Air Quality
Annual Status Report for 2021

Date of Publication: September 2021

THE ROYAL BOROUGH OF
KENSINGTON
AND CHELSEA

Kensington and Chelsea Council
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(Photo taken by Matt McIlroy during first lockdown 25-03-2020)

This report provides a detailed overview of air quality in Kensington and Chelsea during 2020. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2019 (LLAQM.TG(19))

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Abbreviations

Abbreviation	Description
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
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
NO_2	Nitrogen dioxide
O_3	Ozone
PM_{10}	Particulate Matter (less than 10 microns in diameter)
$PM_{2.5}$	Particulate Matter (less than 2.5 microns in diameter)
TEB	Transport Emissions Benchmark
TfL	Transport for London
WHO	World Health Organisation

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	Standard / 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
Nitrogen Dioxide (NO_2)	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
Particles (PM_{10})	40 µg m^{-3}	Annual Mean	31 Dec 2004
Particles ($PM_{2.5}$)	25 µg m^{-3}	Annual Mean	2020
Particles ($PM_{2.5}$)	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
Sulphur Dioxide (SO_2)	350 µg m^{-3} not to be exceeded more than 24 times a year	1-Hour Mean	31 Dec 2004
Sulphur Dioxide (SO_2)	125 µg m^{-3} mot to be exceeded more than 3 times a year	24-Hour Mean	31 Dec 2004

Note:

(1) Date by which to be achieved by and maintained thereafter

Table B. Summary of WHO Air Quality Guideline Values

Pollutant	Metric	Guideline Value (2005)
NO_2	1-Hour Mean	200 µg m^{-3}
	Annual Mean	40 µg m^{-3}
PM_{10}	24-Hour Mean	50 µg m^{-3}
	Annual Mean	20 µg m^{-3}
$PM_{2.5}$	Annual Mean (Stage 1)	10 µg m^{-3}
	Annual Mean (Stage 2)	
	24-Hour Mean	25 µg m^{-3}

Figure 1. Kensington and Chelsea Air Quality Management Area Boundary (Entire Borough)

1.0 Introduction

Throughout 2020, the world faced a challenging new pandemic of Corona Virus Disease (COVID-19) and like all UK Council's we had to adapt and evolve to meet the changing needs of the businesses and residents within our Borough. We are still trying to understand the full impact of COVID-19 while pursuing our roadmap for recovery, however the national lockdown at the start of the pandemic and subsequent lockdowns had a very interesting impact on air quality, which is explored further in this report.

2020 will also be remembered as the year that a coroner ruled that young Ella Kissi-Debrah's death in February 2013 was caused by acute respiratory failure, severe asthma, and exposure to air pollution. This ruling is the first of its kind in the UK and a stark reminder as to why we all need to continue to work to improve air quality.

Towards the end of 2019, our Lead Member for the Environment, agreed that the Council would work towards the World Health Organisation Air Quality Guideline Values, and it declared a Climate Emergency. Air quality therefore remains a priority for the Council, and in response to a survey issued to residents in 2020, air quality was also confirmed as the number one environmental priority.

The Council's existing Air Quality and Climate Change Action Plan is due to come to an end in 2021. To help with drafting a new Air Quality Action Plan (AQAP), in 2020 we commissioned the consultants CERC to undertake some source apportionment work and to model levels of nitrogen dioxide, PM_{10} and $PM_{2.5}$ to help us understand where our future areas of focus should be. The results of this modelling are included within this report and are a solid foundation for future action planning. The development of our new targeted AQAP is a primary aim for 2021. This plan is to be produced in tandem with a new Climate Change Action Plan and a Biodiversity Action Plan recognising the synergies and co-benefits between them.

1.1 Local Authority Area

Kensington and Chelsea is a densely populated urban environment located to the west of central London. The borough extends from Chelsea Embankment in the south, through Kensington, Notting Hill, and Ladbroke Grove up to Kensal Green to the north. It is bounded by Bayswater, Kensington Gardens and Belgravia to the east and by the West London Railway Line to the west. Kensington and Chelsea has less open space compared to other boroughs; however, it has 26 public parks and open spaces, eight of which are categorised as major parks due to a combination of size and range of facilities. It is home to several major museums and part of the Imperial College campus.

Although the borough is geographically one of the smallest in London, at just over 4.7 square miles, it is the fourth most densely populated areas in the country. The borough is primarily residential in character. The 2010 census showed that out of 78,500 households there were approximately 28,000 in the private rented sector; 29,000 owner occupied and approximately 1,900 homes available for social renting.

In addition to residential accommodation, the borough is also home to internationally recognised shopping centres, 12,000 businesses and over 120,000 jobs, three of the most visited museums in the UK and the second largest number of hotel beds in any London borough.

The borough has a large volume of commuter traffic; people both travelling across and into the area, and local residents travelling within and outside the borough. The area is relatively well served by the London Underground network with the Circle, District, Central, Piccadilly and Hammersmith and City Lines running through the borough. Although currently there is no over-ground rail service actually within the borough, the West London Line stations at Shepherds Bush, Kensington Olympia, West Brompton, and Imperial Wharf are easily accessible to residents and visitors in those localities. There is an extensive bus network.

There are 207 km (127 miles) of roads in the Borough. The Westway (A40), Cromwell Road (A4), the Earl's Court one-way system (A3220) and Chelsea Embankment (A3212) are all part of the Red Route network and Transport for London (TfL) is the Highway Authority for these routes they make up 12.5 km of the roads in the borough. The Council is the Highway Authority for all other adopted roads. The available north/south or east/west routes are constrained by bridges which mean that these are heavily trafficked. They are also often major retail areas with heavy pedestrian flows.

1.2 Emissions Sources

The emission sources of pollutants from within the borough are mainly from transport, residential and commercial activities. A large proportion of the pollution however arises from beyond the borough's immediate area including neighbouring boroughs, the urban area as a whole and further afield from national and European sources. A source apportionment study for the borough was conducted in 2020 and further details can be found in Section 5.

2. Air Quality Monitoring

2.1 Automatic Monitoring Stations

We have automated continuous monitoring at five sites within the Borough. Figure 2 below shows the locations of all the automatic monitoring stations and detailed information about each is contained in Table C.

Figure 2. Locations of Automatic Monitoring Sites

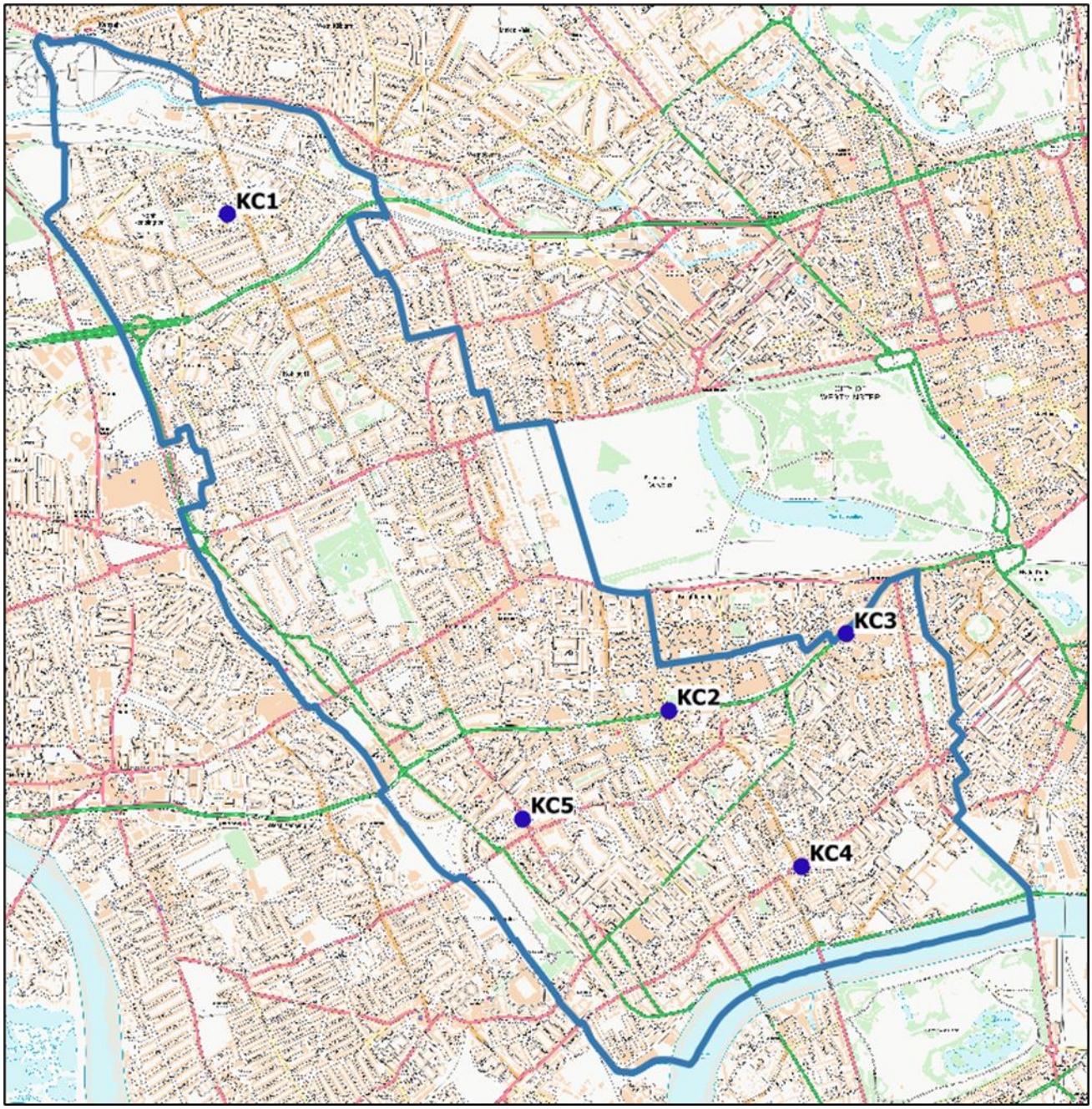


Table C. Details of Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Monitoring Technique
KC1	North Kensington	52404	181752	Urban Background, LAQN & AURN Affiliate Site	Y	Approx. 3.5	Approx. 8m to St Charles Square	3	NO_2, CO, PM_{10}, $PM_{2.5}$, SO_2, O_3	Chemiluminescent, FIDAS, GFC, Fluorescence UV, Photometric
KC2	Cromwell Road	526520	178968	Roadside	Y	10	4m to Cromwell Road and 5m to Queens Gate	1.4	NO_2, PM_{10}	Chemiluminescent, FDMS
KC3	Knightsbridge	527518	179395	Kerbside	Y	0	0.8m to Hans Road, 4.2m from Brompton Road	2.4	NO_2	Chemiluminescent
KC4	Chelsea	527267	178089	Roadside	Y	0	7.7m from Kings Road	3.4	NO_2	Chemiluminescent
KC5	Earls Court	525695	178364	Kerbside	Y	5.2 (Approx. 4m height)	0.5m to Earls Court Road	1.9	NO_2, PM_{10}	Chemiluminescent BAM 1020 Heated

2.2 Non-Automatic NO_2 Monitoring Stations

Monitoring data for nitrogen dioxide (NO_2) is collected using passive diffusion techniques (in addition to continuous monitoring). The borough participates in the London Wide Environmental Programme (LWEP) offered by Bureau Veritas for the provision and analysis of NO_2 diffusion tubes. Further details on the laboratory, method, bias adjustment, and quality control are in Appendix A. Figures 3i and 3ii below shows the locations of all the non-automatic monitoring stations within the borough and detailed information about each is contained in Table D.

The locations and heights of the diffusion tubes are in the process of being re-surveyed. This work was meant to be completed during 2020, however, due to the continuing COVID-19 pandemic and resulting lockdown measures, it was not possible to complete this in time for the production of the report. The diffusion tube locations, heights and site types have therefore been reported the same as they were in last year's ASR. As soon as the review has been completed, any amendments will be reported on the Council's website. During 2020 an additional thirty NO_2 diffusion tube sites were added to the Non-Automatic Monitoring Network (KC82 – KC111) along Kensington High Street (see Figure 3ii).

Figure 3i. Locations of Non-Automatic NO_2 Monitoring Sites

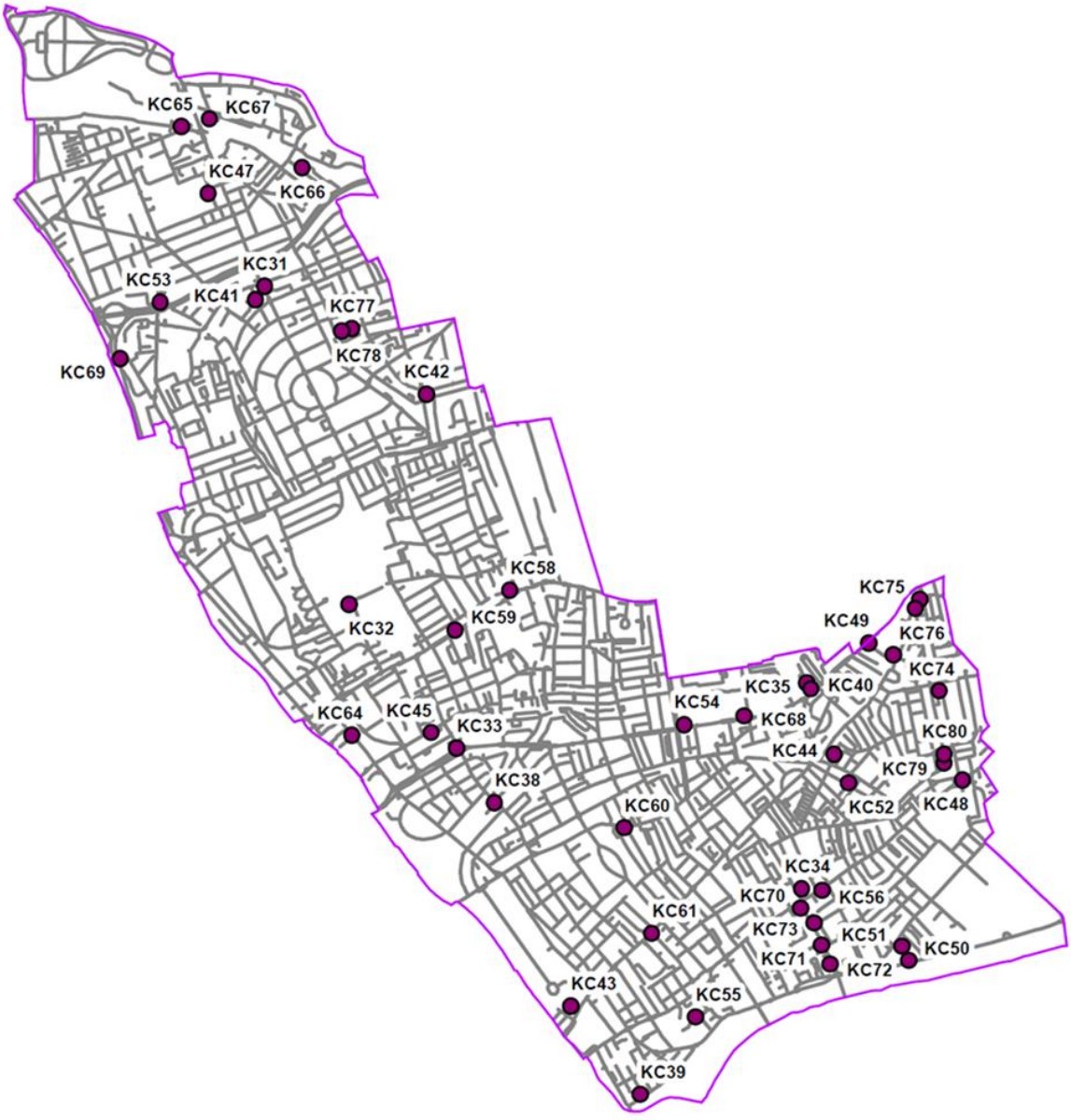


Figure 3ii. Location of new Kensington High Street diffusion tubes

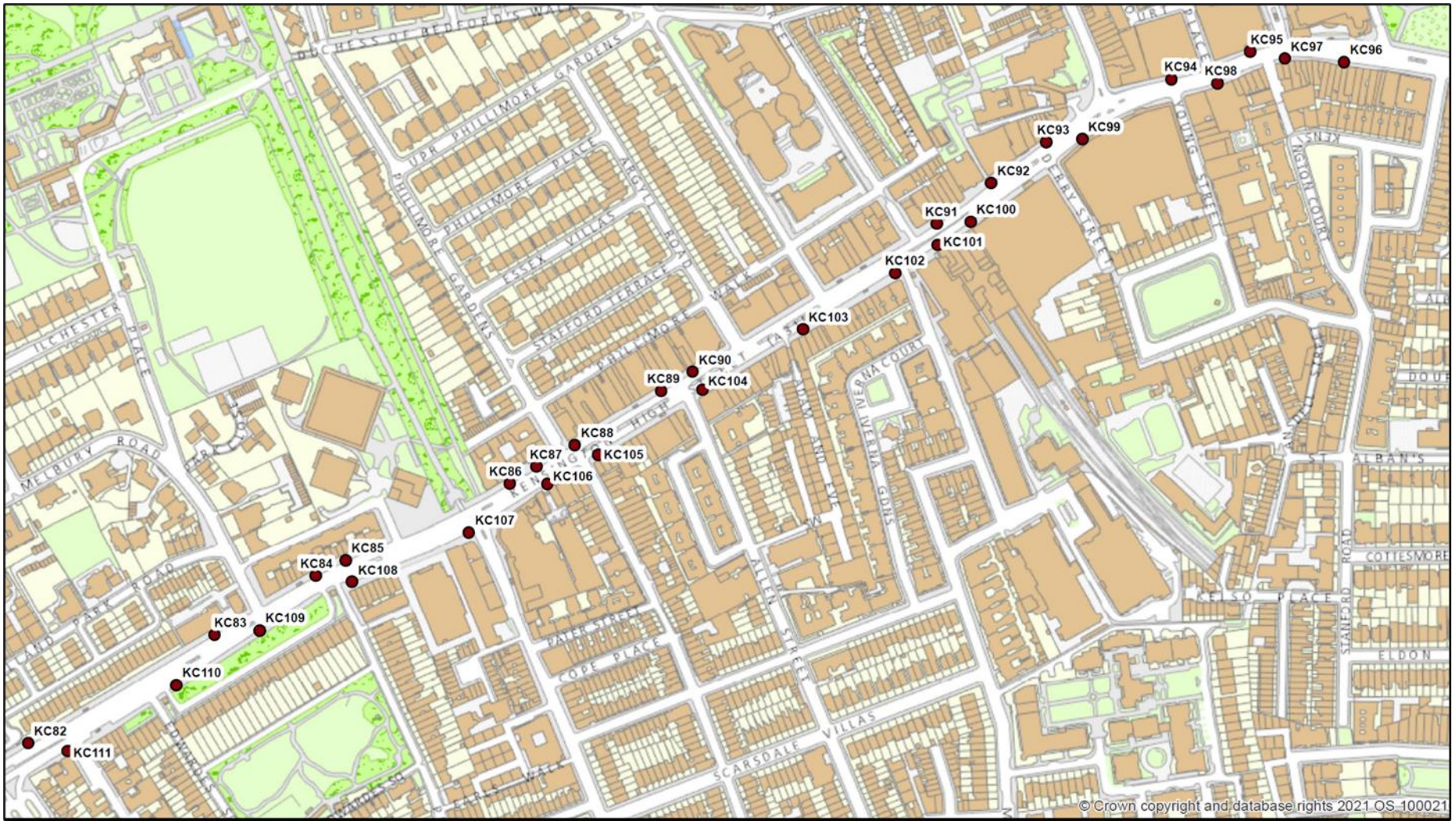


Table D. Details of NO_2 Non-Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA ?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Tube co-located with an Automatic Monitor (Y/N)
KC31	Ladbroke Grove / North Kens. Library	524342	181271	Roadside	Y	6	3.5	5	NO_2	N
KC32	Holland Park	524784	179599	Urban Background	Y	5	380	4	NO_2	N
KC33	Cromwell Rd / Earls Court Rd	525355	178841	Roadside	Y	1	2.1	2.1	NO_2	N
KC34	Dovehouse Street	527164	178103	Urban Centre	Y	30	26	2.8	NO_2	N
KC35	Brompton Road / Cottage Place	527192	179185	Roadside	Y	40	8	1.5	NO_2	N
KC38	Earls Court Station	525548	178556	Roadside	Y	1	1.7	2.7	NO_2	N
KC39	Lots Road / Upcerne Road	526317	177022	Roadside	Y	30	8.1	2.5	NO_2	N
KC40	Brompton Square	527214	179153	Urban Centre	Y	20	65	2.7	NO_2	N
KC41	Ladbroke Crescent	524294	181200	Urban Background	Y	8	70	2.2	NO_2	N
KC42	Pembridge Square Library	525191	180705	Roadside	Y	9	6	3.1	NO_2	N
KC43	St Marks Grove	525950	177487	Urban Background	Y	12	38	2.3	NO_2	N
KC44	Donne Place	527335	178810	Urban Background	Y	15	55	2.4	NO_2	N
KC45	Chatsworth Court	525263	178936	Roadside	Y	13	13	2	NO_2	N
KC47	Sion Manning School	524046	181758	Urban Background	Y	10	8.5	2.1	NO_2	Y -Triplicate

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA ?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Tube co-located with an Automatic Monitor (Y/N)
KC48	Sloane Square	528011	178675	Roadside	Y	1	7	3	NO_2	N
KC49	Harrods	527516	179395	Urban Centre	Y	1	4	2.5	NO_2	Y
KC50	Chelsea Physic Garden (Gate)	527726	177727	Roadside	Y	1	4	2.9	NO_2	N
KC51	Chelsea Physic Garden (Met Station)	527690	177800	Urban Background	Y	3	92	1.5	NO_2	N
KC52	Sloane Avenue	527411	178659	Roadside	Y	5	2.6	2.4	NO_2	N
KC53	Walmer House	523792	181189	Urban Background	Y	20	12.5	2.3	NO_2	N
KC54	Cromwell Rd / Natural History Museum	526522	178968	Roadside	Y	10	3.1	2.6	NO_2	Y - Triplicate
KC55	Blantyre Street	526608	177429	Urban Background	Y	20	100	3	NO_2	N
KC56	Chelsea Old Town Hall	527268	178089	Roadside	Y	14	9	3.1	NO_2	Y
KC57	Pavilion St/ Sloane Ave	527889	179145	Roadside	Y	25	3	2.4	NO_2	N
KC58	Kensington High Street / Kensington Church Street	525630	179674	Roadside	Y	1	13	2.7	NO_2	N
KC59	Kensington High Street / Argyll Street	525342	179464	Kerbside	Y	1	0.7	2.5	NO_2	N
KC60	Old Brompton Road / Draycott Avenue	526231	178425	Kerbside	Y	8	0.7	2.5	NO_2	N
KC61	Fulham Rd / Limerston Street	526377	177867	Roadside	Y	20	10	2.4	NO_2	N
KC64	Warwick Road	524825	178902	Roadside	Y	8	3.5	2.6	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA ?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Tube co-located with an Automatic Monitor (Y/N)
KC65	Barlby Road	523899	182113	Roadside	Y	20	0.5	2.5	NO_2	N
KC66	Acklam Road	524541	181893	Railway	Y	18	16	2.5	NO_2	N
KC67	Southern Row	524056	182148	Railway	Y	55	38	2.5	NO_2	N
KC68	Exhibition Road	526863	179060	Kerbside	Y	0.5	0.5	2.1	NO_2	N
KC69	Darfield Way	523587	180893	Urban Background	Y	2	11.7	2.0	NO_2	N
KC70	Oakley Street	527170	177985	Kerbside	Y	4	0.8	2.0	NO_2	N
KC71	Oakley Street	527267	177812	Kerbside	Y	4	0.7	2.0	NO_2	N
KC72	Oakley Street	527330	177716	Kerbside	Y	4	0.8	2.0	NO_2	N
KC73	Oakley Street	527227	177918	Kerbside	Y	4	0.6	2.0	NO_2	N
KC74	Hans Road	527600	179325	Kerbside	Y	3.1	0.3	2.2	NO_2	N
KC75	Basil Street	527675	179325	Kerbside	Y	3.35	0.7	2.0	NO_2	N
KC76	Basil Street	527691	179390	Kerbside	Y	3.35	0.8	2.0	NO_2	N
KC77	Lonsdale Road	524820	181065	Kerbside	Y	1.7	0.65	2.0	NO_2	N
KC78	Lonsdale Road	524762	181049	Kerbside	Y	3	0.65	2.0	NO_2	N
KC79	Cadogan Gardens	527892	178731	Kerbside	Y	1.5	0.4	2.0	NO_2	N
KC80	Pavilion Road	527917	178755	Kerbside	Y	2.3	1.24	2.0	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA ?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Tube co-located with an Automatic Monitor (Y/N)
KC82	Kensington High Street LP029	524764	179139	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC83	Kensington High Street LP018	524919	179229	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC84	Kensington High Street LP011 / Earls Terrace	525002	179275	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC85	Kensington High Street LP010	525002	179277	Roadside	Y	1.0	0.5	2.0	NO_2	N
KC86	Kensington High Street LP064	525165	179355	Roadside	Y	1.0	0.5	2.0	NO_2	N
KC87	Kensington High Street LP063	525187	179369	Roadside	Y	1.0	0.5	2.0	NO_2	N
KC88	Kensington High Street LP060 / Phillimore Gardens	525219	179387	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC89	Kensington High Street LP054	525291	179432	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC90	Kensington High Street / Stafford Court	525317	179448	Near Road	Y	0.5	5.0	2.0	NO_2	N
KC91	Kensington High Street LP033	525520	179571	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC92	Kensington High Street LP029	525520	179571	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC93	Kensington High Street LP025 / Derry Street	525597	179623	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC94	Kensington High Street LP014 / Young Street	525719	179694	Roadside	Y	0.5	1.0	2.0	NO_2	N
KC95	Kensington High Street LP008 / Kensington Palace Gardens	525786	179717	Kerbside	Y	0.5	0.3	2.0	NO_2	N
KC96	Kensington High Street LP002	525860	179707	Roadside	Y	0.5	1.0	2.0	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA ?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Tube co-located with an Automatic Monitor (Y/N)
KC97	Kensington High Street LP007	525810	179710	Roadside	Y	0.3	0.5	2.0	NO_2	N
KC98	Kensington High Street LP011 / Old Court Place	525755	179687	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC99	Kensington High Street LP022	525644	179639	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC100	Kensington High Street LP032 / High Street Station	525550	179572	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC101	Kensington High Street LP034 / High Street Station	525523	179552	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC102	Kensington High Street LP037 / Wrights Lane	525486	179529	Roadside	Y	0.5	1.0	2.0	NO_2	N
KC103	Kensington High Street / Three	525411	179478	Near Road	Y	0.5	5.0	2.5	NO_2	N
KC104	Kensington High Street LP051 / Allen Street	525327	179434	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC105	Kensington High Street LP059 / Abingdon Road	525239	179379	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC106	Kensington High Street LP062	525197	179353	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC107	Kensington High Street LP002 / Earls Court Road	525132	179314	Roadside	Y	1.0	1.5	2.0	NO_2	N
KC108	Kensington High Street LP009 / Earls Court Road	525034	179273	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC109	Kensington High Street LP015 / Melbury Road	524957	179233	Kerbside	Y	0.5	0.5	2.0	NO_2	N
KC110	Kensington High Street LP021 / Melbury Road	524888	179186	Roadside	Y	0.5	1.0	2.0	NO_2	N
KC111	Kensington High Street LP028	524797	179132	Kerbside	Y	0.5	0.5	2.0	NO_2	N

2.3 Non-Automatic C_6H_6 Monitoring Stations

There has been no change to the number of C_6H_6 (BTEX) diffusion tube monitoring sites within the Non-Automatic Monitoring Network. Further details on the laboratory, method, bias adjustment, and quality control are in Appendix A. Figure 4 below shows the locations of all the automatic monitoring stations within the borough and detailed information about each is contained in Table E.

Figure 4. Locations of Non-Automatic C_6H_6 Monitoring Sites

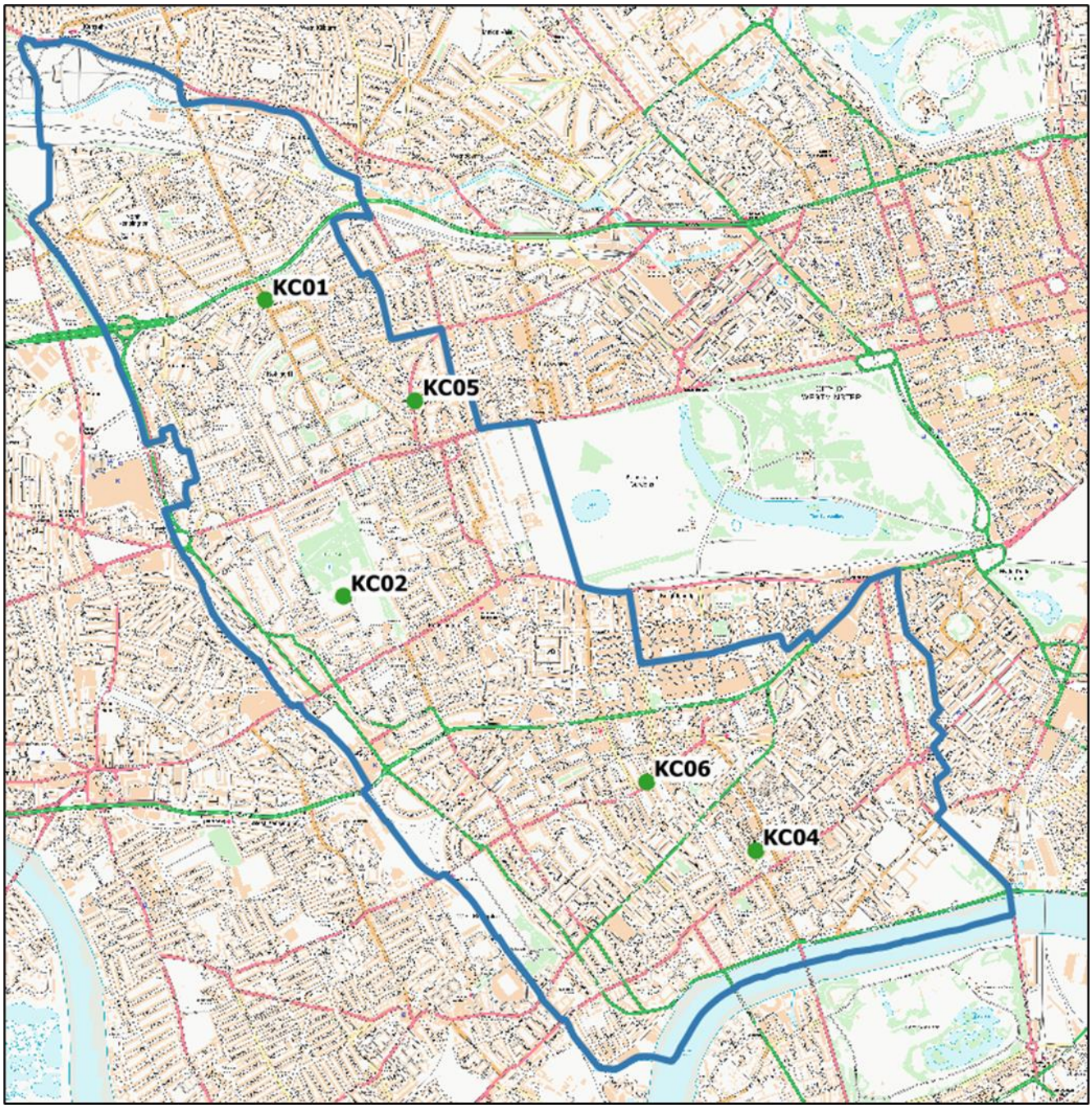


Table E. Details of BTEX Non-Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA ?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Inlet Height (m)	Pollutants Monitored	Monitoring Technique
KC01	Ladbroke Grove / North Kensington Library	524342	181271	Roadside	Y	6	3.5	5.5	C_6H_6	N
KC02	Holland Park	524784	179599	Urban Background	Y	5	380	4	C_6H_6	N
KC03	Dovehouse Street	527111	178165	Urban Background	Y	30	45	2.2	C_6H_6	N
KC04	Pembridge Square Library	525191	180705	Roadside	Y	9	6	4	C_6H_6	N
KC05	Old Brompton Rd/ Clareville Grove Petrol St	526496	178553	Petrol Station	Y	3	12	N/A	C_6H_6	N

2.4 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for "annualisation" (bias adjusted column) and for distance (DC column) to a location of relevant public exposure (if required), the details of which are described in Appendix A. Figures 5-9 display the results graphically.

Table F. Annual Mean NO_2 Ratified and Bias-Adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020[c] Raw	2020[c] Bias Adjusted & Annualised	2020 (DC)
KC1	Urban Background	99.44	99.44	34	32	35	33	29.1	27.38	21	N/A	N/A
KC2	Roadside	99.53	99.53	**56**	**55**	**58**	**51**	**47.6**	**43.73**	30	N/A	N/A
KC3	Kerbside	99.16	99.16	**72**	**71**	**80**	**66**	**66.4**	**54.41**	32	N/A	N/A
KC4	Roadside	97.96	97.96	**76**	**73**	**78**	**63**	**59.6**	**54.98**	**40**	N/A	**40**
KC5	Kerbside	96.71	96.71	**93**	**91**	**86**	**78**	**78.7**	**55.94**	37	N/A	34.1
KC31	Roadside	75.00	75.00	**53.5**	**49.26**	**55.50**	**52.2**	**42.8**	**42.6**	34.9	31.8	N/A
KC32	Urban Background	100.00	100.00	29.2	27.49	29.9	31.5	26.2	23.8	18.9	17.2	N/A
KC33	Roadside	83.33	83.33	**98.2**	**84.45**	**104.5**	**106.1**	**84.0**	**71.6**	**55.6**	**50.5**	**48.0**
KC34	Urban Centre	100.00	100.00	**45.1**	**40.76**	**43.7**	**43.7**	39.0	36.3	29.1	26.5	N/A
KC35	Roadside	75.00	75.00	**82.4**	**75.68**	**80.7**	**77.9**	**58.5**	**56.0**	**41.8**	38.0	34.2
KC38	Roadside	100.00	100.00	**100.7**	**99.0**	**101.0**	**119.2**	**75.8**	**70.3**	**51.7**	**47.1**	**45.4**
KC39	Roadside	100.00	100.00	34.5	32.5	38.5	34.7	30.6	29.2	25.2	22.9	N/A
KC40	Urban Centre	100.00	100.00	**44.1**	**41.6**	**45.1**	-	32.5	32.0	25.2	22.9	N/A
KC41	Urban Background	100.00	100.00	36.7	34.6	38.2	37.7	32.2	30.5	24.7	22.4	N/A
KC42	Roadside	100.00	100.00	**42.4**	**41.2**	**46.2**	**45.4**	38.4	34.5	26.9	24.5	N/A
KC43	Urban Background	100.00	100.00	38.7	34.2	36.2	36.6	30.0	29.9	24.6	22.4	N/A
KC44	Urban Background	100.00	100.00	**40.0**	39.6	**46.1**	**41.0**	35.5	33.1	26.4	24.0	N/A
KC45	Roadside	100.00	100.00	**53.5**	**48.6**	**52.6**	**50.3**	**44.9**	**41.9**	31.6	28.8	N/A
KC47	Urban Background	100.00 / 100.00 / 100.00	100.00 / 100.00 / 100.00	32.9	27.5	34.2	33.3	27.7	27.2	21.8	20.52	N/A
KC48	Roadside	91.67	91.67	**73.9**	**63.0**	**72.3**	**71.8**	**58.4**	**49.9**	**45.7**	**41.6**	**41.1**
KC49	Urban Centre	100.00	100.00	**74.5**	**69.7**	**87.5**	- [e]	- [e]	**59.9**	**43.0**	39.1	38.6

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020[c] Raw	2020[c] Bias Adjusted & Annualised	2020 (DC)
KC50	Roadside	100.00	100.00	**59.4**	**48.2**	**56.4**	**52.7**	**41.0**	**45.9**	31.3	28.5	N/A
KC51	Urban Background	83.00	83.00	33.3	31.6	36.2	39.5	27.7	31.4	29.1	27.0	N/A
KC52	Roadside	83.00	83.00	**58.4**	**52.9**	**64.5**	**56.1**	**49.4**	39.4	33.7	30.7	N/A
KC53	Urban Background	91.67	91.67	**48.4**	**42.6**	**47.0**	**49.0**	**40.7**	38.0	31.4	28.6	N/A
KC54	Roadside	100.00 / 100.00 / 83.33	100.00 / 100.00 / 83.33	**73.7**	**62.9**	**72.5**	**70.9**	**57.3**	**48.8**	38.9	36.56	34.8
KC55	Urban Background	100.00	100.00	**44.1**	**35.5**	**49.0**	**48.0**	**40.5**	37.5	29.1	26.4	N/A
KC56	Roadside	100.00	100.00	**74.4**	**63.7**	**72.7**	**68.0**	**59.9**	**51.2**	**44.1**	**40.0**	37.1
KC57	Roadside	100.00	100.00	**54.4**	**43.6**	**56.2**	**57.2**	**47.1**	**42.8**	29.7	27.0	N/A
KC58	Roadside	100.00	100.00	**58.9**	**50.9**	**59.7**	**62.7**	**48.0**	**46.0**	**40.6**	36.9	36.8
KC59	Kerbside	100.00	100.00	**74.9**	**70.3**	**79.0**	**74.9**	**66.5**	**59.2**	**57.4**	**52.2**	**48.7**
KC60	Kerbside	100.00	100.00	**69.9**	**61.2**	**73.1**	**71.3**	**51.8**	**50.9**	37.5	34.1	N/A
KC61	Roadside	100.00	100.00	**54.6**	**51.5**	**61.0**	**52.3**	**45.2**	**43.6**	36.7	33.4	N/A
KC64	Roadside	100.00	100.00	**54.8**	**50.6**	**58.3**	**46.5**	**42.5**	**41.6**	36.3	33.0	N/A
KC65	Roadside	100.00	100.00	**40.5**	33.1	**41.3**	**40.9**	34.5	33.2	27.1	24.6	N/A
KC66	Railway	100.00	100.00	**44.2**	34.4	**55.8**	**46.2**	38.5	33.6	30.0	27.3	N/A
KC67	Railway	91.67	91.67	**44.2**	36.2	**45.1**	**46.0**	36.8	35.3	28.2	25.6	N/A
KC68	Kerbside	75.00	75.00	**52.9**	**44.6**	**51.0**	**51.9**	**42.1**	39.1	37.0	30.7	N/A
KC69	Urban Background	91.67	91.67	**48.7**	39.3	**46.1**	**47.1**	35.8	37.0	26.8	24.0	N/A
KC70	Kerbside	100.00	100.00	-	-	-	-	**55.5**	**50.1**	**40.1**	36.8	34.9
KC71	Kerbside	100.00	100.00	-	-	-	-	**44.0**	**41.6**	33.6	30.8	N/A
KC72	Kerbside	100.00	100.00	-	-	-	-	**59.6**	**51.5**	39.4	35.7	N/A
KC73	Kerbside	100.00	100.00	-	-	-	-	**44.0**	**41.2**	33.5	30.2	N/A
KC74	Kerbside	83.33	83.33	-	-	-	-	-	38.8	30.6	27.8	N/A
KC75	Kerbside	100.00	100.00	-	-	-	-	-	**48.9**	33.5	30.9	N/A
KC76	Kerbside	91.67	91.67	-	-	-	-	-	**46.2**	33.8	30.4	N/A
KC77	Kerbside	91.67	91.67	-	-	-	-	-	30.4	26.3	23.3	N/A
KC78	Kerbside	100.00	100.00	-	-	-	-	-	30.4	27.9	25.5	N/A

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020[c] Raw	2020[c] Bias Adjusted & Annualised	2020 (DC)
KC79	Kerbside	100.00	100.00	-	-	-	-	-	34.1	28.3	25.6	N/A
KC80	Kerbside	100.00	100.00	-	-	-	-	-	35.8	24.4	22.0	N/A
KC82	Kerbside	100.00	25.00	-	-	-	-	-	-	**44.6**	38.2	37.4
KC83	Kerbside	33.33	8.33	-	-	-	-	-	-	-	**-**	-
KC84	Kerbside	100.00	25.00	-	-	-	-	-	-	**59.3**	**44.6**	**43.0**
KC85	Roadside	100.00	25.00	-	-	-	-	-	-	**55.6**	**41.8**	39.8
KC86	Roadside	100.00	25.00	-	-	-	-	-	-	**49.0**	36.8	35.7
KC87	Roadside	100.00	25.00	-	-	-	-	-	-	**51.4**	38.6	37.2
KC88	Kerbside	100.00	25.00	-	-	-	-	-	-	**55.8**	**42.0**	**40.7**
KC89	Kerbside	100.00	25.00	-	-	-	-	-	-	**67.0**	**50.4**	**48.1**
KC90	Near Road	33.33	8.33	-	-	-	-	-	-	-	**-**	N/A
KC91	Kerbside	100.00	25.00	-	-	-	-	-	-	**69.7**	**52.4**	**49.8**
KC92	Kerbside	66.67	16.67	-	-	-	-	-	-	-	**-**	N/A
KC93	Kerbside	100.00	25.00	-	-	-	-	-	-	**57.2**	**43.0**	**41.6**
KC94	Roadside	100.00	25.00	-	-	-	-	-	-	**49.7**	37.4	36.9
KC95	Kerbside	100.00	25.00	-	-	-	-	-	-	**59.6**	**44.8**	**42.7**
KC96	Roadside	66.67	16.67	-	-	-	-	-	-	-	**-**	N/A
KC97	Roadside	100.00	25.00	-	-	-	-	-	-	**60.8**	**45.7**	**44.5**
KC98	Kerbside	100.00	25.00	-	-	-	-	-	-	**61.6**	**46.3**	**44.5**
KC99	Kerbside	100.00	25.00	-	-	-	-	-	-	**61.7**	**46.4**	**44.5**
KC100	Kerbside	100.00	25.00	-	-	-	-	-	-	**66.9**	**50.3**	N/A
KC101	Kerbside	100.00	25.00	-	-	-	-	-	-	**65.3**	**49.1**	N/A
KC102	Roadside	100.00	25.00	-	-	-	-	-	-	**59.5**	**44.7**	N/A
KC103	Near Road	33.33	8.33	-	-	-	-	-	-	-	**-**	N/A
KC104	Kerbside	100.00	25.00	-	-	-	-	-	-	**59.3**	**44.6**	N/A
KC105	Kerbside	100.00	25.00	-	-	-	-	-	-	**53.7**	**40.4**	N/A
KC106	Kerbside	100.00	25.00	-	-	-	-	-	-	**56.3**	**42.3**	N/A

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020[c] Raw	2020[c] Bias Adjusted & Annualised	2020 (DC)
KC107	Roadside	100.00	25.00	-	-	-	-	-	-	**46.5**	35.0	N/A
KC108	Kerbside	100.00	25.00	-	-	-	-	-	-	**42.2**	31.7	N/A
KC109	Kerbside	100.00	25.00	-	-	-	-	-	-	**49.1**	36.9	N/A
KC110	Roadside	100.00	25.00	-	-	-	-	-	-	**45.7**	34.4	N/A
KC111	Kerbside	100.00	25.00	-	-	-	-	-	-	**46.1**	34.6	N/A

Notes:

The annual mean concentrations are presented as µg m^{-3}.
Exceedances 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**.
Means for diffusion tubes have been corrected for bias.
All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 33%.
Results have been distance corrected where applicable.
Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
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%).

2.5 Interpretation of annual mean NO_2 results

There has been a reduction in annual mean NO_2 concentrations at all monitoring sites across the Borough. Only five long term monitoring sites (for those with sufficient data capture) exceeded the annual mean objective. The most notable reduction in concentrations were identified mostly at roadside locations with reductions of between 5.85 µg/m^{-3} and 22.25 µg/m^{-3}. The greatest occurred at KC33 at the A4 Junction and KC38 at Earl's Court Station. KC49 Hans Road, an Urban Centre site, also saw a large reduction of 20.13 µg/m^{-3}.

When compared to the Air Quality Objectives (AQO) and WHO Guideline Values, no new long-term monitoring locations breached the annual mean objective of 40 µg/m^{-3}. Sixteen further locations (KC2, KC3, KC5, KC31, KC45, KC50, KC54, KC57, KC60, KC61, KC64, KC71, KC72, KC73, KC75 and KC67) met the AQO and WHO Guideline Value of 40 µg/m^{-3} this year, for the first time.

Figure 5. Annual Mean NO_2 Concentrations (2014-2020): Automatic Monitoring Stations

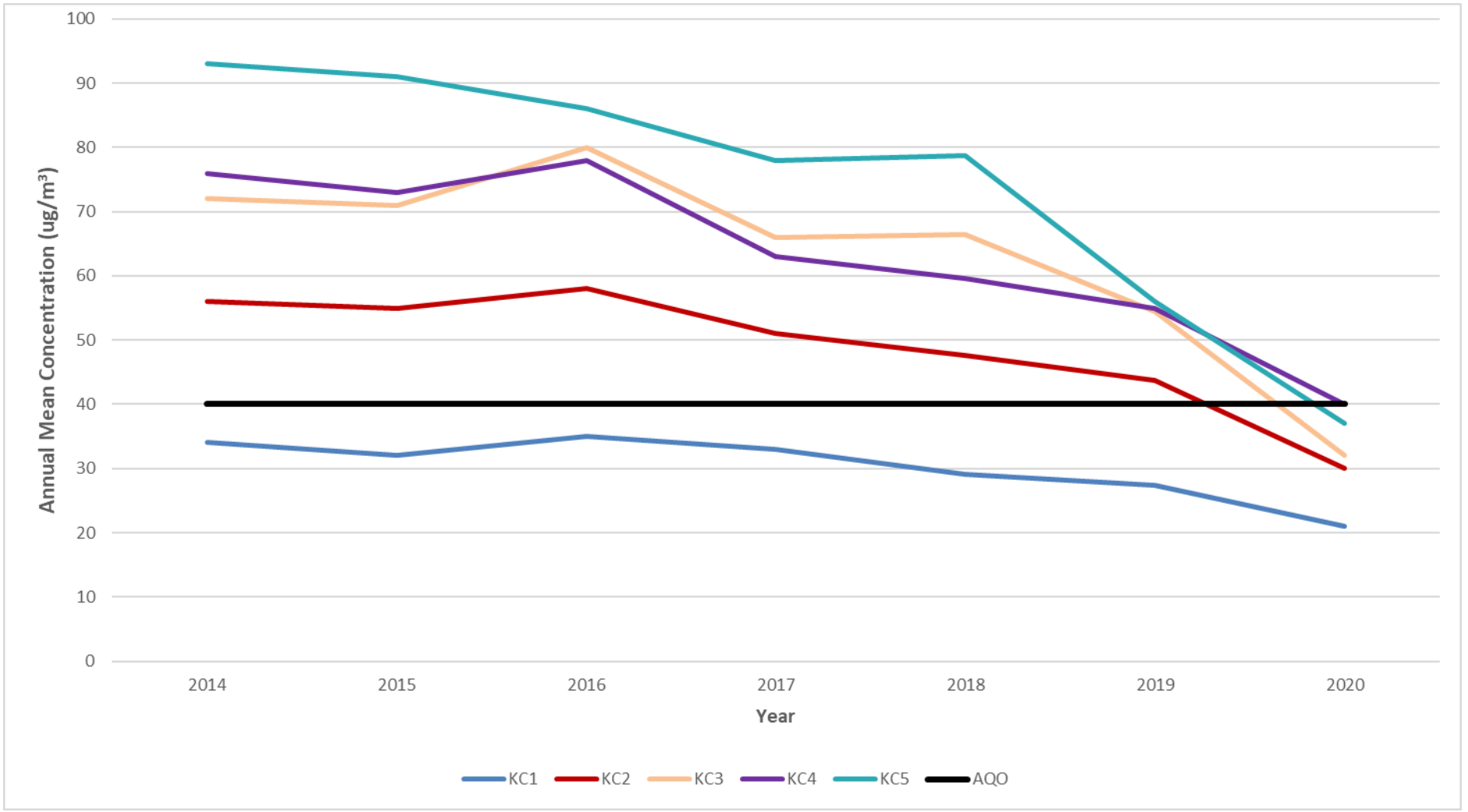


Figure 6. Annual Mean NO_2 Concentrations: Roadside Monitoring Locations

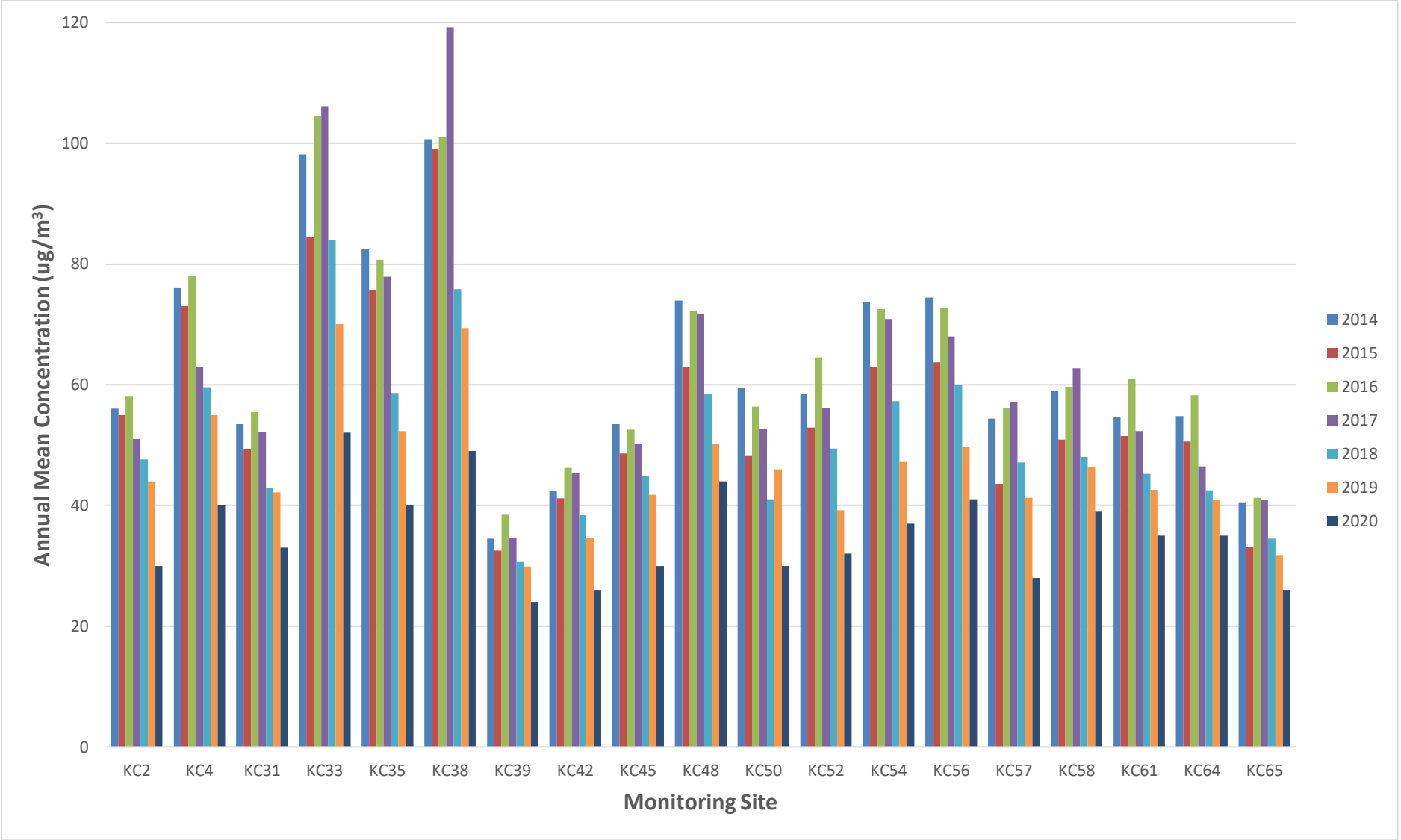


Figure 7. Annual Mean NO_2 Concentrations: Kerbside Monitoring Locations

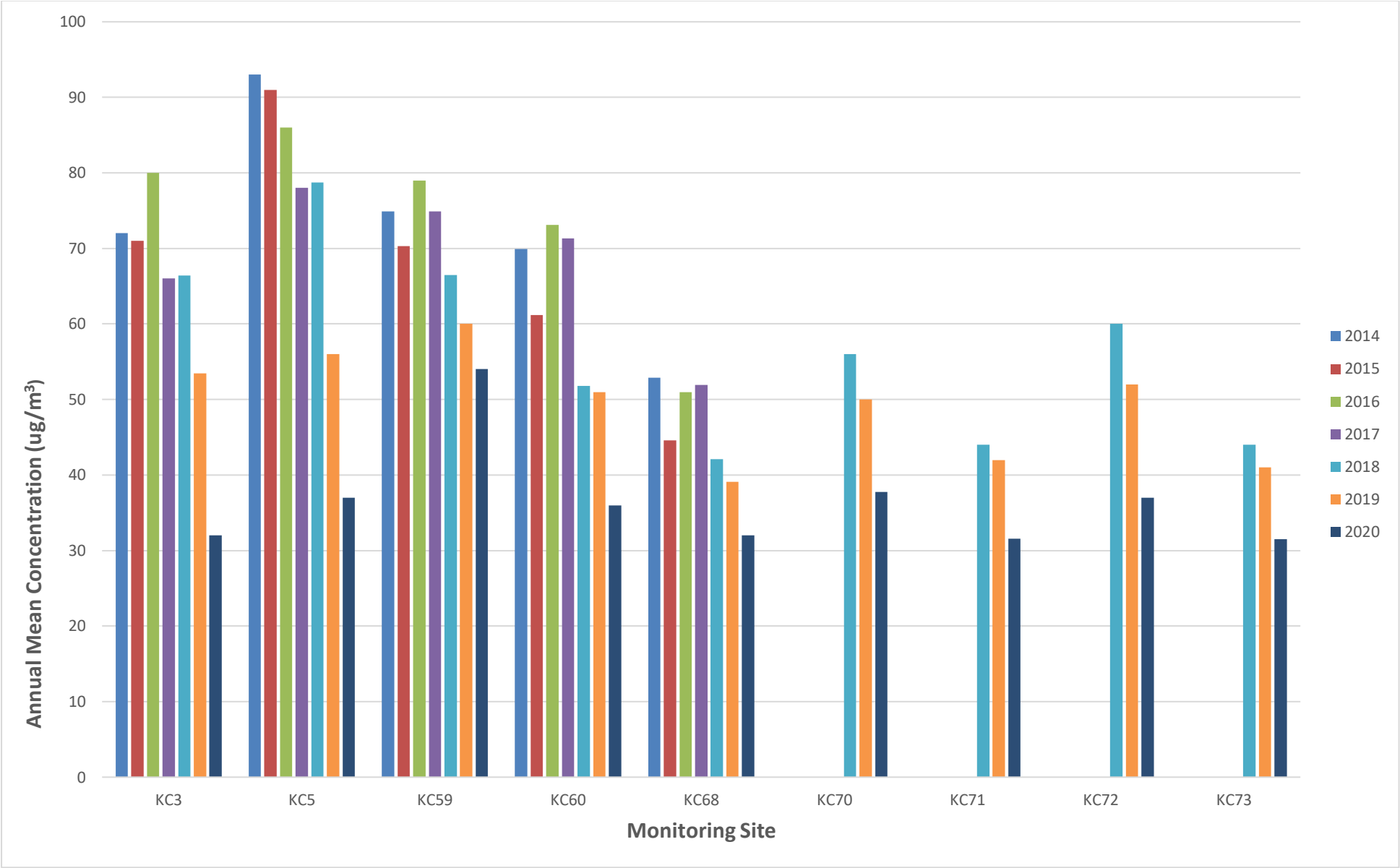


Figure 8. Annual Mean NO_2 Concentrations: Urban Background & Urban Centre Locations

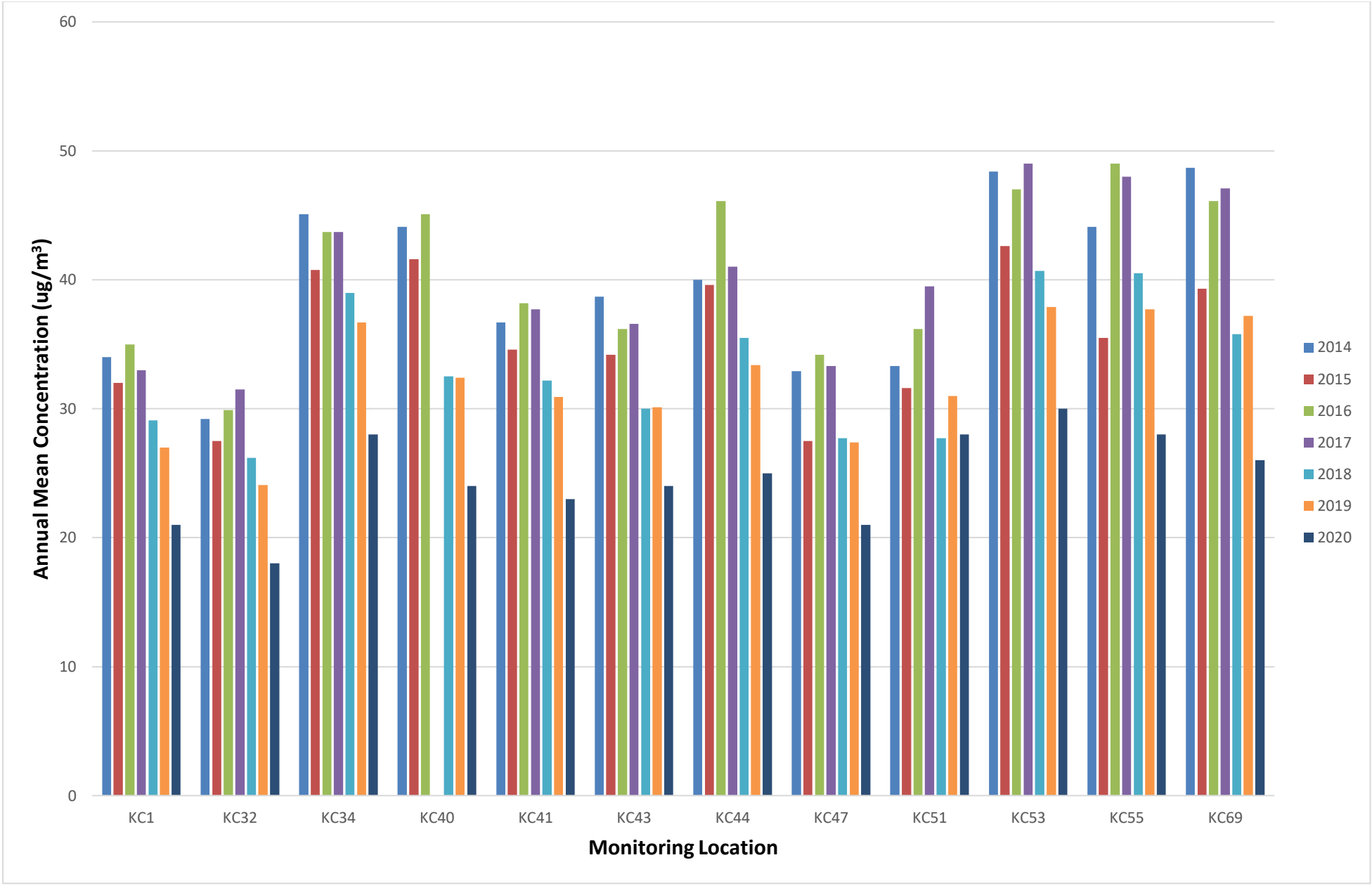


Figure 9. Annual Mean NO_2 Concentrations: Railway Monitoring Locations

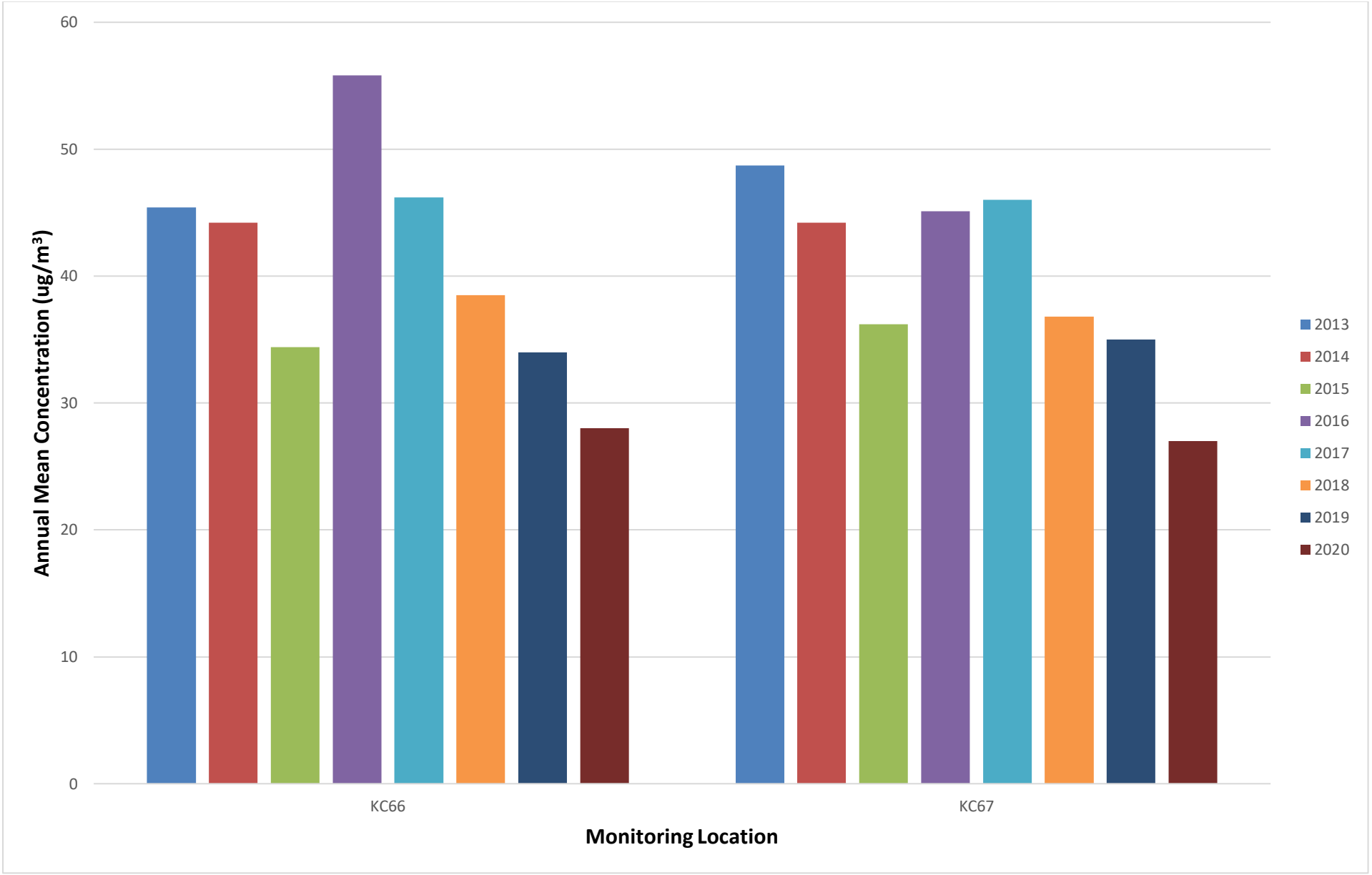


Table G. NO_2 Automatic Monitoring Results: Comparison with 1-hour Mean Objective, number of 1-Hour Means > 200 µg/ m^{-3}

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2020 %([b])	2014	2015	2016	2017	2018	2019	2020
KC1	99.44	99.44	0	0	0	1	0	0	0
KC2	99.53	99.53	0	0 (1197)	1	0	0	0	0
KC3	99.16	99.16	**109**	**97**	**262**	**92**	**43**	15	3
KC4	97.96	97.96	5	9	**54**	4	0	0	0
KC5	96.71	96.71	**212**	**135**	**120**	**24**	**29**	2	0

Notes

Results are presented as the number of 1-hour periods where concentrations greater than 200 µg m^{-3} have been recorded.
Exceedance of the NO_2 short term AQO of 200 µg m^{-3} over the permitted 18 hours per year are shown in **bold**.
If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.
Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
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%).

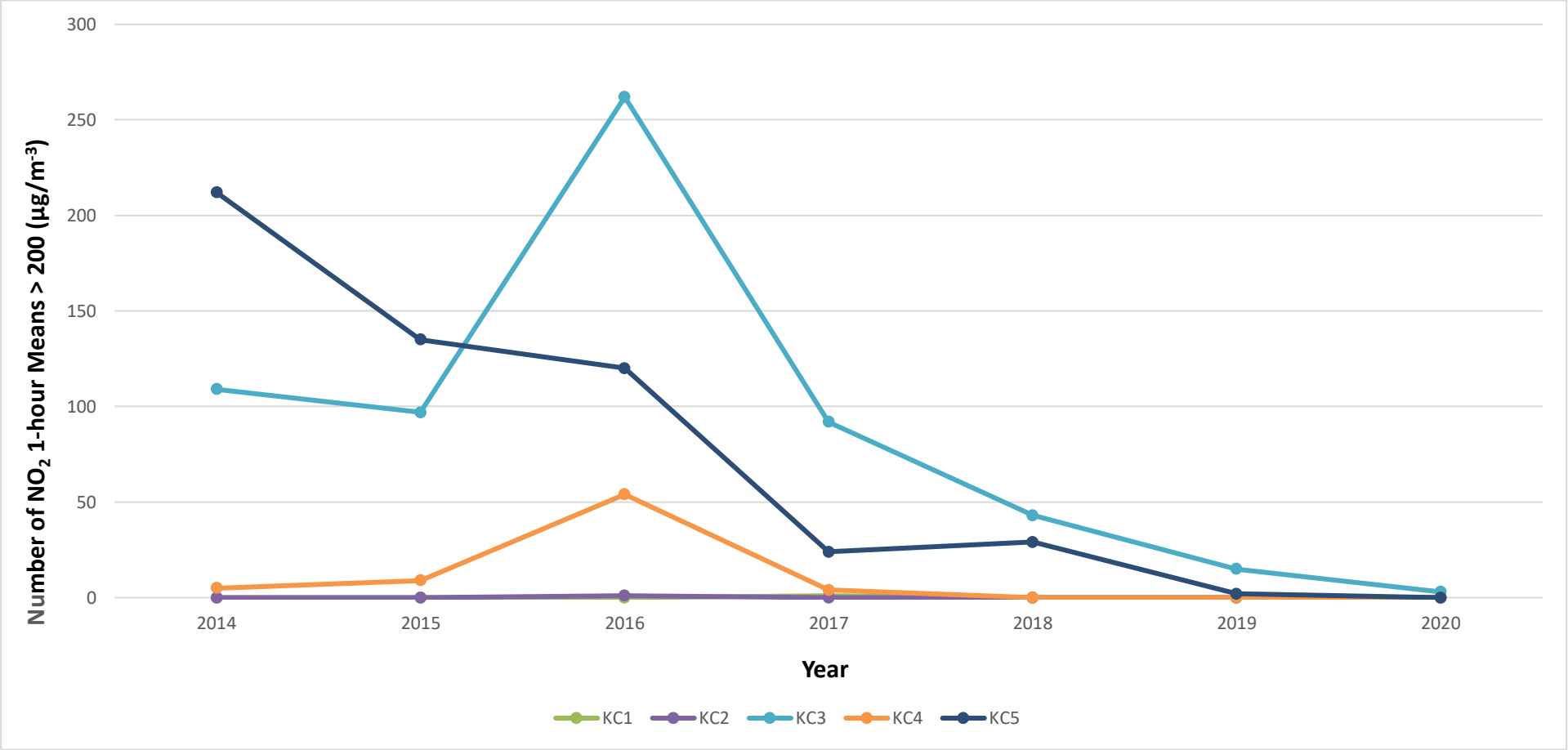
2.6 Interpretation of NO_2 Automatic 1-Hour mean objective results

Compliance with the AQO NO_2 1-hour mean objective of 200 µg/m^{-3} (not to be exceeded more than 18 times in a year) was achieved at all five automatic monitoring locations during 2020, with only 3 exceedences in total at KC3. This is the second year within the seven years of data presented that all locations have achieved compliance with this AQO and the lowest number of exceedences overall. KC3 and KC5 had previously exceeded the AQO every year for the period 2014-2018.

The WHO Guidelines also suggest a 1-Hour Objective of 200 µg/m^{-3}; however, this is not allowed to be exceeded more than once. In this case KC1, KC2, KC4 and KC5 have met the objective, whilst KC3 has not. KC1 and KC2 have remained at a consistent number throughout the seven-year period with fewer than five 1-hour NO2 mean Concentrations in excess of 200 µg/m^{-3} for each year.

Figure 10 overleaf presents the number of 1-hour means in excess of the AQO for the period of 2014-2020. For KC2 in 2015, the actual number of 1-hour means in excess of the AQO have been plotted rather than the 99.8th percentile value, due to the data capture being low (51.2%). As a result of this, at KC2 in 2015, there may have been further exceedances experienced which were not recorded. At KC3, KC4 and KC5, there has been an overall downward trend in concentrations between 2014 to 2020. KC1 and KC2 have remained at a consistent number throughout the seven-year period with fewer than five 1-hour NO_2 mean Concentrations in excess of 200 µg/m^{-3} for each year.

Figure 10. Number of NO_2 1-Hour Means > 200 µg/m^{-3}



Notes

Data capture was less than 85% in for KC2 during 2015 (51%). The monitored number of 1-hour means in excess of 200 µg/m^{-3} have been plotted rather than the 99.8th percentile value of 1-hour means.

Table H. Annual Mean PM_{10} Automatic Monitoring Results ($\mu g/m^{-3}$)

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2020 %([b])	2014	2015	2016	2017	2018	2019	2020
KC1	99.64	99.64	23	20	20	17	14	15	13
KC2	00.00	0.00	25	23	22	20	18	-	-
KC5	98.93	98.93	31	27	28	27	25	24	24

Notes

The annual mean concentrations are presented as µg m^{-3}.
Exceedances of the PM_{10} annual mean AQO of 40 µg m^{-3} are shown in **bold**.
All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture is less than 75% and more than 33%.
(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%).
The Gravimetric Partisol previously located at KC5 was removed during October 2017 and replaced by a heated 1020 BAM in May 2018. Data capture at KC5 was below 75% during 2018 and the monitoring data was annualised to obtain a representative annual mean concentration. In early 2019 the TEOM FDMS located at KC2 failed, beyond viable repair, having reached its end of life usability and the cabin that the monitoring equipment is housed in has become vulnerable to water ingress. A new PM_{10} analyser has been purchased and will be installed upon erection of the new cabin. Due to the COVID-19 pandemic and subsequent lockdown measures the new cabin and equipment (including a $PM_{2.5}$ monitor) installation had to be postponed. With the lifting of restrictions, the new cabin and monitors should be installed by Summer 2021.

2.7 Interpretation of annual mean PM_{10} results

Figure 11 presents the annual mean PM_{10} concentrations for the period of 2014-2020 for KC1, KC2 (in part) and KC5. It can be seen that there has been a small gradual decline in concentrations at KC5 between 2014 and 2019 but the was no further reduction between 2019 and 2020. The concentrations at KC1 have remained more stable across the period. This is in contrast to the reductions that occurred with concentrations of NO_2 in 2020.

Overall, compliance with the PM_{10} annual mean AQO (40 $\mu g/m^{-3}$) continued to be achieved at all monitoring sites (as it did 2014-2019). In addition to this, the lowest annual mean concentration in recent monitoring history (2014-2020) was reported at KC1 (shown by the green line below in Figure 11). It should be noted that there was no data capture at KC2 in 2020 and less than 5% in 2019 due to the instrument malfunction, so beyond 2018 it is not possible to comment on trends. The WHO Guidelines suggest a max

value of 20 µg/m^{-3} for the PM_{10} annual mean, with this in mind KC1 would have met the objective for a fourth year in a row while KC5 is still to reach this level.

Figure 11. Annual Mean PM_{10} Automatic Monitoring Results

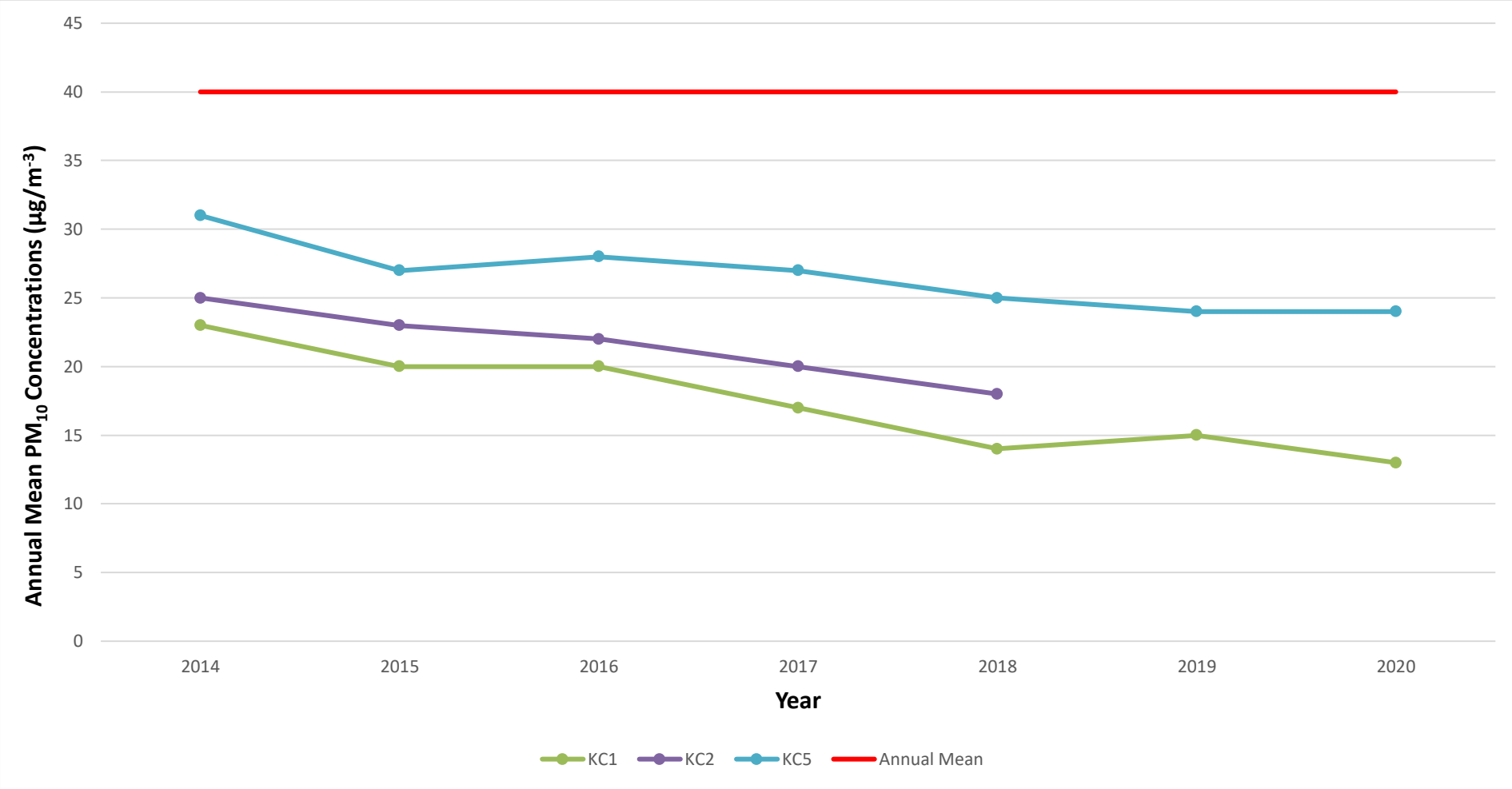


Table I. PM_{10} Automatic Monitoring Results: Comparison with 24-Hour mean objective, number of PM_{10} 24-Hour means > 50 µg/m^{-3}

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	2014	2015	2016	2017	2018	2019	2020
KC1	99.64	99.64	10 (36.7)	7	10	16	1	5	0
KC2	00.00	00.00	11	4	8	6	0	-	-
KC5	98.93	98.93	25	15	19	18	4 (33.2)	13	10

Notes

Exceedances of the PM_{10} 24-hour mean objective (50 µg m^{-3} over the permitted 35 days per year) are shown in **bold.**
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is provided in brackets.
(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%).

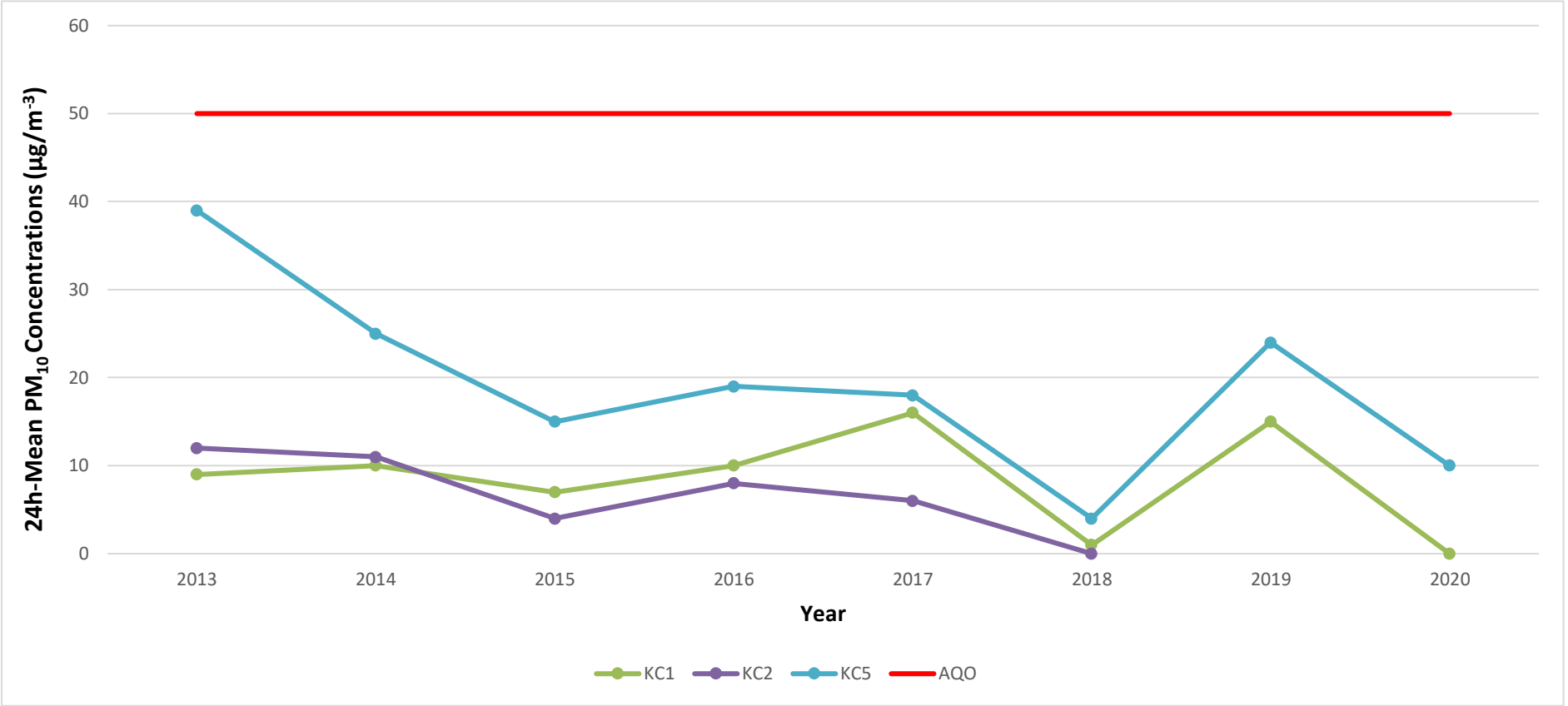
2.8 Interpretation of PM_{10} 24-Hour mean objective results

Compliance of the PM_{10} short term AQO was achieved at all monitoring locations, as it was for 2014-2019. There were no exceedences of the 24 hour mean at KC1 in 2020 and while there were 10 at KC5, this is lower than the permitted 35 and the lowest number ever recorded at this site.

The WHO Guidelines suggest a value of 50 µg/m^{-3} for the PM_{10} 24-Hour Mean, however this is not allowed to be exceeded more than once. With regards to the WHO Guideline value KC5 would not have met this objective.

Figure 12 displays the number of daily means in excess of the short term PM_{10} AQO across the monitoring sites for the period of 2014-2020. It can be seen that there has been a decline experienced at all sites compared between 2012 and 2018, with 2018 resulting in the lowest numbers but 2019 seeing a slight rise in exceedences at KC1 and KC5, with a further fall in 2020.

Figure 12. Number of PM_{10} Daily Means > 50 µg/m^{-3}



Notes

Data capture for was less than 85% for KC1 (74.1%) and KC2 (63.5%) in 2014, and for KC5 (58.6%) in 2018. The monitored number of daily means in excess of 50 µg/m^{-3} have been plotted rather than the 90.4th percentile value of daily means.

Table J. Annual Mean $PM_{2.5}$ Automatic Monitoring Results ($\mu g/m^{-3}$)

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	2014	2015	2016	2017	2018	2019	2020
KC1	99.64	99.64	15.9	10.9	12.1	12.0	9.2	10	8

Notes

The annual mean concentrations are presented as $\mu g\ m^{-3}$.
Exceedances of the $PM_{2.5}$ annual mean AQO of 25 $\mu g\ m^{-3}$ are shown in **bold**.
All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture is less than 75% and more than 33%.
(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%).

2.9 Interpretation of annual mean $PM_{2.5}$ results

Compliance with the $PM_{2.5}$ annual mean AQO of 25 $\mu g/m^{-3}$ was achieved at KC1 during 2020, as it was for the previous seven years. 2018 saw the lowest annual mean concentrations recorded across the period 2013-2018, however this was not continued as 2019 saw a marginal rise in concentrations. The WHO Guidelines suggest a value of 10 $\mu g/m^{-3}$ for the $PM_{2.5}$ annual mean, in this instance the value has been met between 2018-2020. There has been a gradual decline in concentrations experienced between 2014 and 2018 (after a period of increase between 2012 and 2013). There was a slight increase in 2019 but in 2020, this fell to the lowest annual mean concentration ever recorded at 8 $\mu g/m^{-3}$. Annual mean concentrations at KC1 have almost halved since 2014.

Previously $PM_{2.5}$ monitoring was undertaken at KC2, however due to an instrument fault, the FDMS that was removed from site in October 2017. Following the removal of equipment, the Council agreed upon a temporary hire agreement to ensure the continuation of $PM_{2.5}$ monitoring; however, this data has not yet been made available. A permanent replacement instrument has now been purchased. The present cabin is no longer waterproof and is in need of replacement. At the time of drafting this report, installation was scheduled to be completed by the end of May 2021, when it will then be possible to install the new monitors.

Figure 13. Annual Mean $PM_{2.5}$ Automatic Monitoring Results

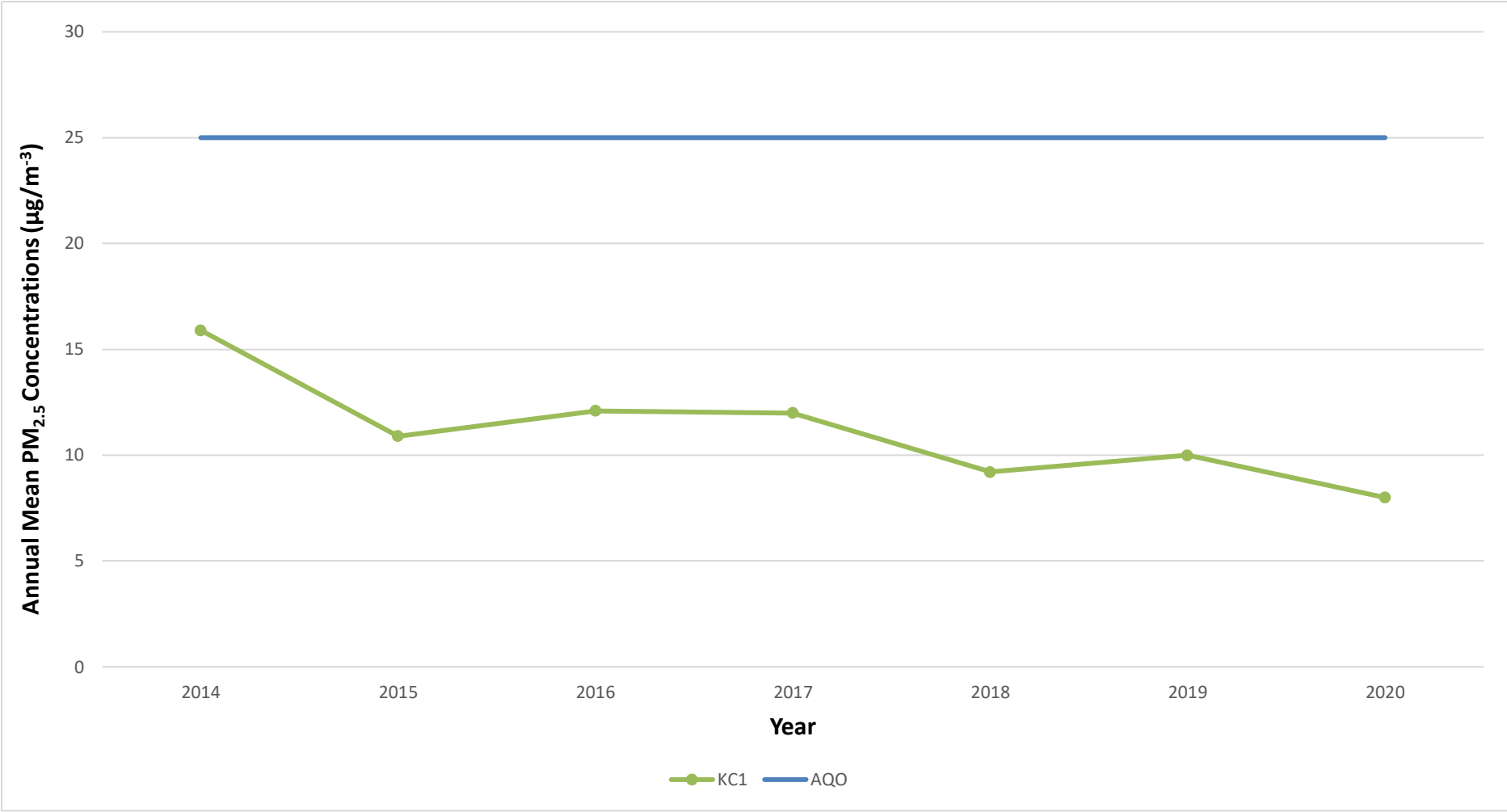


Table K. 2020 SO_2 Automatic Monitoring Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	Number of 15-minute means > 266 µg m^{-3}	Number of 1-hour mean > 350 µg m^{-3}	Number 24-hour mean > 125 µg m^{-3}
KC1	91.03	91.03	0	0	0

Notes

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.
Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).
If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.
(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%).

2.10 Interpretation of SO_2 Objectives Results

During 2020, as it was also during 2018 and 2019, there were no mean values at KC1 monitoring site that exceeded either the 15-minute, 1-hour, or 24-hour SO_2 AQO concentration limits.

Table L. O_3 Automatic Monitoring Results: Comparison with 8-Hour Mean objective, number of O_3 24-Hour Means > 100 µg/m^{-3}

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	2014	2015	2016	2017	2018	2019	2020
KC1	85.89	85.89	**39**	**29**	**35**	**48**	**176**	**136**	**308**

Notes

Exceedances of the O_3 8-hour mean objective (100 µg/m^{-3} over the permitted 10 days per year) are shown in **bold.**
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is provided in brackets.
(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%).

2.11 Interpretation of O_3 Objectives Results

The 8-Hour Mean Objective has not been met. In 2020 there was a significant increase in the number of exceedences, which is likely to be due to the reduction of fresh NO_x.

Figure 14. Number of O_3 8-Hour Mean Objectives > 100 µg/m^{-3}

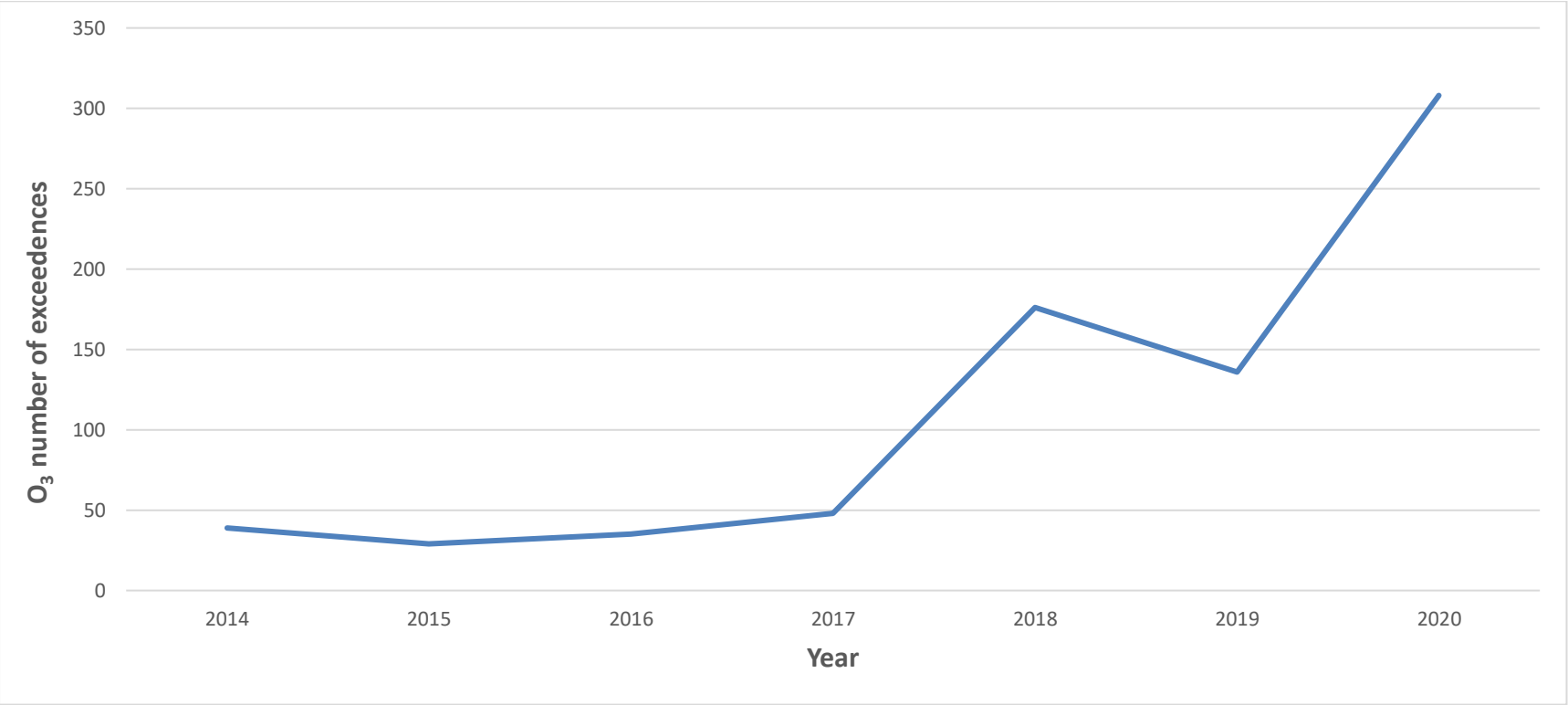


Table M. Annual Mean Benzene Monitoring Results (µg/m$^{-3)}$

Year	KC01	KC02	KC03 (Site discontinued 2007)	KC04	KC05	KC06
2000	5.1	3.1	11.4	2.6	4.2	-
2001	4.3	2.0	11.0	3.7	2.9	-
2002	4.9	1.8	12.5	2.1	2.6	-
2003	3.9	2.4	9.6	2.5	2.9	-
2004	2.1	1.2	9.5	1.4	1.6	-
2005	2.0	1.3	9.2	1.4	1.8	-
2006	2.3	1.9	9.2	1.7	2.0	5.7
2007	2.2	1.6	Site Discontinued	1.5	1.7	3.2
2008	2.3	1.6	-	1.6	2.0	2.8
2009	2.1	1.6	-	1.7	1.8	2.6
2010	1.6	1.0	-	1.2	1.6	1.7
2011	1.4	1.3	-	1.4	1.9	2.8
2012	1.2	1.1	-	1.0	1.1	1.6
2013	1.0	0.7	-	0.7	0.9	1.2
2014	0.9	0.7	-	0.7	0.8	1.3
2015	1.25	0.78	-	1.0	0.94	1.8
2016	1.18	0.87	-	0.89	0.92	*6.75*
2017	0.57	0.56	-	0.55	0.61	0.73
2018	0.57	0.47	-	0.78	0.53	0.85
2019	0.49	0.38	-	0.42	0.44	0.69
2020	0.53	0.40	-	0.45	0.42	0.71

2.12 Interpretation of Benzene Monitoring

Benzene (C_6H_6) monitoring is currently undertaken at five locations across the Borough using BTEX diffusion tubes, these include two roadside, two background, and one site in close proximity to a petrol station forecourt. The petrol station has operated Stage Two (in addition to stage one) Vapour Recovery since 2007.

Two AQOs have been set for the assessment of benzene, a running annual mean of 16.25 µg/m^{-3} (any exceedances within Table M shown in bold) to be met by 31.12.2003, and a more stringent Annual Mean of 5 µg/m^{-3} (any exceedances within Table M shown in italics) to be achieved by 31.12.2010.

Table M shows that the 2003 AQO has been met since 2000 (the measured annual mean is assumed to be the equivalent of the running annual mean), and since the introduction of the 2010 AQO only one annual mean concentration has been recorded in excess of 5 µg/m^{-3}; at site KC06, located at a petrol station, which recorded an annual mean of 6.75 µg/m^{-3} in 2016.

The highest annual mean concentration of benzene recorded since 2000 has been at sites close to a petrol station - KC03 (before the petrol station on Warwick Road closed in 2007 and the monitoring site was discontinued) and KC06 which is located close to the petrol station on Old Brompton Road / Clareville Grove.

Aside from the high concentrations monitored at the now discontinued KC03 site, monitored concentrations have been low at all sites. The only exceedance of the 2010 AQO was in 2016 at KC06 and following this high monitored value, the concentration at the location reduced in both 2017 and 2018. Within 2020, as in 2019, there were no exceedances of the 2010 AQO at any monitoring location.

3. Impact of COVID-19 upon LAQM

3.1 Summary

In the last five years, London has experienced a general downwards trend in pollution due in part to the introduction of large-scale air quality measures including the Congestion Charge Scheme, the Ultra-Low Emission Zone, and the upgrade of TfL's bus fleet. However, the year 2020 was like no other and gave an opportunity to review the impact of significant inactivity in certain areas.

On Friday 20th March, the Government announced the closure of pubs and restaurants and asked people to stay at home. Traffic levels fell significantly (see figure 15 below). On Wednesday 13th May, a gradual relaxation of the lockdown measures commenced. On 4th July, restrictions were lifted. By the very end of August, office workers were encouraged to get back on public transport and return to the office, only for this advice to be changed again mid-October with a second lockdown to commence on 5th November, when again, volumes of traffic fell. London then entered Tier 4 on 20th December.

With these changes, overall, concentrations of Nitrogen Dioxide fell significantly in Kensington and Chelsea, most likely as a result of the decrease in traffic. However, this was not the same for all pollutants. There was not a similar corresponding decrease in concentrations of PM_{10} and ozone increased. However, before considering this in more detail, it is important to understand what else is at play and having an impact on concentrations.

The biggest factor is likely to be the weather, which has an impact on air quality on a local level as well as a national scale through the transportation and removal of pollutants. Certain atmospheric conditions can trap pollutants, whilst wind and rain can aid pollution removal mechanisms. It can also influence human behaviour and the contribution our actions have on pollution i.e., through the demand for energy to provide heating and lighting.

As we know, air quality also changes over time with clear seasonal cycles, meaning it is difficult to make direct comparisons between concentrations monitored in a specific month with those in other months (in the same or different calendar year) and this makes any review more complex.

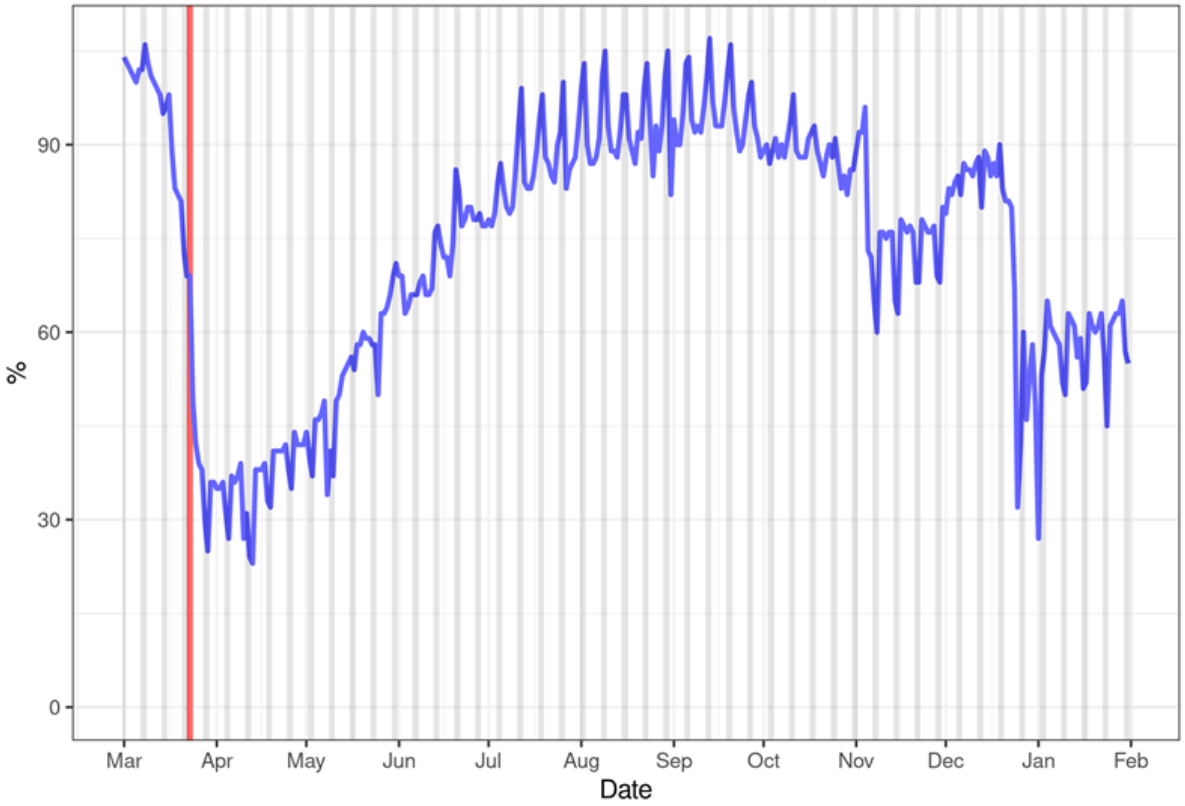
It should also be noted that there were a number of regional O_3 pollution episodes which may have affected any changes observed. High ozone episodes typically occur during the summer season when weather conditions are warm and sunny. And, at the start of the first lockdown, particulate pollution was transported from northern Europe.

3.2 Lockdown effects on NO_2 concentrations

In 2020, concentrations of NO_2 fell, in the main, due to a reduction in traffic, particularly during the first lockdown between the end of March and beginning of July. The Department for Transport published (weekly) statistics on estimated transport use during the COVID-19 pandemic, which was used to predict traffic levels from March 2020 to February 2021. Figure 15 below shows the estimated daily percentage of all

motor vehicles with respect to the equivalent day in the first week of February, across Great Britain, since 1st March 2020. The red line indicates the start of lockdown on the 23 March 2020 and shaded grey areas represent weekends. When a further lockdown was announced at the beginning on November, traffic levels dropped, and then again at the end of December and even further in January 2021.

Figure 15. **Estimated** Percentage of Motor Vehicles compared to 1st Week February 2020



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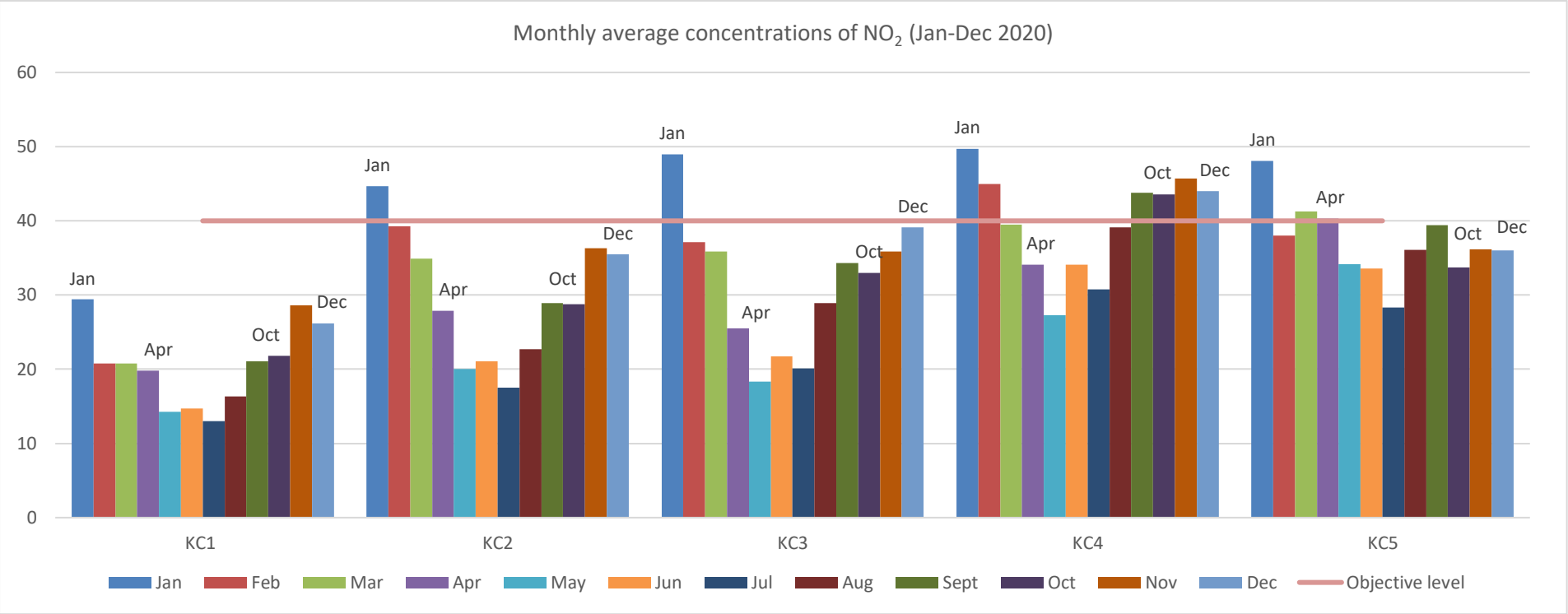
At roadside locations, concentrations of NO_x are closely linked to primary emissions and therefore monitored concentrations should reflect the direct impact of reduced local traffic.

NO_2 is formed from a mixture of primary emissions and secondary chemical reactions, and the reduced concentrations monitored can therefore also be closely linked to a reduction in local traffic. In 2020, there were significant reductions in levels of nitrogen dioxide at all monitoring sites in the Borough (see figure 16 below), particularly during the first lockdown between April until July. Post July, concentrations began to gradually increase, generally peaking in November (as they also did in 2019 – see tables O and P).

However, as a result of the reduction of NO_x concentrations, we have seen an increase in ozone (O_3) concentrations, especially at roadside locations. This is because higher NO_x emissions result in lower concentrations of ozone production and as there was less emitted NO_x, O_3 was more efficiently produced.

Figure 16. NO_2 concentrations at automatic monitoring stations in RBKC in 2020



Due to the influence of weather, it is not necessarily accurate to compare concentrations in 2020 with 2019, but we can confirm that the number of times this annual objective has been exceeded (on a monthly basis) was significantly fewer in 2020 than in 2019 (as shown in Tables N and O below, where concentrations over the annual objective of 40µg/m^{-3} are highlighted in red)

Table N. Monthly average concentrations of nitrogen dioxide in 2020:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
KC1	29.4	20.8	20.8	19.8	14.3	14.7	13	16.3	21.1	21.80	28.60	26.2
KC2	44.7	39.3	34.9	27.9	20	21.1	17.5	22.7	28.8	28.9	36.3	35.5
KC3	49	37.1	35.9	25.5	18.3	21.7	20.1	28.9	34.3	33	35.9	39.1
KC4	49.7	45	39.5	34.1	27.3	34.1	30.8	39.1	43.8	43.6	45.7	44
KC5	48.1	38	41.3	40.3	34.2	33.6	28.3	36.1	39.4	33.7	36.2	36.0

Table O. Monthly average concentrations of nitrogen dioxide in 2019:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
KC1	39.7	41.3	25.1	30.6	20.7	17.2	16.3	19.8	21.7	28.20	36.50	31.50
KC2	51.4	59.1	46.4	50.4	36.9	37.8	33.3	35.5	35.4	41.7	48.4	48.4
KC3	67	65.7	53.5	82.3	54.1	38.8	44.6	44	33.4	51	62.7	55.8
KC4	65.2	64.7	50.6	62.5	51.7	50.5	48.5	53.6	49	56.1	64	53.3
KC5	75.9	75.6	65.4	68	53.5	45.9	45.3	46.4	45.8	46.2	54.7	48.6

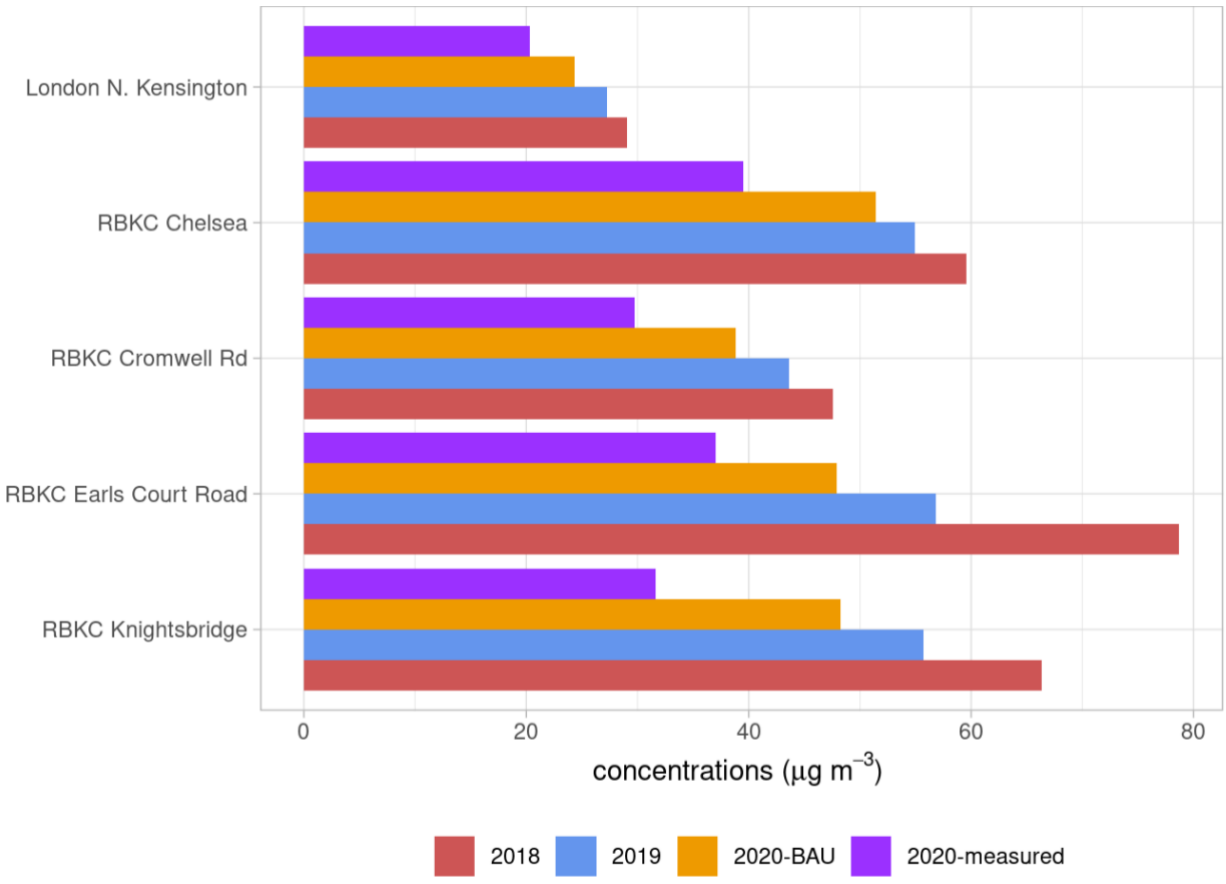
In 2020, without exception, the highest average concentrations of pollution were recorded in January, before lockdown began. But even concentrations in January and February 2020 were lower than in previous years, which suggests that measures such as the ULEZ have also contributed to the improvement overall. As lockdown restrictions lifted in July, traffic increased, as did concentrations of NO_2. With the exception of KC4 (the monitor at Chelsea Old Town Hall) the monthly average concentrations did not exceeded the overall annual objective in 2020. The annual average at KC4 was exactly 40µg/m^{-3}

During 2020, Ricardo produced a monthly report for Kensington and Chelsea that examined the impact of the COVID-19 pandemic and subsequent lockdown measures on air quality. The monthly analysis focused on NO_x, NO_2 and O_3 data (where measured) from January 2020 through to January 2021 and the report used proven modelling techniques to discount the influence of weather on ambient air pollutant concentrations. The model was used to predict pollutant concentrations from March 2020 against those measured by local automatic monitoring stations. Figures C1-C5 in Appendix C present the modelled and measured concentrations of NO_2 at all five of Kensington and Chelsea's automatic monitoring stations.

Prior to 23rd March 2020, before the first lockdown occurred, the measured and modelled concentrations are similar, suggesting that the measured concentrations are comparable to the usual levels of pollution at this time of the year under normal business activities. The modelled (i.e., 'business as usual') NO_2 and NO_x concentrations are predominately higher than the measured concentrations between 23rd March and July 2020, which suggests that reduced emissions from traffic and industry are being reflected within the measurements.

Ricardo then mapped annual average concentrations for 2018 and 2019 against the BAU and measured averages for 2020 for comparison, which is displayed in Figure 17 (produced by Ricardo) below which shows measured concentrations are without exception lower than the business as usual concentrations demonstrating the impact that the lockdown and the accompany measures had.

Figure 17. Annual Average NO_2 Concentrations for 2018, 2019 and 2020



3.3 Kensington and Chelsea Observations on the lockdown effects on PM concentrations

In the first two months of 2020, monthly average concentrations of particulate matter of the PM_{10} fraction were mostly reduced in 2020 compared with data from 2019, however this trend did not continue throughout the year. Table P shows that there were months where concentrations were greater in 2020 than in 2019 – blue coloured font.

Table P. Monthly average concentrations of PM_{10} for 2020:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
KC1	14.4	11.7	14.2	21.3	12.6	11.2	9.1	13.7	13.1	8.9	18	11.1
KC5	25.3	22.5	21.9	31.5	25.3	24.3	20	21.9	24.2	18.6	27	24.2

Table Q. Monthly average concentrations of PM_{10} for 2019:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
KC1	15.5	20.2	14.4	27.9	11.9	11.1	10.9	12.9	10.1	13.1	14.2	12.9
KC5	27.7	33.7	23.9	35.1	21.6	18.3	16.6	15.9	18.1	23.4	23.6	21.9

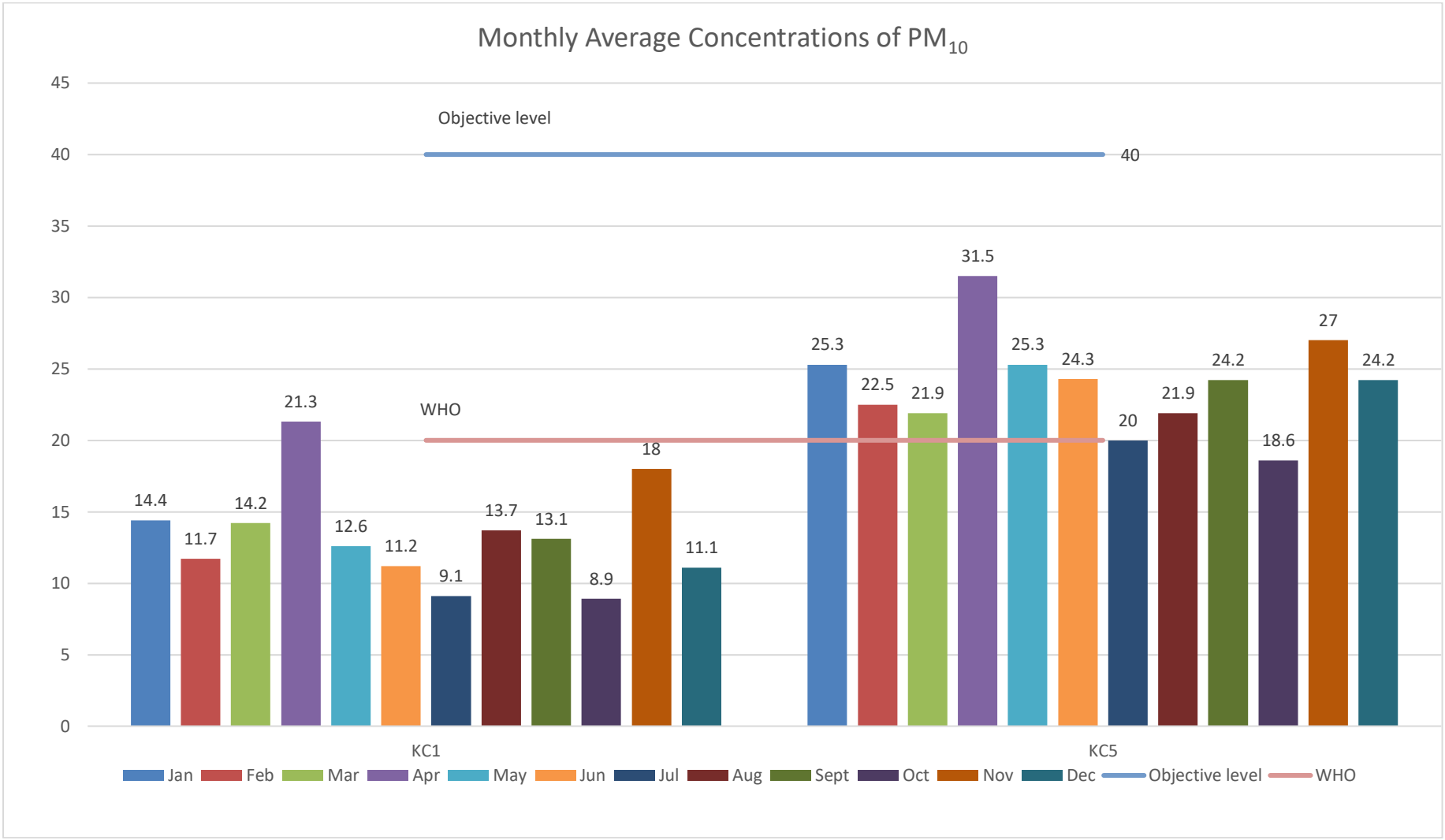
In April 2020, there was a noticeable increase in concentrations (as there also was in 2019) but this fell again in May. The reasons for are likely to be as follows:

- Not all air pollution is caused by cars.
- It is not just about emissions from within the Borough. A large component comes from sources located outside of London and the UK.
- Air quality is heavily dependent on the weather. There were easterly winds carrying particulate matter from Northern Europe.
- There were increased emissions from residents across London burning wood and cooking food.
- Construction and demolition continued.

2020 data is shown in Figure 18 below.

It also demonstrates the challenge we face to meet the World Health Organisation Guideline Values. The fact that PM is carried across continents by wind, shows how much neighbouring nations rely on each other and how important the cumulative effect of our local actions will be.

Figure 18. Monthly average concentrations of PM_{10} for 2020



3.4 Impact of COVID-19 on Local Authority Resources

- Kensington and Chelsea's (RBKC's) Pollution Regulatory Team was able to continue to work throughout the pandemic as the Council adopted a home-working policy which enabled us to submit the 2019 Annual Status Report on time in May 2020;
- RBKC's non-automatic monitoring locations (NO_2 diffusion tubes and BTEX tubes) are changed on a monthly basis by the Council's Pest Control Team who remained operational throughout the pandemic, which subsequently allowed for continued monitoring during this period (although some locations could not be accessed due to site closures);
- Ricardo and ET who provide data management, LSO, and SAM duties at RBKCs Automatic Monitoring Stations continued to provide a service (with reduced operatives) during the pandemic to enable the continued monitoring at these locations;
- Council Enforcement Officers remained authorised and on patrol to ask idling drivers to switch off their engines, however this was not their primary role during the pandemic; and,
- A recruitment freeze during 2020 meant we were unable to appoint to our vacant Air Quality Officer post. This will be advertised in 2021.

3.5 Impact of COVID-19 on Implementing AQ Improvement Measures

- The Council sought to introduce several new School Streets during 2020, however due to the closure of schools, the implementation was postponed. However, in partnership with Sustrans, the Council was able to consult on eight further school streets in 2020 ready for implementation in 2021, which will take the total to 11.
- RBKC is part of the Pan-London Anti Idling Project. This was paused, in part, during the lockdown due to schools closing, travel restrictions and the reduction in motor vehicle use, so we were unable to carry out any anti-idling workshops with schools, businesses or residents;
- RBKC participated in the CAV3 project, which included Cromwell Road as its focus area for a 'Clean Air Village'. The initial project was to engage with the numerous businesses within the area and identify the appetite and feasibility for the introduction of a shared e-cargo bike or electric van for the business to use for deliveries. Due to the pandemic most of the local retailers, shops, facilities, and business had to shut and the project was adapted (see below), and;
- Delivery of many transport related projects were affected by the withdrawal of TfL LIP funding. Projects affected have been referred to in the update of our Air Quality and Climate Change Action Plan in Table R.

3.6 Positive Actions during COVID-19

- RBKC, in partnership with CRP, worked to support local businesses during the pandemic. As part of the Clean Air Village 2 (CAV2) project, the Council helped establish the use of an e-cargo bike in the Ladbroke Grove Village from February to April 2020, which was funded by CRP through the Defra Air Quality Grant. During that trial period, the bike enabled two local pharmacies and the charity 'Bay 20' to deliver pharmaceutical supplies and hot meals to local residents and those who were most vulnerable. In the first 10 weeks of the scheme, over 250 deliveries were made that would have otherwise been undertaken in a van or car. Towards the end of the trial, the pandemic took hold, and the pharmacies relied on the bike to deliver prescriptions to residents who were shielding. More pharmacies expressed an interest in using it for this purpose and the demand for delivery slots exceeded supply. The Council arranged and funded an extension of the scheme for a further 12 weeks (until shielding arrangements came to an end) where over 1,300 zero emission deliveries were made;
- RBKC, through CAV3, was able to continue working with the three museums located along the Cromwell Road – The Natural History Museum, V&A and Science Museum, as they were able to remain operational with skeleton staff whilst closed to the general public. Initially. separate meetings were held with the museums to discuss project ideas and it was identified that deliveries (personal and commercial) could offer a great opportunity for collaborative work as well as improve local air quality and help the museums work towards their sustainability goals. A monitoring period was arranged, and data was collected over a period of 2 weeks, before the winter lockdown came into effect. The Delivery Service Plan (DSP) was produced with short and long-term recommendations. The DSP has allowed for different departments within the museums to meet, collaborate and share best practice which previously hadn't been possible. We look forward to continuing this work as part of CAV4 and supporting the museums with implementing the recommendations;
- A brief lift in lockdown restrictions allowed a Pollution Regulatory Officer to survey Kensington High Street in September 2020 for new non-automatic monitoring locations which enabled the installation of 30 new diffusion tubes for commencement of monitoring from October 2020; and
- The Council purchased new monitoring equipment to replace old and failing existing monitors. It purchased and replaced the NOx monitor at KC3 and purchased four new monitors to replace the existing CO, SO_2, O_3 and NO_2 monitor at KC1, along with a replacement NOx monitor for KC5. For KC2, we commissioned a new cabin to replace the one that leaks and ordered a new PM_{10} and $PM_{2.5}$ monitor. These will all be installed in 2021. In addition, we also purchased four Vaisala mobile sensors and in December co-located these at KC1, in preparation for installation in 2021.

4. Action to Improve Air Quality

4.1 Air Quality Action Plan Progress

Table R provides a brief summary of Kensington and Chelsea Council's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2020 are shown at the bottom of the table (where applicable).

Table R. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints <Include emissions data and KPIs where possible. Please include recently completed projects as well as any new projects (which have commenced since you last reviewed your AQAP)>
X0. Maintaining and where possible expanding monitoring networks, and fulfilling other statutory duties	Monitoring and other core statutory duties	Continue to provide air quality pollutant monitoring within the borough and fulfill statutory duties.	**Existing automatic Monitoring Sites** • KC1 All Saints College (AURN Background Site); NO_x, PM_{10}, $PM_{2.5}$, SO_2, CO & O_3. • KC2 Cromwell Road; NO_x • KC3 Knightsbridge; NO_x. • KC4 Chelsea; NO_x. • KC5 Earls Court Road; NO_x & PM_{10}. • Sites maintained and serviced by Ricardo under three year contract to be reviewed in 2021. **Non-Automatic Monitoring Sites** • 56 (no.) Monthly NO_2 Diffusion Tubes (KC31-KC80) – an increase of 30 tubes (KC82-111) along KHS to the network; • 5 (no.) Monthly BTEX Diffusion Tubes.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints <Include emissions data and KPIs where possible. Please include recently completed projects as well as any new projects (which have commenced since you last reviewed your AQAP)>
			Upgrade of Automatic Monitoring Equipment In 2020, the Pollution Regulatory Team purchased new monitoring equipment to replace old and failing existing monitors. It purchased and replaced the NOx monitor at KC3 and purchased four new monitors to replace the existing CO, SO_2, O_3 and NO_2 monitor at KC1, and a new NOx monitor for KC5. For KC2, we have purchased a new cabin to replace the one that leaks and ordered a new PM_{10} and $PM_{2.5}$ monitor. These will all be installed in 2021. In addition, we also purchased four Vaisala mobile sensors which were co-located at KC1 in December and will be re-deployed in 2021. **Annual Reporting & Statutory Duties** The Pollution Regulatory Team continues to produce its Annual Status Report, which it submits on an annual basis to the GLA and DEFRA for approval and comment. The Council's combined Air Quality and Climate Change Action Plan is due to come to an end in 2021. In 2021, a new Air Quality Action Plan will be consulted on and adopted to reflect the Council's commitment to achieve the WHO Guideline values. This action will be carried forward into the Council's new AQAP.
X1. Support vulnerable hospital discharge patients with heart and lung conditions	Public Health and Raising Awareness	Provide air quality advice and home modifications to discharged hospital patients, particularly those most vulnerable (i.e., children/elderly) with heart and lung diseases.	Not yet started. This action will be modified and incorporated into a new Air Quality Action Plan where raising awareness will be a high priority.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints <Include emissions data and KPIs where possible. Please include recently completed projects as well as any new projects (which have commenced since you last reviewed your AQAP)>
1. Support and promote air quality awareness programmes	Public Health and Raising Awareness	Support and promote the schemes Breathe London, AirTEXT and Walkit to include CityAir/LondonAir and 'Breathe Better Together' principles to provide more information to a wider audience of subscribers.	Public Health has continued to fund AIRTEXT. In 2021 we intend to focus on seeking new subscribers and look for opportunities to develop and tailor the service to provide more bespoke messaging. This action will be carried forward into the Council's new AQAP.
2. Support school and community campaigns to reduce smoking at home	Public Health and Raising Awareness	Carry out air quality campaign through the 'Healthy School Partnership' at primary schools and 'Thrive Tribe' in the community to reduce domestic smoking at home.	The Young Person Smoking Cessation service 'Insight' has continued to give advice and information to young people, school and hostel staff as required throughout the pandemic. There has been an increase in activity of young smokers digitally accessing the smoking advice and prevention services. Insight is currently reporting above average targets. It has also continued to engage with young people remotely and on site from a number of schools (while they were open) through digital workshops. In 2021, Smoking Cessation and Drug and Alcohol workshops in schools will resume. This action will be carried forward into the Council's new AQAP.
3. Support initiatives to improve outdoor air quality	Localised solutions	Identify local needs including smoke free areas and air pollution abatement through	Not yet started. This action requires further consideration.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints <Include emissions data and KPIs where possible. Please include recently completed projects as well as any new projects (which have commenced since you last reviewed your AQAP)>
		'Healthy Parks/Playgrounds' initiative.	
X5 Produce policy guidance on the use of e-cigarettes in the workplace	Public Health and Raising Awareness	Develop policy guidance for commercial premises on the use of e-cigarettes in the workplace to improve indoor air quality.	PHE Has recently produced new evidence on E cigarettes which will be shared with 'One You'.
4 Promote initiatives to reduce smoking at home	Public Health and Raising Awareness	Ensure 'Smoke Free Homes' is promoted through the NHS 'Stop Smoking Service'.	One You Kensington and Chelsea has seen an increase in the recording of Smoke Free Home pledges - in 2020, 338 pledges were signed. This increase was partially because all advisors were given NCSCT second-hand smoke refresher training. It is now a mandatory field in their database to record this information which we anticipate will see a further increase in numbers in 2021. Despite having to work online and via telephone, rather than face to face, because of the pandemic, the service is on track to meet its smoking quit targets for 2020. This action will be carried forward into the Council's new AQAP.
5. Support financial saving schemes that aid residents living in fuel poverty	Public Health and Raising Awareness	Support the delivery of the Big Energy Switch 2015, a collective energy switching scheme to help residents negotiate tariffs on gas and electricity and to aid residents living in fuel poverty in line with	Through the Homes4Health fuel poverty scheme managed by the Climate Change Team, the Green Doctors (who are independent energy advisors as part of Groundwork London) have provided fuel poverty, debt and energy advice and energy switching support to RBKC vulnerable residents. In 2021, the Council is publishing a new Green Plan. This has five priority areas (improving Air Quality, tackling Climate Change, increasing biodiversity, reducing waste, and reducing fuel poverty). Each priority area will have its own

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints <Include emissions data and KPIs where possible. Please include recently completed projects as well as any new projects (which have commenced since you last reviewed your AQAP)>
		the 'Healthier Homes' scheme.	bespoke action plan. Fuel poverty will therefore be in a plan of its own which new Air Quality Action Plan will summarise and refer to.
X7 Encourage cycling as a non-polluting mode of transport and to combat obesity	Cleaner Transport	Promote cycling through GPs, 'GP Navigator', 'Health Trainer' and 'Cycle Coordinator' schemes to improve heart/respiratory health, combat obesity and promote non-polluting transport modes.	Sadly, in 2020, the majority of TfL funding for cycle skills training and other cycling promotion was withdrawn in the wake of the COVID19 pandemic. It is hoped that normal funding streams will resume in 2021-22. This action will be carried forward into the Council's new AQAP.
6 Discourage burning of logs and house coal	Emissions from buildings and developments	Launch an initial publicity drive backed up by yearly campaigns in the autumn to highlight pollution caused by burning non-smokeless fuels in household fireplaces backed up with enforcement for persistent offenders.	The entire borough remains a Smoke Control Area. The Pollution Regulatory Team has recently joined the Wood Burning Working Group set up by the GLA to further future action on discouraging the burning of solid fuel. This will include communications to sellers / producers / consumers within the borough of the new Eco-design stoves, ClearSkies project and changes in upcoming legislation surrounding appliances and fuel. This will support improving indoor air quality and reducing levels of ambient $PM_{2.5}$. This action will be carried forward into the Council's new AQAP.
7 Support vulnerable residents to reduce energy consumption and bills	Emissions from buildings and developments	Support residents by providing energy efficiency advice and by installing small and low-cost energy efficiency measures to combat climate change. Reduce	The Council has received funding from the Warm Homes Fund which is provided by the National Grid and administered by Affordable Warmth Solutions (AWS) to deliver a fuel poverty (home energy programme) project called Homes4Health during 2018-2021. Since 2018, more than 400 free telephone consultations and home energy visits have been carried out in RBKC. Between January and March 2020, more than

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		their energy bills and carbon footprint, through the Healthy Homes project and through home energy visits by trained green experts.	40 free home energy visits were delivered to RBKC vulnerable residents, including young families and elderly residents and those with multiple health conditions. In response to the Coronavirus pandemic, the free home energy visits were suspended as a precautionary measure and replaced with a free telephone-based or online consultation. 117 telephone consultation have been delivered since March 2020. As part of the visits and telephone consultations, small energy efficiency measures were either installed or sent via post including draught proofing, energy efficient light bulbs, radiator panels, TV power downs, shower heads and water saving devices, energy monitors and door brushes etc. The Council's Homes4Health programme provides free home energy support and visits to residents in Kensington and Chelsea to help them keep warm, make their home energy efficient, save money on their energy bills and improve their health. A single referral to the scheme will provide access to a range of services. The telephone consultation is carried out by independent trained energy advisors called Green Doctors, who are part of Groundwork's team. The call lasts approx. 45 minutes during which time the Green Doctors will ask residents a series of questions and then provide tailored advice and answer any energy-related questions. Advice covers: • Reading energy bills and signing up for cheaper tariffs and on-the-phone support to change tariff if needed; • Behaviour changes to deal with damp and mould; • Energy-saving behaviour in the home, what residents can do and what will save the most money;

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			• Helping residents deal with energy and water debt and apply for grants; • Helping residents get their meter topped up during the restrictions ; • Signing residents up for the Warm Homes Discount (£140 off their bills) • Signing residents up for the Priority Services Register if they are vulnerable, so they get extra support and help first during a power cut. Green Doctors also offer the following services to residents as part of the visits: - Health and well-being services - London fire brigade for a free fire safety check and smoke alarm - Benefit checks - Handyperson schemes - Befriending programmes The outcome will help residents saving money on their bills and will have a positive impact on mental health issues caused by financial problems. The programme will further help residents maintaining a comfortable home, which improves health conditions exacerbated by cold and damp weather during the winter months. Since January 2020, the Green Doctors attended more than 20 community events in RBKC where they were able to engage with hundreds of people and to get residents referred into the scheme. They also trained more than 40 Council and community frontline staff on the fuel poverty scheme. This action will form part of the Air Quality Action Plan due to it synergies with action required for Climate Change to reduce carbon emissions (and fuel costs).
8 Promote case studies of higher-standard insulation	Emissions from buildings and developments	Promote exemplar case studies about sustainable retrofit and regeneration	Energy retrofitting case studies have been prepared and will be developed as part of the Green Homes Grant Scheme, Solar Together and Ecofurb schemes.

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and heating systems for existing buildings in the borough		schemes within the borough that have improved insulation and heating systems, and which have exceeded the minimum standards set out in Building Regulations.	The Lancaster West Estate (LWE) is located in the heart of Notting Dale. Following the Grenfell Tragedy, a commitment was made by all levels of government to work with LWE residents and transform it into a model 21st century housing estate. In January 2020, this vision was broadened to deliver an estate that is also carbon-neutral by 2030. The Climate Change Team is working closely with Lancaster West Neighbourhood Team to produce exemplar case studies on low energy homes and deep retrofitting which will also improve air quality. A case study will be published in 2021 of a three bedroom house which used the design and delivery of a model 21st century retrofit, which features 150 elements co-designed with RBKC residents. Take a 360-degree tour of Lancaster West Estate's first low-energy home - YouTube This action will form part of the new Air Quality Action Plan due to it synergies and co-benefits with action required for Climate Change as well as improving air quality.
X12 Improve the energy efficiency of the six main Council's buildings	Emissions from buildings and developments	Deliver energy efficiency projects in six of the Council's main facilities (Town Hall, Chelsea Old Town Hall, Pembroke Road, Carlyle building, Violet Melchett and Pembroke Road car park).	Chelsea Old Town Hall project has been completed and the building is now able to accommodate a greater density of staff. Project Works to other properties are in various stages of delivery and the performance outcomes together with the significantly reduced occupancy levels due to Covid-19 cannot yet be demonstrated. This action will form part of the new Air Quality Action Plan due to it synergies and co-benefits with action required for Climate Change as well as improving air quality.

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X13 Improve the use of space in council buildings to increase occupancy and reduce overall energy demand	Emissions from buildings and developments	Improve the use of Council buildings making them more sustainable, flexible and cost- and space-efficient, so that the remaining sites are more energy efficient. This includes the closure of unsuitable and energy inefficient Council sites.	Chelsea Old Town Hall project has been completed and the building is now able to accommodate a greater density of staff. Project Works to other properties are in various stages of delivery and the performance outcomes together with the significantly reduced occupancy levels due to Covid-19 cannot yet be demonstrated. This will feature in the Climate Change Action Plan. The Air Quality Action Plan will signpost to this.
9 Continue to insulate the heating systems in schools	Emissions from buildings and developments	Deliver and support Flange & Valve insulation projects to the remaining 11 schools to reduce carbon emissions and improve energy efficiency	In 2020, it was not possible to deliver any flange and valve insulation projects in schools due to COVID19 restrictions. Out of 31 RBKC schools included in the Council's carbon performance scope, 29 schools have flange and valve insulation projects already installed. These schemes were either carried out through the Council's climate change energy efficiency programme for schools or independently by the schools themselves. The two remaining schools identified as potential sites for delivering future flange and valve projects Golborne's Children's Centre and Latimer Education Centre RBKC. These will be explored as part of the decarbonisation plans currently being developed. This action will feature in the future Climate Change Action Plan. The Air Quality Action Plan will signpost to this.
10 Make sure that boilers in schools are set up and controlled	Emissions from buildings and developments	Deliver heating health check projects to a large number of schools	No heating health checks were carried out in 2020 due to the COVID19 restrictions and schools being closed. Also, following the Council's climate emergency declaration, the schools have been included in the 2030 carbon neutral target. Decarbonisation plans will be developed in 2021 for the schools

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to better adapt heating to each school's needs			and these will address replacing gas boilers with air source heat pumps and low carbon heating systems. In September 2020, the Council commissioned a Carbon Neutral Pathways report which outlines recommendations for schools on how to achieve net zero and reduce emissions at pace. This action will feature in the future Climate Change Action Plan. The Air Quality Action Plan will signpost to this.
11 Continue to install LED energy- efficient lighting in schools	Emissions from buildings and developments	Deliver energy efficiency lighting projects within schools to increase the use of LEDs and reduce CO_2.	Between 2014-2019, the RBKC Climate Change Team installed LED projects in 16 schools across the borough, the majority including community schools owned by the Council. Around 178 tonnes of CO_2 reduction per year (cumulatively) is estimated with £35,802 financial savings for all the schools. In February 2020, four LED lighting projects were delivered at Oxford Gardens Primary School, St Thomas CE Primary School, St Clements and St James Primary School and Servite RC Primary School. Cumulatively, these projects are expected to reduce 48.5 tonnes of CO_2 per year and to save £25,427 per year for all four schools (financial savings). This action will feature in the future Climate Change Action Plan. The Air Quality Action Plan will signpost to this.
X18 Introduce more energy efficient street lighting	Emissions from buildings and developments	Introduce more energy-efficient street lighting	We have completed the conversion of the main road Geo lights from 210w lamps to 133w LED, the focus of the Street Lighting Team has continued to be replacing old and damaged lamp posts across the borough. Covid-19 has continued to be a factor. The EV lamp column charging programme has continued utilising existing streetlights as vehicle charging points. We have converted approximately 32% of our streetlights have been converted to LEDs.

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			In 2020/21 the carbon emissions from street lighting reduced by 2,226 tonnes compared to the baseline year of 2007/08.
12 Embed climate change and sustainability topics in the schools' curriculum	Public Health and Raising Awareness	Organise the Children's Parliament on the Environment, deliver energy champions and climate change workshops/sessions and carbon reduction initiatives in schools	The RBKC schools registered in 2020 were: • St Francis of Assisi Primary School – Air Quality & Climate Change focused project. • Park Walk School – River, flooding, and sustainable sewage systems. • Oratory RC School – Single-use plastics. • St Charles RC Primary – Green Detectives (Green spaces & biodiversity). • St Clements & St James – Upcycling project. All the workshops took place but the main plenary presentations event which was scheduled to take place in March 2020 was cancelled due to coronavirus and the lockdown restrictions. Some schools have produced leaflets and published their materials and/or sent videos. The plenary will be rescheduled for 2021. This action will feature in both the new Air Quality Action Plan and Climate Change Action Plan as the teams work jointly on these aspects to deliver co-ordinated messages.
13 Develop planned programme of communal boiler upgrades and renewals within council housing	Emissions from buildings and developments	Complete the review of communal boilers from council housing and develop a planned programme of replacements and	A feasibility study, funded by the Government's Heat Network Delivery Unit, was completed by Arup looking at the technical options for the development of a new low-carbon heat network on the Lancaster West Estate. This identified a sewer source heat pump as one potential option and sewage monitoring has now started at 2 sites.

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		upgrade works. When possible, install individual controlled heating within flats.	An estate-wide M&E consultant and heat networks consultant have been selected and are undertaking technoeconomic and financial modelling to determine viable options. The strategic case for the heat network has been developed and the team are working towards a Heat Network Investment Project funding application in summer 2021, as well as identifying other funding opportunities. Treadgold House on Lancaster West has received funding through the EU's MustBe0 project, of which a requirement is the removal of gas by the delivery deadline in October 2022. Homes in this block have individual gas boilers which will be replaced by renewable heating systems. The energy-efficient refurbishment of a pilot property has been completed, which included the replacement of a gas boiler with an air source heat pump.
14 Install ultra-low-nitrogen oxide (NOX) boilers in council housing	Emissions from buildings and developments	Install ultra-low pollution boilers in next phase of boiler replacement in social and council housing (Further phase planned for 2019-20).	A hydrogen fuel cell boiler is being trialled in a pilot property on Lancaster West. Planning application conditions are applied where appropriate. This action will feature in the new air quality action plan.
15 Incorporate energy efficiency improvements into the Council's planned social housing renewal programme	Emissions from buildings and developments Emissions from buildings and developments	Incorporate energy efficiency improvements into the planned renewal programme, for example: upgrade windows from single glazed to double glazed and improve the insulation standard for	A feasibility study looking at all homes on the Lancaster West Estate was completed by Retrofit Accelerator Homes. This modelled the current energy performance of the buildings, identified what measures should be put in place to improve this and reduce carbon, and the potential costs and benefits of these improvements. Multidisciplinary design consultants are now on board and have developed feasibility studies looking at potential improvements to all blocks on the estate.

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		TMO properties when renewing roofs.	The design teams are working with residents to develop detailed design for each block. Sustainability and carbon reduction have been at the forefront of all feasibility and design work. Lancaster West Neighbourhood Team has sought additional funding to help raise the ambition of the refurbishment and ensure that it results in high levels of energy efficiency and large reductions in carbon emissions. This includes Green Homes Grant Local Authority Delivery Scheme and MustBe0 funding. Sustainable elements of the Lancaster West refurbishment will include: • Triple glazed windows • Roof, wall, and floor insulation • Mechanical heat recovery and ventilation systems Internal refurbishment works are continuing in void properties across Lancaster West. This includes energy efficiency improvements including: • Installation of Switchee and Nest thermostats • Replacement of lighting with LEDs • Installation of water efficient shower heads and dual flush toilets • Installation of induction hobs • Significant work is also being done to green the supply chain to minimise the environmental impact during delivery of refurbishment works and through day-to-day operations. improve and increase green space on the estate.
16 Explore the opportunity to install renewable energy technologies in the council's social	Emissions from buildings and developments	Through additional or external funding Renewables will be considered and explored but insulation and energy	The Lancaster West Estate feasibility study completed by Retrofit Accelerator Homes looked at an option including the installation of solar panels on all blocks. This option is being explored and funding has been secured to potentially enable the installation of solar panels on a number of blocks, subject to resident engagement and roof surveys.

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housing (e.g., solar panels)		efficiency will be a higher priority. It will be undertaken when it is a practical and affordable solution.	The estate-wide M&E and heat network consultant team is running technoeconomic and financial modelling to identify viable options for a low-carbon heat network for the whole of Lancaster West. The option of using sewer heat is being explored. The team are working towards a funding bid to the Heat Network Investment Project in summer 2021. The refurbishment of a pilot property on the estate has been completed. As well as improvements in energy efficiency, an air source heat pump and solar panels were installed to provide energy to the property. Lessons from this project will be used to guide the wider refurbishment programme.
17 Ensure that major building sites minimise dust and emissions including those from on-site mechanical plant	Emissions from buildings and developments	Apply the new London Plan – The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance and require low-emission NRMM with appropriate Euro standards on major redevelopment sites.	The Council has been part of the Pan London NRMM Project since the projects outset and continues to support its work. Planning Conditions continue to require developers to sign up to the NRMM website to register their development site and proposed NRMM equipment. Cleaner Construction for London undertook 21 site audits in Kensington and Chelsea and found that between January – December 2020, 67% of sites were self-compliant and 33% of sites were compliant. The Councils Construction Management Team continues to proactively monitor much of the construction in the borough, working alongside colleagues in Noise and Nuisance and Streetscene dd. These teams aim to provide a reactive service to handle complaints from residents. The Council continues to require Air Quality (Dust) Management Plans, Air Quality Monitoring and Construction / Demolition Environmental Plans in line with the Mayor's SPG and other Best Practice Guidance are submitted for Major Developments in the borough via the planning regime.

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			The Pollution Regulatory Team has worked alongside Planning to help produce an Air Quality focus section for the Green SPG document which will be published in 2021. To continue in new AQAP.
18 Ensure that the planning system minimises impact of new development during operation	Emissions from buildings and developments	Utilise the planning application process to assess the implementation of energy strategies in major developments and make air quality and climate change recommendations.	The Local Plan was adopted in September 2019. https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/local-plan/local-plan-2019. Policy CE5 relates to air quality and policy CE1 to climate change and achieving zero carbon. The Council is currently consulting on the Draft Greening SPD which aims to reduce the overall impact of development both during construction and operation. It also aims to help addressing climate change impacts. It gives detailed guidance to both developers and residents on the measures they can implement to reduce the building's carbon footprint. This guidance is not only for new development but also for existing development (retrofitting). The adoption of the Greening SPD will take place in the spring 2021. The following chapters refer to addressing the impact of the development during operation. Chapter 3: circular economy Chapter 4: energy hierarchy and whole life-cycle approach Chapter 5: reduce energy demand Chapter 6: heat networks (be clean) Chapter 7: renewable energy (be green) Chapter 8: monitoring (be seen)

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			Chapter 9: retrofitting existing buildings Chapter 10: air quality Chapter 11: urban greening Chapter 12: minimising flood risk Chapter 13: biodiversity
19 Use the planning system to ensure that emissions from energy and heat sources in new developments are minimised	Emissions from buildings and developments	Make informed decisions on planning applications about 'Decentralised Energy' (DE) networks, 'Combined Heating Power (CHP)', biomass and biofuel, by considering the balance between air quality and carbon reduction benefits. Assess and make recommendations.	The Local Plan was adopted in September 2019. https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/local-plan/local-plan-2019. Policies CE1 and CE5 refer to DE, CHP, and biomass. Both policies combined would help make a more balanced decision of the site's suitability for the use of CHP due to air quality impacts and if carbon saving targets can be met using different methods with a lesser impact to local air quality. The Council is currently consulting on the Draft Greening SPD which aims to reduce the overall impact of development both, during construction and operation. It also aims to help addressing climate change impacts. It gives detailed guidance to both developers and residents on the measures they can implement to reduce the building's carbon footprint. This guidance is not only for new development but also for existing development (retrofitting). The adoption of the Greening SPD will take place in the spring 2021. The Council's Draft Greening SPD includes the following chapters which could have a positive impact on energy and emissions Chapter 3: circular economy Chapter 4: energy hierarchy and whole life-cycle approach Chapter 5: reduce energy demand Chapter 6: heat networks (be clean) Chapter 7: renewable energy (be green) Chapter 9: retrofitting existing buildings

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20 Ensure any new homes forming part of major developments to be zero carbon	Emissions from buildings and developments	Apply the London Plan Policy 5.2 and utilise the Local Plan to request residential elements of all major schemes to achieve 100% reduction on site; if not possible, a minimum 35% reduction of regulated carbon emissions on-site and offset all remaining carbon emissions up to 100%.	To accord with the requirements of the London Plan, from the 1 April 2017, the Council fully implemented the zero carbon standard through the creation of a Carbon Offset Fund. This fund will be used for carbon reduction initiatives which will benefit residents and the community. The Local Plan https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/local-plan/local-plan-2019 contains policy CE1 which requires non-residential development of 1,000 square metre or more to meet BREEAM very good with 60 per cent of the unweighted credits available in the energy, water and materials sections and conversions and refurbishments of 1,000sq.m or more non-residential development achieve BREEAM very good rating. For residential development we follow the London Plan policy. The New London Plan will be adopted in March 2021 and includes a new policy, Policy SI 2: Minimising greenhouse gas emissions, which requires major development to be net zero-carbon. The Council is currently consulting on the Draft Greening SPD which aims to reduce the overall impact of development both, during construction and operation. It also aims to help addressing climate change impacts. It gives detailed guidance to both developers and residents on the measures they can implement to reduce the building's carbon footprint. This guidance is not only for new development but also for existing development (retrofitting). The adoption of the Greening SPD will take place in the spring 2021. The Draft Greening SPD provides guidance on achieving zero-carbon in chapters: Chapter 4: energy hierarchy and whole life-cycle approach Chapter 5: reduce energy demand Chapter 6: heat networks (be clean)

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			Chapter 7: renewable energy (be green) Chapter 9: retrofitting existing buildings.
21 Improve walking and cycling access to White City	Cleaner Transport	Provide new direct pedestrian and cycle routes by means of a bridge and a subway between the White City Opportunity Area and Norland and Notting Barns wards.	The bridge project has stalled as the Council is yet to secure the requisite eastern landing site. We expected the eastern landing site to be transferred to the Council under a planning obligation. Unexpectedly the development proposal that we had hoped would yield the landing site has been refused planning permission twice. There is no prospect of progress in the near term. The Underpass project continues to progress. The talks around the Asset Protection Agreement involving Network Rail and LBHF are ongoing. Once these conclude Imperial are in a position to progress at speed. The detailed design is now complete. Planning applications are expected as soon as the asset protection agreement concludes. To continue in new AQAP.
22 Continue to reduce the Council's vehicle emissions	Borough Fleet	Deliver the Council's Green Fleet Strategy and Action Plan and implement the green procurement process to lease ultra-low emission vehicles and introduce a travel hierarchy with active travel at the core of it	25 workplace charging points were Installed in 2020 at four Council locations/offices as part of delivering the Council's Green Fleet Strategy and commitment to green the Council's and contractors' fleet. The locations are: KTH, Pembroke Road, Glasshouse – Holland Park and Ladbroke Grove Tavistock Recycling Depot. Eco driving training has been organised for the Council's and contractors' drivers. As part of delivering the Green Fleet Strategy, the Climate Change Team has been working with colleagues in Procurement to embed the travel hierarchy in the leasing agreements and to ensure that the Council's diesel fleet is being phase out and replaced with electric vehicles. To continue in new AQAP.

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23 Continue to reduce emissions from our contractor's waste collection and street cleaning vehicles	Borough Fleet/Cleaner Transport	Work with our contractor SITA to reduce emissions from its fleet.	The entire waste fleet is now ULEZ compliant. The new waste contract commences on 01 April 2021 and moving forward within the new contract, it is our ambition to replace fleet vehicles with new electric versions, where technology and depot infrastructure allows. By 2030, we would hope to have a large proportion of the fleet running on electricity. To continue in new AQAP.
24 Work with contractors to green their fleet and comply with ULEZ	Borough Fleet/Cleaner Transport	Include requirements for contractors to use low and ultra-low emission vehicles as part of their operations and ensure their fleet is ULEZ compliant.	Action complete - The fleet became ULEZ compliant at the tail end of 2020.
X34 Maintain an up-to-date Council Travel Plan	Cleaner Transport	Undertake staff survey and site audits and revise the travel plan.	No Council Travel Plan staff survey was undertaken in 2020 as the large majority of staff were working from home due to Covid19. Officers did however work with the HR team to permit applications to the Cycle to Work Scheme at any time to support staff wishing to travel by bike with capacity on public transport reduced. Previously the Cycle to Work Scheme could only be applied for in short periods offered twice a year. This action will continue in the new AQAP.
25 Increase public awareness to reduce engine idling	Cleaner Transport/ Public Health and Raising Awareness	Reduce idling of engines by raising awareness of public health and	With most schools and businesses being closed for significant periods of time during 2020 idling has, perhaps understandably, been less of an issue.

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		environmental benefits in addition to using enforcement powers to issue fines to those who persist. Carry out campaigns targeted at the public, fleet managers and council drivers, e.g., including a pamphlet in permit renewal paperwork. Erect temporary signage in target areas.	RBKC has continued to be part of the pan-London behaviour change campaign Idling Action London helping to reduce the amount of localised air pollution in the borough from idling by raising awareness, mainly with schools, businesses and within the Council. In the 12 month period, we have had 71 interactions around idling engines and sign requests and 86 for idling interactions which are a mixture of complaints and officers proactively recording. This is in the context of 13,000 service requests for this period, covering the rest of the work carried out. NSL has given out 977 warning leaflets in the same period. 100% of drivers switched off their engines when asked to do so, therefore no FPNs were issued during this period. This action will be included in the new Air Quality Action Plan.
X38 Review of effectiveness of parking permit fee structure in encouraging the uptake of cleaner vehicles	Cleaner Transport	Review Parking Policy banding to encourage choice of lower-emission vehicles.	The key decision report with the new parking permit pricing structure has been approved and implemented https://www.rbkc.gov.uk/howwegovern/keydecisions/decision.aspx?DecisionID=5520 Changes will be implemented from 1 April 2021.
X39 Increase number of on-street charging points for electric vehicles	Cleaner Transport	Expand the availability of on-street charging points for electric vehicles.	In 2020, we installed and commissioned 112 more lamp column chargers, 40 new Source London charging points and three rapid chargers. A c£50K contribution from S106 air quality funding went towards these. By the end of March practically all residents will be within 200 metres of a charging point.

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			Electric charging will continue as an action in the new AQAP.
X40 Encourage car clubs to go electric	Cleaner Transport	Explore with car club operators the potential for introducing or increasing the number of electric cars or hybrid electric vehicles in their fleets.	Car Club demand has been significantly impacted throughout 2020 as a result of Covid restrictions. We do however continue to work with Car Clubs to encourage an increase in the number of electric vehicles within their fleets. We maintain a 50% discount on permits fees for fully electric floating vehicles. Zipcar Flex currently operate 30% of their fleet as EVs and this continues to translate to an average of 10 EVs within the borough on a daily basis. This number is expected to grow in 2021. Ubeeqo have introduced four EV lamp column charging points for fixed bay vehicles allowing them to provide four plug in hybrid vehicles on a trial basis and the success of these will be monitored. This action will be included in the new Air Quality Action Plan.
X41 Encourage children to walk or cycle to school	Cleaner Transport	Double the number of schools with Silver or Gold accredited School Travel Plans and promote walking and cycling to school as part of a combined effort to tackle childhood obesity. Introduce advice on engine idling in promoting and creating travel plans.	Sadly, in 2020, the majority of TfL funding for school travel plans, cycle skills training and other initiatives was withdrawn in the wake of the COVID19 pandemic. It is hoped that normal funding streams will resume in 2021-22. However, the Council launched trials of eight new School Street closures from September 2020, which aim to promote active and sustainable travel to and from school. Further details can be found at www.rbkc.gov.uk/school-streets This action will be included in the new Air Quality Action Plan.

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X42 Use cycle training to promote more cycling	Cleaner Transport	Encourage greater use of cycling, by increasing the number of free cycle training sessions for residents, visitors, and workers in the borough.	Sadly, with the restrictions relating to social distancing and the majority of TfL funding for cycle skills training withdrawn, very little cycle training took place in 2020. It is hoped that normal funding streams will resume in 2021-22. This action will be included in the new Air Quality Action Plan.
X43 Help the Mayor of London to create cycling grid of specially designed routes	Cleaner Transport	Work with the Mayor of London to improve cycle routes in London by introducing the Cycling Grid	With the exception of a new parallel crossing on Ladbroke Grove, no progress was made in 2020 to planned Cycleways due to withdrawal of TfL funding due to financial pressures relating to Covid19.
26 Open up more one-way streets to cyclists using both directions.	Cleaner Transport	Continue to convert one-way streets to two-way operation for cycling.	No progress due to TfL funding withdrawal. This action will be included in the new Air Quality Action Plan.
27 Create safe areas for cyclists at traffic lights	Cleaner Transport	Consider opportunities for introducing Advanced Stop Lines for cyclists when reviewing traffic signals.	No progress due to TfL funding withdrawal. This action will be included in the new Air Quality Action Plan.
28 Support residents to take action in their local areas and implement community energy projects	Localised solutions	Encourage and empower residents to help tackle climate change and reduce energy consumption in their local areas and homes. Stimulate attitude and behaviour change	NKCE is the first community-owned energy enterprise in Kensington and Chelsea developed by Repowering London with support from the Council's Climate Change Team. 138kWp of solar panels have been installed at Westway Sports Centre in August 2020 (more than 500 solar panels). These will save 28 tonnes of carbon dioxide a year. A £42,000 community fund will be created for local causes over their lifetime and generate a 3% annual return on investment for all investors.

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		through community energy projects and energy workshops/training.	This award winning initiative generates clean local energy, reduces carbon emissions, and helps tackle climate change at the local level whilst empowering the community and putting people at the heart of the energy system. It is 100% funded through community share offers. NKCE pays its investors back with interest and creates a community fund to support local projects. So far, NKCE has installed 224 kW of solar panels on local public buildings including two primary schools, a community centre, and a leisure centre. Together they will save 46 tonnes of carbon emissions every year and over their lifetime generate £75,000 of profits to benefit the local community. Every member has an equal say, no matter how much they invest, and RBKC residents can join for £1. NKCE plans to continue developing future schemes across the borough. NKCE in partnership with Repowering and the RBKC Climate Change Team organised an event- Greener Living Day in February 2020 to show North Kensington's residents practical steps they can take to live a more sustainable life. There were a wide range of activities for kids and adults: planting with gardeners, bike fixing workshop, games and crafts, energy advice, bike smoothie maker, and of course a delicious vegan lunch! We also had facilitated conversations with local changemakers, showing what they are doing to protect the environment. Organisations such as Urbanwise, Trees4Grenfell, Sustrans, Meanwhile Gardens, Pollinator Paths, Long Live the Lunchbox, Plan Zheroes, Community Kitchen Gardeners, XR K&C, Zero Waste Mindset exchanged and discussed with the audience in small groups. The Greener Living Day in numbers: - 7 successful activities - 14 speakers - 100+ attendees, from which approx. 20 children - 30+ conversations on NKCE and mailing list sign-ups

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			- 7 local Councillors This action will continue in the new Climate Change Action Plan.
29 Support and encourage the development of community energy enterprises/co-ops	Localised solutions	Support community groups to come together and generate clean local electricity and put profits back to the community through solar installation and ethical investment	The Climate Change Team is working with Repowering London and NKCE to develop a community owned energy strategy for RBKC with a 1MV targets. We are currently working on developing Phase 3 and will be applying in partnership with Repowering London for the Community Energy Fund for Phase 4. As part of NKCE Phase 2, 138kWp of solar panels have been installed at Westway Sports Centre in August 2020 (more than 500 solar panels). These will save 28 tonnes of carbon dioxide a year. A £42,000 community fund will be created for local causes over their lifetime and generate a 3% annual return on investment for all investors. The share offer opened at the end of October and more than £80,000 have been raised so far from 97 investors. This action will continue in the new Climate Change Action Plan.
30 Encourage and increase the renewable uptake and green energy in the borough	Emissions from buildings and developments	Deliver and facilitate pan-London solar schemes which support residents to install solar panels	For the last three years, the Council has been taking part in the GLA'S Solar Together Phase scheme to support residents to install solar panels and battery storage at highly competitive prices and to reduce energy bills and supply their homes with clean, local energy. It makes a significant impact on reducing carbon. It boosts solar power for UK homes by making it easier for residents to find a trustworthy installer and easier for installers to find willing customers. In Phase 2, 324 RBKC residents showed interest to install solar panels and 19 installations took place by end of March 2019. In 2020, Phase 3, more than 350 showed an interested with 55 registering and 10 installation taking place so far across the borough. As part of Phase 4, registrations open in February 2021.

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			This action will continue in the new Climate Change Action Plan.
31 Identify and train green champions in the community	Public Health and Raising Awareness/Reducing Emissions from Buildings	Identify and sign up green champions/leaders and residents' groups within the borough to initiate and support the delivery of energy reduction and energy generation projects or provide energy advice to their local community.	A paid community champions role has been created to support with delivering the North Kensington Community Energy – this is a job opportunity for a local resident who will start in June 2021. Through the North Kensington Community Energy scheme, Environment Roundtable and Extinction Rebellion Kensington and Chelsea group more than 50 volunteers and members have been identified as green champions. The Climate Change Team has been working closely with key community groups: Dalgarno Community Centre, Al Manaar Mosque, churches, community champions schemes etc to identify active residents in the borough. NKCE volunteer group has around 20 active people who meet regularly every two weeks. Through the Homes4Health fuel poverty scheme, more than 20 events have been attended by the Green Doctors to promote the free home energy service and support for vulnerable residents and to identify champions to refer residents into the schemes. Groundwork London and the Green Doctors provided frontline training on energy switching advice for Council's staff working with vulnerable residents and Grenfell survivors. Paid training for young people has also been carried out by Repowering London as part of the NKCE together with solar panel making workshops.
32 Understand better the sources and quantities of greenhouse gas	Emissions from buildings	Analyse the sources and quantities of greenhouse gas emissions across the borough.	The Council declared a climate emergency in October 2019 and adopted two carbon neutral targets: 2030 Internal target – for the Council to be net zero as an organisation by 2030 (including its operations, buildings, and Council owned housing stock); and Borough-wide target – for the borough to be carbon neutral by 2040.

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emissions across the borough			To inform the development of RBKC's Climate Emergency Action Plan, the Climate Change Team commissioned in September 2020 a consortium of specialist consultants (following a competitive procurement process which attracted 16 high quality proposals) formed of Aether, CAG and SE2 to develop a series of products, including: greenhouse gas (GHG) inventories for the borough and the Council, decarbonisation pathways to reach the targets, economic and social analysis, and means to track progress towards the targets. The main objectives of the Carbon Neutral Pathways study were: • To develop the greenhouse gas (GHG) inventories for the borough and the Council; • To model different decarbonisation pathways; • To recommend low carbon reduction and transformative programmes and actions; and • Carry out an economic and social analysis to outline as much as possible the cost and resources needed to achieve the carbon neutral targets. The Carbon Neutral Pathways Report includes the co-benefits of climate actions, the challenges, implications, gaps in current policies/strategies and action plans. An Internal Scoping Workshop was held in October 2020 with all key cross-department colleagues to discuss the scope of the Council 2030 and borough 2040 targets and inventories. Representatives from all key services areas and our major contactors were invited to attend, with more than 55 participants. These discussions and 121s continued into November and December with Council officers to finalise and agree on the scopes for both targets, data requirements in more detail and to review their existing work programme and actions. Meetings were organised with Planning, Housing and Lancaster West,

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			Waste and Recycling, Corporate Property, Air Quality, Transport and Children Services teams. The Council's greenhouse gas (GHG) emissions for 2018/19 were estimated to be 25.5 ktCO2e, out of which 14.6 ktCO2e came from the Council owned Housing stock (9,345 properties). The most significant emissions sources are electricity and gas consumption in the Council's operational buildings, Council owned housing and community schools. The borough-wide GHG emissions for 2018 were estimated to be 896 ktCO2e. More than 80% of the emissions come from building energy use: the use of natural gas for heating and electricity for heating and lighting homes, businesses, and other buildings such as museums, universities, hospitals, and schools. This will be developed further as part of the new Climate Change Action Plan.
33 Support local businesses and large organisations to reduce emissions from their operations	Emissions from developments and buildings	Offer environmental advice and sources of technical information to local businesses and large organisations on how to improve energy efficiency of their building operations	Following the climate emergency declaration, the Council has carried out an in-depth research by mapping out all the institutions and businesses across the borough that have officially declared climate emergency, set up carbon neutral targets and environmental commitments. The Climate Change Team has developed a guide which includes information about what support there is available for businesses to reduce carbon emissions and their environmental footprint; what funding they can apply for; what actions and initiatives can be delivered. An environmental chart has also been developed. The Climate Change Team has also met with local organisations such as the Royal Court Theatre, community centres – Dalgarno Community Centre; Housing providers and landowners - Cadogan Estates, SKE, Octavia Housing; Westway Trust; schools and faith groups to provide advice and support with aligning their policies to net zero carbon and developing action plans to reduce

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			their emissions at pace. Funding opportunities for energy efficiency projects were promoted. This will be developed further as part of the new Climate Change Action Plan.
34 Encourage visitors to major venues to walk or cycle.	Cleaner Transport	Work with major destination venues in line with the Healthy Workplace Charter to reduce trips using private and public transport by promoting active travel (walking and cycling), using customised maps, and adapting existing publicity materials.	No progress due to TfL funding withdrawal and major venue Lockdown closures. This will form part of the new Air Quality Action Plan
35 Support businesses to reduce their emissions from deliveries	Delivery Servicing and Freight	Support businesses to combine and rationalise deliveries (of 100 – 400 Kg loads) using low/zero emissions vehicles and local distribution hubs for final stage deliveries.	Building on the success of CAV2 projects, the Defra Air Quality Grant provided Cross River Partnership with another year of funding to continue the Clean Air Village Project which is now in its 3rd iteration. CAV2 successfully introduced an e-cargo bike scheme into the Ladbroke Grove village and supported smaller businesses with retiming their deliveries. For CAV3 the project we looked to support businesses, cultural organisations, and communities with the impact of COVID-19 and deliver improvements in air quality in South Kensington. The Cromwell Road area was selected to be this years 'village' with a focus on the three museums situated here (Science, Natural History and V&A).

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			Unfortunately, due to the COVID-19 pandemic and the subsequent lockdown measures, many businesses were closed and the usual face to face engagement was not possible. For those businesses still able to operate engagement occurred through online exchanges and telephone calls. Through the engagement, although limited, we were able to provide some small recommendations for projects that can be taken forward in the following months, once restrictions have eased; • Support those businesses considering switching to electric vehicle and implementing shared electric services as there appears to be an appetite to move towards cleaner vehicles, particularly with the ULEZ expansion in October 2021. • Investigate the feasibility of providing an 'outreach' shared cargo bike for use between the museums. A Deliveries and Servicing Plan (DSP) has been produced for the three key museums within the Cromwell Road Village (Natural History, Victoria & Albert, and Science Museum) after delivery and servicing vehicle movements (in and out) were tracked by the museums for a period of two weeks. The data was analysed by CRP and a DSP report produced. A number of recommendations have been presented to the Museums to take forward and explore with the Council upon the CAV3 project completion in April 2021. In addition to the above 34 businesses have now been added to CRP's Clean Air Villages directory of businesses that deliver by ultra-low emission vehicles, cargo bikes or by foot to or around Cromwell Road.
36 Continue to work with our main contractors to reduce	Borough Fleet	Work in detail with the Council's main contractors (SITA,	In 2020, the Climate Change Team worked with the Sustainable Procurement Team on developing a sustainability procurement strategy with environmental clauses to be embedded in the tender documents and major contracts.

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their energy consumption		Quadron, Bellrock, Atlas) to reduce their overall energy consumption related to the Council's operations (building use and vehicle fleets).	We have worked with contractors Ideverde (parks maintenance), Suez (waste contractor) and GLL(leisure contractor) to develop carbon reduction plans as part of their operations and contracts with the Council. Environmental clauses have been included in these contracts. As part of the Carbon Neutral Pathways Report, the carbon emissions from all the main contractors included in the Council's carbon scope have been collected and analysed and a monitoring system have been developed. A Governance paper on how embedding climate change across Council's operations and decision making has been produced. As mentioned under action 23, work will be ongoing to move the waste fleet over to electric within the new contract. A fundamental part of this transition will require the electric vehicle charging infrastructure to be installed at Pembroke Road. This is a huge piece of work not only at Pembroke Road, but also in laying the supply from the substation on Old Brompton Road. Unfortunately, in discussions with UK Power Networks, this is the closest suitable electric supply to the depot. The cost of all this work is circa £2m. We are working with colleagues in Property to formalise a plan of action.
37 Continue to develop the Community Kitchen Garden scheme	Localised solutions	Continue to develop the Community Kitchen Garden scheme which encourages residents and community groups to grow seasonal fresh fruit and vegetables. Local production eliminates deliveries (zero food	Garden redesign/builds completed at Wiltshire Close Estate and Oxford Gardens. The layout of the kitchen garden at Oxford Gardens has been improved and better access to irrigation installed. Locations for additional food growing schemes in the borough have been identified at Tor Gardens and Chelsea Manor Court. Discussions are taking place with residents at Gunter Grove with a view to installing raised beds in there currently under used garden.

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		miles) and helps tackle childhood obesity.	As suitable sites are becoming more difficult to secure for new kitchen garden builds, instead, there will be further scrutiny of current schemes – particularly within social housing. Certain existing sites should have some capacity for extending the growing areas already in place. During the Covid pandemic there has been an increase of interest in local food growing and requests from residents applying for plots by registering on garden waiting lists has been steadily rising.
38 Commercial production of fresh fruit, vegetables and flower seedlings through the charitable Cultivating Kensington and Chelsea gardens in the borough	Localised solutions	Overseeing the operations of the Cultivating K&C and support volunteers in establishing policies and systems. All profits from sales to the community kitchen garden clubs	As a registered charity with elected trustees 'Cultivating Kensington and Chelsea' (CKC) continues to support the Council's food grow project by growing vegetable, herb, and flower seedlings for sale. CKC trustees have become more autonomous in the operational activities of the charity and no longer depend on the Council's community gardening team or the volunteers that the community gardeners brought to the greenhouses. However, there is some question as to whether this operational shift is sustainable in the longer term. During the covid pandemic operational activities have been delivered by two trustees covering the growing and cultivation of plants. Sales of seedlings have moved online to allow for social distancing with clear collection points and delivery options. This has proved highly successful and reduced the need to travel apart from locally to collect orders.
39 Increase recycling by Council staff members	Public Health and Raising Awareness	Refresh the promotion of recycling to members of Council staff.	Due to the COVID 19 restrictions and most Council staff working from home, no recycling campaigns and/or waste audits have been carried out since March 2020. However, Health and Wellbeing and environmental online sessions have been organised. Air Quality and Climate Change were both themes. An environmental guide with measures that staff can do at home and in the office has been developed and promoted.
40 Increase the municipal recycling rate by 2%	Public Health and Raising Awareness	Deliver communication campaigns for residents, improve recycling	Work in 2020 was hampered by Covid restrictions, especially in-person events and door knocking, as well as installing a food waste collection on an estate and trialling a school food waste collection.

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		infrastructure on estates, waste crew training and work with Commercial Waste Team to increase business recycling capture	However, we delivered a new comms campaign, working with 'innocent' and environmental charity 'Hubbub'. Our 'recycling's most wanted' campaign was distributed via social media, leaflets to households, on our waste trucks, and in our annual Council tax billing that goes to all residents. We've helped promote and organise digital waste reduction events including reusable nappy demos, events for repair week and virtual tours of our recycling plant. Composter demos given to community groups and continue to heavily subsidise composters and promote them. Exceeded Christmas tree recycled tonnage from previous year. Figures not finalised yet, as financial year has not yet finished plus WRWA provide some data 1- 2 months after the final quarter. It's estimated that the municipal recycling rate will stay the same this year.
41 Review and model different waste collection systems	Localised solutions	Assess whether introducing a borough-wide food waste collection will be environmentally beneficial to identify solutions to improve waste collection rounds	Report commissioned by WRWA set out that an introduction of food waste rounds would likely increase carbon emissions overall. We are looking at this again in more detail as part of the Climate Change Team's work on the Council's net zero by 2030 work. Some trials have been conducted already and these will be pursued post April 2021. This will be incorporated into new Climate Change Action Plan.
42 Deliver carbon reduction initiatives/campaign within the Council's offices to emissions and change	Emissions from developments and buildings	Implement and deliver the Greening the Office initiative and the Green Champions Scheme in Pembroke Road and at the Kensington Town Hall	Most Council's staff have been working from home during the pandemic, so the carbon reduction initiatives/campaigns in the office have been replaced with virtual/online sessions and lunch and learns. Two in-depth Scoping workshops with more than 100 colleagues were organised as part of the Carbon Neutral Pathways work. Suggestions and ideas

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			from colleagues on how to reduce the environmental impact of the Council's operations, especially in the offices in a post Covid world have been collected. A cycling to work campaign was organised at the beginning of March 2020 for staff members to promote the Council's travel hierarchy and to encourage colleagues to cycle more as part of their work. This action will continue in the new Climate Change Action Plan.
43 Develop a Single Use Plastic policy and action plan	Localised solutions	Develop and deliver an action plan to minimise and phase out where feasible, the use of non-essential single-use plastics across the Council's operations and buildings, its contractors/suppliers, in schools and across the borough	A single-use Plastic Policy Statement was adopted by the Council in May 2019. The policy's aim is to ensure that Council operations are free on non-essential single-use plastics by the end of 2020 and sets out a commitment to work accords the council internally, with the council's contractors and partners, and with local schools, businesses, and residents. Since then, the following initiatives and actions have been delivered internally across the Council buildings to support with becoming single-use plastic free by the end of 2020: • The cafeteria from the Council's main office at Kensington Town Hall replaced all their single-use plastic cutlery and containers with plastic free alternatives in 2019. Staff members were allowed to start using their own keep cups and lunch boxes when purchasing food from the cafeteria. • In 2019/2020 the Council's Events Team replaced their single-use plastic cups with plastic free alternatives (paper cups or plant-based alternatives) for all the events organised in the Council's buildings. • Kensington Leisure Centre and Dalgarno Community Centre have signed up to become part of the national Refill Scheme. • Virtual reusable nappy events held (disposable nappies contain lots of singles-use plastic).

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			In terms of borough-wide initiatives, the following have been carried out: Phasing out single use plastics has been included as part of the environmental clauses introduced in the major contracts. The Climate Change Team has been working with contractors to adopt the Single Use Plastic strategy and action plan. Less activity has taken place in the office since the pandemic started in March 2020. The campaigns will restart once the activity in the office is getting back to normal. No external events have been held since March and majority of planned engagement and external business related activities were unable to take place due to Covid -19 restrictions and lockdown. This action will continue in the new Climate Change Action Plan.
44 Increase the size of the existing Counters Creek Victorian sewer system		In partnership with Thames Water, facilitate work to increase the size of the existing Counters Creek Victorian sewer system to cope with flash flooding from intense rainstorms.	Thames Water confirmed that a strategic sewer was no longer needed and agreed to the following: • Sustainable drainage systems to reduce surface water run-off entering the sewers (most of the schemes are in the London Borough of Hammersmith and Fulham except for Arundel Gardens); • anti-flooding (FLIP) devices to stop the sewers surcharging into lower properties; and, • a local sewer improvement (pumping station in Queensdale Road to reduce local flood risk). The Council publicly scrutinised Thames Water's decision regarding the strategic sewer. It successfully lobbied Ofwat to ensure further monitoring and

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			research of the Counters Creek continues for the next Business Plan. Ofwat added two new performance commitments regarding the Counters Creek: • to produce a report about the risk of the catchment by the end of July 2023. The report should outline a long-term strategy for alleviating flooding in the area; • to report annually on how they are managing the network to ensure long-term resilience and reduce flood risk for customers, and how they are progressively developing their understanding of flood risk in the catchment. Further updates are provided on our webpage: https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/flooding/counters-creek-project. Ofwat's final determination included two new performance commitments for Thames Water regarding the Counters Creek: • to produce a report about the risk of the catchment by the end of July 2023. The report should outline a long-term strategy for alleviating flooding in the area • to report annually on how they are managing the network to ensure long-term resilience and reduce flood risk for customers, and how they are progressively developing their understanding of flood risk in the catchment
45 Support the delivery of Sustainable Drainage Systems (SuDs) both in new		Support the delivery of Sustainable Drainage Systems (SuDs) both in new developments and	The Local Plan 2019 can be found here: https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/local-plan/local-plan-2019. Policy CE2(g) refers to the provision of SuDS and has strengthened the requirement for SuDS.

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developments and through retrofitting		through retrofitting, to absorb and divert as much rainwater as possible away from the sewers during periods of heavy rainfall.	Planning and Place successfully bid for £500k of levy funds to implement SuDS in the Council's social housing from the Thames Regional Flood and Coastal Committee. A draft design was produced in 2020 and is currently being consulted with the residents in 2021. The draft design can be seen here: https://planningconsult.rbkc.gov.uk/consult.ti/PortobelloSuDS/consultationHome The Council is currently consulting on the Draft Greening SPD which aims to reduce the overall impact of development both, during construction and operation. It also aims to help addressing climate change impacts. It gives detailed guidance to both developers and residents on the measures they can implement to reduce the building's carbon footprint. This guidance is not only for new development but also for existing development (retrofitting). The adoption of the Greening SPD will take place in the spring 2021. The Draft Greening SPD provides guidance on how to implement por SuDS policy (CE2g) in chapter 12 (minimising flood risk.
X61 Retrofit SuDs in existing properties		Install SuDs such as rainwater retention features in existing properties.	The Council is currently consulting on the Draft Greening SPD which aims to reduce the overall impact of development both, during construction and operation. It also aims to help addressing climate change impacts. It gives detailed guidance to both developers and residents on the measures they can implement to reduce the building's carbon footprint. This guidance is not only for new development but also for existing development (retrofitting). The Draft Greening SPD provides guidance on how to implement por SuDS policy (CE2g) in chapter 12 (minimising flood risk). The adoption of the Greening SPD will take place in the spring 2021.
46 Mitigate against increases in area of		Use the planning control process to reduce the	Policy CE2i of the Council's Local Plan resists the increase in impermeable areas not just in front gardens but all landscaped areas. Policy CE2g(i) also

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impermeable land by stopping the paving of front gardens		loss of front gardens by resisting paving	encourages the increase of permeable areas when providing SuDS. https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/local-plan/local-plan-2019. Information regarding the permitted development rights for using permeable surfaces when paving front gardens has been included at the end of the Council's SuDS webpage: https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/flooding/sustainable-drainage-systems
47 Promote the use of the Council's SuDs tool for small developments		Continue to promote the use of the Council's SuDs tool for small developments.	The SuDS tool was decommissioned in March 2019. Very detailed information on how to meet our policy on SuDS for minor and major applications was uploaded on our SuDS webpage: https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/flooding/sustainable-drainage-systems The SuDS uptake has continued as SuDS are required by policy CE2g and CL7i of the Local Plan. The Draft Greening SPD provides guidance on how to implement por SuDS policy (CE2g) in chapter 12 (minimising flood risk).
48 Promote green infrastructure (walls, roofs) and other eco-initiatives in schools	Localised solutions	Further develop school participation in green infrastructure and eco-initiatives that enhance the curriculum, involve parents and lead to reduction of car use in collaboration with the	The delivery of this action was impacted by Covid-19. The service delivered 10 Environmental Education Sessions and 101 Forest School sessions in 2020, engaging 1,629 pupils in outdoor education. The Bee Superhighway projects commenced at the end of 2020 with the aim of delivering 15 on the ground projects, produce an interactive map, deliver 10 community training sessions, and run a public campaign in 2020_21. This work is ongoing.

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		Healthy School Partnership.	
49 Support the development of food growing gardens in schools	Localised solutions	Work with schools to encourage and support them in the delivery of food growing gardens.	Work to support food growing and education around sustainability continue in selected borough schools. Staff from Hammersmith Community Gardens Association delivered sessions funded by RBKC. During the Covid pandemic more online resources have been provided and focused socially distanced activities. As schools have been mostly closed over the last year, activities with schools such as St Cuthbert with St Matthias have been paused until Covid restrictions are eased.
50 Support the development of community food waste composting initiatives	Localised solutions	Encourage and support the development of small-scale community food waste composting initiatives	Colleagues in Waste are looking at ways to encourage more food waste composting and providing food collection caddies. Work to explain the value of composting green waste in situ in kitchen gardens is the focus of the community gardening team. Community composting is a challenging topic and regular workshops are key to making it a success.
51 Review planning applications to ensure that biodiversity is improved, not damaged by new build and refurbishment	Other	Check/review planning applications to ensure that development impacts on the borough's ecology are minimised and to maximise biodiversity gains from development by creating new habitat through green roofs.	A biodiversity section has been drafted and produced for the new Greening SPD due for publication in 2021. The biodiversity action plan has been delayed until 2021. This action will be picked up in the Council's New Biodiversity Action Plan.
52 Require developers to contribute to local air quality improvements		Increase air quality action fund contributions to directly provide a resource for air quality	No further S106 funding for AQ was secured in 2020-2021 as CIL is collected instead into a corporate central budget. The allocation of CIL is determined by finance through Capital Strategy and Asset Management Board and the

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		specialists and to achieve actual air quality improvements.	Leadership Team through the Capital Programme (to be spent on infrastructure). The carbon offsetting fund is now £419,400.
X74 Push for the borough to be included in the Ultra-Low Emission Zone (ULEZ)	Cleaner Transport	As part of the TfL/GLA Engagement Group, enter discussions with the new Mayor of London on the potential to increase the air quality benefits in the borough of the ULEZ proposal, and/or tightening the LEZ.	ULEZ encompassing RBKC will begin from October 2021.
X75 Support TfL in ensuring the entire borough is part of the 'Cycle Hire' scheme	Cleaner Transport	Support the expansion of the Cycle Hire scheme north of the Westway.	No progress due to TfL funding constraints.
X76 Work with TfL to reduce emissions from buses in the borough	Cleaner Transport	Lobby and work with TfL to ensure that all bus routes through the borough are ULEZ-compliant and explore options for hybrid buses to run in pure electric mode through the most polluted areas.	We now have five routes in the borough which operate with fully electric vehicles (routes 70, 94, 360, C1 and C3,). The route 7 will be fully Hydrogen from June 2021 and the route 23 will be fully electric from April 2021. The route 49 will be electric from September 2021 and the route 319 is also due to be fully electric in the near future. Of the 32 routes in the borough only one will remain a non-hybrid Euro 6 Diesel until 2023. Three Euro 6 Diesel routes will become Euro 6 Hybrid before the end of 2021 and all remaining routes are already Euro 6 Hybrid. This action will continue in the new AQ Action Plan.

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X77 Work with TfL to deliver Crossrail stations in the borough	Cleaner Transport	Work with TfL on delivery of Crossrail 2 station in the King's Road area.	There seems no imminent prospect of Crossrail 2 being taken forward.
X78 Lobby TfL for increased public transport links in the borough	Cleaner Transport	Continue to work with Crossrail sponsors on feasibility of a Kensal Portobello Crossrail station at Canal Way.	We are continuing to correspond with Network Rail and Transport for London on the Council's aspiration to deliver a station on the Elizabeth line at Kensal Canalside. We understand from our dialogue that the delivery of a station within the next 15 years is not considered feasible.
X79 Lobby TfL and the Mayor of London to reduce emissions from taxis	Cleaner Transport	Lobby TfL/Mayor of London to make the decommissioning scheme for 10 year old taxis mandatory.	We continue to work with TfL on taxi problems around Harrods, Whole Foods on Young Street and the Chelsea and Westminster Hospital.
54 Lobby TfL and the Mayor of London to raise taxi drivers' awareness of techniques to reduce emissions	Cleaner Transport	Lobby TfL/Mayor of London to establish eco-driving training as a requirement for all taxi and private cab drivers.	We continue to engage regularly with the Taxi Driver representative bodies as well as the Taxi team at TfL to raise issues over idling and illegal ranking in residential areas. This action will continue in the new AQ Action Plan.
55 Lobby the government for higher environmental building standards	Reduce Emissions from Developments and Buildings	Continue lobbying the Government so that Local Authorities are allowed to set higher environmental standards for new buildings and major refurbishments that are higher than the current building	The Local Plan Partial Review (LPPR) was adopted in September 2019. It is now called the Local Plan 2019 and can be found here: https://www.rbkc.gov.uk/planning-and-building-control/planning-policy/local-plan/local-plan-2019 Policies within chapter 24 refer to environmental standards. In 2020, the Council responded to the Future Homes Standard consultation: changes to Part L and Part F of the Building Regulations for new dwellings. The Council recognised and supported the fact that the London Plan successfully

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints <Include emissions data and KPIs where possible. Please include recently completed projects as well as any new projects (which have commenced since you last reviewed your AQAP)>
		regulations (Housing Standard Review).	required higher standards than those being consulted upon. We explained that lowering those standards would not help meeting the Government's 2050 net zero carbon targets nor would it help the Council's climate change emergency targets. We requested that local planning authorities were not restricted from setting higher energy efficiency standards for dwellings. We argued that the principal performance metric should be the actual energy used in the home (regulated and unregulated) rather than carbon emissions or primary energy and we lobbied for the Fabric Energy Efficiency Standard (FEES) not to be removed. Earlier in 2021 the government made the decision to continue to allow local planning authorities to set their own energy efficiency targets. The Council is currently consulting on the Draft Greening SPD which aims to reduce the overall impact of development both, during construction and operation. It also aims to help addressing climate change impacts. It gives detailed guidance to both developers and residents on the measures they can implement to reduce the building's carbon footprint. This guidance is not only for new development but also for existing development (retrofitting). The adoption of the Greening SPD will take place in the spring 2021.

5. Planning Update and Other New Sources of Emissions

Table S. Planning requirements met by planning applications in Kensington and Chelsea in 2020

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	44
Number of planning applications required to monitor for construction dust	17
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	1
Number of developments required to install Ultra-Low NO_x boilers	1
Number of developments where an AQ Neutral building and/or transport assessments undertaken	17
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0
Number of planning applications with S106 agreements including other requirements to improve air quality	0
Number of planning applications with CIL payments that include a contribution to improve air quality	Cannot be determined as added to a central pot.
NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered with the GLA through the relevant NRMM website and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	2 Conditions Included
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.	16 Conditions Included 2 Self Compliant 1 Compliant 10 No NRMM 0 Non-Compliant 24 Registered Sites

Planning Applications requiring air quality comments are either forwarded directly to the Pollution Regulatory Team or through to the EH Plan inbox which is checked on a regular basis. Kensington and Chelsea participate in the Pan-London NRMM project which sees NRMM Officers visit construction sites to ensure their compliance with guidance and legislation. This is often in conjunction with the Councils CREST and Noise and Nuisance Teams who oversee construction dust complaints and issues.

5.1 New or significantly changed industrial or other sources

No new sources identified.

6. CERC Modelling of Kensington and Chelsea

6.1 Introduction

To provide evidence to assist with the development of our new Air Quality Action Plan, last year, the Pollution Regulatory Team commissioned Cambridge Environmental Research Consultants (CERC) to carry out source apportionment to identify the main sources of nitrogen dioxide and particulate matter in the Borough.

In addition, CERC was asked to undertake boroughwide air quality modelling for 2016, 2019 and 2022 at 1.5 m (ground level), 4 m (about first floor level) and 10m (worst case for Westway) above ground level to predict the annual mean concentrations of nitrogen dioxide (NO_2) and fine particles (PM_{10} and $PM_{2.5}$) and short-term concentrations of NO_2 (1 hour mean) and PM_{10} (24 hour mean) for comparison against National Air Quality Objectives (NAQO) and WHO Guideline Values. The modelling has included predictions at 286 receptor points (such as homes, parks, and community centres) along the Westway and an apportionment study for 2016, to identify the sources of air pollution in the borough.

The detailed results of our modelling will be included in the Council's New Air Quality Action Plan. A summary is included here.

6.2 Nitrogen Dioxide

Based on CERC's apportionment study for 2016, Figure 19 shows that 90% of emissions come from a combination of road transport (58%) and commercial emissions (31%), with commercial emissions being dominated by 'heat and power generations (90%) of which most is derived from gas combustion (86%). However, despite road transport only comprising 58% of overall borough emissions, at the points where the NAQO's are exceeded, road transport contributes a far higher proportion of emissions (see Figure 20).

Figure 19. Breakdown of NO_x Emissions by Major Source Group and for Road Transport, by Vehicle Type

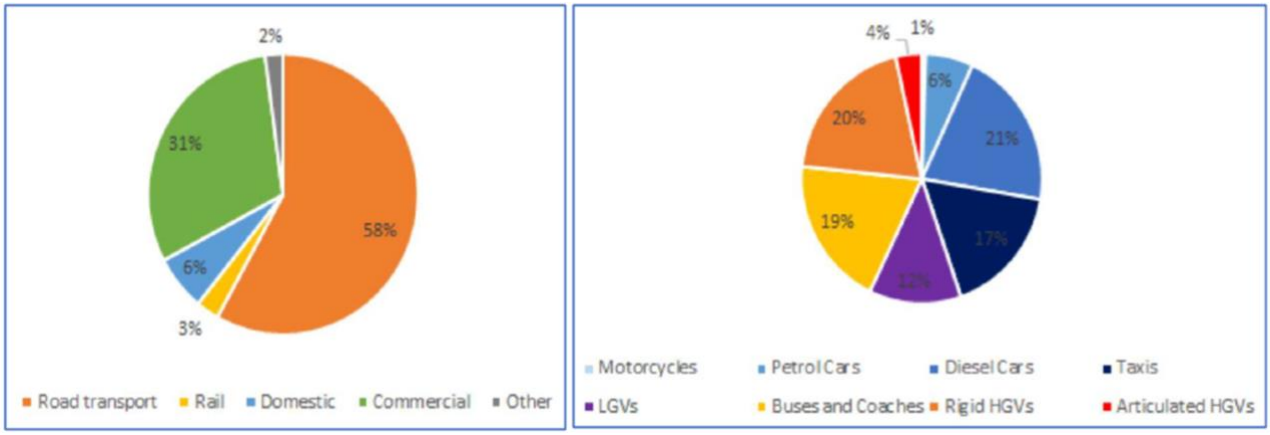
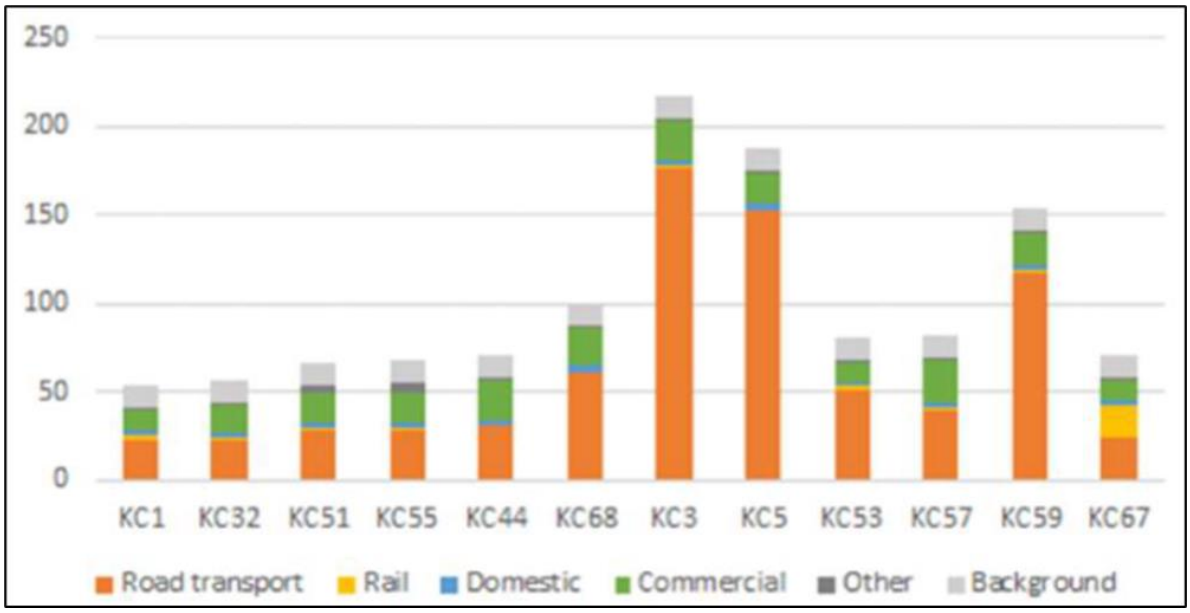


Figure 20. NO_x Major Source Groups at various KC monitoring sites



The orange bars show that road transport is the dominant source of pollution at most of these monitoring locations, but this is particularly the case at KC3 (Knightsbridge) and KC5 (Earl's Court).

CERC's borough wide modelling for 2022 suggests that, considering the ULEZ and ULEZ extension:

- Annual mean NAQO: 96% of the borough will be unlikely to exceed the annual mean.
- Short-term objective and WHO guideline value: only localised areas along the east section of Kensington High Street and around South Kensington Underground Station will exceed.

The removal of the internal combustion engine from roads will substantially reduce nitrogen dioxide levels across the borough above the predicted 96% for 2022. It would also result in the NAQO's, and short-term WHO Guideline Value being met across the borough. Replacing gas boilers across the borough and other parts of London will also have a significant effect and contribute further to meeting the annual mean NAQO across most of the borough. Combined these measures would result in the objective being met at over 99.9% or more of the borough.

If the internal combustion engine is removed from the borough's roads, the main sources of NO_x emissions from within the borough would be from CHP and gas engines and if any remain, diesel powered generators. We need to understand the degree to which these sources will be tackled through the net zero carbon and carbon neutral targets. In particular where CHP and gas engines remain in use, the annual mean NAQO may be exceeded in local areas of the borough. Further research would be needed to identify the locations and impact of these sources.

6.3 Ozone

It is possible that over the next decade, as NO_2 levels continue to reduce, the Ozone will increase potentially exceeding NAQO's. Further research is needed to identify whether this is likely to occur.

6.4 Particulate Matter (PM_{10} and $PM_{2.5}$)

Source apportionment undertaken for 2016 suggests that, considering all contributions from outside the borough (i.e., background and emissions from the rest of London), away from busy main roads, typically about 90% of PM_{10} and $PM_{2.5}$ is derived from sources outside the borough. This drops to about 70% at busy main roads. Contributions from outside of the borough background concentrations make up between about 53% and 75% of concentrations for PM_{10} and 55% and 77% of concentrations for $PM_{2.5}$.

In terms of borough sources (see Figures 21 and 22):

- Commercial emissions form 58% of PM_{10} and $PM_{2.5}$ emissions. PM_{10} emissions are dominated by cooking (51%) and Construction (41%), while for $PM_{2.5}$ emissions are dominated by cooking (75%), construction (13%) and Heat and Power Generation (10%).
- Road sources form 28% and 21% of emissions for PM_{10} and $PM_{2.5}$ respectively. For PM_{10} road related sources are relatively evenly spread between exhaust, resuspension and break, tyre, and road ware. For $PM_{2.5}$, exhaust forms a greater proportion of emissions (42%), however, the largest part of the emissions is still derived from non-exhaust emissions (see figure 22).

Figure 21. Breakdown of PM_{10} and $PM_{2.5}$ emissions by major source group

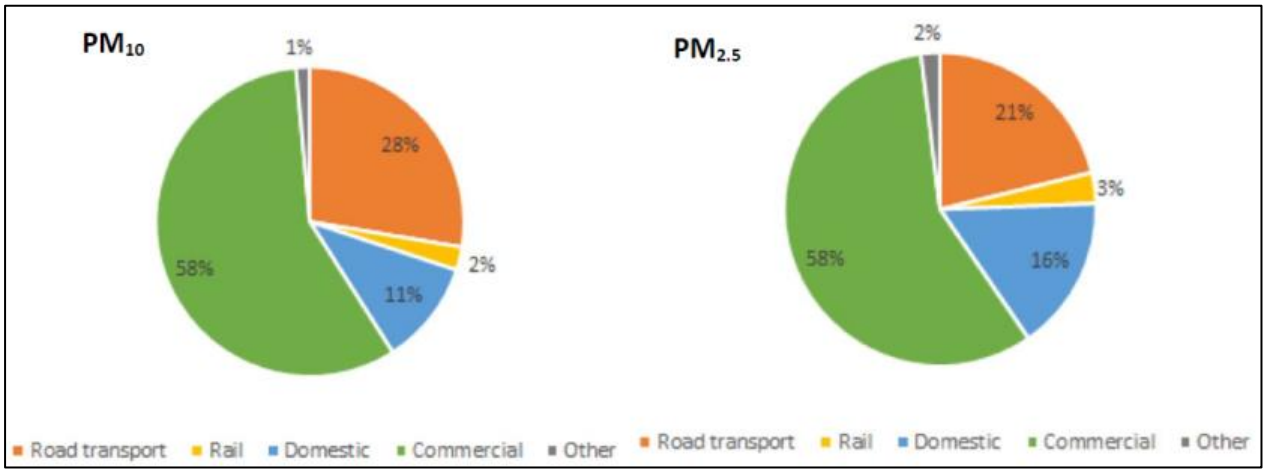
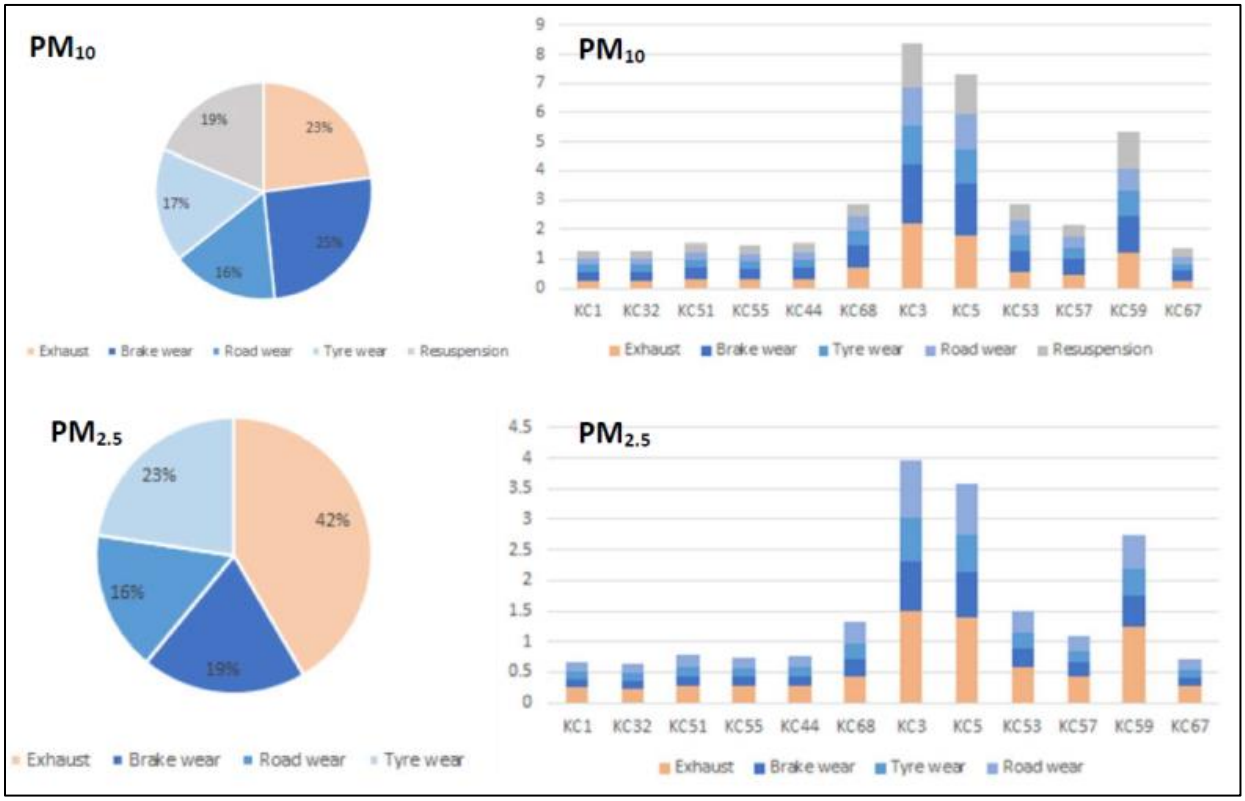


Figure 22. Breakdown of road transport PM_{10} and $PM_{2.5}$ emissions by major source type



The annual mean NAQO for PM_{10} and $PM_{2.5}$ objective is met across the borough and the short-term objective for PM_{10} is predicted to be exceeded in localised areas along the east section of Kensington High Street and around South Kensington Underground Station.

The WHO Annual Mean Guideline Value for PM_{10} is likely to be met across large parts of the borough when model overprediction is taken into account. When model overprediction is accounted for, the Annual Mean WHO Guideline Value for $PM_{2.5}$, which otherwise is predicted to exceed across the whole of the borough, is predicted to be met across about a third of the borough in 2019 and 2022.

Removing the exhaust component of the internal combustion engine is predicted to reduce overall borough emissions for PM_{10} by 6% and $PM_{2.5}$ by 9%. There are other measures that the Council can take to positively impact PM_{10} and $PM_{2.5}$ including:

- Working with business to reduce their impacts on air pollution.
- Properly regulating commercial cooking to minimise emissions.
- Regulating development to minimise emissions.
- Initiatives to ensure responsible burning by residents with fireplaces and stoves.

We will look to explore these and others in the development of our new Air Quality Action Plan in 2021.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

Data Management and Local Site Operator (LSO) duties for RBKC's Automatic Monitoring Station Network for the period of 2019 was undertaken by Ricardo Energy and Environment, who have been in employment by RBKC since November 2017. All real-time data from the monitoring stations was independently collected and validated on a daily basis. A combination of automatic and manual checks was utilised to assess data, identify, and diagnose potential equipment faults and adjust data to take account of calibration tests. Automatic overnight calibrations were supplemented with regular manual calibrations of analysers. The procedures used conform to EU standards that are a requirement of the AURN.

All data is also formally ratified and available online by accessing the Air Quality England Website and selecting Kensington & Chelsea within the menu bar. During this process the validation decisions can be ratified with the benefit of hindsight and using greater information, such as service records, calibration records and the results of station audits. Station audits are carried out by Ricardo Energy and Environment's in house audit team.

In addition, due to the PM_{10} / $PM_{2.5}$ monitoring undertaken at the North Kensington monitoring site being affiliated to the AURN/LAQN monitoring network, independent calibration and audits are completed for the FIDAS monitors by Defra appointed contractors.

PM_{10} Monitoring Adjustment

PM_{10} monitoring is completed within the borough at three monitoring sites: KC1 with a FIDAS, KC2 with an FDMS, and KC5 with a 1020 heated BAM (installed May 2019). As per LLAQM guidance1, through independent data validation completed by Ricardo Energy and Environment, the BAM data is corrected by dividing the raw data by 1.035. Monitoring data from the FDMS and FIDAS monitors do not require correction during their data validation stage.

All fully validated monitoring PM_{10} data is available through the Air Quality England Website.

A.2 Diffusion Tubes

The NO_2 Diffusion Tubes for the year 2019 were supplied and analysed by Gradko International, with the 50% Triethanolamine (TEA) in acetone preparation method utilised. Gradko is a UKAS accredited laboratory that follows the procedures set out by Defra within Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users, and strict internal QA/QC procedures to ensure that concentrations reported are as accurate as possible. In addition, Gradko participate in two independent QA/QC schemes to ensure their performance is constantly independently reviewed.

1) AIR-PT

AIR is an independent proficiency-testing (PT) scheme that is operated by LGC standards and supported by the Health and Safety Laboratory (HSL). AIR-PT began

in April 2014 and combined two long running PT schemes: LGC Standards STACKS PT scheme, and the HSL WASP PT scheme. AIR is a recognised performance-testing programme for labs undertaking NO_2 diffusion tube analysis as part of a wider UK NO_2 monitoring network. The AIR-PT results for Gradko during 2020 are presented in Table A.1 below, it can be seen that a 75% result was achieved for all monitoring samples provided.

Further information on proficiency testing can be found at Defra's Local Air Quality Management webpages under QA/QC framework for NO_2 diffusion tube monitoring.

Table A.1 Gradko Performance within AIR-PT for NO_2 Diffusion Tubes – 2020

AIR PT AR030	AIR PT AR031	AIR PT AR032	AIR PT AR033
January – February 2020	**April – May 2020**	**July – August 2020**	**September – November 2020**
75%	NR	NR	75%

Notes
NR denotes none reported as round was cancelled due to the pandemic.

Table A.2 Socotec Performance with AIR-PT for NO_2 Diffusion Tubes – 2020

AIR PT AR030	AIR PT AR031	AIR PT AR032	AIR PT AR033
January – February 2020	**April – May 2020**	**July – August 2020**	**September – November 2020**
100%	NR	NR	100%

Notes
NR denotes none reported as round was cancelled due to the pandemic.

2) Network Field Inter-Comparison Exercise

Gradko International also takes part in the NO_2 Network Field Inter-Comparison Exercise, operated by the National Physical Laboratory (NPL), which complements the AIR-PT scheme in assessing sampling and analytical performance of diffusion tubes under normal operating conditions. This involves the regular exposure of a triplicate set of tubes at an Automatic Urban Network site (AURN) site where continuous chemiluminescent analysers measure NO_2 concentrations.

The inter-comparison exercise is completed at the Marylebone AURN monitoring station. Of particular interest is the bias of the diffusion tube measurement relative to the automatic analyser that gives an indication of accuracy. Performance criterion have been established for participating laboratories in line with the Air Quality Directive 2008/50/EC requirement for indicative monitoring techniques, as the 95% confidence interval of the annual mean bias which should not exceed ±25%.

In conjunction with this, a measure of precision is determined by comparing the triplicate co-located tube measurements, commonly referred to as the coefficient of variation (CoV). This value is useful for assessing the uncertainty of results due to sampling and analytical techniques. The NPL performance criterion for precision is

that the mean coefficient of variation for the full year should not exceed 10%, should this be achieved the precision is given a score of 'good'.

Gradko and Socotec both operate well within the required level of performance in terms of accuracy and precision, as shown by the results presented in Tables A.3 and A.4 below.

Table A.3 Gradko NO_2 Network Field Inter-Comparison Results for 2020

Annual Mean Bias		Precision	
Performance Target	**Gradko Annual Mean Bias**	**Performance Target**	**Gradko Precision**
±25%	+ 6.5%	10%	Good

Table A.4 Socotec NO_2 Network Field Inter-Comparison Results for 2020

Annual Mean Bias		Precision	
Performance Target	**Socotec Annual Mean Bias**	**Performance Target**	**Socotec Precision**
±25%	+ 6.5%	10%	Good

Benzene Diffusion Tubes

All Benzene tubes were analysed by a Gradko International who are a UKAS accredited laboratory using desorption scanning gas chromatography/mass spectrometry (GC/MS). This method of analysis gives unequivocal identification of BTEX peaks. The analysis is carried out in accordance with the Gradko International Laboratory Quality Procedure GLM 4.

The accuracy of the Laboratory measurements was monitored by participation in the Laboratory Measurement Proficiency Scheme.

The measurement method used in the Benzene survey were consistent with the sampling, analysis, and QA/QC requirements of EN 14662-4: 2005 Ambient Air Quality – Standard Method for Measurement of Benzene Concentrations – Part 4: Diffusive Sampling followed by Thermal Desorption and Gas.

Factor from Local Co-location Studies

RBKC are part of the London Wide Environmental Programme (LWEP) for which a number of co-location studies are completed across seven London Boroughs. During 2020 triplicate diffusion tube monitoring was completed at two Automatic Monitoring sites within the borough: North Kensington – KC47 and Cromwell Road – KC54. The bias adjustment factor calculated for the North Kensington and Cromwell Road Monitoring Stations are presented in Figure A.1.

The co-location study result was included within the LWEP bias adjustment calculations as presented in Table A.3 due to passing both data capture and diffusion tube precision checks.

Figure A.1 North Kensington Bias Adjustment Factor

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
1	08/01/2020	05/02/2020	31.7	30.7	27.6	30	2.1	7	5.3	28.928879	99.55357143	Good	Good
2	05/02/2020	04/03/2020	21.3	21.7	24.8	23	1.9	8	4.7	21.769365	99.25595238	Good	Good
3	04/03/2020	01/04/2020								20.084481	99.95034757		Good
4	01/04/2020	29/04/2020	22.2	20.9	21.1	21	0.7	3	1.7	20.536273	99.85119048	Good	Good
5	29/04/2020	03/06/2020								15	99.82351425		Good
6	03/06/2020	01/07/2020	14.8	15.3	15.9	15	0.5	4	1.4	15	100	Good	Good
7	01/07/2020	29/07/2020	13.0	13.0	12.5	13	0.3	2	0.7	12	99.10714286	Good	Good
8	29/07/2020	02/09/2020	17.8	19.0	18.9	19	0.7	4	1.6	17	99.4047619	Good	Good
9	02/09/2020	30/09/2020	21.8	19.6	21.0	21	1.1	5	2.8	21	99.25595238	Good	Good
10	30/09/2020	04/11/2020	22.2	22.9	23.1	23	0.5	2	1.2	21	99.64285714	Good	Good
11	04/11/2020	02/12/2020	31.0	29.5	33.0	31	1.7	6	4.3	30.168312	99.55357143	Good	Good
12	02/12/2020	06/01/2021	27.8	25.3	27.9	27	1.5	5	3.6	24.232138	99.76190476	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

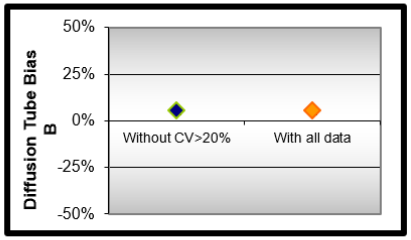
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	

Precision	10 out of 10 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	0.95 (0.93 - 0.97)
Bias B	5% (3% - 7%)
Diffusion Tubes Mean:	22 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	21 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	21 (21 - 22) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 10 periods of data	
Bias factor A	0.95 (0.93 - 0.97)
Bias B	5% (3% - 7%)
Diffusion Tubes Mean:	22 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	21 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	21 (21 - 22) μgm^{-3}



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Version 04 - February 2011

Figure A.2 Cromwell Road Bias Adjustment Factor

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	08/01/2020	05/02/2020	50.49	58.80	57.72	56	4.5	8	11.2
2	05/02/2020	04/03/2020	54.70	55.13	55.36	55	0.3	1	0.8
3	04/03/2020	01/04/2020	51.70	48.00	49.40	50	1.9	4	4.6
4	01/04/2020	29/04/2020	32.24	31.65	30.91	32	0.7	2	1.7
5	29/04/2020	03/06/2020	26.40	26.10	21.90	25	2.5	10	6.2
6	03/06/2020	01/07/2020	22.87	30.40	29.23	27	4.1	15	10.1
7	01/07/2020	29/07/2020	18.46	17.90	18.21	18	0.3	2	0.7
8	29/07/2020	02/09/2020	32.16	32.05		32	0.1	0	0.7
9	02/09/2020	30/09/2020	36.33	38.79	39.10	38	1.5	4	3.8
10	30/09/2020	04/11/2020	32.41	34.88	34.52	34	1.3	4	3.3
11	04/11/2020	02/12/2020	48.64	49.13	49.24	49	0.3	1	0.8
12	02/12/2020	06/01/2021	45.09	43.20	42.03	43	1.5	4	3.8
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
44.7	100	Good	Good
39.3	100	Good	Good
34.9	100	Good	Good
27.9	100	Good	Good
20	100	Good	Good
21	100	Good	Good
18	100	Good	Good
23	100	Good	Good
29	100	Good	Good
29	100	Good	Good
36.3	100	Good	Good
35.5	100	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.78 (0.74 - 0.83)
Bias B	28% (21% - 36%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	30 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	30 (28 - 32) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.78 (0.74 - 0.83)
Bias B	28% (21% - 36%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	30 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	30 (28 - 32) μgm^{-3}

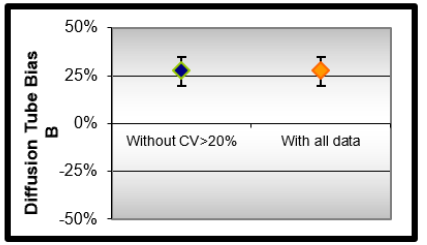

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Table A.5 Bias Adjustment Factor and % Bias of all LWEP Monitored Co-Location Studies 2019

Local Authority	Length of Study (Months)	Diffusion Tube ($\mu g/m^3$)	Continuous Analyser ($\mu g/m^3$)	Bias (B)	% Bias based on continuous monitor (B)
City of London	12	74	71	4.1%	**0.96**
City of London	12	37	33	14.3%	**0.88**
Marylebone Road Intercomparison	12	83	65	26.3%	**0.79**
LB Richmond upon Thames	12	46	35	30.4%	**0.77**
LB Richmond upon Thames	12	29	27	7.1%	**0.93**
LB Richmond upon Thames	11	21	21	1.0%	**0.99**
Falkirk Council	9	18	15	18.1%	**0.85**
LB Newham	12	35	30	16.2%	**0.86**
Overall Bias Adjustment Factor					**0.87**

Table A.5 will be updated upon receiving the LWEP report from Bureau Veritas to contain the updated 2020 information.

Discussion of Choice of Factor to Use

Historically a single BAF derived from the North Kensington Monitoring Station (NKMS) Urban Background co-location site, was used to correct raw Diffusion Tube data. The NKMS BAF is considered to represent the best local BAF for Urban Background Diffusion Tube monitoring locations and monitoring locations away from busy roads in the borough.

However, under LAQM guidance in situations where the supplier and / or preparation method for NO_2 Diffusion Tubes has been changed during the calendar year, the process of bias adjustment is more complex than that usually undertaken. A single bias adjustment factor, applicable to one laboratory in terms of using a National Factor,

or applicable to a single Local Factor derived from a co-location study completed for the calendar year of monitoring.

In this scenario, a single bias adjustment factor, either locally or nationally derived, is no longer applicable. It is instead best practice to apply two separate bias factors across the relevant periods of exposure for each laboratory. As the borough has a co-location study separate bias calculations were made by Bureau Veritas from the different sets of diffusion tubes from the separate suppliers. The derived Local Factors could be used as the resulting tube precision and data capture met the requirements of the LLAQM Technical Guidance TG(16).

For the months of January to February, April, and June to December the diffusion tubes were supplied and analysed by Gradko, however due to the COVID-19 pandemic for the month of March the diffusion tubes were supplied by Gradko but analysed by Socotec and for the month of May the diffusion tubes were supplied and analysed by Socotec. This means that it is best practice to apply three separate bias factors across the relevant periods of exposure for each different scenario.

For the March diffusion tubes (supplied by Gradko and analysed by Socotec) a factor of 0.88 has been used.

For the May diffusion tubes (supplied and analysed by Socotec) a factor of 0.89 has been used.

For the remaining 10 months (Jan, Feb, April, June to December) a factor of 0.95 has been used.

A factor was calculated for all 12 months which was 0.94, however the use of a single factor would not be the approach recommended by the LAQM Helpdesk.

Table A.6 Bureau Veritas Bias Calculations

Time On	Time Off	Tube 1	Tube 2	Tube 3	Lab	Average DT	Average CM	CM Data Capture	Bias
08/01/20	05/02/20	31.67	30.71	27.62	Gradko	30.00	28.93	99.55	0.96
05/02/20	04/03/20	21.35	21.68	24.77	Gradko	22.60	21.77	99.26	0.96
04/03/20	01/04/20	21.7	23.8	23.3	Gradko analysed by Socotec	22.93	20.08	99.95	0.88
01/04/20	29/04/20	22.22	20.95	21.13	Gradko	21.43	20.54	99.85	0.96
29/04/20	03/06/20	15.80	15.70	17.70	Socotec	16.40	14.60	99.82	0.89
03/06/20	01/07/20	14.82	15.25	15.91	Gradko	15.33	14.54	100.00	0.95
01/07/20	29/07/20	13.00	13.02	12.48	Gradko	12.83	12.03	99.11	0.94
29/07/20	02/09/20	17.84	19.04	18.89	Gradko	18.59	17.49	99.40	0.94

Time On	Time Off	Tube 1	Tube 2	Tube 3	Lab	Average DT	Average CM	CM Data Capture	Bias
02/09/20	30/09/20	21.85	19.62	20.99	Gradko	20.82	20.60	99.26	0.99
30/09/20	04/11/20	22.20	22.92	23.08	Gradko	22.73	21.17	99.64	0.93
04/11/20	02/12/20	31.02	29.53	33.02	Gradko	31.19	30.17	99.55	0.97
02/12/20	06/01/21	27.79	25.35	27.92	Gradko	27.02	24.23	99.76	0.90

Table A.7 Bias Adjustment Factor

Year	Local or National	If Local, Version of National Spreadsheet	Adjustment Factor
2020	Local	06/21	March 0.88 May 0.89 Jan, Feb, Apr, Jun-Dec 0.95
2019	Local	09/20	Non-Urban Background: 0.87 Urban Background: 1.01
2018	Local	06/19	0.98
2017	Local	03/18	1.15
2016	Local	-	1.15
2015	Local	-	1.07
2014	Local	-	1.03

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

In regard to the 2020 diffusion tube data set, the data capture for 2020 was below 75% at two long term monitoring sites: KC31 and KC68. The new diffusion tubes located along the Kensington High Street, were deployed in October; KC82, KC84-KC89, KC91, KC93-KC95, KC97-KC102 an KC104 and KC11 achieved a full 3 months monitoring (October-December) allowing enough data for the results to be annualised, however they should be treated with caution. The remainder of the new Kensington High Street tubes (KC83, KC90, KC92, KC96 and KC103 only achieved one or two months monitoring so could not be annualised.

Annualisation of the monitoring sites has been completed in line with Box 4.8 and 4.9 within LLAQM.TG(16)1 and full working details are presented in Table A.6 and Table A.7. In completing the annualisation process, data has been taken from a number of automatic monitoring sites that are part of the LAQN/AURN. In line with LLAQM.TG(16)1 the monitoring sites that have been used lie within a radius of approximately 50 miles of the sites to be annualised and have a data capture of 85% or above.

All monitoring stations that were used are background monitoring stations and as such are not influenced by local sources of air pollution such as road traffic emissions at roadside monitoring sites. The monitoring sites that were used are listed in Table A.5.

Distance Adjustment

In line with LLAQM.TG(16) distance correction has been applied to NO_2 monitoring sites that are not sited at locations of relevant exposure as detailed within the LLAQM Guidance documents. The NO_2 Fall-Off with Distance Calculator (v4.2) has been used to predict the NO_2 concentration at a location of relevant exposure; the calculations are presented below, with the predicted concentrations also presented in Table M.

To complete the NO_2 fall off with distance calculations a background value for each monitoring location is required. Background NO_2 concentrations for 2020 have been derived from the Defra Background Map database that has a current baseline of 2018.

Distance correction has been completed for all Roadside and Kerbside monitoring locations and not the Urban Background and Urban Centre locations. In addition, distance correction was unable to be completed at a number of Diffusion Tube monitoring sites due to the 2020 monitored NO_2 concentration being higher than the 2019 background concentration as derived from the Defra Background Maps.

Table A.8 Short-Term to Long-Term Monitoring Data Adjustment

Site ID	Annualisation Factor Sion Manning	Annualisation Factor London Westminster	Average Annualisation Factor	Raw Data Annual Mean (µg m^{-3})	Annualised Annual Mean (µg m^{-3})
KC51	0.9854	1.0527	1.0190	29.1	29.1
KC68	0.9213	0.8990	0.9102	37.1	30.7
KC82	0.8047	0.8495	0.8271	50.8	38.2
KC84	0.8047	0.8495	0.8271	59.3	44.6
KC85	0.8047	0.8495	0.8271	55.6	41.8
KC86	0.8047	0.8495	0.8271	49.0	36.8
KC87	0.8047	0.8495	0.8271	51.4	38.6
KC88	0.8047	0.8495	0.8271	55.8	42.0
KC89	0.8047	0.8495	0.8271	67.1	50.4
KC91	0.8047	0.8495	0.8271	69.7	52.4
KC93	0.8047	0.8495	0.8271	57.2	43.0
KC94	0.8047	0.8495	0.8271	49.7	37.4
KC97	0.8047	0.8495	0.8271	60.8	45.7
KC98	0.8047	0.8495	0.8271	61.6	46.3
KC99	0.8047	0.8495	0.8271	61.7	46.4
KC100	0.8047	0.8495	0.8271	66.9	50.3
KC101	0.8047	0.8495	0.8271	65.3	49.1
KC102	0.8047	0.8495	0.8271	59.5	44.7
KC104	0.8047	0.8495	0.8271	59.3	44.6
KC105	0.8047	0.8495	0.8271	53.7	40.4
KC106	0.8047	0.8495	0.8271	56.3	42.3
KC107	0.8047	0.8495	0.8271	46.5	35.0
KC108	0.8047	0.8495	0.8271	42.2	31.7
KC109	0.8047	0.8495	0.8271	49.1	36.9
KC110	0.8047	0.8495	0.8271	45.7	34.4
KC111	0.8047	0.8495	0.8271	46.1	34.6

Table A.9 NO_2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Background Concentration (µg m^{-3})	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
KC33	1.1	2.1	31.9	52.1	**49.4**	Predicted concentration at Receptor above AQS objective.
KC35	8.0	48.0	31.9	39.4	34.7	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
KC38	1.7	2.7	31.9	48.8	**47.0**	Predicted concentration at Receptor above AQS objective.
KC48	7.0	8.0	31.3	43.1	**42.6**	Predicted concentration at Receptor above AQS objective.
KC49	4.0	5.0	31.3	40.4	*39.8*	Predicted concentration at Receptor within 10% the AQS objective.
KC54	3.1	13.1	32.0	36.5	*34.8*	
KC56	9.0	23.0	31.3	41.4	*38.0*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
KC58	13.0	14.0	31.3	38.1	*37.9*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
KC59	0.7	1.7	31.3	53.9	**50.1**	Predicted concentration at Receptor above AQS objective.
KC60	0.7	8.7	31.8	40.3	*36.3*	Predicted concentration at Receptor within 10% the AQS objective.
KC70	0.8	4.8	30.2	37.7	*35.1*	
KC72	0.8	4.8	30.2	37.0	*34.7*	

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Background Concentration (µg m^{-3})	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
KC84	0.5	1.0	31.3	46.6	**44.7**	Predicted concentration at Receptor above AQS objective.
KC85	1.0	1.5	31.3	43.7	**42.7**	Predicted concentration at Receptor above AQS objective.
KC86	1.0	1.5	31.3	38.5	*37.9*	Predicted concentration at Receptor within 10% the AQS objective.
KC87	1.0	1.5	31.3	40.4	*39.6*	Predicted concentration at Receptor within 10% the AQS objective.
KC88	0.5	1.0	31.3	43.9	**42.3**	Predicted concentration at Receptor above AQS objective.
KC89	0.5	1.0	31.3	52.7	**50.1**	Predicted concentration at Receptor above AQS objective.
KC91	0.5	1.0	31.3	54.8	**51.9**	Predicted concentration at Receptor above AQS objective.
KC93	0.5	1.0	31.3	45.0	**43.3**	Predicted concentration at Receptor above AQS objective.
KC94	0.5	1.5	31.3	39.0	*37.5*	Predicted concentration at Receptor within 10% the AQS objective.
KC95	0.3	0.8	31.3	46.8	**44.4**	Predicted concentration at Receptor above AQS objective.
KC97	0.3	0.8	31.3	47.8	**45.1**	Predicted concentration at Receptor above AQS objective.
KC98	0.5	1.0	31.3	48.4	**46.3**	Predicted concentration at Receptor above AQS objective.
KC99	0.5	1.0	31.3	48.5	**46.4**	Predicted concentration at Receptor above AQS objective.

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Background Concentration (µg m^{-3})	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
KC100	0.5	1.0	31.3	52.5	**49.9**	Predicted concentration at Receptor above AQS objective.
KC101	0.5	1.0	31.3	51.3	**48.9**	Predicted concentration at Receptor above AQS objective.
KC102	0.5	1.5	31.3	46.8	**43.8**	Predicted concentration at Receptor above AQS objective.
KC104	0.5	1.0	31.3	46.6	**44.7**	Predicted concentration at Receptor above AQS objective.
KC105	0.5	1.0	31.3	42.2	**40.8**	Predicted concentration at Receptor above AQS objective.
KC106	0.5	1.0	31.3	44.3	**42.7**	Predicted concentration at Receptor above AQS objective.
KC107	1.0	2.5	31.3	36.5	*35.6*	
KC109	0.5	1.0	31.3	38.6	*37.7*	Predicted concentration at Receptor within 10% the AQS objective.
KC110	0.5	1.5	31.3	35.9	*35.0*	
KC111	0.5	1.0	31.3	36.2	*35.6*	

Appendix B Full Monthly Diffusion Tube Results for 2020

Table B.1 NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Mean – Raw Data	Annual Mean – Bias Adjusted
KC31	75.00	75.00	40.3	36.6	-	-	-	30.2	24.2	31.6	36.3	29.5	47.3	38.4	34.9	33.19
KC32	100.00	100.00	26.0	22.9	17.5	18.9	13.1	14.0	11.0	16.6	19.0	18.2	28.0	21.8	18.9	17.80
KC33	83.33	83.33	77.9	67.8	65.4	40.9	43.7	47.4	46.0	46.7	63.0	57.0	-	-	**55.6**	**52.07**
KC34	100.00	100.00	42.1	37.0	26.9	25.6	19.5	21.3	18.0	27.0	29.6	31.2	42.3	28.9	29.1	27.40
KC35	75.00	75.00	-	52.1	40.6	31.8	-	36.4	-	39.3	48.5	40.3	48.5	38.3	**41.8**	39.35
KC38	100.00	100.00	75.2	56.2	31.4	41.5	44.7	47.6	42.6	47.0	58.3	57.0	73.3	46.3	**51.7**	**48.75**
KC39	100.00	100.00	35.5	28.5	25.8	25.0	19.4	19.8	16.1	23.6	24.7	22.1	32.8	28.6	25.2	23.65
KC40	100.00	100.00	37.8	31.4	27.6	25.1	17.9	16.1	13.3	20.7	24.7	22.5	34.5	30.5	25.2	23.66
KC41	100.00	100.00	28.8	27.0	28.9	24.8	18.6	17.1	14.2	21.3	23.1	24.0	40.9	27.5	24.7	23.18
KC42	100.00	100.00	38.8	32.4	28.0	23.1	18.6	17.7	17.0	23.2	27.9	28.7	38.5	29.2	26.9	25.31
KC43	100.00	100.00	32.7	25.3	27.3	25.3	18.8	17.9	12.9	21.1	23.9	24.8	36.5	28.8	24.6	23.12
KC44	100.00	100.00	38.0	32.6	28.2	20.5	16.9	18.5	13.7	22.4	29.3	27.2	40.7	28.4	26.4	24.79
KC45	100.00	100.00	41.3	29.0	34.4	29.3	23.5	28.0	20.6	32.1	32.3	32.4	42.9	34.2	31.6	29.75
KC47	100.00	100.00	31.7	21.4	21.7	22.2	15.8	14.8	13.0	17.8	21.9	22.2	31.0	27.8	21.8	20.48
KC47	100.00	100.00	30.7	21.7	23.8	21.0	15.7	15.3	13.0	19.0	19.6	22.9	29.5	25.4	21.5	20.17
KC47	100.00	100.00	27.6	24.8	23.3	21.1	17.7	15.9	12.5	18.9	21.0	23.1	33.0	27.9	22.2	20.90
KC48	91.67	91.67	57.0	52.0	53.9	37.4	-	37.8	30.8	37.2	49.8	42.6	56.8	47.5	**45.7**	**43.08**
KC49	100.00	100.00	58.2	56.6	48.8	34.4	30.3	31.8	28.6	45.5	48.8	45.1	48.7	38.8	**43.0**	**40.37**
KC50	100.00	100.00	44.7	40.5	31.7	28.4	27.1	28.8	11.7	31.0	29.3	29.0	40.1	33.7	31.3	29.45
KC51	83.00	83.00	29.7	23.7	-	-	-	63.8	24.0	19.4	19.9	23.0	29.3	-	29.1	27.65
KC52	83.00	83.00	43.8	34.3	37.4	28.3	23.1	26.6	20.5	33.2	39.6	31.1	49.1	38.0	33.7	31.72
KC53	91.67	91.67	44.8	37.9	27.7	26.3	-	22.9	21.5	26.6	31.9	33.1	40.3	32.9	31.4	29.69
KC54	100.00	100.00	50.5	54.7	51.7	32.2	26.4	30.4	18.5	32.2	36.3	32.4	48.6	45.1	38.3	35.91
KC54	100.00	100.00	58.8	55.1	48.0	31.7	26.1	29.2	17.9	32.1	38.8	34.9	49.1	43.2	38.7	36.39
KC54	83.33	83.33	57.7	55.4	49.4	30.9	21.9	-	18.2	-	39.1	34.5	49.2	42.0	39.8	37.37
KC55	100.00	100.00	38.4	37.2	29.1	25.6	21.3	21.8	17.4	25.9	30.8	30.5	41.1	30.0	29.1	27.35
KC56	100.00	100.00	57.7	52.1	47.2	33.8	33.3	38.9	30.4	45.3	49.5	48.5	52.7	39.2	**44.1**	**41.41**

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Mean – Raw Data	Annual Mean – Bias Adjusted
KC57	100.00	100.00	34.0	32.4	33.0	28.6	24.1	24.7	15.9	26.9	31.3	30.7	42.2	33.2	29.7	27.95
KC58	100.00	100.00	54.8	52.3	47.6	36.2	35.3	29.8	31.9	35.9	42.7	37.1	46.7	37.1	**40.6**	38.11
KC59	100.00	100.00	63.4	66.6	61.8	49.5	49.1	46.9	45.7	57.3	68.8	59.3	62.0	58.0	**57.4**	**53.90**
KC60	100.00	100.00	1.3	88.6	33.4	32.1	28.8	28.8	23.7	34.1	39.6	33.2	48.0	22.1	37.5	34.10
KC61	100.00	100.00	45.6	42.1	42.4	31.1	27.2	27.6	23.7	35.5	40.3	37.6	51.2	36.2	36.7	34.49
KC64	100.00	100.00	39.5	31.5	41.2	37.5	31.9	30.6	22.9	39.0	41.6	35.7	49.1	35.5	36.3	34.12
KC65	100.00	100.00	32.0	29.7	29.2	26.6	21.0	21.8	16.3	27.3	27.3	26.8	35.9	31.2	27.1	25.46
KC66	100.00	100.00	35.9	31.3	-	31.6	25.5	28.3	19.4	30.5	26.4	26.8	42.1	32.2	30.0	28.34
KC67	91.67	91.67	37.8	36.3	29.2	23.2	19.2	18.0	19.5	23.6	27.5	31.2	39.3	33.4	28.2	26.50
KC68	75.00	75.00	50.8	44.9	-	25.7	20.8	-	-	27.2	-	43.4	43.3	40.4	37.0	35.03
KC69	91.67	91.67	33.9	33.1	25.1	24.2	13.3	19.6	18.7	23.6	28.5	24.6	40.5	32.2	26.5	25.25
KC70	100.00	100.00	55.1	53.4	45.3	29.3	28.9	36.2	27.7	34.3	45.7	44.3	49.3	36.4	**40.5**	37.73
KC71	100.00	100.00	45.9	39.3	34.4	27.3	24.1	28.5	17.6	31.7	35.9	33.6	48.5	40.3	33.9	31.60
KC72	100.00	100.00	51.0	38.5	42.6	33.5	34.2	37.8	22.2	42.3	43.3	39.5	47.7	38.2	39.2	37.01
KC73	100.00	100.00	44.6	39.9	39.5	27.9	22.4	26.1	16.9	32.1	38.0	32.5	44.4	34.1	33.2	31.53
KC74	83.33	83.33	41.2	38.6	33.1	28.1	21.0	26.2	17.5	28.1	38.3	-	-	34.0	30.6	28.73
KC75	100.00	100.00	50.0	34.1	39.3	29.3	20.2	25.7	19.0	30.9	38.2	35.0	46.6	39.6	34.0	31.51
KC76	91.67	91.67	46.2	34.3	34.8	<0.76	20.1	24.3	25.4	31.3	35.8	-	45.7	36.9	33.5	31.70
KC77	91.67	91.67	37.7	28.8	28.7	23.9	18.7	17.0	14.8	21.7	24.5	-	36.7	30.0	25.7	24.71
KC78	100.00	100.00	41.5	35.0	28.0	26.4	20.4	20.9	17.1	22.5	26.7	28.6	37.5	31.8	28.0	26.20
KC79	100.00	100.00	40.3	33.7	28.7	26.0	18.4	22.8	14.0	24.4	29.8	28.5	41.7	29.4	28.2	26.67
KC80	100.00	100.00	17.6	34.6	24.4	28.5	20.7	19.5	12.1	21.7	24.1	24.7	35.4	27.4	24.2	22.93
KC82	100.00	25.00	-	-	-	-	-	-	-	-	-	48.0	58.3	46.2	**50.8**	42.34
KC83	33.33	8.33	-	-	-	-	-	-	-	-	-	47.9	-	-	-	N/A
KC84	100.00	25.00	-	-	-	-	-	-	-	-	-	69.9	59.4	48.7	**59.3**	**56.33**
KC85	100.00	25.00	-	-	-	-	-	-	-	-	-	62.9	58.9	45.0	**55.6**	**52.83**
KC86	100.00	25.00	-	-	-	-	-	-	-	-	-	54.1	58.8	34.0	**49.0**	**46.52**
KC87	100.00	25.00	-	-	-	-	-	-	-	-	-	51.9	58.6	43.6	**51.4**	**48.80**
KC88	100.00	25.00	-	-	-	-	-	-	-	-	-	54.6	62.1	50.8	**55.8**	**53.05**
KC89	100.00	25.00	-	-	-	-	-	-	-	-	-	62.9	76.3	62.0	**67.0**	**63.69**
KC90	33.33	8.33	-	-	-	-	-	-	-	-	-	-	66.4	-	-	N/A
KC91	100.00	25.00	-	-	-	-	-	-	-	-	-	64.4	70.8	73.9	**69.7**	**66.21**

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Mean – Raw Data	Annual Mean – Bias Adjusted
KC92	66.67	16.67	-	-	-	-	-	-	-	-	-	45.9	-	47.5	-	N/A
KC93	100.00	25.00	-	-	-	-	-	-	-	-	-	59.0	58.5	54.2	**57.2**	**54.36**
KC94	100.00	25.00	-	-	-	-	-	-	-	-	-	39.6	59.1	50.4	**49.7**	**47.18**
KC95	100.00	25.00	-	-	-	-	-	-	-	-	-	66.3	57.0	55.6	**59.6**	**56.64**
KC96	66.67	16.67	-	-	-	-	-	-	-	-	-	57.0	-	49.8	-	N/A
KC97	100.00	25.00	-	-	-	-	-	-	-	-	-	62.0	67.2	53.2	**60.8**	**57.73**
KC98	100.00	25.00	-	-	-	-	-	-	-	-	-	68.1	64.3	52.5	**61.6**	**58.55**
KC99	100.00	25.00	-	-	-	-	-	-	-	-	-	60.5	69.7	54.9	**61.7**	**58.62**
KC100	100.00	25.00	-	-	-	-	-	-	-	-	-	71.1	74.2	55.4	**66.9**	**63.53**
KC101	100.00	25.00	-	-	-	-	-	-	-	-	-	66.1	73.2	56.6	**65.3**	**62.05**
KC102	100.00	25.00	-	-	-	-	-	-	-	-	-	63.7	64.3	50.5	**59.5**	**56.53**
KC103	33.33	8.33	-	-	-	-	-	-	-	-	-	33.7	-	-	-	N/A
KC104	100.00	25.00	-	-	-	-	-	-	-	-	-	52.0	66.5	59.4	**59.3**	**56.32**
KC105	100.00	25.00	-	-	-	-	-	-	-	-	-	50.9	61.3	48.8	**53.7**	**50.97**
KC106	100.00	25.00	-	-	-	-	-	-	-	-	-	60.1	59.6	49.2	**56.3**	**53.51**
KC107	100.00	25.00	-	-	-	-	-	-	-	-	-	45.9	53.4	40.3	**46.5**	**44.18**
KC108	100.00	25.00	-	-	-	-	-	-	-	-	-	36.1	50.3	40.2	**42.2**	**40.05**
KC109	100.00	25.00	-	-	-	-	-	-	-	-	-	50.8	51.0	45.4	**49.1**	**46.63**
KC110	100.00	25.00	-	-	-	-	-	-	-	-	-	45.8	47.7	43.7	**45.7**	**43.45**
KC111	100.00	25.00	-	-	-	-	-	-	-	-	-	46.1	49.2	42.9	**46.1**	**43.78**

Notes

Concentrations are presented as µg m^{-3}.
Exceedances 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**.
All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 33%.
(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%).

Appendix C Effects on Lockdown – Ricardo Modelling and Monitoring Data at RBKC Sites

The model used by Ricardo was used to predict pollutant concentrations from March 2020 against those measured by local automatic monitoring stations. Figures C1-C5 below present the modelled and measured concentrations of NO_2 at all five of Kensington and Chelsea's automatic monitoring stations. The orange line represents the modelled concentrations, and the purple line represents the measured concentrations.

Figure C1. KC1 London North Kensington Monitoring Station Modelled and Monitored NO_2 Concentrations for January 2020 to February 2021

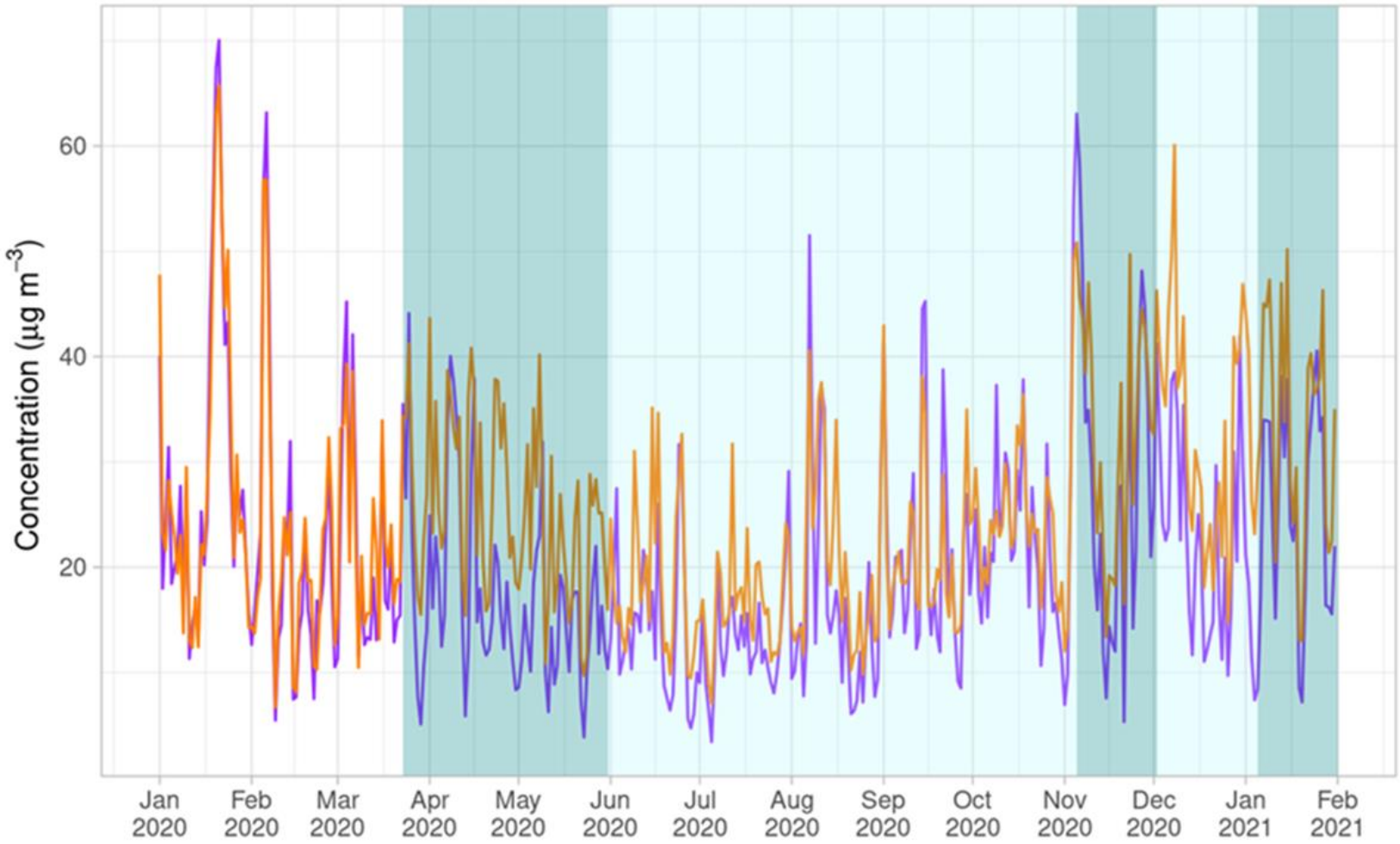


Figure C2. KC2 Cromwell Road Monitoring Station Modelled and Monitored NO_2 Concentrations for January 2020 to February 2021

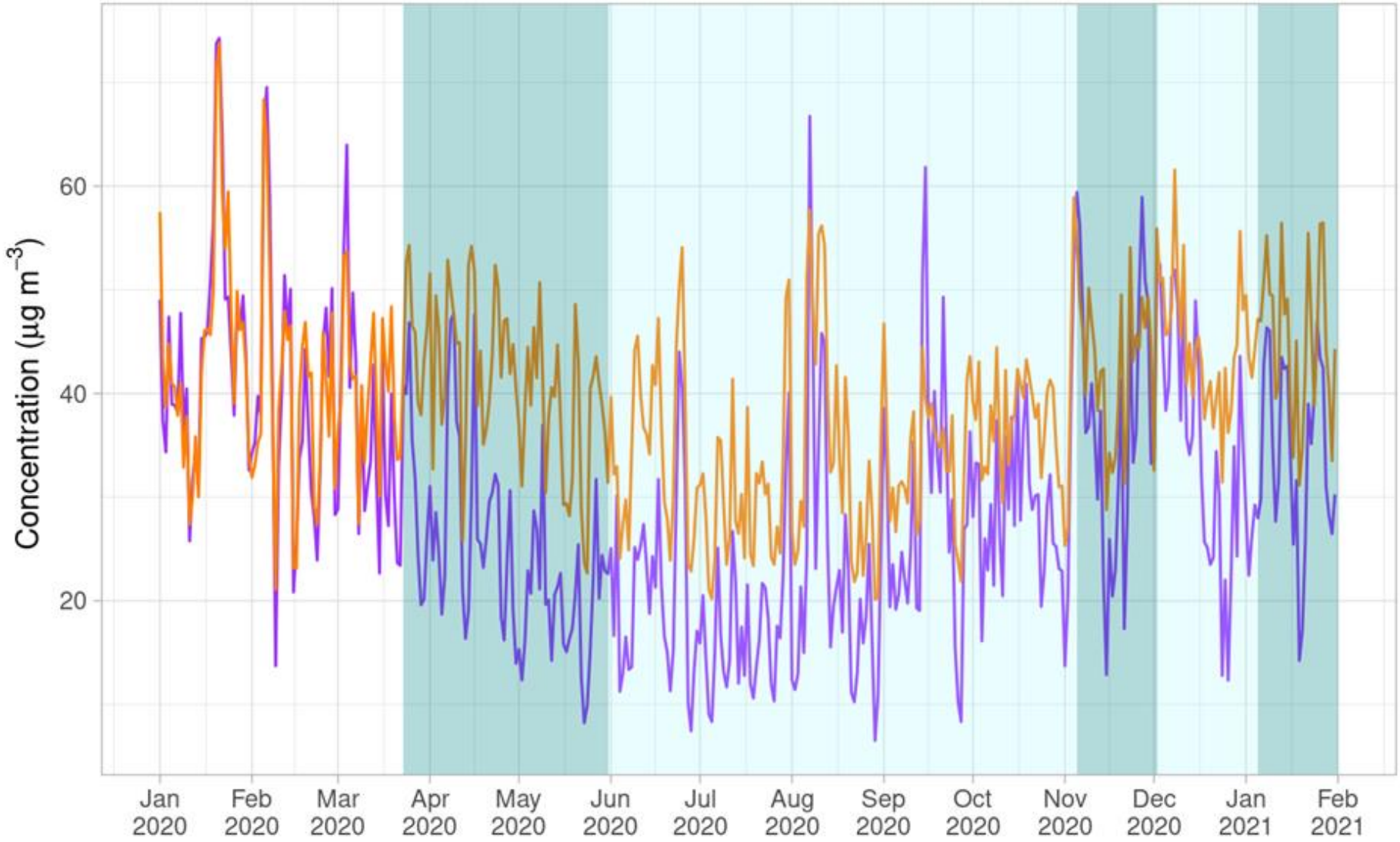


Figure C3. KC3 Knightsbridge Monitoring Station Modelled and Monitored NO_2 Concentrations for January 2020 to February 2021

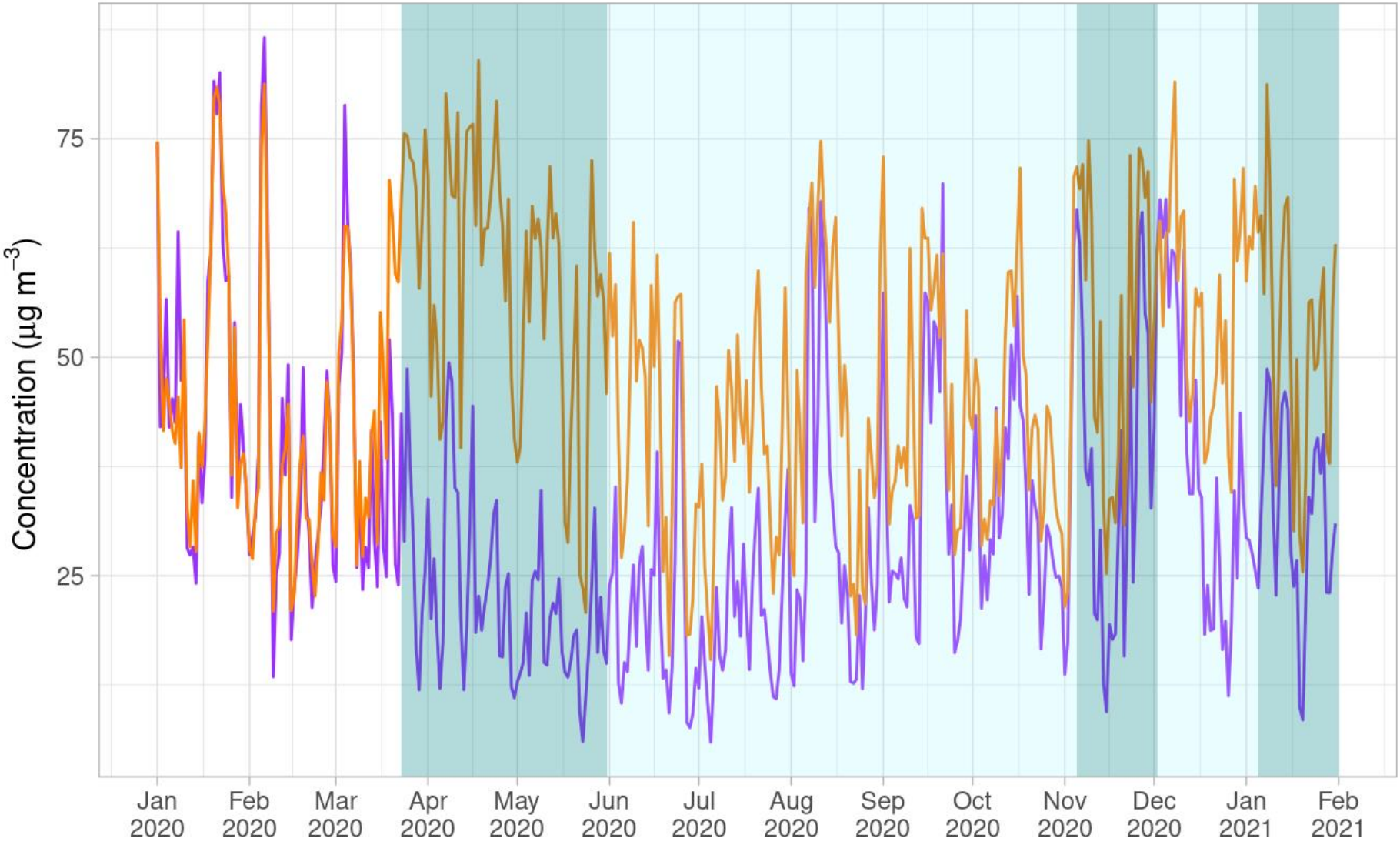


Figure C4. KC4 Chelsea Old Town Hall Monitoring Station Modelled and Monitored NO_2 Concentrations for January 2020 to February 2021

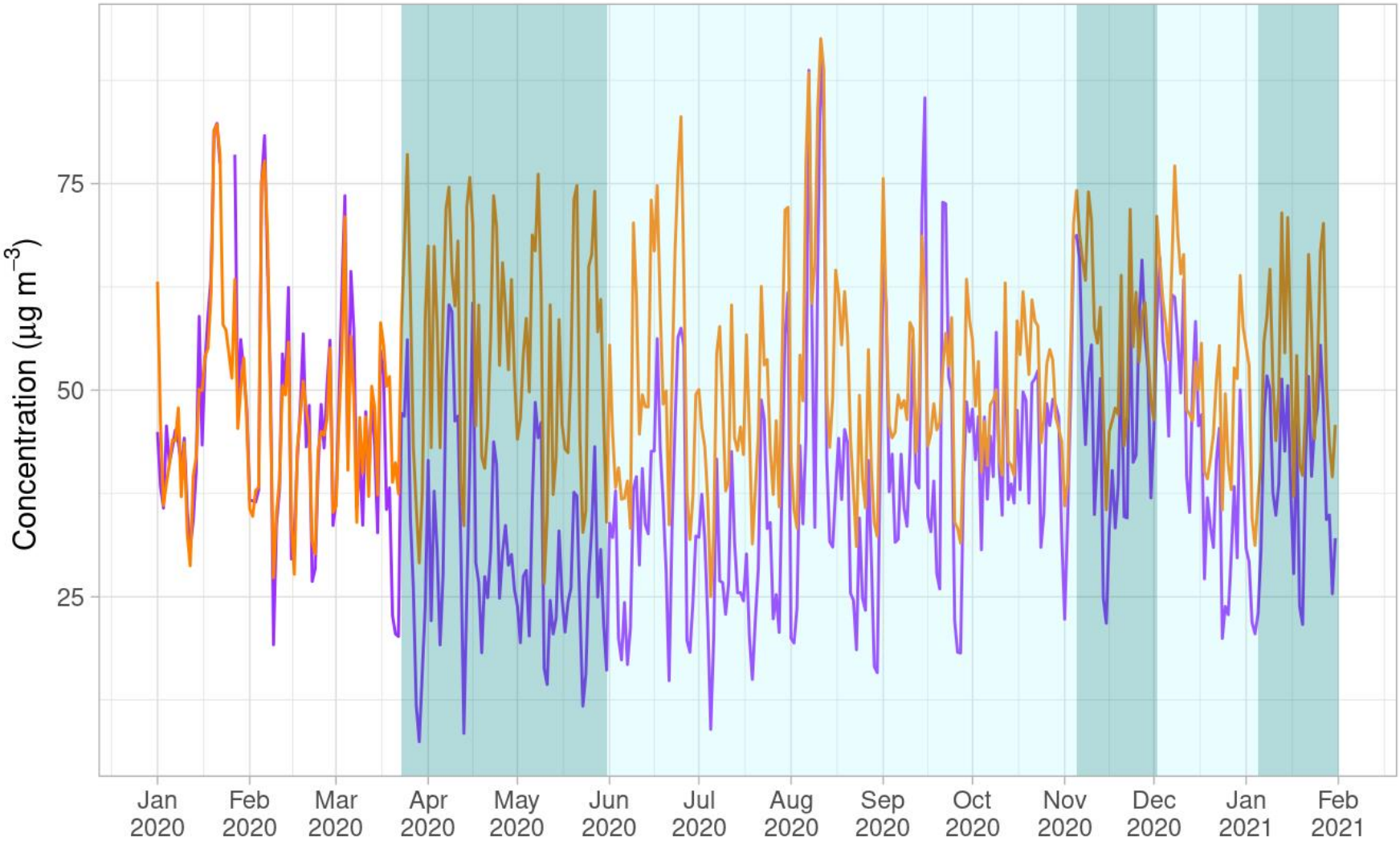
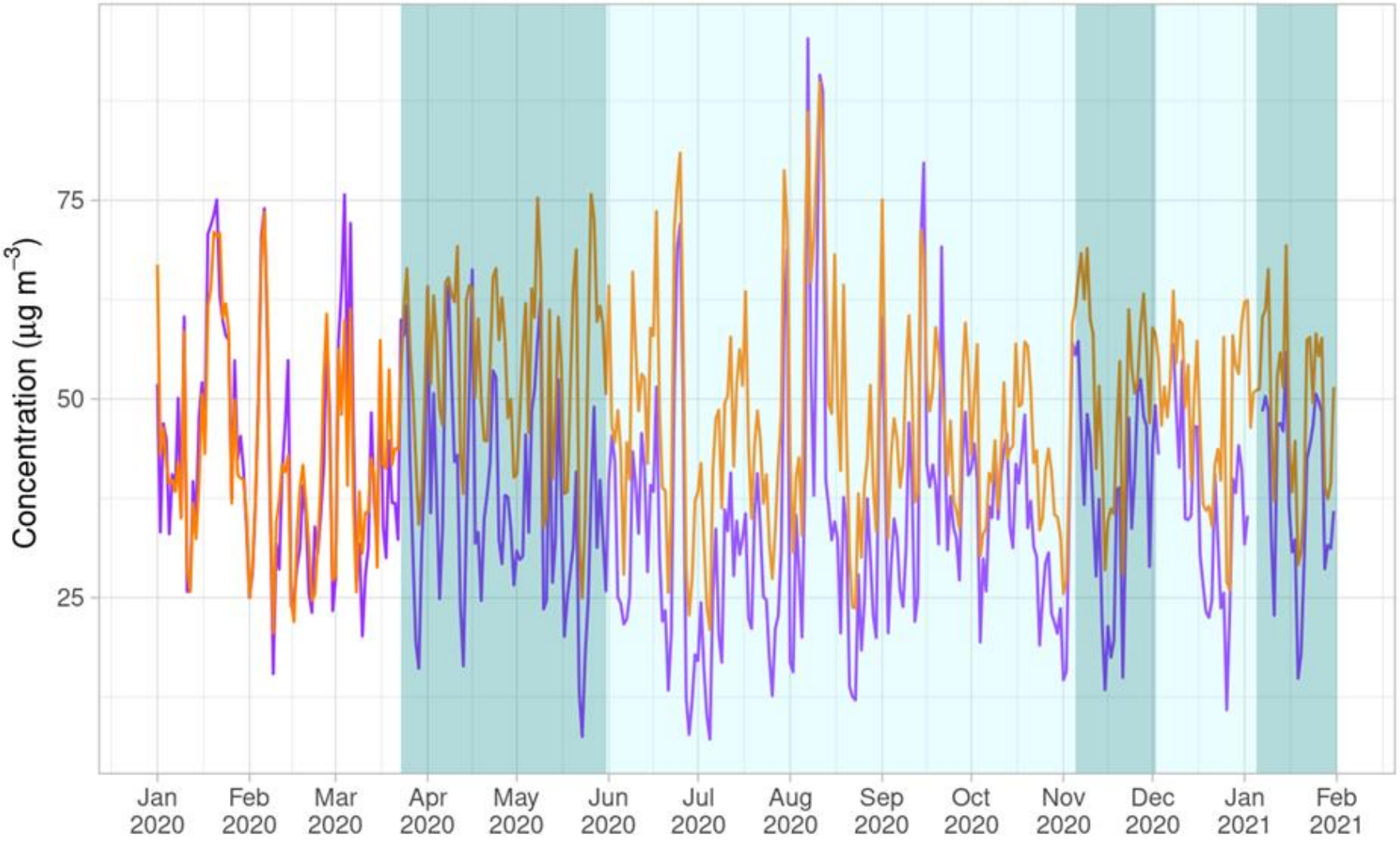


Figure C5. KC5 (Earl's Court Road) Modelled and Monitored NO_2 Concentrations for January 2020 to February 2021



Prior to 23/03/2020, before the first lockdown occurred, the measured and modelled concentrations are similar, suggesting that the measured concentrations are comparable to the usual levels at this time of the year and under normal business activities. The modelled (i.e., 'business as usual') NO_2 and NO_x concentrations are predominately higher than the measured concentrations from 23/02/2020 to July 2020, which suggests that reduced emissions from traffic and industry are being reflected within the measurements.