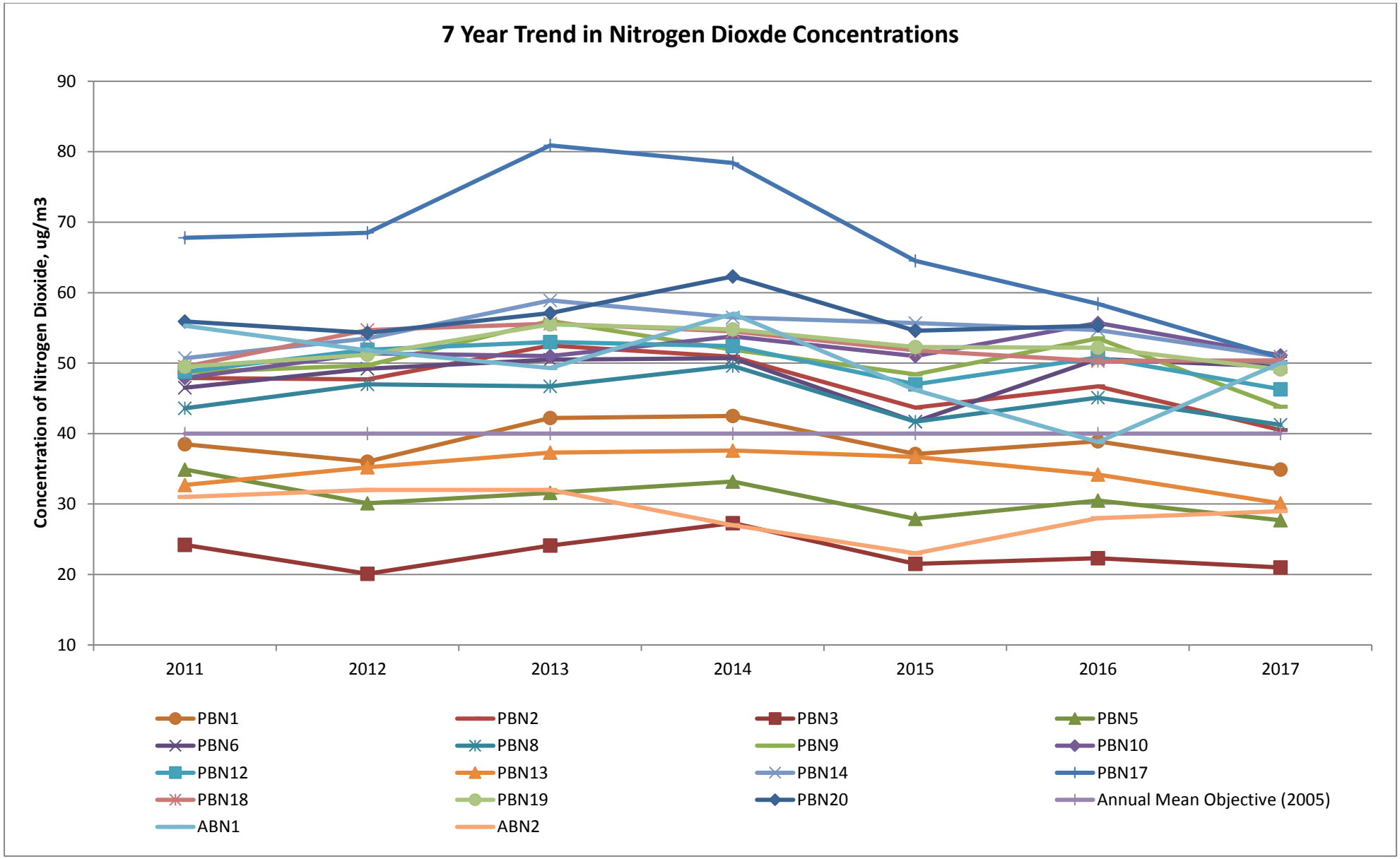
7 Year Trend in Nitrogen Dioxde Concentrations
Concentration of Nitrogen Dioxide, ug/m3
90
80
70
60
50
40
30
20
10
2011
2012
2013
2014
2015
2016
2017
PBN1
PBN2
PBN3
PBN5
PBN6
PBN8
PBN9
PBN10
PBN12
PBN13
PBN14
PBN17
PBN18
PBN19
PBN20
Annual Mean Objective (2005)
ABN1
ABN2

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Number of Hourly Means > 200 µgm^{-3}						
			2011 [c]	2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]
ABN1	74	74	15	17(208)	5	9 (182)	9 (136)	0	1
ABN2	69	69	0	0	0	0 (115)	0 (92)	0	1

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 were "annualised" in accordance with LLAQM Technical Guidance, as valid data capture was less than 75%

The hourly mean at both automatic monitoring sites met the objective in 2017. There has been a dramatic improvement over the last seven years. This is backed up by the diffusion tube results, which indicate that there are no longer exceedences of the one hour mean at the busy High Street locations or at Golders Green Bus Station. Currently Barnet has an Air Quality Management Area for exceedences of the one hour mean for nitrogen dioxide. Should results for 2018 continue to show the objective is met, then it would be appropriate to consult on revoking this AQMA.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
			2011 [c]	2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]
ABN1	70	70	28	27	27	26	22	23	21.29
ABN2	67	67	21	19	19	20	18	18	18.0

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%

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 2017 % [b]	Number of Daily Means > 50 µgm^{-3}						
			2011 [c]	2012[c]	2013 [c]	2014[c]	2015 [c]	2016 [c]	2017 [c]
ABN1	70	70	21	7(41)	5	6	6	4(35)	6 (32)
ABN2	67	67	14	0	0	0	3	3	4 (29)

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%

The air quality objectives for PM10 are being comfortably met at both of Barnet's automatic monitoring sites, and have been for the past seven years. Particulate levels only tend to exceed the objectives on events such as Bonfire Night, Diwali and New Year's Eve. Although the objectives are being met in these two locations, there might be exceedences on the dual carriage-ways and major junctions. Therefore it is still relevant to have an AQMA in place for PM10. It could be useful to re-draw the boundaries of it so that it is not Borough-Wide, and focusses on areas known to be an issue. This would require modelling.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of the London Borough of Barnet's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2017 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

The London Borough of Barnet published its new Air Quality Action Plan in 2017 following public consultation. Barnet ensures its action plan is up to date and on track through quarterly Action Plan steering group meetings.

Action ID	Action description	Progress	Further information
1	Minimise dust emissions from construction sites	The supplementary planning document for Sustainable construction was adopted in October 2016. Developers are required to supply where necessary an Air Quality and Dust Risk and Air Quality and Dust Management Plan. Officers continue to respond to complaints of dust from construction sites, and will investigate and take appropriate action using the Environmental Protection Act 1990. The enforcement officer for construction sites (action 2) advises sites on dust control. The team reviewed at least 160 "Construction method	https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/supplementary-planning-documents/sustainable-design-and-construction.html

		statements" submitted to discharge planning conditions in 2017. A key component of this is dust control.	
2	Enforce Non Road Mobile Machinery (NRMM) air quality policies	A part-time enforcement officer has been in place since January 2017. All NRMM over a certain size must comply with specific emissions criteria. NRMM with stage I and II emission standards are now a rare occurrence in the enforcement area. The old machines have been relocated to other areas in England where NRMM is not a requirement. There is now a 95% compliance rate in the enforcement area. An NRMM planning condition is now put on all major developments. NRMM requirements have been in the Council's Supplementary Planning Document since October 2016.	Funded by the Mayor's Air Quality Fund until March 2019.
3	Enforce CHP and biomass air quality policies	The requirements in the London Plan's Sustainable Design and Construction SPG document 2014 for CHP to meet certain emissions standards are now being pursued by applying a planning condition. The requirements have been written into the Council's SPD. The planning system is ensuring that the cleanest CHP boilers are installed. However, a note of caution is that CHPs are on the increase. There was only one application for a biomass boiler in 2017, and this was refused on grounds of its likely effect on both air quality and likelihood of nearby residents complaining of smoke odour.	

4	Enforce Air Quality Neutral policies and Monitor sustainable Travel Plans for developments	There is now an “air quality neutral” planning condition that is required for all major developments. The requirements are in the Council’s SPD. Performance indicator PITD03 Monitoring Travel Plans for Developments	Further work is needed on quantifying measures that developers can implement to become air quality neutral.
5	Enforce Smoke Control Areas	The scientific services team continues to take action where necessary to ensure approved stoves / approved fuel is used in residential chimneys. About 5 complaints are received each year. There is an increasing use in Barnet by restaurants of charcoal grills and wood-fired pizza ovens. 2017 saw a rise in residents complaining about them. The scientific team take enforcement action when necessary. The scientific team took part in the Defra consultation process to revise the Clean Air Act.	.
6	Increase the planting of green barriers and vegetation	In 2017, 612 trees were planted across the Borough with the specific aim to improve air quality. The London Borough of Barnet adopted a new Green Infrastructure Supplementary Planning Document in October 2017. It recognises that green infrastructure can improve air quality. Air quality is a key subject in the document.	https://barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/local-plan/supplementary

			-planning-documents/Green-Infrastructure-SPD1.html
7	Regularly brief Director of Public Health (DPH) on air quality issues in Barnet; what is being done, and what is needed.	This has been done, and public health are invited to the air quality action plan steering group meetings. Public Health also contributed to the most recent Defra air quality grant application. It is proving useful to have health inequality statistics.	Action will link Air quality and Health and Wellbeing
8	Director of Public Health to sign off statutory Annual Status Reports and all new Air Quality Action Plans	This ASR will be signed off by the Director of Public Health. The Councillor with the Environment Brief signed off the 2017-2022 Action Plan; and the public health director also made comments.	Action will link Air quality and Health and Wellbeing
9	Encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme	In 2017, of 181 schools, 34% were Gold STARS, 11% Silver, and 13% Bronze. 42% had no travel plan. The sustainable travel team at Barnet work intensively with schools to improve engagement and maintain accreditation. School Junior Travel Ambassadors have helped with anti-idling campaigns	
10	Air quality projects with schools	An Anti-idling campaign was done for Clean Air Day 2017. This received good publicity in the local press. Officers from the Scientific Services (Environmental Health) and Sustainable Travel teams visited a total of 8 schools over two weeks. Junior Travel Ambassadors gave out leaflets. We spoke with parents to advise them not to leave their engines running, and the effect of it on children's' health.	Environmental Health are working with Highways (School travel Team) to deliver this action.

		In February 2018 our school travel team organised a poster competition to raise awareness of air pollution. Over 100 entries were received. The Cabinet Member for the Environment reviewed the entries and the winners were acknowledged in Barnet First Magazine. Air quality was featured in March 2018 Barnet First; the publication goes out to all of Barnet's households.	We will report in 2018 the outcome of the School Air Quality Audits delivered by the GLA and WSP.
11	Investigate joining North London Freight Consolidation Scheme	A feasibility study was conducted from January to March 2017. It concluded that joining the scheme would be beneficial in reducing delivery miles. However further detailed work throughout 2017 did not identify any key deliveries that could be consolidated and have an appreciable impact. This is largely due to the way in which the Council operates as a commissioning council (no direct control over most ordering and deliveries) and the nature of some contracts e.g. to deliver a service. Work in 2018 will concentrate on developing green procurement policies, and reviewing existing and future contracts for the potential to minimise deliveries and ensure the cleanest vehicles are used.	Other related issues such as personal items delivery will be looked at. Procurement have taken steps to reduce the amount of deliveries through consolidation and minimum order value practises.
12	Achieve Bronze accreditation of the	The audit is planned for summer 2018. There were delays as the	

	Fleet Operator Recognition Scheme (FORS) for the borough's own fleet	depot operations moved to a completely new site in 2017. The existing site has now been demolished for housing. The new site had to go through planning approvals and consultations. Also, there was a large consultation on how to deliver the service, which is now being kept in-house.	
13	Investigate the possibility of increasing the number of hydrogen, electric, hybrid, bio-methane and other cleaner vehicles in the borough's fleet	Passenger Transport have had an electric minibus on the demo in Nov 2017 and concluded not to pursue this option as they were not operationally viable and would significantly increase the cost. There are currently 2 electric vans on the demo for street scene service. We will be assessing the operational viability and capital requirement at the end of this programme.	
14	Accelerate uptake of new Euro VI vehicles in borough fleet	Street Scene have placed an order for four new refuse vehicles that will comply with the expanded ULEZ. The remainder of the fleet is Euro V, and a review of these is to take place toward the end of 2018. This is accelerating what had previously been planned, as the renewal date is 2022.	
15	Safer Urban Driver Training for drivers of vehicles in Borough's fleet i.e. through training of fuel efficient driving and providing regular re-training of staff. This was introduced in 2012 with training from the Energy Savings Trust.	Street Scene used TfL funding for the Safer Urban Driving training for year 2017/18.	
16	Control air pollution from industrial / commercial and residential sources	All our authorised processes were inspected according to the risk assessment schedule. The Borough has 5 crematoria, 66 drycleaners, 1 print-works, 3 vehicle re-sprayers, 2 bulk cement, and 23 petrol station permits.	Regional Enterprise Regulatory Services KPI EH02(LAPPC) for annual 100% inspection of

			medium and high risk rated premises.
17	Monitor air quality	The Council continues to monitor for both nitrogen dioxide and PM10 at two continuous monitoring stations. There are also 15 diffusion tubes around the borough.	The data is used extensively by consultants to model air quality for new developments.
18	Explore the option of extending the Ultra-Low Emission Zone (currently proposed to stop at the A406) to cover whole of London Borough of Barnet	LB Barnet wanted the whole of the Borough to be included in all ULEZ expansion proposals. Shortly prior to submitting this document the Mayor announced that the ULEZ will be extended to the North and South circular roads for cars and light vans from 25 October 2021. For buses, coaches and lorries the ULEZ will cover the whole of Greater London from 26 October 2020. TfL have predicted that from the date of implementation there will be 29% less NOx, and 32% less PM2.5 in the Borough.	Having emissions standards is going to have a positive effect on air quality; however, it is equally important to reduce the number of vehicles and improve congestion.
19	Lower the legal speed limit to 20mph in areas close to certain schools	The council is continuing to increase the number of 20mph zones close to schools. In 2017 there were 6 new zones near schools, with a total of 4.6km.	The Council target is for an extra 2km per year.
20	Differential charges for residential parking permits based on pollutant emissions	We implemented gCO2 emissions based parking permits in 2015-16 and in 2016 introduced an additional surcharge of £10 for diesel cars. There is also an additional £15 per car surcharge for additional cars. A key aim of the Council's Parking Service is to reduce air pollution.	The Council will constantly review its pricing strategy to reflect national, regional and local policies.

21	Improvement of electric vehicle charging point infrastructure	The number of electric vehicles available for hire for council officers and residents increased from 2 to 5 in 2017. This is part of a pilot with E-Car Club. If it proves successful, the pool of cars will be increased in size. LB Barnet was awarded £400K in 2017 to improve electric vehicle infrastructure across the Borough. The new Council office building in Colindale will have 20 electric vehicle charging spaces.	
22	Increase provision of cycle parking	In the combined financial years of 2016/17 and 2017/18, the Council has installed 325 stands at 88 locations around the borough at destination locations and transport hubs. This caters for 650 bicycles	Target of between 50-100 extra cycle spaces per annum. Cabinet agreed in 2016 to improve cycling infrastructure and produce a Cycling Strategy.
23	Encourage modal shift to bicycle through improved bicycle routes and encourage a shift to walking by providing safer, more accessible and attractive pedestrian routes.	2017-2022 Current evidence of 1% modal shift based on 3 years data from TfL. Target of 2,000 children and 250 adults to receive cycle training per year. Over the course of the 17/18 financial year, 2427 children have received Bikeability cycle training, achieving 121% of the target of training 2000 children. Bikeability training was delivered in 90	Regional Enterprise Highways PI HSTD02 target of 3 % of journeys by cycle in 2024 and HSTD01 % increase trips by walking from 29-31% by 2024

		schools across the Borough. Over the course of the 17/18 financial year 591 individuals received Adult Cycle Skills and Family training from complete beginner to advanced skills levels, achieving 107% of the target of training 550 individuals	
24	Liaise with Transport for London to explore traffic control actions on TfL-controlled roads	Primarily, TfL are going to be expanding the ULEZ. This will include some TfL controlled roads, including the key A406 but only for heavy vehicles and buses. General London-wide initiatives by the Mayor and TfL will have a positive impact on air quality: • Clean up every bus in London by making them either zero tailpipe emission (electric or hydrogen) or the cleanest emission standard – Euro 6, including hybrid buses • Introduce a progressive set of charges to drivers of older polluting vehicles. Further detail on this 'Ultra Low Emission Zone' programme is detailed below • Only licence new black taxis if they are clean Zero Emission Capable (able to run on electric only) • Promote the installation of electric vehicle charging points across London • Invest in and encourage the use of cleaner and healthier forms of transport – walking, cycling and public transport – discouraging unnecessary private car use However, the Council would still like to work with TfL to hone in on the Air Quality Focus Areas within the Borough that are caused by TfL roads, and deliver targeted action.	This action is very important as the busiest roads in the Borough are TfL-controlled, and so TfL is best-placed to take the lead. In 2018 we aim to invite TfL to an air quality steering group meeting.

25	Liaise with the Highways Agency to explore options for improving air quality on the M1	Progress is slow – the work started in 2016/2017 concerning feasibility of Noise and air quality barriers in Mill Hill by Highways England is still not complete.	

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in the London Borough of Barnet in 2017

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	85
Number of planning applications required to monitor for construction dust	6
Number of CHPs/Biomass boilers refused on air quality grounds	1
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	20
Number of developments required to install Ultra-Low NO_x boilers	Required for all developments over 9 units in Barnet
Number of developments where an AQ Neutral building and/or transport assessments undertaken	60
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	15
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. 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.	105 conditions related to NRMM Enforcement being carried out by dedicated officer through the Mayor's Air Quality Fund. He systematically checks the nrmm website to ensure sites are registered and then audits to check compliance. There is a 95% compliance rate for NRMM used on sites

The team commented on 812 planning applications in 2017 (100 more than the previous year). We have provided guidance to the vetting team to ensure that all relevant applications (that have an impact on noise, contaminated land and air quality) come to the Scientific Team.

We are getting an increased number of Prior Notification applications; it is not possible within the legislation to require an air quality assessment and this unfortunately means that many offices within polluted areas are being converted to flats with no mitigation for air pollution.

The team frequently provides advice to consultants on proposed air quality modelling methodology. This is not captured in the table above.

Initial meetings have been had with the planning policy team in the first quarter of 2018 to kickstart the use of S106 and CIL for air quality.

NRMM is being successfully tackled through the planning process where conditions are put on all relevant developments, coupled with auditing by the dedicated project officer. Smaller sites that are not subject to the NRMM regulations at present, have been noted to have older (and therefore more polluting) machinery.

3.1 New or significantly changed industrial or other sources

In 2017, the planning process for the redevelopment of Brent Cross and the wider area carried on apace. This includes a new large aggregate facility, waste transfer station, new bus station, new railway station as future new sources of air pollution. Officers within the scientific team are reviewing documents including air quality assessments to ensure that the effects are adequately mitigated to protect residents' health.

There are no new industrial sources of air pollution.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

ABN1 and ABN2 are routinely calibrated, serviced and audited to ensure data is as accurate as possible. In 2017, the site audits and data management was carried out by Ricardo Energy and Environment to national standards and operational procedures defined by AURN. Site audits were carried out every six months and post audit the site data was then ratified.

Routine calibrations take place bi-monthly for ABN1 and monthly for ABN2 by Barnet Scientific Officers. Servicing and maintenance is carried out bi-annually by an external contractor. Throughout 2017 the contractor for both sites was Matts Monitors and bi-annual servicing followed the Ricardo Energy and Environment audits.

There was a period of significant data loss in 2017. This was caused by the inability to dial-in to the monitoring stations as the phone lines were not working.

PM_{10} Monitoring Adjustment

The TEOM data is corrected using the VCM method.

A.2 Diffusion Tube Quality Assurance / Quality Control

The diffusion tubes used in all London Borough of Barnet sampling are supplied and analysed by Gradko (UKAS 2187) and conform to BS EN 13528 Parts 1-3: 2002/3.

All of the tubes used are prepared using 50% TEA/Acetone and analysed using the UKAS accredited in house method (GLM 9), by continuous flow colorimetric analyser. Gradko participates in the WASP scheme (Workplace Analysis Scheme for Proficiency).

Using the most recent national bias adjustment data (as of March 2018), a bias adjustment factor of 0.97 has been applied to all of the diffusion tubes in the 2017 calendar year. The relevant examples were selected using the spreadsheet workflow by using the same manufacturer, preparation method and similar site location type. A local bias adjustment was not used as there is only one tube co-located and not triplicate.

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

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

Annual Mean NO2

1. ABN1, Tally Ho

There was a gap in the data between 14.02.2017 and 07.05.2017. The ratio of 1.11 was applied to the period mean of 46.85 to give an annualised result of 52.0 µg/m^3

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3) (07.05.2017 to 31.12.2017)	Ratio
Haringey Priory Park	Background	24	21.56	1.11
Enfield Prince of Wales School	Background	23	20.78	1.11
ABN1			46.85	
			Average	1.11

2. ABN2, Chalgrove

There was a gap in the data between 14.02.2017 and 07.06.2017. The ratio of 1.10 was applied to the period mean of 24.66 to give an annualised result of 27.2 µg/m^3

Site	**Site Type**	**Annual Mean (µg/m^3)**	**Period Mean (µg/m^3) (07.06.2017 to 31.12.2017)**	**Ratio**
Haringey Priory Park	Background	24	21.94	1.09
Enfield Prince of Wales School	Background	23	20.68	1.11
ABN2			24.66	
			Average	1.10

Tally Ho Annual Mean, PM10

Roadside sites needed to be used for annualisation as background sites with sufficient data capture were not available within a close distance to Barnet. The ratio of 1.16 was applied to the figure of 18.39 to give an annualised annual mean of 21.29 **µg/m^3**.

Site	**Site Type**	**Annual Mean (µg/m^3)**	**Period Mean (µg/m^3) (07.05.2017 to 31.12.2017)**	**Ratio**
Brent, John Keble School	Roadside	20	18.17	1.10
Enfield, Bowes Primary	Roadside	19	15.64	1.21

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3) (07.05.2017 to 31.12.2017)	Ratio
ABN1			18.39	
			Average	1.16

Chalgrove, Annual Mean PM10

The average ratio of 1.18 was applied to 15.17 µg/m^3 to give an annualised annual mean of 17.97 µg/m^3.

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3) (07.06.2017 to 31.12.2017)	Ratio
Brent, John Keble School	Roadside	20	18.08	1.11
Enfield, Bowes Primary	Roadside	19	15.05	1.26
ABN2			15.17	
			Average	1.18

Distance Adjustment

The following monitoring sites recorded an exceedance, but were not representative of public exposure and so a distance correction, using the procedure specified in LLAQM.TG (16) was used to estimate the concentration at the nearest receptor.

1. Tally Ho automatic, (ABN1) (5m from relevant exposure; measurement made 1m from kerb) distance adjusted from 52.0 μgm^{-3} to 43.96μgm^{-3}

Cz=((52.0-27.2)/(-0.5476 * Ln(1) +2.7171)) x (-0.5476*Ln(5) +2.7171) + 27.2

=((24.8/2.7171))x(1.83577)) +27.2

= 43.96μgm^{-3}

2. Tally Ho Tube (PBN8) (5m from relevant exposure; measurement made 1m from kerb) distance adjusted from 48.0μgm^{-3} to 41.25μgm^{-3}

CZ = ((Cy-Cb) / (-0.5476 x Ln(Dy) + 2.7171)) x (-0.5476*Ln(Dz)+2.7171) + Cb

=((48.0-27.2)/(-0.5476xLn(1)+2.7171)) x (-0.5476 x Ln(5)+2.7171) +27.2

=(7.655 x 1.835)+27.2

= 41.25μgm^{-3}

3. 347 Hendon Way (10m from relevant exposure; measurement made 1m from kerb) distance adjusted from 68.8 μgm^{-3} to 49.49μgm^{-3}

Cz = ((68.8-27.2)/(-0.5476xLn(1)+2.7171)) x (-0.5476*Ln(10) + 2.7171) + 27.2

= (15.31x 1.456) + 27.2

= 49.49 μgm^{-3}

The background site used was Chalgrove monitoring station with an annual mean of 27.2μgm^{-3} for 2017.

This used the calculator on the Defra website created by Air Quality Consultants that follows the procedure set out in Box 2.3 of LAQMTG (09):

Box 2.3: Predicting nitrogen dioxide concentrations at different distances from roads

A method has been developed to allow NO2 measurements made at one distance from a road to be used to predict

concentrations at a different distance from the same road. It is appropriate for distances between 0.1 m and 140 m of the kerb.

Step 1: Identify the local background concentration in µg/m3, either from local monitoring or from the national maps published

at www.airquality.co.uk. (Note that the background concentration must be less than the measured concentration).

Step 2: apply the following calculation

CZ = ((Cy-Cb) / (-0.5476 x Ln(Dy) + 2.7171)) x (-0.5476*Ln(Dz)+2.7171) + Cb

Where:

Cz is the total predicted concentration (µg/m3) at distance Dz;

Cy is the total measured concentration (µg/m3) at distance Dy;

Cb is the background concentration (µg/m3);

Dy is the distance from the kerb at which concentrations were measured; and

Dz is the distance from the kerb (m) at which concentrations are to be predicted.

Ln(D) is the natural log of the number D.

Results derived in this way will have a greater uncertainty than the measured data. Further assistance with this procedure and

interpretation of the results can be obtained from the Review and Assessment helpdesk (www.uwe.ac.uk/aqm/review).

Appendix B Full Monthly Diffusion Tube Results for 2017

Table M. NO_2 Diffusion Tube Results

All of the diffusion tubes were in place for a full calendar year, apart from Cricklewood Lane. There were renovations at this building and so the tube will be reinstated in 2018.

Site ID	Valid data capture 2017 % [b]	Annual Mean NO_2													
		Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Annual mean – raw data [c]	Annual mean – bias adjusted [c]
PBN1 Pointalls Close	*100*	58.31	39.29	37.96	28.50	31.32	30.60	25.14	34.49	32.33	31.96	41.45	40.39	35.98	34.9
PBN2 71 Ballards Lane	100	60.54	41.54	45.26	43.38	28.06	36.58	38.75	44.70	34.47	42.75	44.26	40.64	41.74	40.5
PBN3 Sanders Lane	83	35.59	27.14	22.31	14.86	x	16.2	13.96	x	12.12	20.90	27.11	26.35	21.65	21.0
PBN5 St James School	83	43.23	29.75	32.43	23.20	20.20	22.20	20.20	27.79	x	x	33.55	32.95	28.55	27.7
PBN6 349 Hendon Way	100	87.92	62.52	73.78	65.41	58.94	67.41	63.28	56.01	61.55	83.62	86.45	84.64	70.96	**68.8**

Site ID	Valid data capture 2017 % [b]	Annual Mean NO_2													
		Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Annual mean – raw data [c]	Annual mean – bias adjusted [c]
PBN8 Tally Ho Monitoring Station	*100*	50.57	52.34	50.22	39.06	35.57	48.10	43.21	50.40	52.06	56.24	63.69	52.64	49.51	**48.0**
PBN9 52 Golders Green Road	92	61.99	x	46.10	48.14	44.55	40.34	38.62	33.81	40.23	47.23	48.02	47.52	45.14	**43.8**
PBN10 Greggs, High St Barnet	92	56.93	53.50	51.68	52.08	32.66	x	71.47	45.80	52.65	50.87	65.81	45.61	52.64	**51.1**
PBN12 1295 High St, Whetstone	*100*	58.22	45.41	48.24	43.88	40.24	46.80	47.27	46.95	40.35	46.69	64.03	44.5	46.69	**46.3**
PBN13 Courtland Avenue	92	44.05	36.48	32.21	28.91	20.10	25.43	25.28	29.3	29.83	30.77	39.52	x	31.08	30.1
PBN14 William Hill, Station Road, Edgware	100	72.8	52.74	53.35	51.92	42.90	49.06	49.68	54.26	49.7	43.4	61.06	48.81	52.47	**50.9**

Site ID	Valid data capture 2017 % [b]	Annual Mean NO_2												
		Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Annual mean – raw data [c]	Annual mean – bias adjusted [c]
PBN17 National Express Stop, Golders Green Bus Station	83	71.73	x	x	45.58	44.33	47.25	46.64	44.86	46.40	52.00	66.17	58.88	52.38	**50.8**
PBN18 Rear of Golders Green Bus Station	100	57.73	52.14	51.41	53.96	41.19	48.85	49.23	43.20	48.22	54.31	66.06	57.72	52.00	**50.4**
PBN19 Rear of Dyson Court, Tilling Road	100	61.54	49.56	54.97	53.57	49.06	47.47	49.04	41.46	40.35	43.68	62.42	53.7	50.57	**49.1**

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%