London Borough of Barnet Air Quality Annual Status Report for 2015
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This report provides a detailed overview of air quality in the London Borough of Barnet during 2015. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG (16)). https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs

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Abbreviations

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

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	Objective (UK)	Averaging Period	Date[1]
Nitrogen dioxide - NO_2	200 μg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 μg m^{-3}	Annual mean	31 Dec 2005
Particles - PM_{10}	50 μg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 μg m^{-3}	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 μg m^{-3}	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020
Sulphur Dioxide (SO_2)	266 μg m^{-3} not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
	350 μg m^{-3} not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 μg m^{-3} mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

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

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2015

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 2015

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]	6	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

Note [1] Highlights where monitoring is done as an indicator for the hourly mean

1.2 Comparison of Monitoring Results with AQOs

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

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

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Annual Mean Concentration (μgm^{-3})						
				2009	2010	2011	2012	2013	2014	2015
ABN1	Automatic	75.2	75.2	**57.6**	**56.3**	**55.3**	**51.8**	**49.3**	**57**	**46.2**
ABN2	Automatic	88.5	88.5	34	32	31	32	32	27	23
PBN1	Diffusion tube	90	90			38.5	36	**42.2**	**52.5**	37.1
PBN2	Diffusion tube	100	100			**47.9**	**47.7**	**52.5**	**50.0**	**43.7**
PBN3	Diffusion tube	70	70	27.1	24.9	24.2	20.1	24.1	27.3	21.5
PBN5	Diffusion tube	89	89	35.7	36.4	34.9	30.1	31.6	33.2	27.9
PBN6	Diffusion tube	80	80	**51.4**	**49.0**	**46.5**	**49.2**	**50.5**	**50.7**	**41.7**
PBN8	Diffusion tube	100	100	**48.3**	**50.7**	**43.6**	**47.0**	**46.7**	**49.6**	**41.7**
PBN9	Diffusion tube	90	90			**48.7**	**49.7**	**56**	**51.9**	**48.4**
PBN10	Diffusion tube	90	90			**47.9**	**51.4**	**51**	**53.8**	**51.0**
PBN12	Diffusion tube	80	80			**48.8**	**51.9**	**53**	**52.4**	**47.0**
PBN13	Diffusion tube	100	100			32.7	35.2	37.3	37.6	36.7

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Annual Mean Concentration (µgm^{-3})						
				2009	2010	2011	2012	2013	2014	2015
PBN14	Diffusion tube	90	90			**50.7**	**53.5**	**58.9**	**56.5**	**55.7**
PBN17	Diffusion tube	90	90	**83.7**	**79.5**	**67.8**	**68.5**	**80.9**	**78.4**	**64.5**
PBN18	Diffusion tube	90	90			**49.5**	**54.7**	**55.6**	**54.5**	**51.8**
PBN19	Diffusion tube	80	80			**49.5**	**51.2**	**55.5**	**54.8**	**52.3**
PBN20	Diffusion tube	100	100			**55.9**	**54.3**	**57.1**	**62.3**	**54.6**

Notes: Exceedances of the NO_2 annual mean AQO of 40 µgm^{-3} are shown in **bold**.
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO^2 hourly mean AQS objective are shown in bold and underlined.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
Monitoring sites ABN1, PBN8 and PBN6 were distance corrected in 2015 but not for previous years

Trends in pollutant concentrations

Graphs showing the trends can be found in Appendix C. The monitoring results show that concentrations of nitrogen dioxide have continued to decrease both at roadside and background locations. The exception is at PBN6 (Hendon Way, A41) where concentrations are increasing over time. This is a very busy dual carriage way close to the large Brent Cross Shopping Centre.

Several tubes are positioned to measure the one-hour mean at our busy high streets. These are remaining below 60ug/m3, the indicator for the one-hour mean objective. This trend will be monitored as it suggests the AQMA for the one hour mean at High Streets could be revoked. However, residents do live above shops in High Streets and the annual mean here is still being exceeded. It is concerning that the trend shows a levelling out of concentrations and not a significant decrease. This information is important for new developments proposed in this type of location.

There are still sites where the annual mean is significantly exceeded – PBN20 (Cricklewood Lane), PBN16 (Dyson Court) and PBN6 (Hendon Way). Cricklewood Lane is a busy junction with the A5. Dyson court overlooks the A406 at the Brent Cross Shopping Centre. Hendon Way is the A41 at Brent Cross. The traffic numbers at these sites is very large.

The one-hour mean at Golders Green bus stop continues to be exceeded, although concentrations are coming down.

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 2015 % [b]	Number of Hourly Means > 200 µgm^{-3}						
			2009[c]	2010 [c]	2011[c]	2012 [c]	2013[c]	2014 [c]	2015 [c]
ABN1	75.0	75.0	11	**33**	15	**17(208)**	5	9(182)	0(136)
ABN2	*79.8*	*79.8*	0	0	0	0	0	0(115)	0(92)

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

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

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

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

[d] Any number in brackets shows the 99.8th percentile of the 1-hour mean concentrations as the annual data capture was below 90%.

[e] 2012 figures for ABN1 are in bold as the 99.8th percentile is higher than 200µg/m^3, this indicates that the hourly mean was breached in 2012

The one-hour mean as measured by the automatic monitoring stations is not exceeded at either of the sites.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Annual Mean Concentration (μgm^{-3})						
			2009[c]	2010[c]	2011[c]	2012[c]	2013[c]	2014[c]	2015[c]
ABN1	86.6	86.6	24	24	28	27	27	26	22(34)
ABN2	83.0	83.0	20	20	21	19	19	20	18(28)

Notes: Exceedance of the PM_{10} annual mean AQO of 40 μgm^{-3} are shown in **bold**.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means are "annualised" in accordance with LLAQM Technical Guidance, where valid data capture is less than 75%
[d] Results have been VCM corrected
[e] 90th percentile values have been provided in brackets where the annual data capture was below 90%

The PM10 annual mean objective is not exceeded at either ABN1 (roadside) or ABN2 (background) sites. ABN1 has shown a marked decrease in 2015 compared to 2014. ABN2 data has stabilised but continues to show a gradual decrease in PM10 concentrations.

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 2015 % [b]	Number of Daily Means > 50 μgm^{-3}						
			2009	2010	2011	2012	2013	2014	2015
ABN1	86.6	86.6	7	6	24	7(41)	5	6	6
ABN2	83	83	4	1	14	0	0	0	3

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

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

2. Action to Improve Air Quality

Table J. Commitment to Cleaner Air Borough Criteria

Theme	Criteria		Achieved (Y/N)	Evidence
1. Political leadership	***1.a***	Pledged to become a Cleaner Air for London Borough (at cabinet level) by taking significant action to improve local air quality and signing up to specific delivery targets.	*Y*	Made pledge at Cabinet Level in 2013
	1.b	Provided an up-to-date Air Quality Action Plan (AQAP), fully incorporated into LIP funding and core strategies.	*Y*	The 2016 Action Plan is in the consultation process and the draft is available online. Incorporated into LIP process/public health via steering group and signposting to different strategies
2. Taking action	**2.a**	Taken decisive action to address air pollution, especially where human exposure and vulnerability (e.g. schools, older people, hospitals etc.) is highest.	*Y*	The Council has undertaken several projects with funding from the Mayors Air Quality Fund. For example the Installation of a 40m long ivy screen alongside a school playground bordering the A41; Air Quality Champion project: Advised 189 drivers of anti-idling at 10 schools over seven days and stopped 64 instances of idling, and Worked with 45 schools directly delivering lessons about air quality, anti-idling initiatives and road safety/active travel initiatives; Go Your Own Way to School theatre tour to reduce car use on the school run.
	2.b	Developed plans for business engagement (including optimising deliveries and supply chain), retrofitting public buildings using the RE: FIT framework, integrating no engine idling awareness raising into the work of civil enforcement officers, (etc. etc.)	Y	Project with E-Car club to promote electric cars Smoke Control leaflets given to shops selling wood burning stoves, and restaurants using Charcoal Grills and Wood-Fired Pizza ovens. Construction Site Enforcement Officer will work with construction companies to reduce dust and

				emissions.
	2.c	Integrated transport and air quality, including by improving traffic flows on borough roads to reduce stop/start conditions	*Y*	Projects to increase take up of cycling (thus reducing amount of cars and congestion) include: Installation of cycle racks in town centres Development of Quiet Routes for cyclists Cycle training for adults living and working in the Borough Recommendations from a study to reduce congestion at the Tally Ho Gyratory System will soon be implemented.
	2.d	Made additional resources available to improve local air quality, including by pooling its collective resources (s106 funding, LIPs, parking revenue, etc.).	Y	£95,000 of LIP funding was realised to match fund air quality projects between 2013-2016
3. Leading by example	**3.a**	Invested sufficient resources to complement and drive action from others	*Y*	The Air Quality Champion project (2013-2016) enabled a full-time officer to work with cycling and school travel officers and complement their work
	3.b	Maintained an appropriate monitoring network so that air quality impacts within the borough can be properly understood	*Y*	2 automatic monitoring stations and 15 diffusion tubes maintained and serviced and regularly calibrated
	3.c	Reduced emissions from council operations, including from buildings, vehicles and all activities.	*Y*	The aim is to Achieve Bronze accreditation by October 2016 with plans to achieve Silver March 2018 for the council fleet. MAQF funding to investigate joining the North London freight consolidation project to reduce emissions from deliveries.
	3.d	Adopted a procurement code which reduces emissions from its own and its suppliers activities, including from buildings and vehicles operated by and on their behalf (e.g. rubbish trucks).	Y	All current fleet vehicles are Euro V; All new fleet vehicles will be EURO VI. Freight Consolidation project will also investigate how to get green procurement into

				new contracts
4. Using the planning system	**4.a**	Fully implemented the Mayor's policies relating to air quality neutral, combined heat and power and biomass.	Y	All approved planning applications must meet the Mayor's requirements relating to AQ neutral and CHP. This is being written into the Council's new Supplementary Planning Guidance for Sustainable Construction.
	4.b	Collected s106 from new developments to ensure air quality neutral development, ***where possible***	N	This has not been done but this is something the Council will investigate doing
	4.c	Provided additional enforcement of construction and demolition guidance, with regular checks on medium and high risk building sites.	Y	The London Borough of Barnet is leading on a four-Borough project for an enforcement officer to inspect construction sites for dust and NRMM emissions as part of the Mayor's Air Quality Fund
5. Integrating air quality into the public health system	**5**	Included air quality in the borough's Health and Wellbeing Strategy and/or the Joint Strategic Needs Assessment	Y	The Council's new Air Quality Action Plan (2016-2021) signposts the 2015-2020 Joint Strategic Needs Assessment (JSNA) and Health and Wellbeing Strategy 2016-2020. The Director of Public Health will be regularly briefed and will have a role in signing off the New Action Plan and this Annual Status Report.
6. Informing the public	**6.a**	Raised awareness about air quality locally	Y	Various projects to raise awareness including speaking to parents outside school; engaging communities by monitoring their air quality; promoting air text to those most vulnerable to the effects of poor air quality through a joint project with the Winter Well scheme.

2.1 Air Quality Action Plan Progress

Table K 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 2015 are shown at the bottom of the table. The action plan was reviewed and an updated action plan will be published at the end of the consultation process. Some measures have been kept, and some are new.

Table K. Delivery of Air Quality Action Plan Measures

Action ID	Action description	Expected emissions/ concentrations benefit	Timescale for implementation	Progress in 2015
1	Minimise dust emissions from construction sites	Medium. 12% of air pollution in Barnet arises from construction sites. Action will reduce PM10 and PM2.5.	2016-2021	Supplementary Planning Guidance is being reviewed in line with London Plan policies to emphasise control of dust from sites. Construction method statements are required for most developments, and Environmental Health ensures dust controls are adequate. The council continues to respond to complaints from residents to prevent dust from being a statutory nuisance.
2	Enforce Non Road Mobile Machinery (NRMM) air quality policies	Medium. 12% of air pollution in Barnet arises from construction sites. Action will reduce NO2, PM10 and PM2.5.	Sep 2016-March 2019	New Action
3	Enforce CHP and biomass air quality policies	Medium. (Benefits potentially significant but unquantifiable) Action will reduce NO2, PM10 and PM2.5.	2016-2021	New Action
4	Enforce Air Quality Neutral policies and Monitor	Medium. (Benefits	2016-2021 Performance	New Action

	sustainable Travel Plans for developments	potentially significant but unquantifiable) Action will reduce NO2, PM10 and PM2.5.	indicator PITD03 Monitoring Travel Plans for Developments	
5	Enforce Smoke Control Areas	Medium. Action will reduce PM10 and PM2.5.	2016-2021	In 2015 we did a leaflet campaign outside schools to inform residents about wood-burning stoves and the Clean Air Act legislation. We also visited restaurants to ensure they knew the requirements to use approved fuel (charcoal grills and wood-fired pizza ovens).
6	Regularly brief Director of Public Health (DPH) on air quality issues in Barnet; what is being done, and what is needed.	Low. (But unquantifiable)	On-going	New Action
7	Director of Public Health to sign off statutory Annual Status Reports and all new Air Quality Action Plans	Low. (But unquantifiable)	2016-2021	New Action
8	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	Medium. Action will reduce NO2, PM10 and PM2.5.	2016-2021	90% of schools are STAR accredited.
9	Air quality projects with schools	Medium. Action will reduce NO2, PM10 and PM2.5.	2016-2017	In 2015, work was in progress with the Air Quality Champion recruited through the Mayor's Air Quality Fund. This included an anti-idling awareness campaign at primary schools; campaign work with the charity Living Streets to promote walking to school and "Clean Air Routes"; work with the music industry to encourage secondary school children to walk or cycle to school to improve air quality and their health; and provision of information to parents about air quality in the form of leaflets. The Council has worked with 45 schools, directly delivering lessons about air quality, anti-idling initiatives and road safety/active travel initiatives. Over a seven day period, outside 10 schools, 189 drivers have been advised about not leaving vehicles idling and 64 instances of idling were stopped. 1,600 secondary school pupils attended a "Go Your Own Way to School" show; 92% of these

				pupils are now committed to improving air quality outside their school, and 87% have stated they will make an effort to walk and cycle more for their health.
10	Investigate joining North London Freight Consolidation Scheme	Low. Action will reduce NO2, PM10 and PM2.5.	2016-2019	New Action
11	Achieve Bronze accreditation of the Fleet Operator Recognition Scheme (FORS) for the borough's own fleet	Medium. Action will reduce NO2, PM10 and PM2.5.	2016-2019	New Action. The aim is to achieve Bronze accreditation of the Fleet Operator Recognition Scheme (FORS) for the borough's own fleet by October 2016 and Silver accreditation by March 2018.
12	Investigate the possibility of increasing the number of hydrogen, electric, hybrid, bio-methane and other cleaner vehicles in the borough's fleet	Low. Action will reduce NO2, PM10 and PM2.5.	2016-2021	The council is actively exploring the use of hybrid vans and the feasibility of introducing them
13	Accelerate uptake of new Euro VI vehicles in borough fleet	Low. Action will reduce NO2, PM10 and PM2.5.	2016-2021	All fleet vehicles are currently either Euro V or Euro IV. All new vehicles will be Euro VI.
14	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.	Low. Action will reduce NO2, PM10 and PM2.5. and contribute to road safety	2016-2021	LIP funding is provided for CPC Safer Urban Driver Training for borough fleet drivers. The training focuses on the challenges of driving in cities in a way that lowers the risk to vulnerable road users, such as cyclists and pedestrians. The training includes an outdoor on-road cycling session to gain insights into the cyclist experience on the road
15	Increase the planting of green barriers and vegetation	Low. Action may lead to absorption of NO2, PM10 and PM2.5.		114 nitrogen-reducing trees were planted in 2015, as part of the Mayor's Air Quality Fund. They were planted primarily in air quality focus areas. LIP funding enabled the planting of a 40m long ivy green screen to remove air pollutants from school playground adjoining the A41. Percy Road pocket near Tally Ho corner was "greened" using LIP money to improve the environment

				of this park only 100m from the busy A1000.
16	Control air pollution from industrial / commercial and residential sources	Low. Action will reduce NO2, PM10 and PM2.5.	2016-2021	The Council regulates over 100 premises including cement batchers, dry cleaners, crematoria, printing presses, petrol stations, vehicle re-sprayers and concrete crushers. Key Performance Indicator EH02 (LAPPC) sets an annual target of 100% inspection of medium and high risk rated premises. This has been achieved every year since 2005.
17	Monitor air quality	Low. Action to review and assess Air Quality levels and effectiveness of Action plan	2016-2021	The Council continues to invest in two automatic monitoring stations and 15 diffusion tubes. In 2015 extra monitoring started to assess the impact of planting magnolia trees on air quality, and the new green ivy screen at St Joseph's school.
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	High. Action will significantly reduce NO2, PM10 and PM2.5.	2019-20	New Action
19	Lower the legal speed limit to 20mph in areas close to certain schools	Medium. Action will reduce NO2, PM10 and PM2.5.	2016-2021	New Action There are currently 23.2Km of 20mph road in the Borough. There is an achievable target of an extra 2km a year subject to feasibility studies.
20	Differential charges for residential parking permits based on pollutant emissions	Low. Action will reduce NO2, PM10 and PM2.5.	Already implemented in 2015-16	New Action This new scheme was implemented in 2015. It links the charges to emissions in gCO2. There are three bands of vehicles. Electric vehicles incur no charge.
21	Surcharge on diesel vehicles below Euro VI standards for Resident and Controlled Parking Zone permits	Low. Action will reduce NO2, PM10 and PM2.5.	2017/2018	New Action This complements action 20. Further feasibility testing is underway and this scheme could be in place for the start of the 2017/2018 financial year.
22	Improvement of electric vehicle charging point infrastructure	Medium. Action will reduce NO2, PM10 and PM2.5.	100 new points in next 3 years (2016-2019)	New Action In 2015 12 points were installed. A dual charging point has been installed at the Council Offices at Barnet House. This is used by two E-Car club vehicles.
23	Increase provision of cycle parking	Low. Action will increase cycle	2016-2021	New Action 24 stands were installed in 2015 in air quality schemes. The Highways department has a target of 50-100 stands to be installed per annum

		journeys and reduce NO2, PM10 and PM2.5.		
24	Encourage modal shift to bicycle through improved bicycle routes and encourage a shift to walking by providing safer, more accessible and attractive pedestrian routes.	Medium. Action will increase active and sustainable travel and reduce NO2, PM10 and PM2.5.	2016-2021 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.	New Action Quietway routes are being progressed in the Borough. IN 2015 1,764 pupils and 261 adults received cycle training (BIkeability Level 2 or 3) Target for 2016/2017 is 2000 children and 250 adults.
25	Liaise with Transport for London to explore traffic control actions on TfL-controlled roads	Medium. Action will reduce NO2, PM10 and PM2.5.		New Action
26	Liaise with the Highways Agency to explore options for improving air quality on the M1	Medium. Action will reduce NO2, PM10 and PM2.5 and Noise	Work in 2016 concerning feasibility of Noise and air quality barriers in Mill Hill	New Action

Table L Key achievements through Mayor's Air Quality Fund Round 1

The following table shows the key project achievements in 2015.

1. North Finchley Clean Air Project

Walking to School	Worked with 6 primary and 1 secondary school in North Finchley area to improve air quality and walking rates (with Living Streets charity)

"Go your own way to school" theatre tour	Amelix theatre group visited 8 secondary schools to encourage pupils not to go to school by car. A further tour has been commissioned.
Cycling initiatives at schools	Cycle training to Bikeability Level 1 for 256 year 3 and 4 pupils**;** 7 Dr Bikes sessions delivered = 147 bikes serviced;
Balance bike training	Training to teachers at 5 schools in North Finchley area to delivery balance bike training, along with 6 pool balance bikes
Pool bikes for training	5 adult bikes and 12 child bikes, plus helmets and hi-vis jackets to enable bicycle training.
School project cycle loan	A pool of bicycles for schools to deliver cycle training where children do not have their own bicycles.
Cycle hire scheme	Supply of 6 bikes including servicing, locks and insurance at a local cycle store
	6 cycle stands for bike hire project
Community Engagement	Using MP Smarter Travel to engage vulnerable people (COPD, asthma, etc.) in environments that are typically hard to engage in (hospitals, GPs surgeries etc.).
	Winter Well partnership with environmental health colleagues to publicise Air Text and other air quality information to older people vulnerable to air pollution effects.
Green Screen at school	A 40m ivy screen planted along the playground boundary of St Joseph's Catholic Primary school that fronts the busy A41(65,000 AADF)
Street tree planting	221 nitrogen dioxide -reducing trees planted across the Borough's air quality focus areas
Electric vehicle charging points	Two locations for a dual charging point (1 installed, 1 commissioned)
	Contribution to further charge point in public car park.
Percy Road Pocket Park	Greening of park close to busy North Finchley junction
Northside School cycle	Creation of a scooter/cycle parking store to encourage pupils to scoot and cycle to school

storage	
Bike stands	23 stands giving 46 spaces
Electric vehicle car club membership	Two electric cars for use by public and staff, administered by E-Car Club. Removes need to travel to work by car.
Air quality leaflets	A range of leaflets were produced to promote the project initiatives, delivered by Air Quality Champion project
website	Website promoting project and cleaner air for North Finchley

2. Air Quality Champion

This was a joint project with the London Borough of Harrow, and ran from July 2014 until March 2016. Most of the engagement work was carried out in 2015.

1. Engaged with 62 schools throughout Barnet and Harrow
    - Out of the 66, 45 were engaged directly through lessons and initiatives such as anti-idling and safer/active travel.
    - The engagement of schools and parents together at targeted schools that have an issue with idling was a great success. The vast majority of drivers did not know that idling was an offence and nearly all drivers were receptive. Of the 10 schools engaged, 64 drivers were caught idling and all turned their engine off.
    - Engagement of children allowed for the dissemination of information to parents e.g. idling without the need for direct engagement.

2. The project engaged with over 22,000 people in Barnet and Harrow

3. Increase in air quality knowledge (general public and in the council):
    - Before the project there was no easy way for the general population to increase their understanding of air quality. However, with the public engagement, publicity, website and other promotion, there has been an increase in knowledge in a significant number of residents.
    - The increase in knowledge in schools was the most profound. Typically there is limited to no teaching of air quality as science especially in schools with poor science programs.
    - Inter departmental working has given other departments such as highways a better insight into air quality and why it is important.

3. Planning Update and Other New Sources of Emissions

In order to be able to provide the information required next year, we have added action codes to our Uniform database system so numbers can be counted.

The requirements from the London Plan policies are being written into the London Borough of Barnet's new Supplementary Planning Guidance for Sustainable Design and Construction.

New planning conditions have been drafted and are awaiting approval from planning colleagues.

3.1 New or significantly changed industrial or other sources

No new significantly changed sources have been identified

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 2015, 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. The 2015 data was fully validated and ratified in February 2016.

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 2015 the contractor for both sites was Matts Monitors and bi-annual servicing followed the Ricardo Energy and Environment audits.

Throughout the calendar year, there were times where data capture was reduced because of either planned maintenance or equipment faults.

Table A.1 Significant Periods of Data Loss in 2015

Site	Date	Equipment Affected	Description
ABN1	Late April to late June	NO_2	Air conditioning unit failure which required replacement and bespoke installation.
ABN1	Late August to late September	NO_2 and PM_{10}	Modem issue: Internal data was overwritten before issue could be resolved. Pump fault: Data rejected as a pump fault coincided with the modem issue.
ABN2	Mid-January to early February	PM10	Analyser part failure and required replacement unit to be installed by ESU
ABN2	Late August to late September	NO_2 and PM_{10}	Communication issue – Billing issue between BT and finance department. Not all of the data could be retrieved once communication was restored via GSM unit.

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 2016), a bias adjustment factor of 0.98 has been applied to all of the diffusion tubes in the 2015 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 the co-location study at Tally Ho Corner would not have been accurate as the NO_2 capture rate for ABN1 was only 75%.

There is a co-location study at ABN1 – Tally Ho, where diffusion tube PBN8 is situated, to allow for the comparison of an automatic NO_x analyser and a diffusion tube. In calendar year 2015, ABN1 produced an annual mean of 50 $\mu g/m^3$ and the annual mean for PBN8 was 52.3 $\mu g/m^3$. As the BN1 NO_2 data capture was 75.2% for 2015 and the annual means only had a difference of 2.9 $\mu g/m^3$, there is no reason to suggest that that PBN8 or any of the other 14 tubes around the borough have produced any spurious or anomalous results. The largest period of NO_2 data loss was in the spring, which typically produces higher concentrations of NO_2. From this we can also infer that it is very likely that the diffusion tubes placed around the borough will provide a good indicator of whether any annual mean objectives have been breached.

Therefore, according to our co-location study, we believe that the 2015 diffusion tube survey is an accurate and precise representation of NO_2 concentrations within the borough.

Figure C.1 Example Diffusion Tube Results Sheet

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

ilac-MRA UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

COLORIMETRIC ANALYSIS OF NITROGEN DIOXIDE DIFFUSION TUBES

REPORT NUMBER: K00530R
BOOKING IN REFERENCE: K00530
DESPATCH NOTE: 23962
CUSTOMER: LB Barnet (Q) RE (Regional Enterprise) Attn: Janet Richards
ACCOUNTS PAYABLE
PO BOX 202
DARLINGTON
DL1 9HB
DATE SAMPLES RECEIVED: 19/01/2016

Location	Sample Number	Exposure Data: Date On	Exposure Data: Date Off	Time (hr.)	µg/m³ *	ppb *	TOTAL µg NO_2
High Street Barnet	622318	09/11/2015	08/12/2015	696.17	52.57	27.44	2.66
Tally Ho Air Quality Station	622320	05/11/2015	08/12/2015	791.92	56.81	29.65	3.27
Pointails Close Ladbrookes	622321	05/11/2015	08/12/2015	791.92	48.28	25.20	2.78
Ballards Lane	622322	05/11/2015	08/12/2015	791.92	54.33	28.36	3.13
Sanders lane allotments	622323	05/11/2015	08/12/2015	791.92	28.84	15.05	1.66
Courtland Avenue NW7	622324	05/11/2015	08/12/2015	791.92	48.06	25.08	2.77
William Hill Edgware	622325	05/11/2015	08/12/2015	792.08	55.05	28.73	3.17
St James School colonade	622326	05/11/2015	08/12/2015	792.00	31.76	16.57	1.83
52 Golders Green Rd	622327	05/11/2015	08/12/2015	792.08	45.63	23.82	2.63
Front Golders Green Station	622329	05/11/2015	08/12/2015	792.00	68.05	35.52	3.92
Back Golders Green Station	622330	05/11/2015	08/12/2015	792.08	62.38	32.56	3.59
Cricklewood Lane	622331	05/11/2015	08/12/2015	792.08	73.83	38.53	4.25
Dyson Court	622332	05/11/2015	08/12/2015	792.17	53.83	28.09	3.10
349 Hendon Lane	622333	05/11/2015	08/12/2015	791.75	71.04	37.08	4.09
Extra tube	653860			792.17	<1.146	<0.598	<0.066
Laboratory Blank				792.17	0.07	0.04	0.004

Comment: Results are not blank subtracted

Results reported as <0.066 on tube are below the reporting limit.

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

Figure C.1 (cont.) Example Diffusion Tube Results Sheet

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

ilac-MRA UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

Tube 653860 was received but not listed on the exposure sheet. Maximum exposure time was used.

Results have been corrected to a temperature of 293 K (20 °C)

Overall M.U.	±3.82%	Limit of Detection	0.066µg NO_2
Tube Preparation: 50% TEA / Acetone			
		Analyst Name	Blazej Fiser
Date of Analysis	20/01/2016	Date of Report	20/01/2016

Analysis carried out in accordance with documented in-house Laboratory Method GLM9 - QuAAtro Analyser

Give the bias adjustment factors for the previous years included in the body of the report – but do not give the full calculation for the previous years.

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of these results
Signed.....
L. Gates, Laboratory Manager

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Where data capture is less than 75% of a full calendar year (less than 9 months), the mean should be "annualised" – i.e. adjusted using the methodology outlined in LLAQM.TG (16) before being compared to annual mean objectives.

Only one site (PBN3) had data capture of less than 75%. Unfortunately the gaps in the data were as a result of missing tubes in a random pattern, with 3 gaps in the data. It is therefore not possible to use the LLAQM.TG (16) methodology to adjust the data.

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

Site	Site Type	Annual Mean ($\mu g/m^3$)	Period Mean ($\mu g/m^3$)	Ratio
			Average	

Distance Adjustment

A distance adjustment was required for the following sites that exceeded the objective but was not representative of public exposure:

Tally Ho automatic (5m from relevant exposure; measurement made 1m from kerb) distance adjusted from 50 μgm^{-3} to 40.3 μgm^{-3}

Tally Ho tube (5m from relevant exposure; measurement made 1m from kerb) distance adjusted from 52.3 μgm^{-3} to 41.7 μgm^{-3}

347 Hendon Way (10m from relevant exposure; measurement made 1m from kerb) distance adjusted from 70.6 μgm^{-3} to 47.6 μgm^{-3}

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).

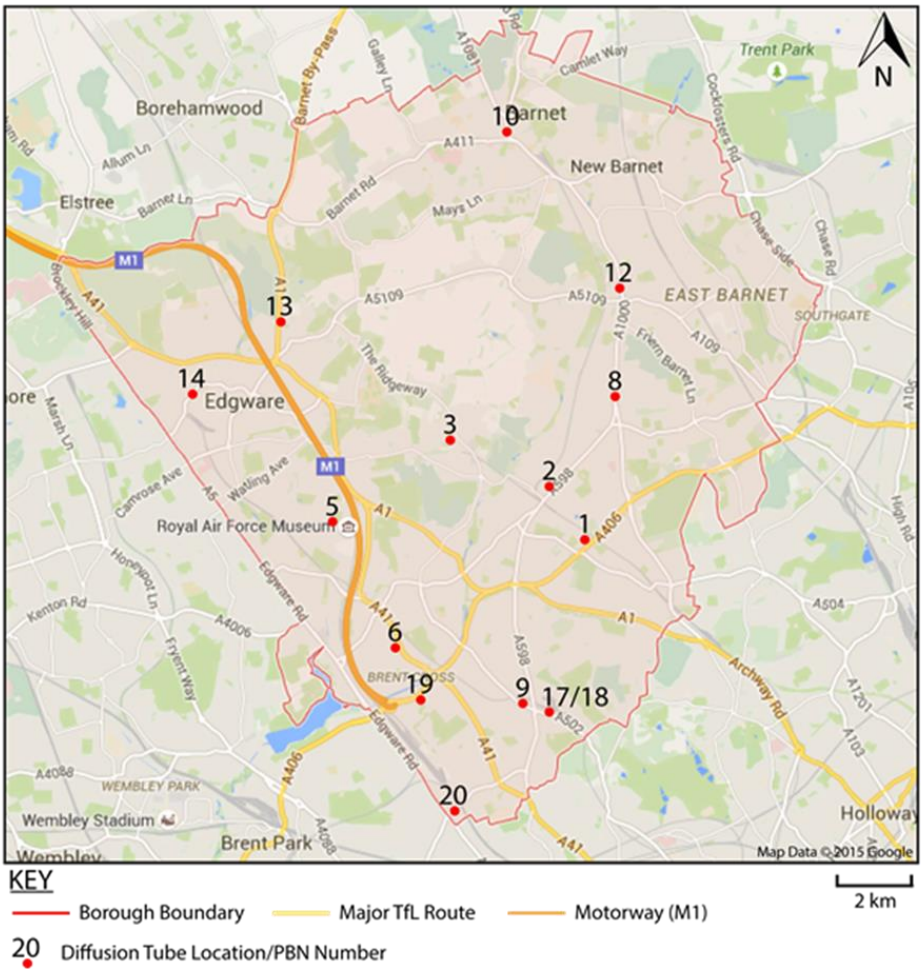
The background site used was Chalgrove monitoring station with an annual mean of 26.3µgm^{-3} for 2015.

Appendix B Full Monthly Diffusion Tube Results for 2015

Table N. NO_2 Diffusion Tube Results

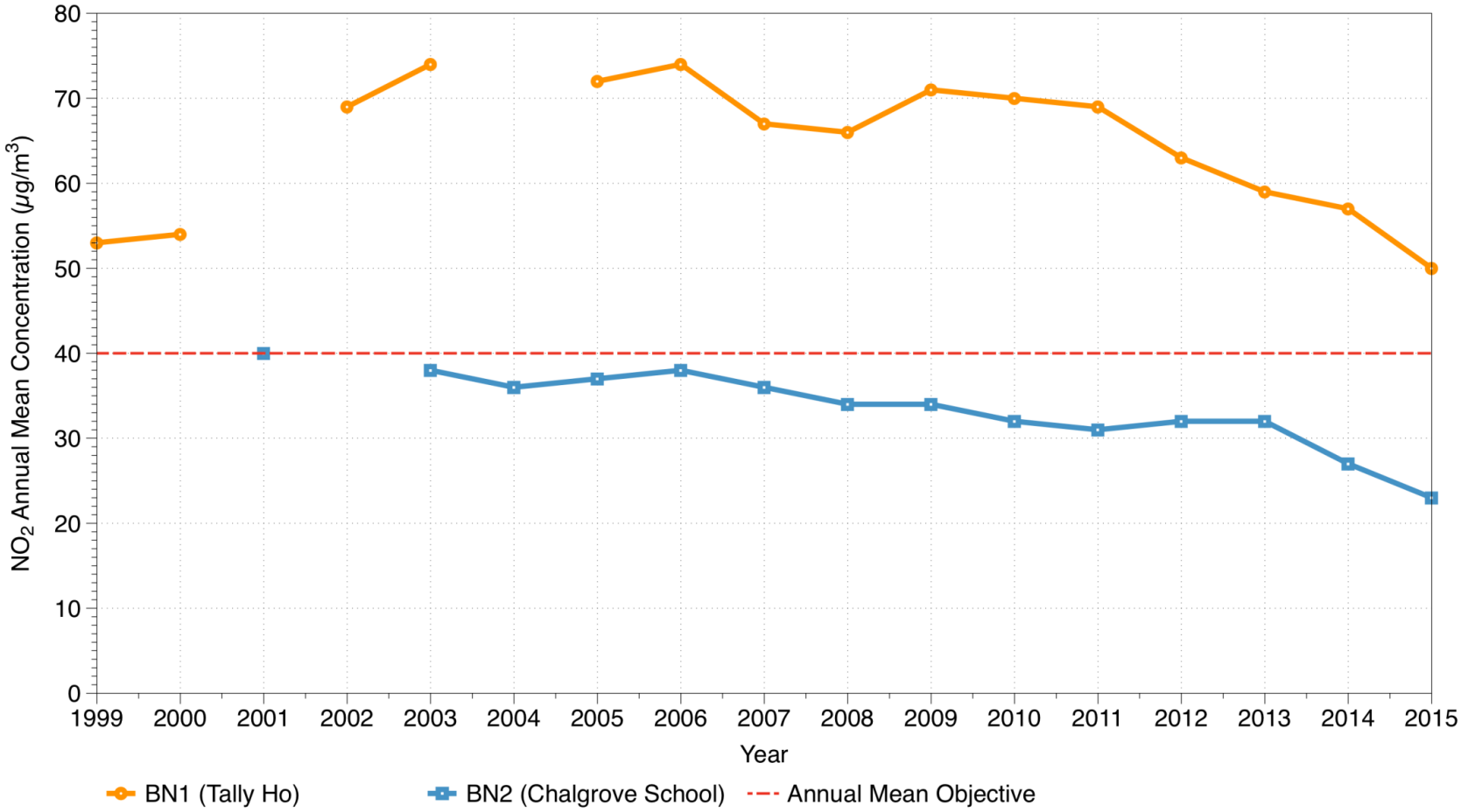
Site ID	*Valid data capture for monitoring period %* [a]	*Valid data capture 2015 %* [b]	*Annual Mean NO_2*											
			Jan-Feb	*March-Apr*	*May*	*June*	*Jul*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Annual mean – raw data* [c]	*Annual mean – bias adjusted* [c]
PBN1	90	90	**44.50**	x	27.17	20.48	27.61	40.84	40.27	47.34	48.28	43.95	37.83	37.1
PBN2	100	100	50.51	35.97	38.77	50.32	34.96	48.22	41.42	51.00	54.33	40.72	44.62	43.7
PBN3	70	70	X	18.49	13.93	20.75	X	21.01	21.48	29.01	28.084	X	21.93	21.5
PBN5	90	90	40.83	X	19.52	X	18.54	28.83	27.79	X	31.76	32.00	28.47	27.9
PBN6	100	100	78.03	48.95	71.30	89.54	64.09	82.5	67.7	74.64	71.04	72.93	72.07	70.6
PBN8	100	100	56.48	43.39	46.74	59.38	43.53	58.77	46.76	60.04	58.81	59.66	53.36	52.3
PBN9	90	90	58.56	40.72	44.63	X	40.47	61.42	54.21	59.94	45.63	38.48	49.34	48.4
PBN10	90	90	55.67	42.66	46.46	66.47	49.23	49.47	46.29	59.40	52.57	X	52.02	51.0
PBN12	80	80	50.81	38.94	46.29	57.06	50.07	42.21	45.95	51.94	X	X	47.91	47.0
PBN13	100	100	45.53	27.86	29.71	41.89	29.31	37.00	33.90	40.38	48.06	40.37	37.40	36.7
PBN14	90	90	60.24	50.30	X	X	41.73	60.50	55.88	70.40	55.05	60.66	56.85	55.7
PBN17	90	90	81.98	46.87	X	76.44	56.32	69.52	58.29	67.80	66.05	68.86	65.78	64.50
PBN18	90	90	63.70	X	43.70	65.54	46.16	52.88	40.13	49.15	62.38	52.53	52.91	51.8
PBN19	80	80	60.12	44.29	X	65.76	47.13	55.50	50.49	53.38	53.83	50.23	53.41	52.3
PBN20	100	100	57.20	41.87	49.12	66.78	47.56	61.31	47.56	55.51	73.83	56.71	55.75	54.6

Map Showing diffusion tube location



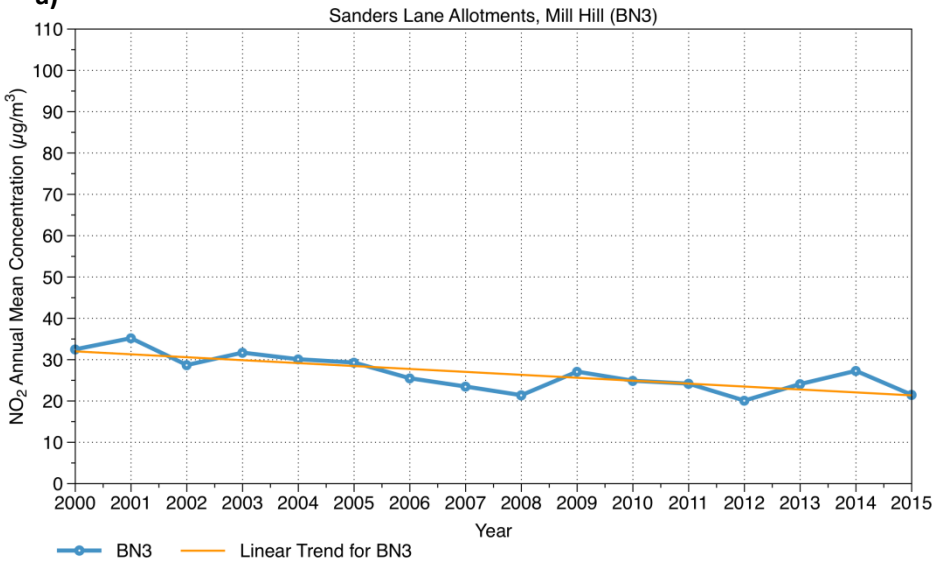
Appendix C Graphs showing trends in pollutant concentrations

C.1 Automatic monitoring stations

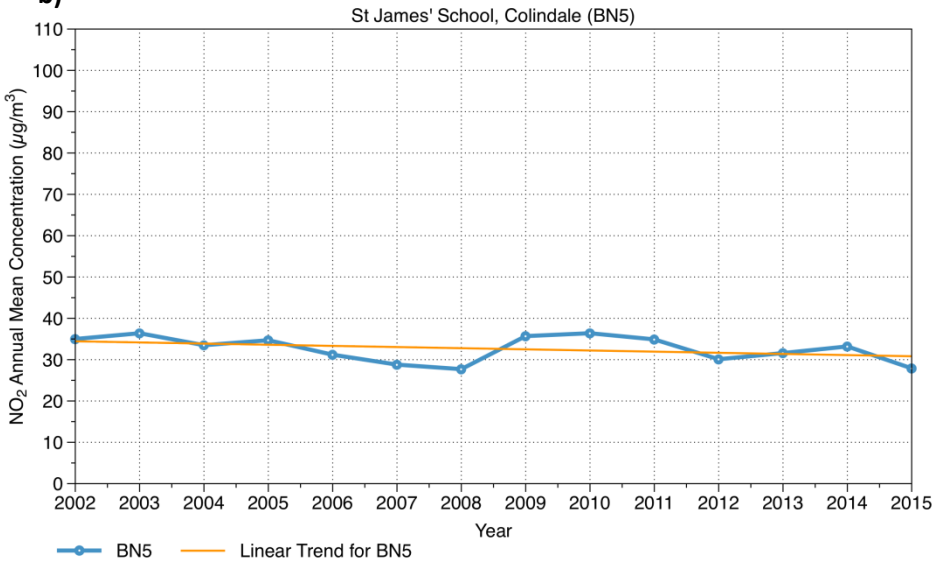


C.2 Long Term NO_2 Diffusion Tube Trends

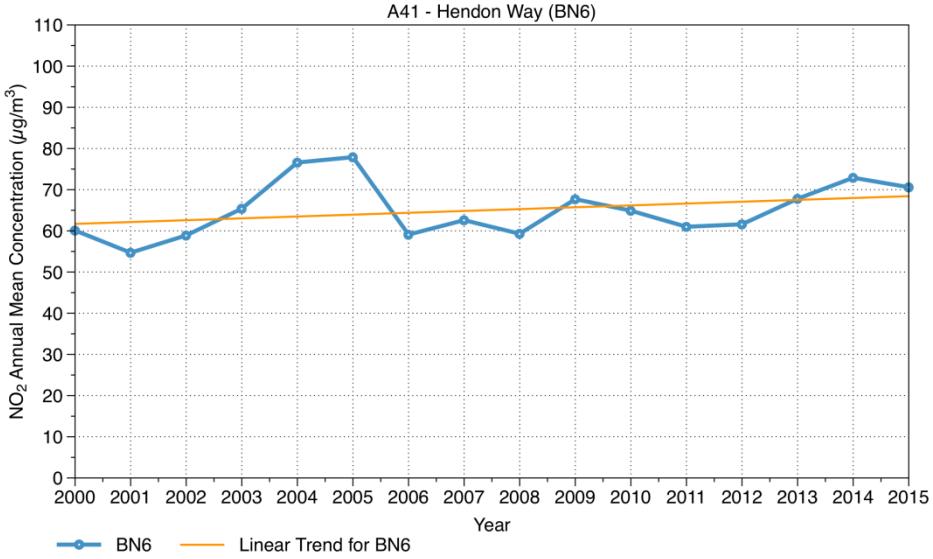
a)

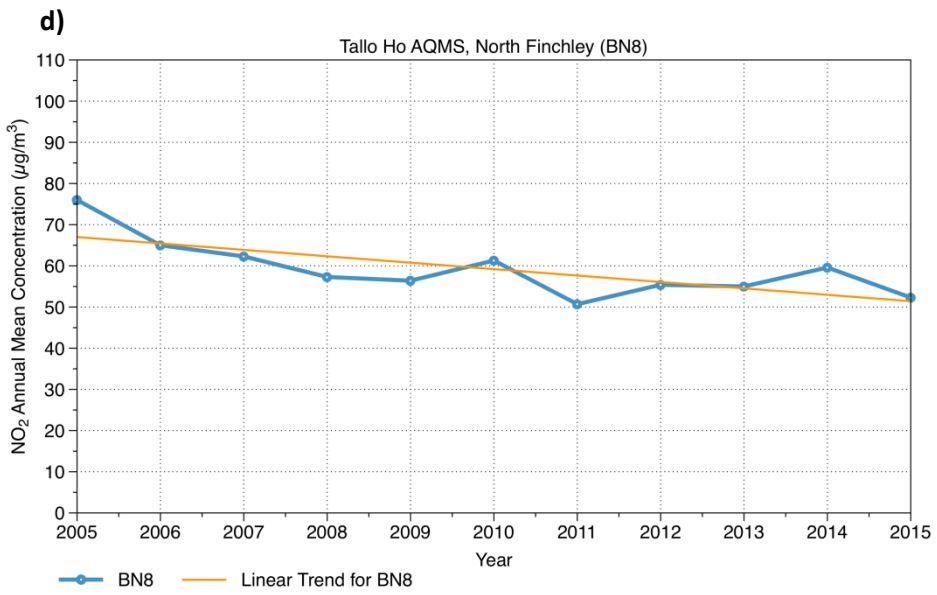


b)



c)





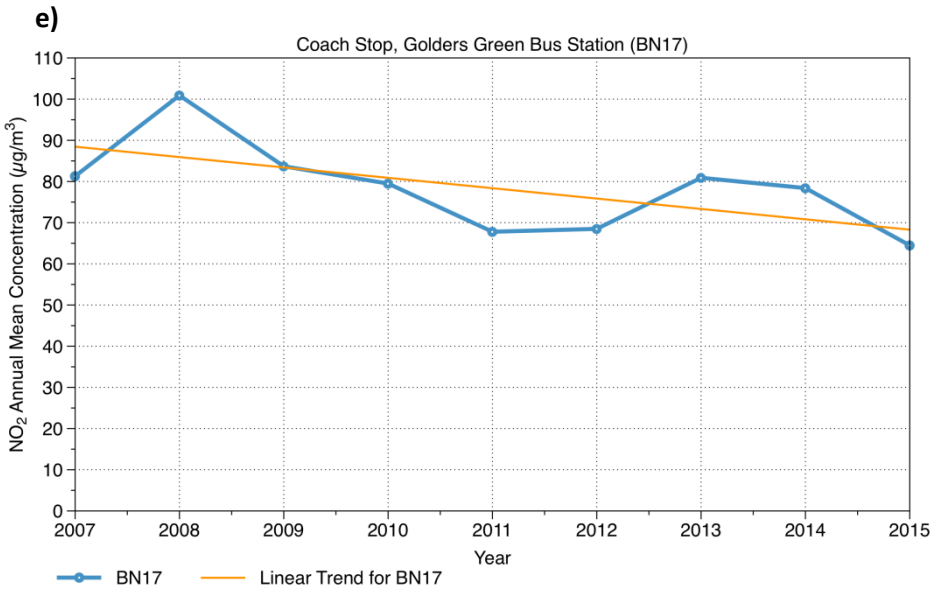
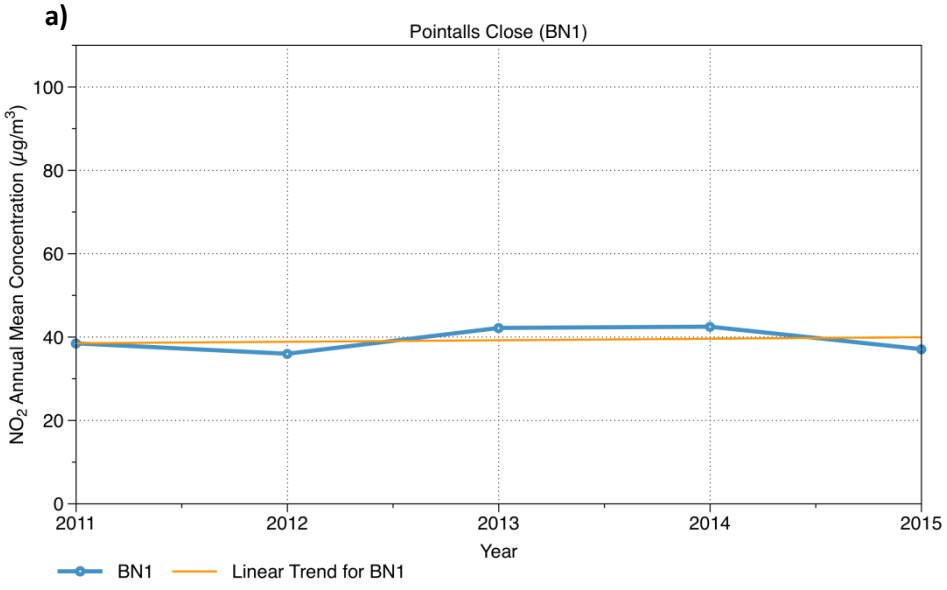
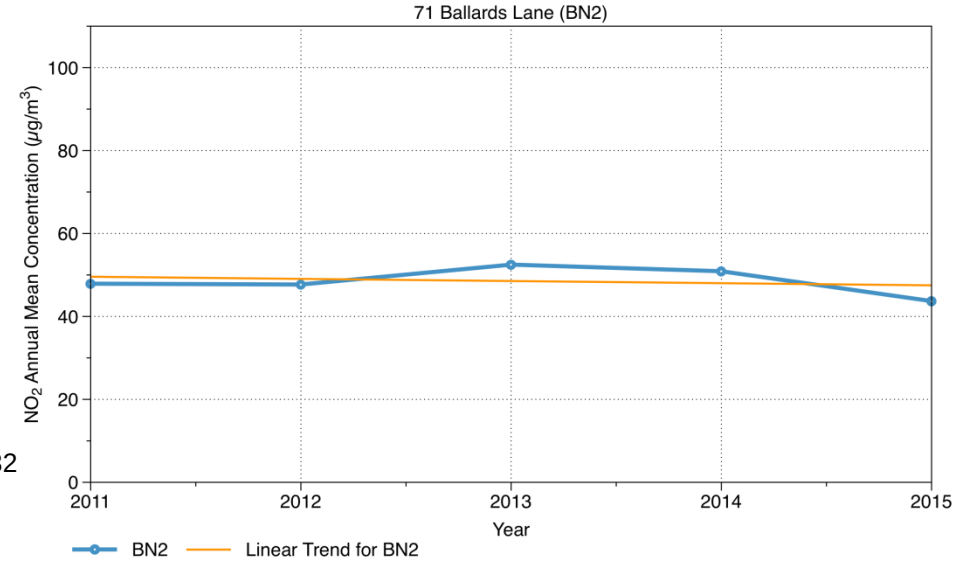
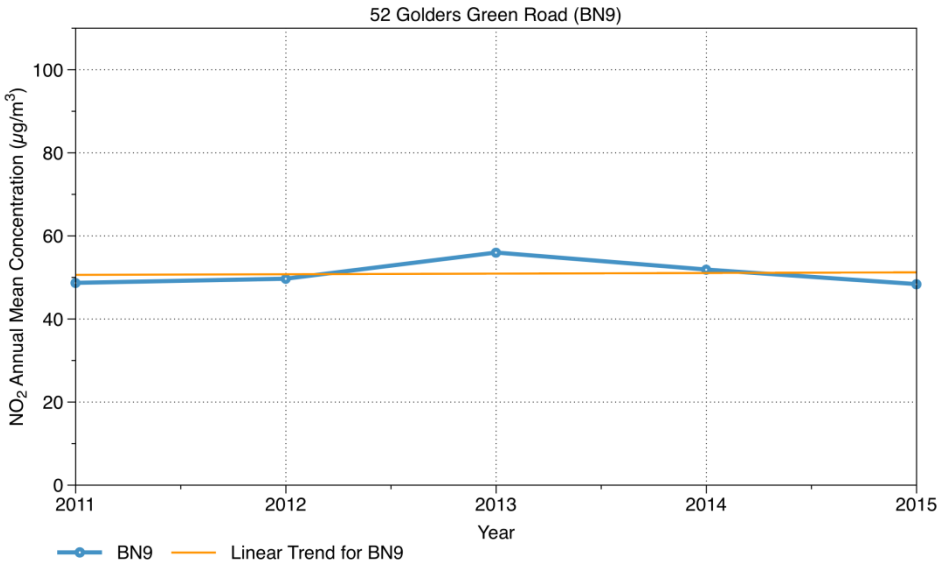
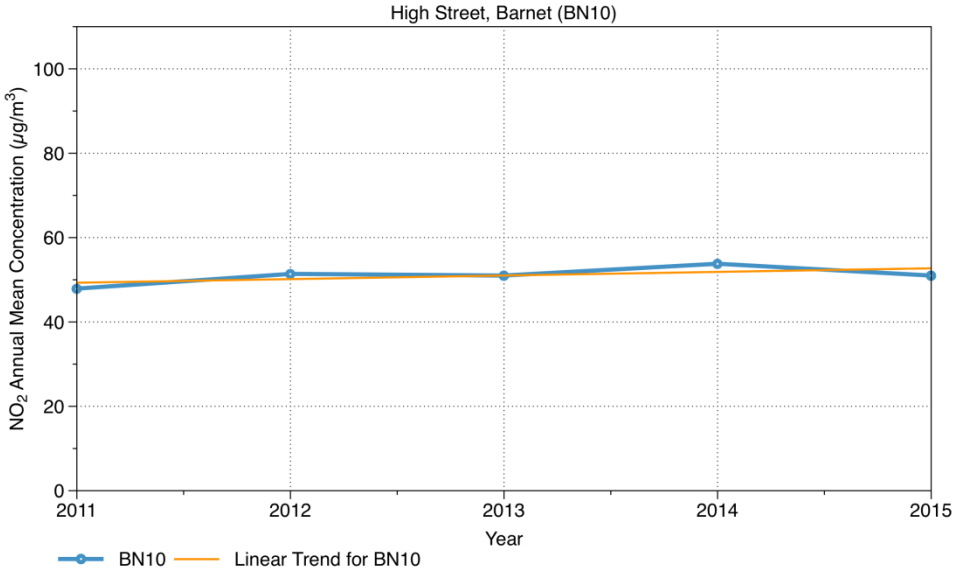


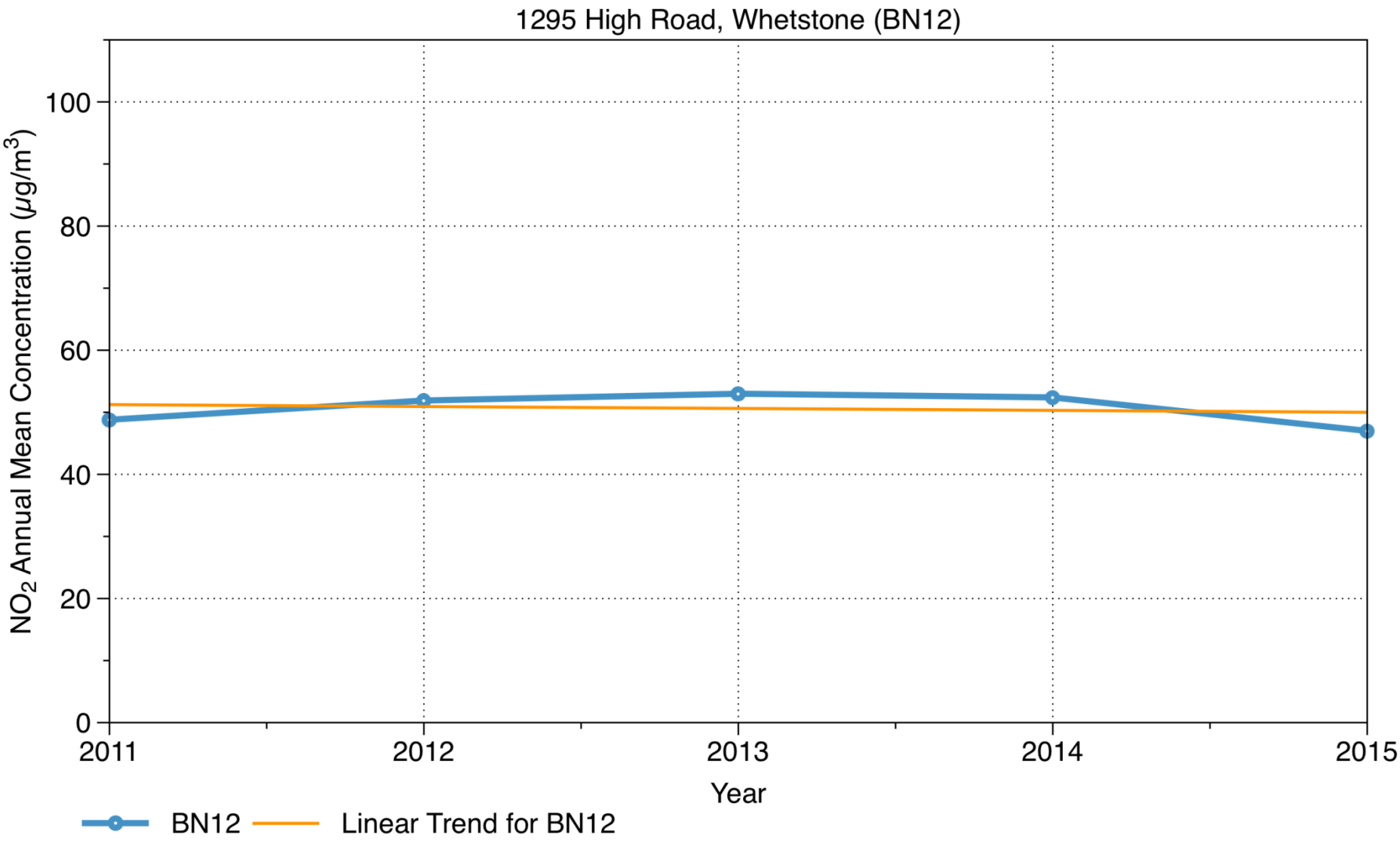
Figure B.2 Short Term NO_2 Diffusion Tube Trends

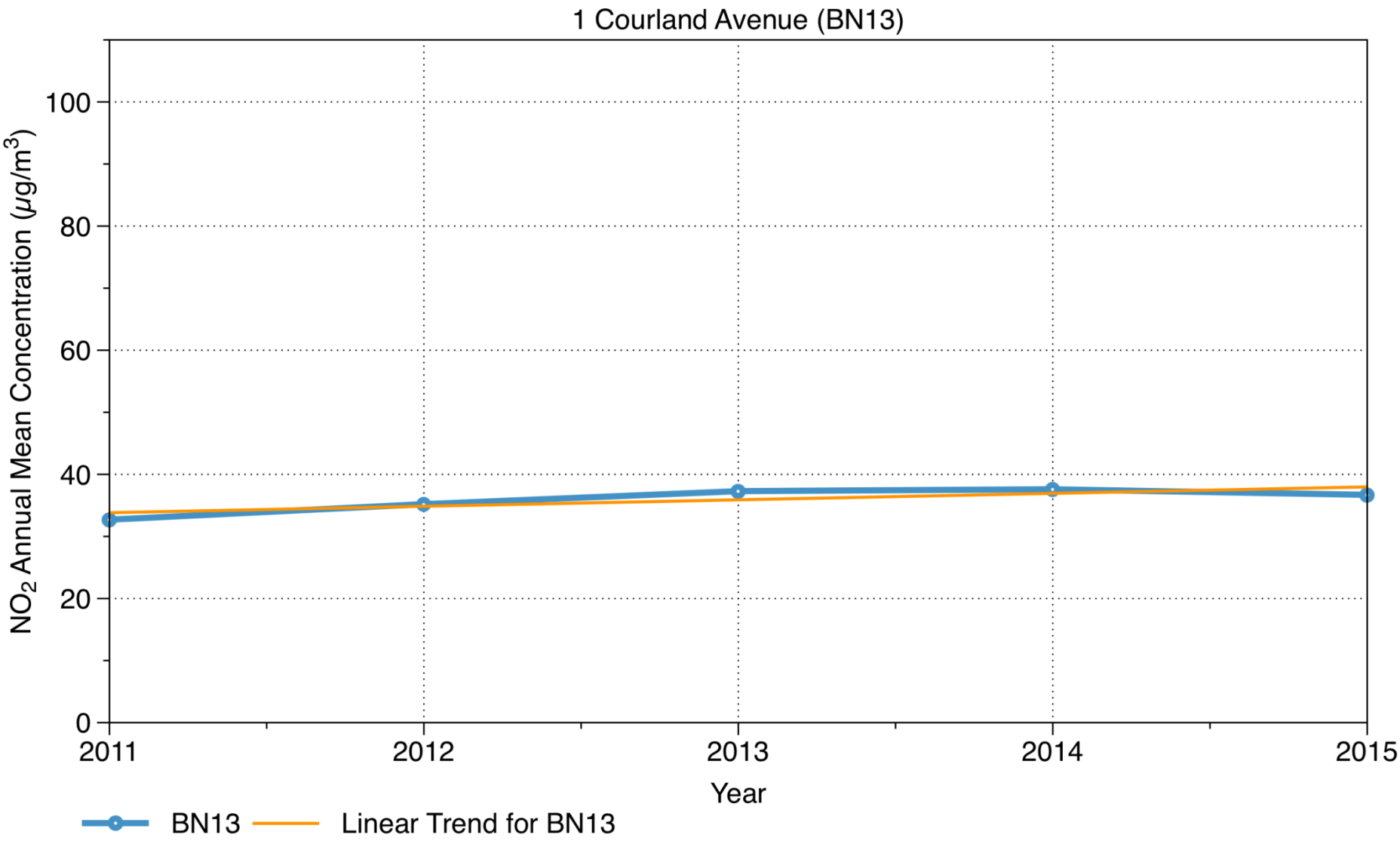


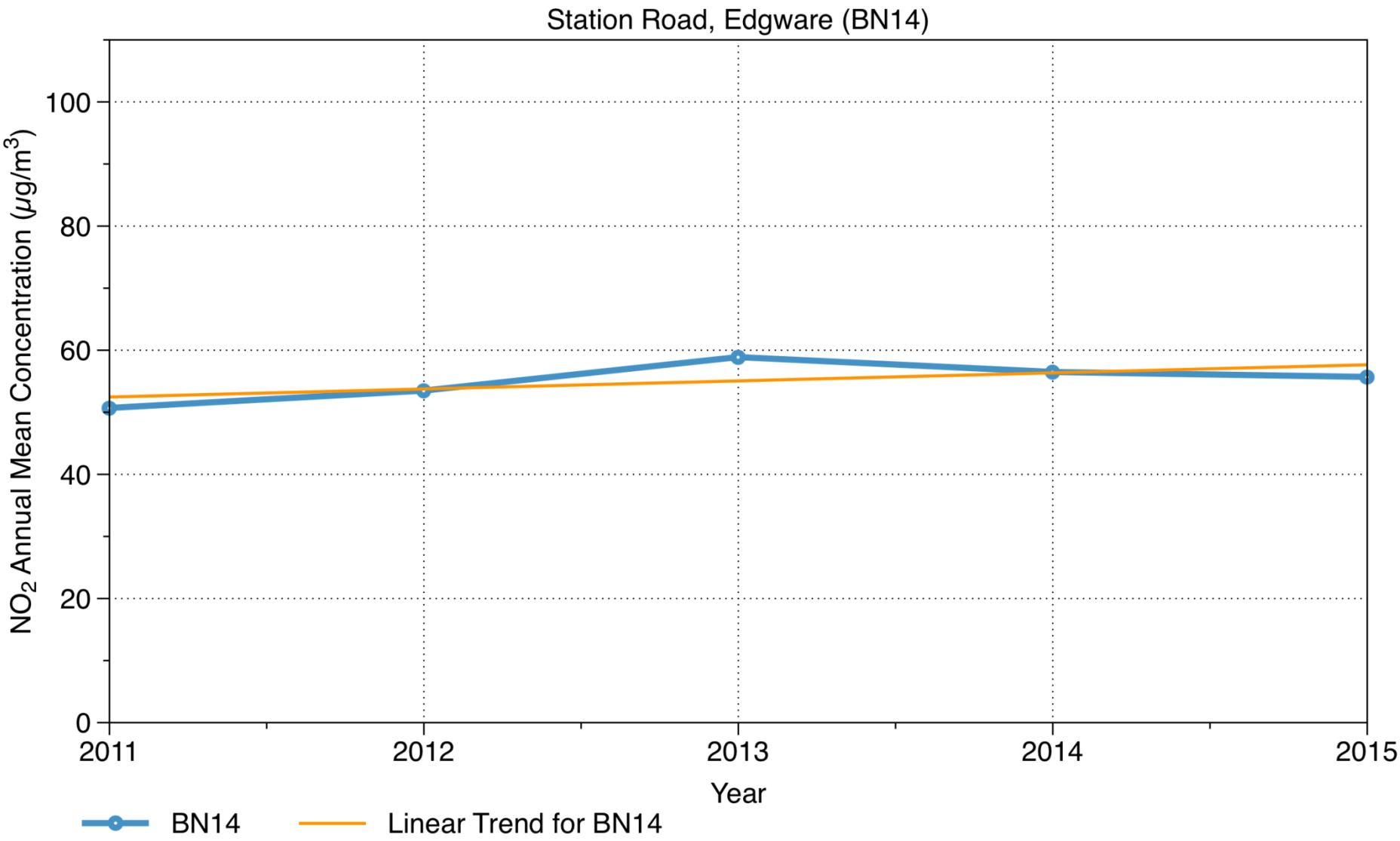


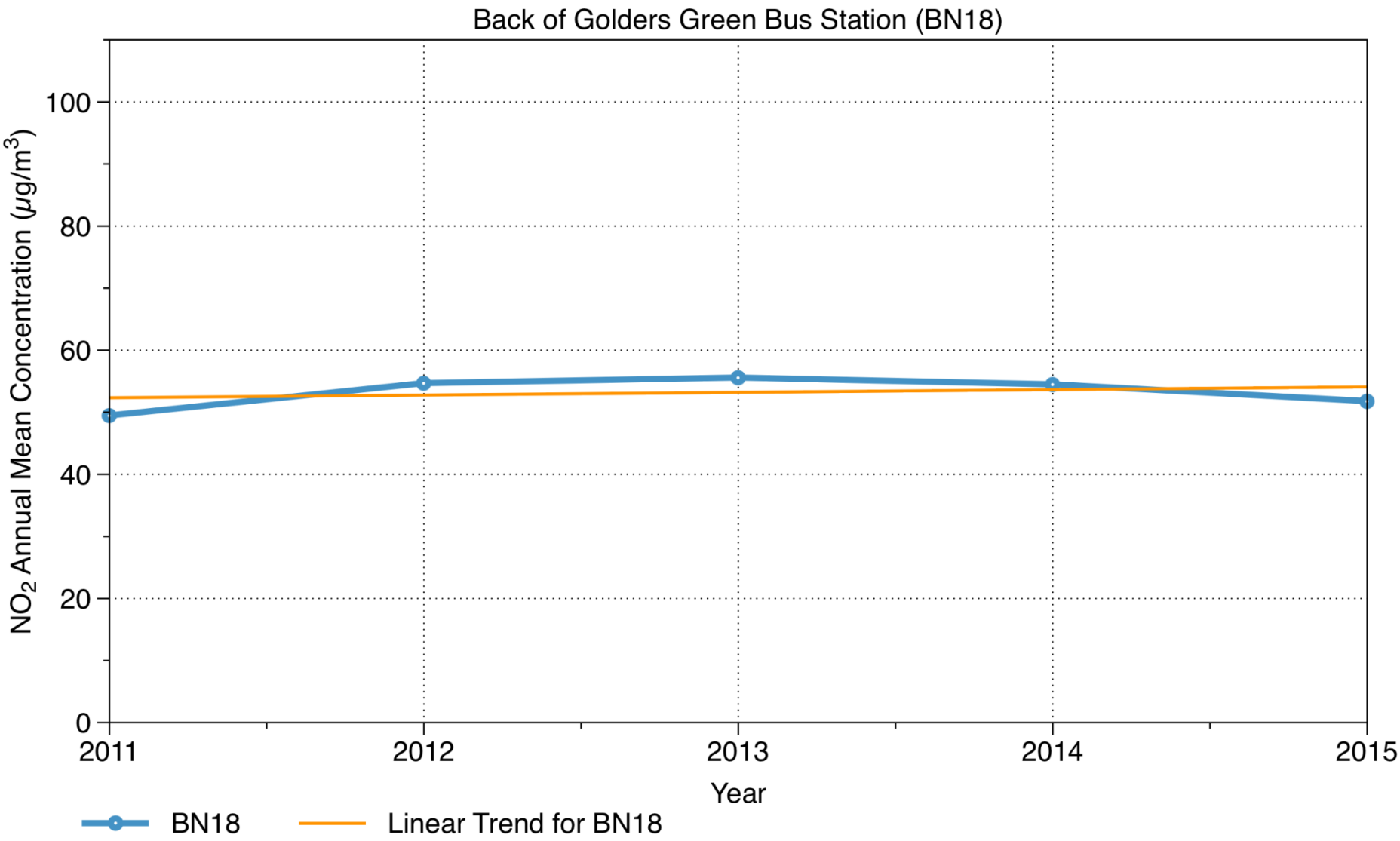

52 Golders Green Road (BN9)
NO2 Annual Mean Concentration (µg/m3)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN9
Linear Trend for BN9

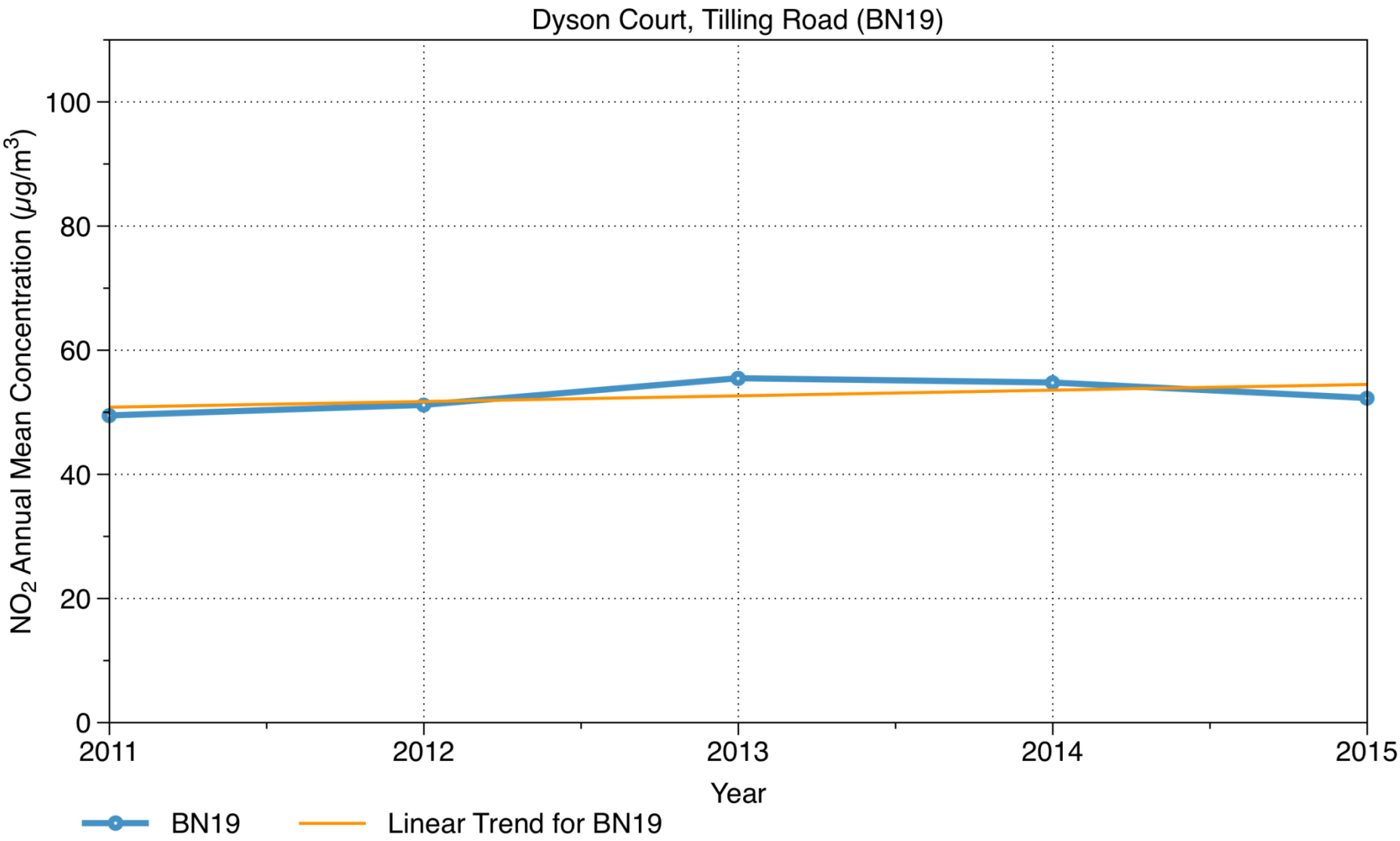

High Street, Barnet (BN10)
NO2 Annual Mean Concentration (µg/m3)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN10
Linear Trend for BN10

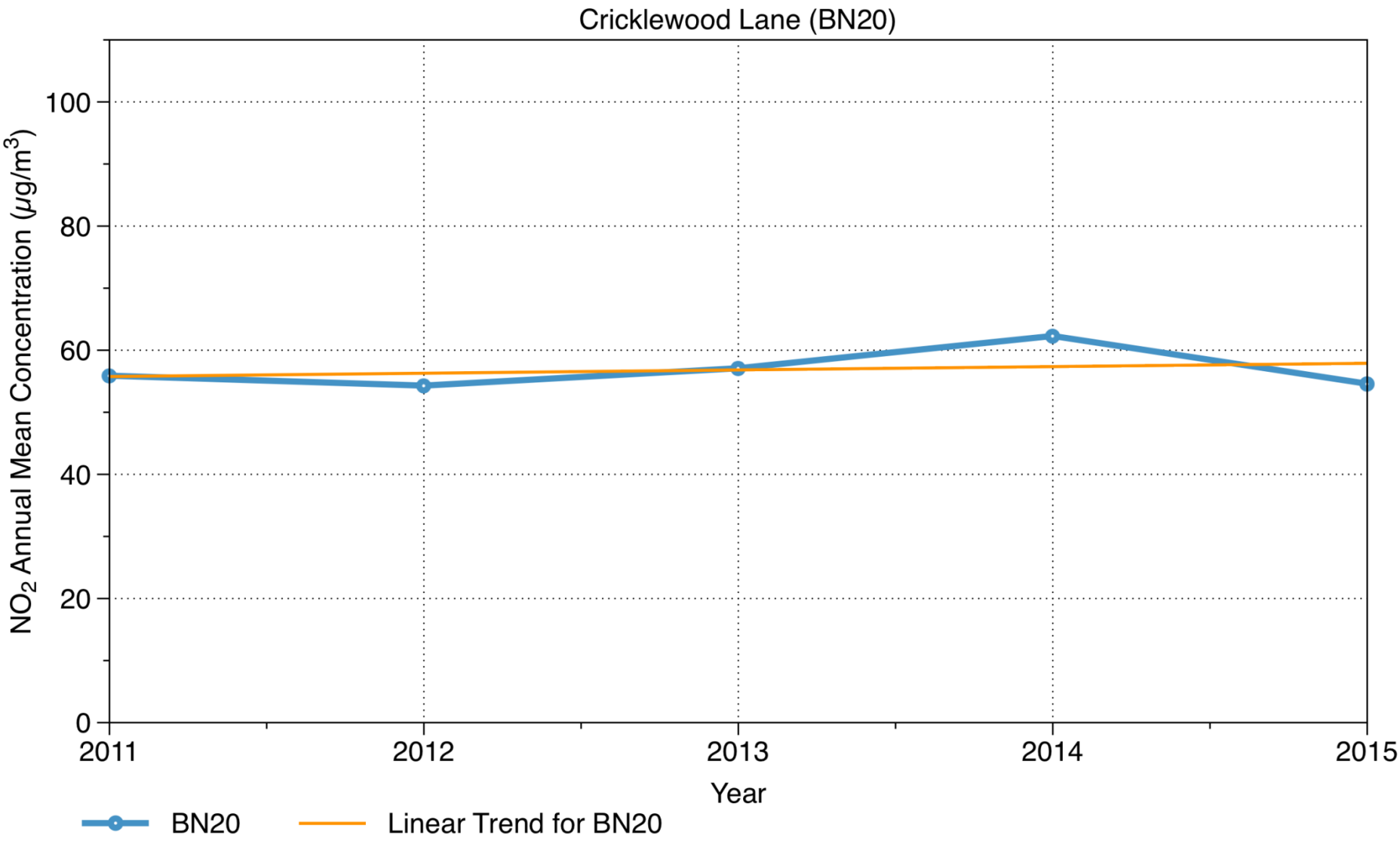

1295 High Road, Whetstone (BN12)
NO2 Annual Mean Concentration (µg/m3)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN12
Linear Trend for BN12


1 Courland Avenue (BN13)
NO_2 Annual Mean Concentration ($\mu g/m^3$)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN13
Linear Trend for BN13


Station Road, Edgware (BN14)
NO_2 Annual Mean Concentration ($\mu g/m^3$)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN14
Linear Trend for BN14


Back of Golders Green Bus Station (BN18)
NO2 Annual Mean Concentration (µg/m3)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN18
Linear Trend for BN18


Dyson Court, Tilling Road (BN19)
NO2 Annual Mean Concentration (µg/m3)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN19
Linear Trend for BN19


Cricklewood Lane (BN20)
NO2 Annual Mean Concentration (µg/m3)
100
80
60
40
20
0
2011
2012
2013
2014
2015
Year
BN20
Linear Trend for BN20