Air Quality

Annual Status Report for 2022

Date of Publication: May 2023

THE ROYAL BOROUGH OF
KENSINGTON
AND CHELSEA

Kensington and Chelsea Air Quality Annual Status Report for 2022

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This report provides a detailed overview of air quality in Kensington and Chelsea during 2022. 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
KHS	Kensington High Street
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LLAQM	London Local Air Quality Management
NO_2	Nitrogen dioxide
NRMM	Non-Road Mobile Machinery
O_3	Ozone
PM_{10}	Particulate matter less than 10 micron in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micron in diameter
SO_2	Sulphur dioxide
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 ($PM_{2.5}$)	Objective is 20 µg m^{-3} New target is 10 µg m^{-3}	Annual mean	31/12/2004 2040
Particles ($PM_{2.5}$)	Target of a 35% reduction in population exposure	3-year mean	2040
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} not 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)	Guideline Value (2021)*
NO_2	1-Hour Mean	200 µg m^3	-
	Annual Mean	40 µg m^3	10 µg m^3
PM_{10}	24-Hour Mean	50 µg m^3	45 µg m^3
	Annual Mean	20 µg m^3	15 µg m^3
$PM_{2.5}$	Annual Mean (Stage 1)	10 µg m^3	5 µg m^3
	Annual Mean (Stage 2)		
	24-Hour Mean	25 µg m^3	15 µg m^3

Note:
(1) These represent the final AQG level recommended by the WHO for countries to achieve globally. There are four interim target values to reach before these concentrations. WHO Global Air Quality Guideline Report available online at https://apps.who.int/iris/bitstream/handle/10665/345329/9789240034228-eng.pdf?sequence=1&isAllowed=y

1. Introduction

In 2022 the COVID recovery continued - this was the first year with no restrictions or lockdown measures since 2020. Analysis of data shows that the National Air Quality Objective (NAQO) for nitrogen dioxide was met at all fixed automatic monitoring sites within Kensington and Chelsea, except KC5 (Earl's Court), which was marginally above at 41 µg/m^3. This is a decrease of 3µg/m^3 since 2021. Compliance with the PM_{10} annual mean NAQO (40 µg/m^3) and the daily mean (50 µg/m^3), which must not be exceeded more than 35 times continued to be achieved at all fixed monitoring sites. The NAQO for $PM_{2.5}$ was also just met at the two fixed stations where it is monitored.

The Council's previous Air Quality and Climate Change Plan came to an end in 2021. A new Air Quality Action Plan was adopted in March 2022 and the first round of reporting on action progress is included within this report.

Since the introduction of the previous plan there has been an improvement in air quality within the borough with annual mean nitrogen dioxide levels having now halved at some locations (KC5 reported an NO_2 annual mean of 86 µg/m^3 in 2016 which is down to 41 µg/m^3 in 2022). Concentrations of particulate matter have continued to improve, although not at the same rate as nitrogen dioxide. However, there is still a long way to go if we are to meet the 2021 WHO Guideline Values.

1.1 Local Authority Area

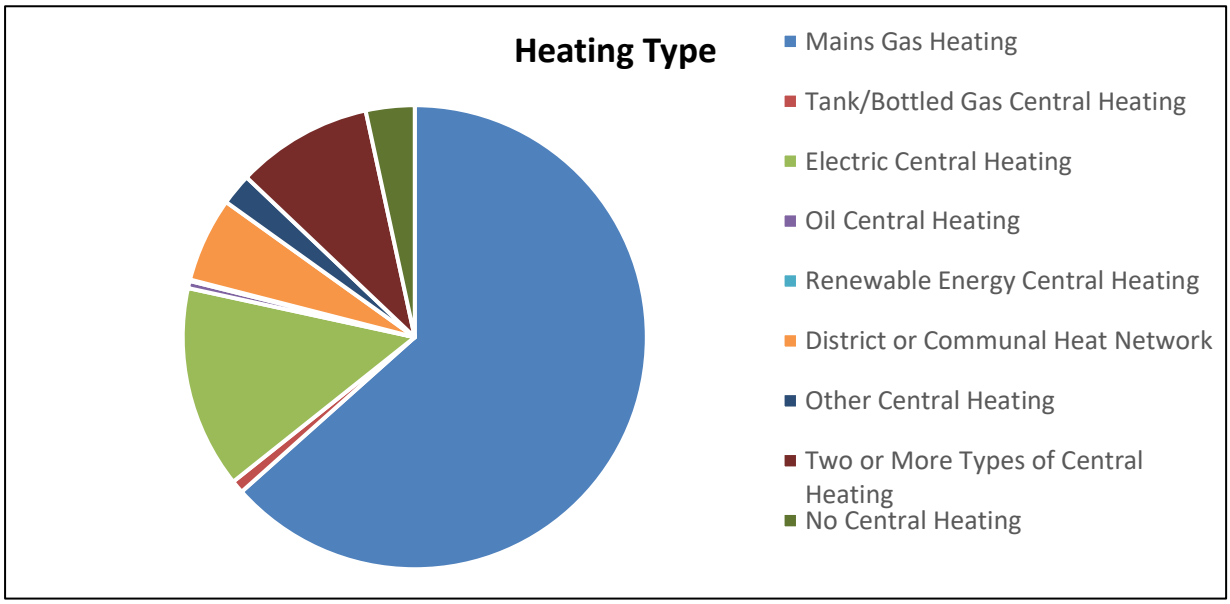
Kensington and Chelsea is a densely populated urban environment located to the west of central London. The borough extends from Chelsea Embankment in the south, through Kensington, Notting Hill, and Ladbroke Grove up to Kensal Green to the north. It is bounded by Bayswater, Kensington Gardens and Belgravia to the east and by the West London Railway Line to the west. Kensington and Chelsea has less open space compared to other boroughs, with only 17% of the total area classed as such. However, the 388 open spaces account for over 78 hectares of green space including 28 parks and two out-of-borough cemeteries. 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 fifth most densely populated of London's 33 local authority areas, with around 84 people living on each 1.76 acres (a football pitch-sized area).

the 2011 figure of 158,649. This was the largest decrease in population recorded in both England and Wales. The borough has seen an increase of 8.3% in people aged 65 years and over, a decrease of 10.7% in people aged 15-64 years and a decrease of 17.8% in children under 15 years.

The borough is primarily residential in nature and the 2021 Census reported there were approximately 89,229 households in Kensington and Chelsea, which is an increase from the previous estimate of 88,700 in 2018, with 82.9% of households now being a flat, maisonette or apartment. Of these households 63.4% have mains gas heating, 0.9% have tank or bottled gas central heating, 14.1% have electric central heating, 0.5% have oil central heating, 0.1% have renewable energy central heating, 5.9% are part of a district or communal heat network, 2.2% have another type of central heating, 9.5% have two or more types of central heating and 3.4% have no central heating. The type of heating used by residents is very interesting from an air quality perspective.

Figure 1: Heating Types within the Borough



Office of National Statistics. (2023). Census Maps – Census 2021 Data. Retrieved April 2023, from https://www.ons.gov.uk/census/maps/choropleth?lad=E09000020

2. Air Quality Monitoring

2.1 Automatic Monitoring Stations

We currently have five automated continuous monitoring locations within the Borough. Figure 1 below shows the locations of the monitoring sites and detailed information about each one is contained within Table 1 overleaf.

Figure 2: Locations of Automatic Monitoring Sites

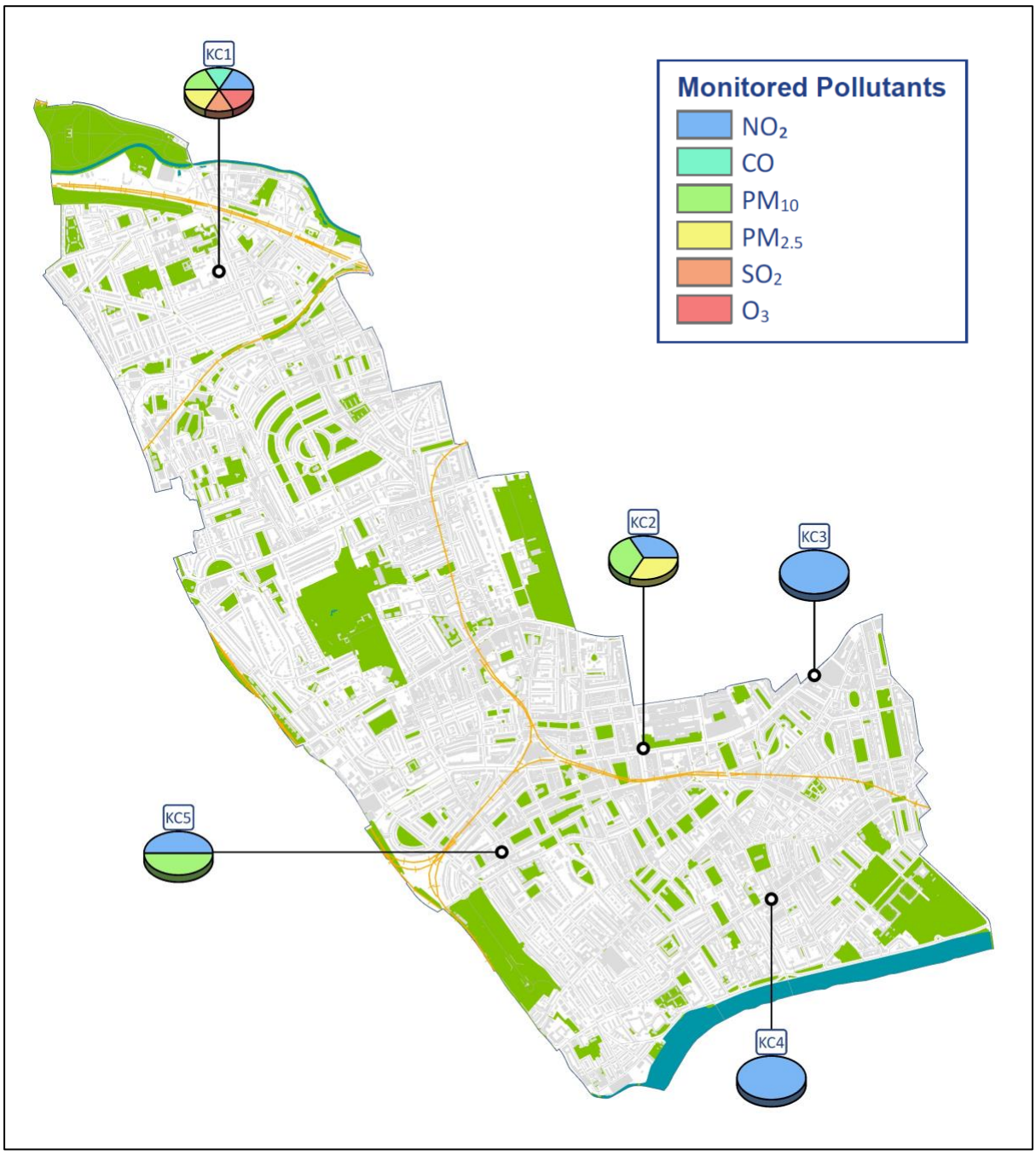


Table 1. Details of Automatic Monitoring Sites for 2022

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet Height (m)	Pollutants Monitored	Monitoring Technique
KC1	North Kensington	524041	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} & $PM_{2.5}$	Chemiluminescent, BAM PM_{10} & BAM $PM_{2.5}$
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 Locations

Nitrogen dioxide (NO_2) data is also collected using passive diffusion techniques. 2022 was the last year the borough participated in the London Wide Environmental Programme (LWEP) offered by Bureau Veritas through its provision and analysis of NO_2 diffusion tubes. Further details on the laboratory, method, bias adjustment, and quality control are in Appendix A. Figures 3 and 4 below show the locations of all the non-automatic monitoring stations within the borough and detailed information about each is in Table 2.

Figure 3: Locations of Borough Diffusion Tubes (excluding Kensington High Street)

Figure 4: Locations of KHS Diffusion Tubes

Table 2. Details of Non-Automatic Monitoring Sites for 2022

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
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? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
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 Road / 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? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
KC65	Barlby Road	523899	182113	Roadside	Y	20	0.5	1.8	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? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
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	2.3	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	2.3	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	2.1	NO_2	N
KC92	Kensington High Street LP029	525569	179613	Kerbside	Y	0.5	0.5	2.1	NO_2	N
KC93	Kensington High Street LP025 / Derry Street	525597	179623	Kerbside	Y	0.5	0.5	2.1	NO_2	N
KC94	Kensington High Street LP014 / Young Street	525719	179694	Roadside	Y	0.5	1.0	2.1	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
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
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	2.1	NO_2	N
KC100	Kensington High Street LP032 / High Street Station	525550	179572	Kerbside	Y	0.5	0.5	2.3	NO_2	N
KC101	Kensington High Street LP034 / High Street Station	525523	179552	Kerbside	Y	0.5	0.5	2.1	NO_2	N
KC102	Kensington High Street LP037 / Wrights Lane	525486	179529	Roadside	Y	0.5	1.0	2.1	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	2.1	NO_2	N
KC105	Kensington High Street LP059 / Abingdon Road	525239	179379	Kerbside	Y	0.5	0.5	2.1	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
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 Locations

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 5 below shows the locations of all the automatic monitoring stations within the borough and detailed information about each is contained in Table 3 below.

Figure 5: Locations of C_6H_6 Monitoring Sites

Table 3. Details of BTEX Non-Automatic Monitoring Locations for 2022

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
KC04	Dovehouse Street	527111	178165	Urban Background	Y	30	45	2.2	C_6H_6	N
KC05	Pembridge Square Library	525191	180705	Roadside	Y	9	6	4	C_6H_6	N
KC0X	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 AQO's

The results presented are after adjustments for "annualisation" and for distance to a location of relevant public exposure (if required), the details of which are described in Appendix A. Figures 5-10 display the results graphically.

Table 4. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2022 %[(b)]	2016	2017	2018	2019	2020	2021	2022 Raw (µg/m^3)	2022 Bias Adjusted & Annualised (µg/m^3)	2022 Distance Corrected Annual Mean (µg/m^3)
KC1	Urban Background	99.44	99.44	35	33	29.1	27.4	21	20	18	N/A	N/A
KC2	Roadside	99.53	99.53	**58**	**51**	**47.6**	**43.7**	30	30	30	N/A	N/A
KC3	Kerbside	99.16	99.16	**80**	**66**	**66.4**	**54.4**	32	34	36	N/A	N/A
KC4	Roadside	97.96	97.96	**78**	**63**	**59.6**	**55**	**40**	39	35	N/A	N/A
KC5	Kerbside	96.71	96.71	**86**	**78**	**78.7**	**55.9**	37	**44**	**41**	N/A	N/A
KC31	Roadside	100	100	**55.5**	**52.2**	**42.8**	**42.6**	31.8	27.3	32.0	25.7	N/A
KC32	Urban Background	100	100	29.9	31.5	26.2	23.8	17.2	15.9	18.8	15.1	N/A
KC33	Roadside	100	100	**104.5**	**106.1**	**84.0**	**71.6**	**50.5**	**43.8**	**50.4**	**40.5**	39.1
KC34	Urban Centre	92.3	92.3	**43.7**	**43.7**	39.0	36.3	26.5	23.4	28.1	22.6	N/A
KC35	Roadside	100	100	**80.7**	**77.9**	**58.5**	**56.0**	38.0	34.8	**43.1**	34.6	N/A
KC38	Roadside	92.3	92.3	**101.0**	**119.2**	**75.8**	**70.3**	**47.1**	**41.0**	**44.9**	36.1	35.4

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022 Raw (µg/m^3)	2022 Bias Adjusted & Annualised (µg/m^3)	2022 Distance Corrected Annual Mean (µg/m^3)
KC39	Roadside	100	100	38.5	34.7	30.6	29.2	22.9	22.7	22.3	17.9	N/A
KC40	Urban Centre	100	100	**45.1**	-	32.5	32.0	22.9	21.4	23.7	19.0	N/A
KC41	Urban Background	82.7	82.7	38.2	37.7	32.2	30.5	22.4	20.9	25.1	20.2	N/A
KC42	Roadside	100	100	**46.2**	**45.4**	38.4	34.5	24.5	20.3	26.0	20.9	N/A
KC43	Urban Background	100	100	36.2	36.6	30.0	29.9	22.4	21.2	22.4	18.0	N/A
KC44	Urban Background	92.3	92.3	**46.1**	**41.0**	35.5	33.1	24.0	25.5	22.9	18.4	N/A
KC45	Roadside	100	100	**52.6**	**50.3**	**44.9**	**41.9**	28.8	22.1	30.6	24.6	N/A
KC47	Urban Background	100 / 100 / 100	100 / 100 / 100	34.2	33.3	27.7	27.2	20.52	18.6	21.5	17.3	N/A
KC48	Roadside	100	100	**72.3**	**71.8**	**58.4**	**49.9**	**41.6**	36.6	**40.0**	32.1	N/A
KC49	Urban Centre	82.7	82.7	**87.5**	- [e]	- [e]	**59.9**	39.1	36.7	**51.6**	**41.4**	**40.6**
KC50	Roadside	100	100	**56.4**	**52.7**	**41.0**	**45.9**	28.5	26.6	28.9	23.2	N/A
KC51	Urban Background	90.4	90.4	36.2	39.5	27.7	31.4	27.0	17.7	20.1	16.1	N/A
KC52	Roadside	100	100	**64.5**	**56.1**	**49.4**	39.4	30.7	28.5	34.0	27.3	N/A
KC53	Urban Background	100	100	**47.0**	**49.0**	**40.7**	38.0	28.6	24.9	28.0	22.5	N/A

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022 Raw (µg/m^3)	2022 Bias Adjusted & Annualised (µg/m^3)	2022 Distance Corrected Annual Mean (µg/m^3)
KC54	Roadside	100	100	**72.5**	**70.9**	**57.3**	**48.8**	36.6	32.0	**41.3**	33.2	N/A
KC55	Urban Background	100	100	**49.0**	**48.0**	**40.5**	37.5	26.4	24.0	28.6	22.9	N/A
KC56	Roadside	92.3	92.3	**72.7**	**68.0**	**59.9**	**51.2**	**40.0**	36.5	37.9	30.4	N/A
KC57	Roadside	84.6	84.6	**56.2**	**57.2**	**47.1**	**42.8**	27.0	26.2	29.2	23.4	N/A
KC58	Roadside	100	100	**59.7**	**62.7**	**48.0**	**46.0**	36.9	30.0	35.5	28.5	N/A
KC59	Kerbside	100	100	**79.0**	**74.9**	**66.5**	**59.2**	**52.2**	39.8	**43.5**	35.0	N/A
KC60	Kerbside	90.4	90.4	**73.1**	**71.3**	**51.8**	**50.9**	34.1	29.3	35.6	28.6	N/A
KC61	Roadside	100	100	**61.0**	**52.3**	**45.2**	**43.6**	33.4	29.9	34.1	27.3	N/A
KC64	Roadside	100	100	**58.3**	**46.5**	**42.5**	**41.6**	33.0	29.8	35.1	28.2	N/A
KC65	Roadside	100	100	**41.3**	**40.9**	34.5	33.2	24.6	21.4	25.1	20.2	N/A
KC66	Railway	100	100	**55.8**	**46.2**	38.5	33.6	27.3	22.1	25.5	20.5	N/A
KC67	Railway	100	100	**45.1**	**46.0**	36.8	35.3	25.6	22.7	26.3	21.1	N/A
KC68	Kerbside	59.6	59.6	**51.0**	**51.9**	**42.1**	39.1	30.7	24.4	29.0	22.7	N/A
KC69	Urban Background	75	75	**46.1**	**47.1**	35.8	37.0	24.0	29.2	24.3	19.5	N/A

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022 Raw (µg/m^3)	2022 Bias Adjusted & Annualised (µg/m^3)	2022 Distance Corrected Annual Mean (µg/m^3)
KC70	Kerbside	90.4	90.4	-	-	**55.5**	**50.1**	36.8	28.4	37.0	29.7	N/A
KC71	Kerbside	100	100	-	-	**44.0**	**41.6**	30.8	32.0	31.9	25.6	N/A
KC72	Kerbside	100	100	-	-	**59.6**	**51.5**	35.7	27.4	37.8	30.4	N/A
KC73	Kerbside	90.4	90.4	-	-	**44.0**	**41.2**	30.2	24.6	30.1	24.2	N/A
KC74	Kerbside	100	100	-	-	-	38.8	27.8	28.5	32.9	26.4	N/A
KC75	Kerbside	100	100	-	-	-	**48.9**	30.9	33.5	35.1	28.2	N/A
KC76	Kerbside	100	100	-	-	-	**46.2**	30.4	21.8	33.8	27.1	N/A
KC77	Kerbside	100	100	-	-	-	30.4	23.3	21.4	24.2	19.4	N/A
KC78	Kerbside	92.3	92.3	-	-	-	30.4	25.5	23.0	29.2	23.5	N/A
KC79	Kerbside	100	100	-	-	-	34.1	25.6	21.6	26.5	21.3	N/A
KC80	Kerbside	92.3	92.3	-	-	-	35.8	22.0	21.0	25.4	20.4	N/A
KC82	Kerbside	73.1	73.1	-	-	-	-	38.2	38.9	**45.7**	36.7	35.9
KC83	Kerbside	100	100	-	-	-	-	**-**	38.4	37.8	30.4	N/A
KC84	Kerbside	100	100	-	-	-	-	**44.6**	**45.6**	**48.3**	38.8	37.6

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022 Raw (µg/m^3)	2022 Bias Adjusted & Annualised (µg/m^3)	2022 Distance Corrected Annual Mean (µg/m^3)
KC85	Roadside	100	100	-	-	-	-	**41.8**	38.2	**40.9**	32.9	N/A
KC86	Roadside	100	100	-	-	-	-	36.8	34.9	**41.9**	33.6	N/A
KC87	Roadside	90.4	90.4	-	-	-	-	38.6	38.6	**43.2**	34.7	N/A
KC88	Kerbside	100	100	-	-	-	-	**42.0**	38.7	**41.8**	33.6	N/A
KC89	Kerbside	100	100	-	-	-	-	**50.4**	**51.3**	**49.8**	**40.0**	38.8
KC90	Near Road	100	100	-	-	-	-	**-**	**44.5**	**44.2**	35.5	N/A
KC91	Kerbside	100	100	-	-	-	-	**52.4**	**49.3**	**54.9**	**44.1**	**42.3**
KC92	Kerbside	82.7	82.7	-	-	-	-	**-**	**42.5**	**46.8**	37.6	36.6
KC93	Kerbside	92.3	92.3	-	-	-	-	**43.0**	**47.3**	**54.1**	**43.4**	**41.7**
KC94	Roadside	100	100.0	-	-	-	-	37.4	**44.0**	**51.8**	**41.6**	**40.6**
KC95	Kerbside	100	100.0	-	-	-	-	**44.8**	**47.2**	**52.4**	**42.1**	**40.1**
KC96	Roadside	32.7	32.7	-	-	-	-	**-**	**41.1**	**45.8**	37.7	37.0
KC97	Roadside	59.6	59.6	-	-	-	-	**45.7**	**42.4**	**48.3**	**41.5**	**40.5**
KC98	Kerbside	100	100.0	-	-	-	-	**46.3**	**44.7**	**55.6**	**44.6**	**42.8**

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022 Raw (µg/m^3)	2022 Bias Adjusted & Annualised (µg/m^3)	2022 Distance Corrected Annual Mean (µg/m^3)
KC99	Kerbside	92.3	92.3	-	-	-	-	**46.4**	**45.3**	**54.7**	**44.0**	**42.2**
KC100	Kerbside	100	100.0	-	-	-	-	**50.3**	**41.9**	**50.8**	**40.8**	**39.4**
KC101	Kerbside	84.6	84.6	-	-	-	-	**49.1**	**42.6**	**50.2**	**40.4**	**39.0**
KC102	Roadside	92.3	92.3	-	-	-	-	**44.7**	**43.1**	**50.2**	**40.3**	**39.4**
KC103	Near Road	100	100.0	-	-	-	-	**-**	32.4	35.9	28.9	N/A
KC104	Kerbside	100	100.0	-	-	-	-	**44.6**	37.1	**40.8**	32.8	N/A
KC105	Kerbside	100	100.0	-	-	-	-	**40.4**	39.7	**42.7**	34.3	N/A
KC106	Kerbside	100	100.0	-	-	-	-	**42.3**	38.1	**41.9**	33.7	N/A
KC107	Roadside	84.6	84.6	-	-	-	-	35.0	36.3	36.8	29.6	N/A
KC108	Kerbside	100	100.0	-	-	-	-	31.7	31.0	37.2	29.8	N/A
KC109	Kerbside	100	100.0	-	-	-	-	36.9	35.5	**41.0**	32.9	N/A
KC110	Roadside	100	100.0	-	-	-	-	34.4	33.7	37.1	29.8	N/A
KC111	Kerbside	100	100.0	-	-	-	-	34.6	31.8	35.5	28.5	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 25%.
Results have been distance corrected where applicable.
(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%).

2.5 Interpretation of Annual Mean NO_2 Results

In 2021 we reported that KC1-KC4 met the annual mean NAQO and WHO 2005 Guideline Value, however KC5 (Earl's Court) exceeded it at 44 µg/m^3. For 2022 we can report a similar occurrence, KC1-KC4 continued to meet both the NAQO and WHO 2005 values, KC5 at 41 µg/m^3, whilst lower than in 2021, still exceeds them.

The following monitoring locations saw a small to medium increase in the bias adjusted and annualised NO_2 concentration between 2021 and 2022.

Table 5. Sites with increased NO_2 Bias Adjusted and Annualised Concentration in 2022

Site ID	Site Type	2021 (µg/m^3)	2022 (µg/m^3)	Difference (µg/m^3)
KC78	Kerbside	23.0	23.5	+0.5
KC42	Roadside	20.3	20.9	+0.6
KC54	Roadside	32.0	33.2	+1.1
KC70	Kerbside	28.4	29.7	+1.3
KC45	Roadside	22.1	24.6	+2.5
KC72	Kerbside	27.4	30.4	+3.0
KC49	Urban Centre	36.7	41.4	+4.7

Site ID	Site Type	2021 (µg/m^3)	2022 (µg/m^3)	Difference (µg/m^3)
KC76	Kerbside	21.8	27.1	+5.4

Of the eight sites that saw increases in concentrations between 2021-2022, seven were located within close proximity to a road, being classified as either Kerbside or Roadside. A few of the sites have been located within the vicinity of construction works (KC54, KC42 and KC49), which could have contributed to the higher recorded levels. These locations will be reviewed in the 2024 Annual Status Report to determine any unfolding trends.

The most notable (greatest) reduction in concentrations were identified in the following locations:

Table 6. Sites with decreased NO_2 Bias Adjusted and Annualised Concentration in 2022

Site ID	Site Type	2021 (µg/m^3)	2022 (µg/m^3)	Difference (µg/m^3)
KC44	Urban Background	25.5	18.4	-7.1
KC83	Kerbside	38.4	30.4	-8.0
KC90	Near Road	44.5	35.5	-9.0
KC69	Urban Background	29.2	19.5	-9.6
KC89	Kerbside	51.3	40.0	-11.2

When compared to the Air Quality Objectives (AQO) and WHO Guideline Values, no automatic monitoring locations breached the annual mean objective of 40 µg/m^3. Of the diffusion tubes, only one long term monitoring site, KC49, exceeded the annual mean objective in 2022, after previously meeting the NAQO in 2021. In total, two long term diffusion tube monitoring locations (KC33 & KC49) and ten newer diffusion tube monitoring locations (KC91, KC93-KC95 and KC97-KC102) exceeded the annual mean objective in 2022 after bias adjustment and annualisation.

Figure 2: Annual Mean NO_2 Concentrations (2016-2022): Automatic Monitoring Stations

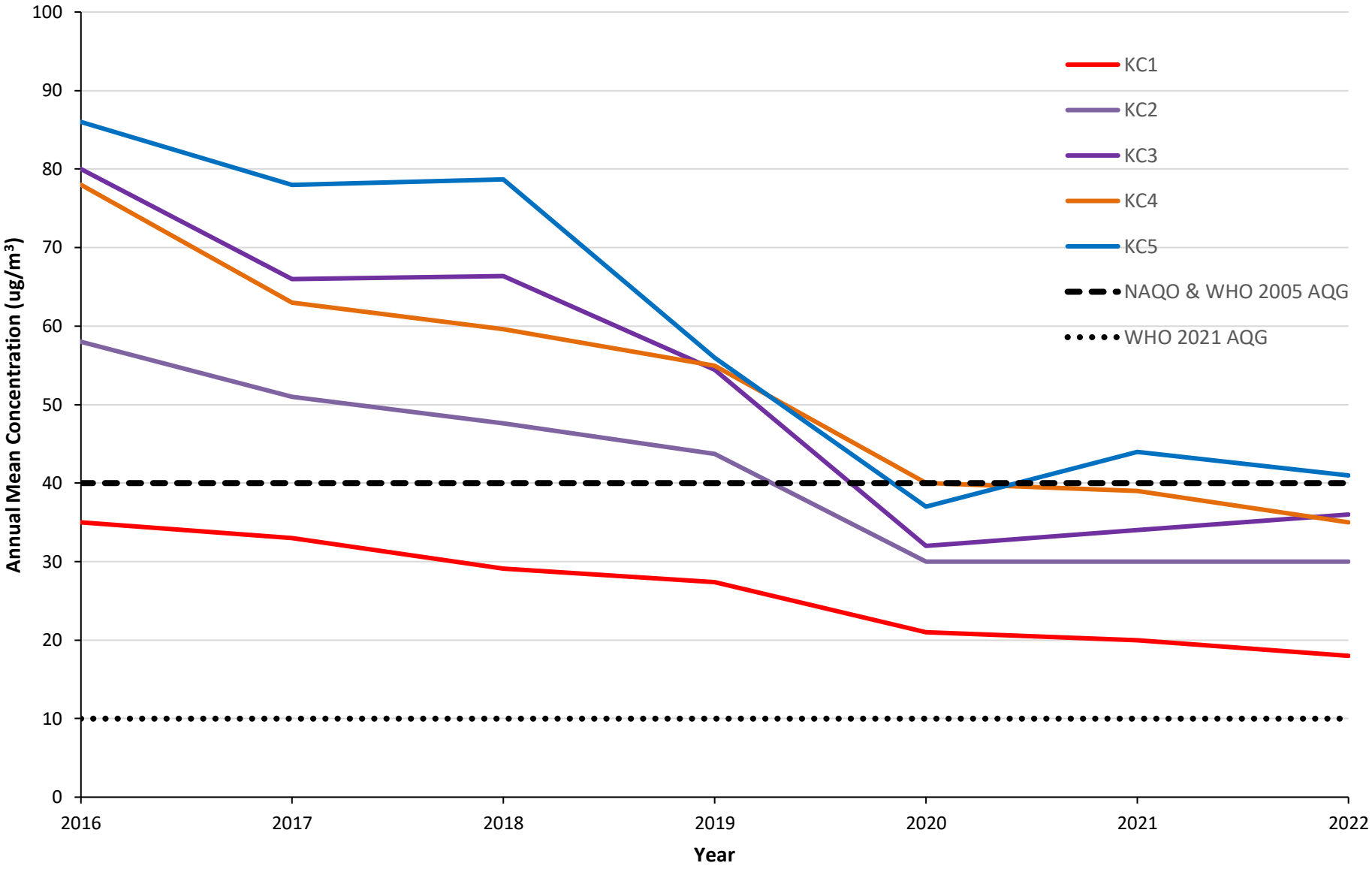


Figure 3: Annual Mean NO_2 Concentrations (2016-2022): Roadside Monitoring Locations

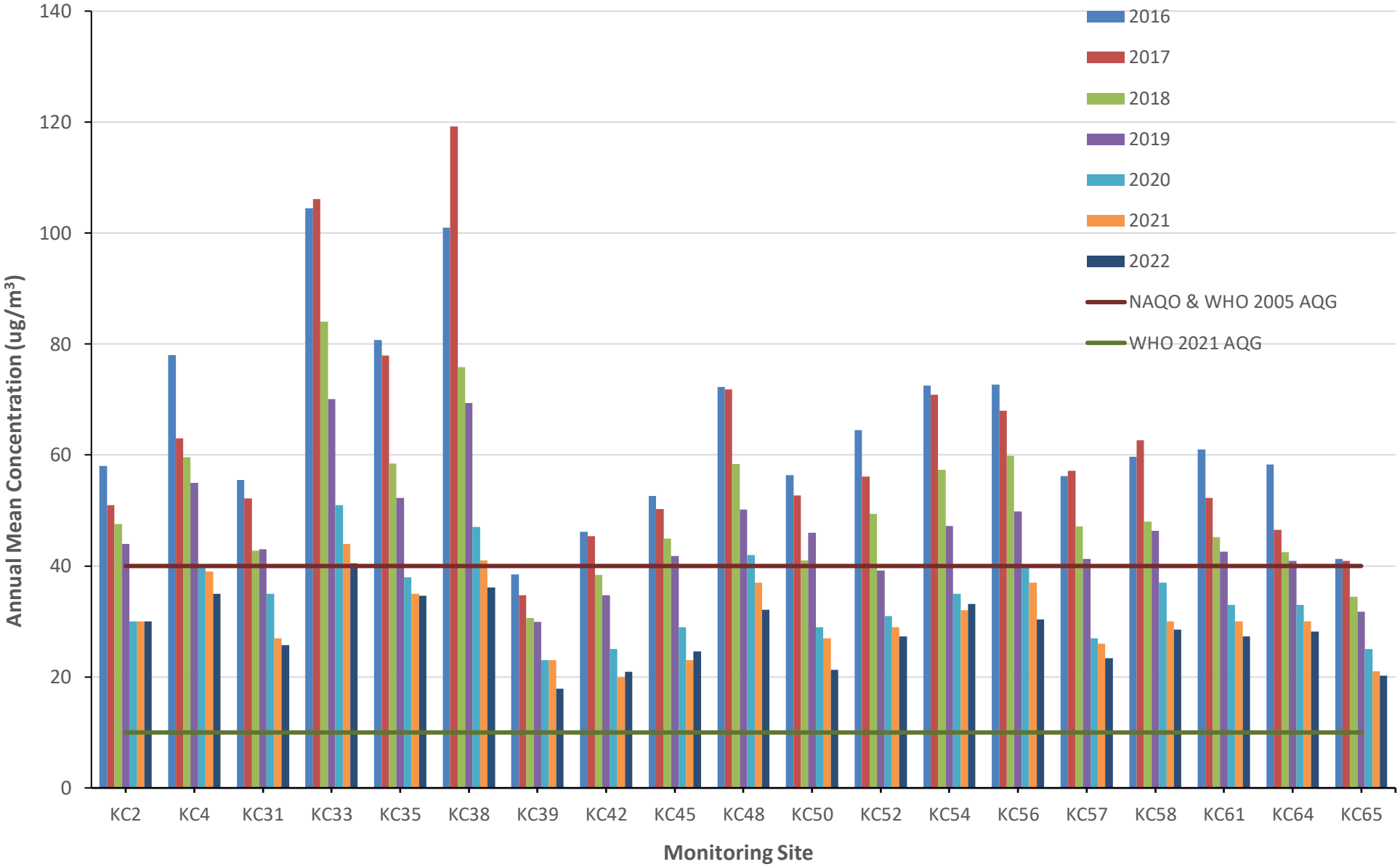


Figure 4: Annual Mean NO_2 Concentrations (2016-2022): Kerbside Monitoring Locations (excluding KHS Locations)

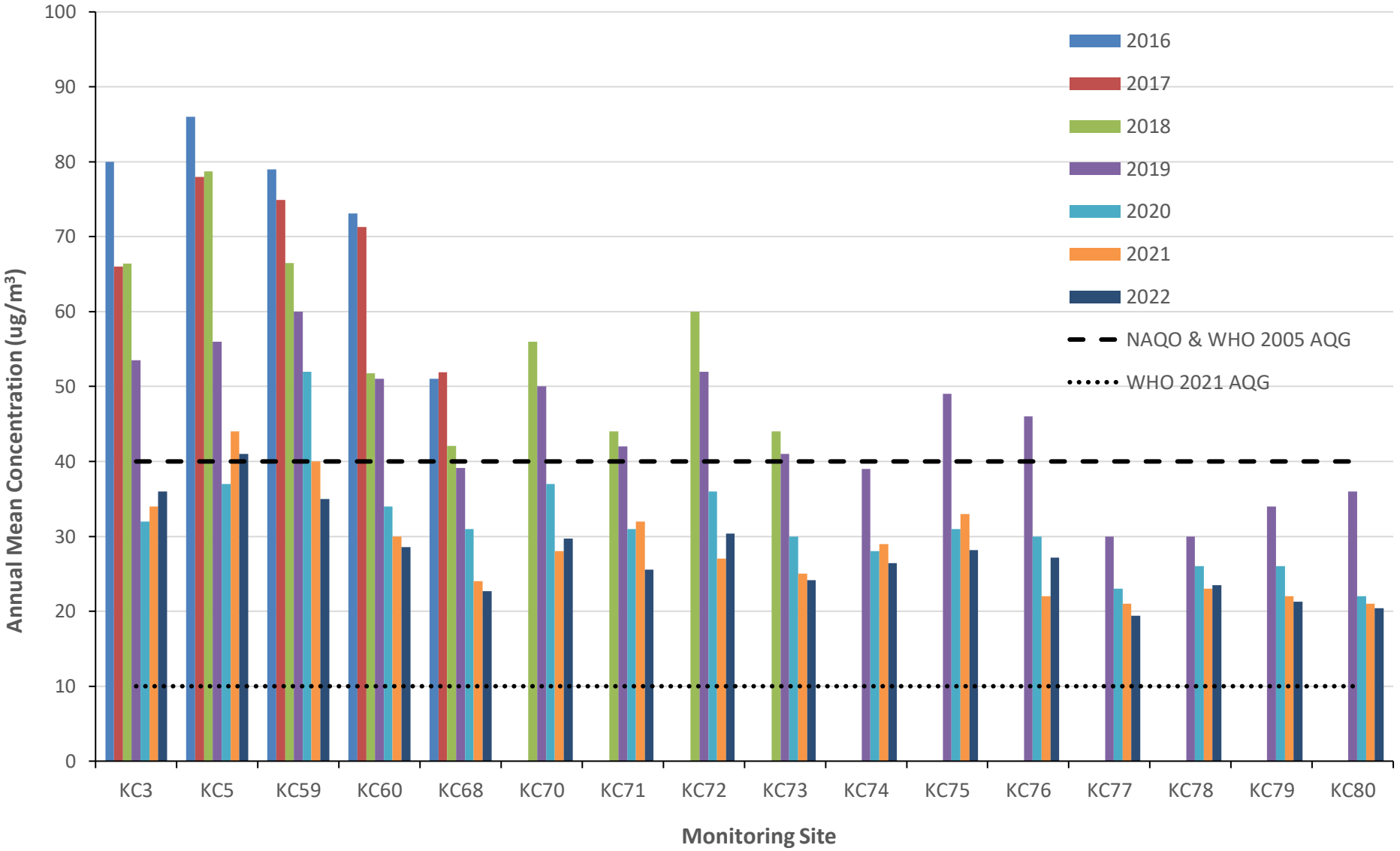


Figure 5: Annual Mean NO_2 Concentrations (2020-2022): Kerbside Monitoring Locations (KHS Locations only)

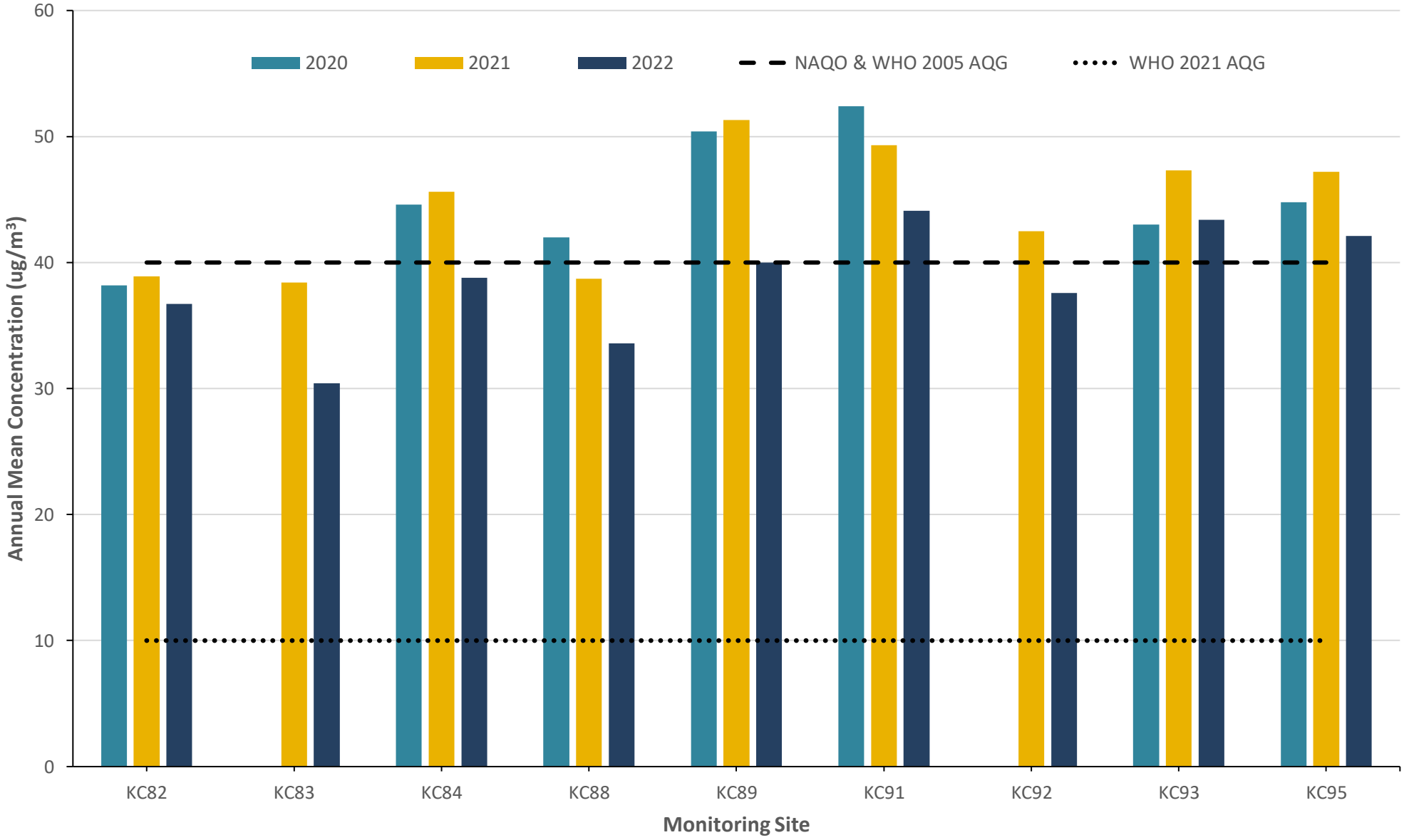


Figure 6: Annual Mean NO_2 Concentrations (2016-2022): Urban Background and Urban Centre Locations

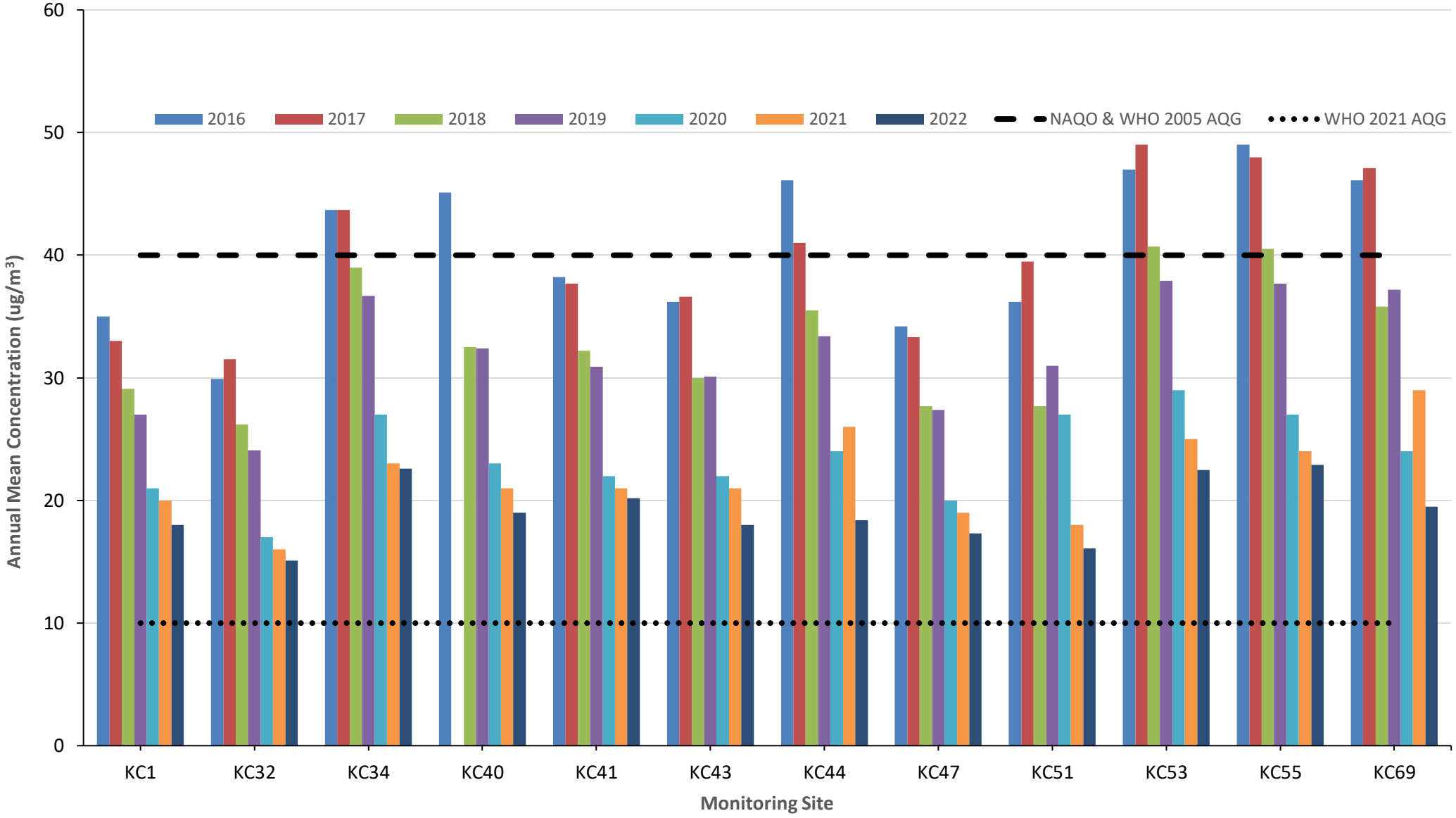


Figure 7: Annual Mean NO_2 Concentrations (2016-2022): Railway Monitoring Locations

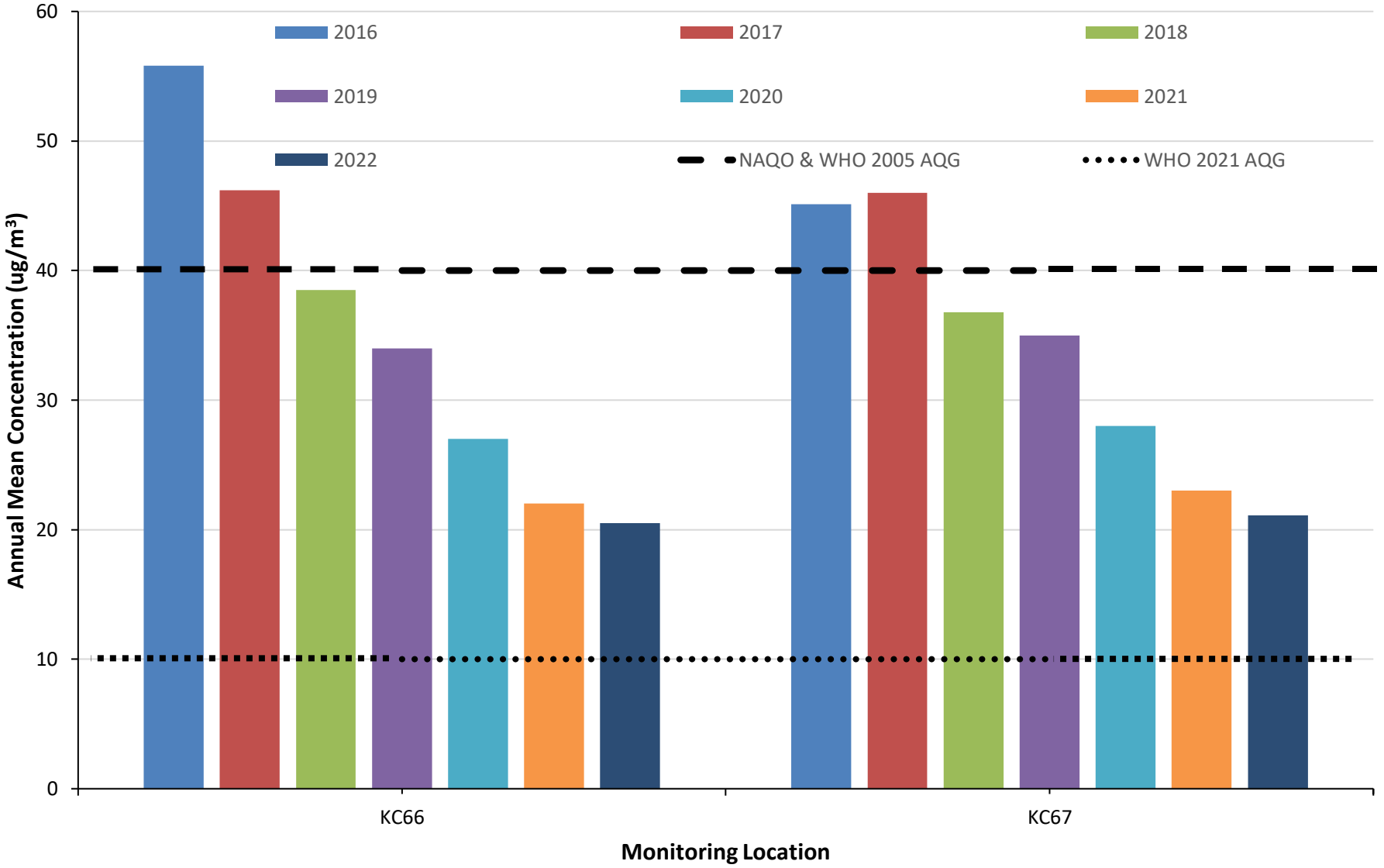


Table 7. NO_2 Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m^3

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2022 %([b])	2016	2017	2018	2019	2020	2021	2022
KC1	98.09	98.09	0	1	0	0	0	0	0
KC2	88.39	88.39	1	0	0	0	0	0	0
KC3	93.62	93.62	**262**	**92**	**43**	15	3	0	0
KC4	99.61	99.61	**54**	4	0	0	0	0	0
KC5	97.68	97.68	**120**	**24**	**29**	2	0	0	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.
(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%)

2.6 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 2022 with no exceedances at all. This is the fourth year in a row that all locations have achieved compliance with this AQO.

The WHO also recommend a 1-hour objective of 200 µg/m^3; however, this is not to be exceeded more than once. All sites would have met this for the last two years, whilst KC1 and KC2, as table 7 shows, have met it for some time.

Figure 11 overleaf presents the number of 1-hour means in excess of the AQO for the period of 2016-2022. At KC3 and KC5, there has been an overall downward trend in concentrations between 2018 to 2022. Exceedances at KC1 and KC2 have remained consistent throughout the most recent five-year period with no 1-hour NO_2 mean concentrations in excess of 200 µg/m^3.

Figure 8: Number of NO_2 1-Hour Means > 200 µg/m^3 between 2016-2022 at KC1-KC5

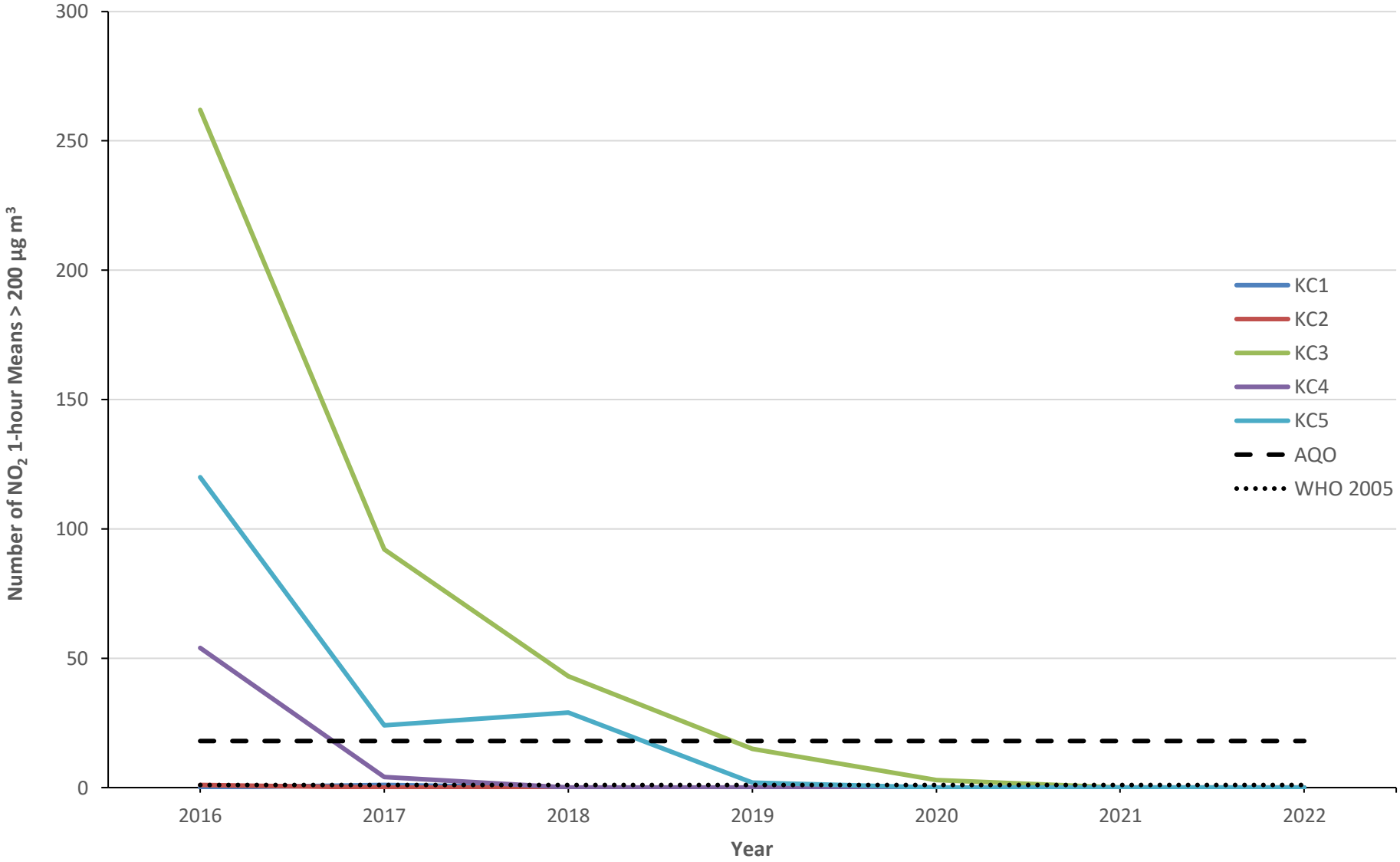


Table 8. Annual Mean PM_{10} Automatic Monitoring Results (µg m^3)

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2022 %([b])	2016	2017	2018	2019	2020	2021	2022
KC1	98.42	98.42	20	17	14	15	13	14	15
KC2	86.13	86.13	22	20	18	-	-	17	18
KC5	89.65	89.65	28	27	25	24	24	25	22

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 25%.

(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%).

2.7 Interpretation of Annual Mean PM_{10} Results

Figure 12 presents the annual mean PM_{10} concentrations for the period of 2016-2022 for KC1, KC2 (in part) and KC5. There has been a small gradual decline in concentrations at KC5 between 2018-2022, whereas KC1 and KC2 have seen a slight increase of 1 µg/m^3 in 2022.

Overall, compliance with the PM_{10} annual mean AQO (40 µg/m^3) continued to be achieved at all monitoring sites. It should be noted that there was only 60% data capture at KC2 in 2021 as the monitor was only installed in May 2021, no data 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 2005 WHO Guideline is a max concentration of 20 µg/m^3 for the PM_{10} annual mean, with this in mind KC1 and KC2 would have met the objective whilst KC5 is still to achieve it.

Figure 9: Annual Mean PM_{10} Automatic Monitoring Results at KC1, KC2 and KC5 between 2016-2022

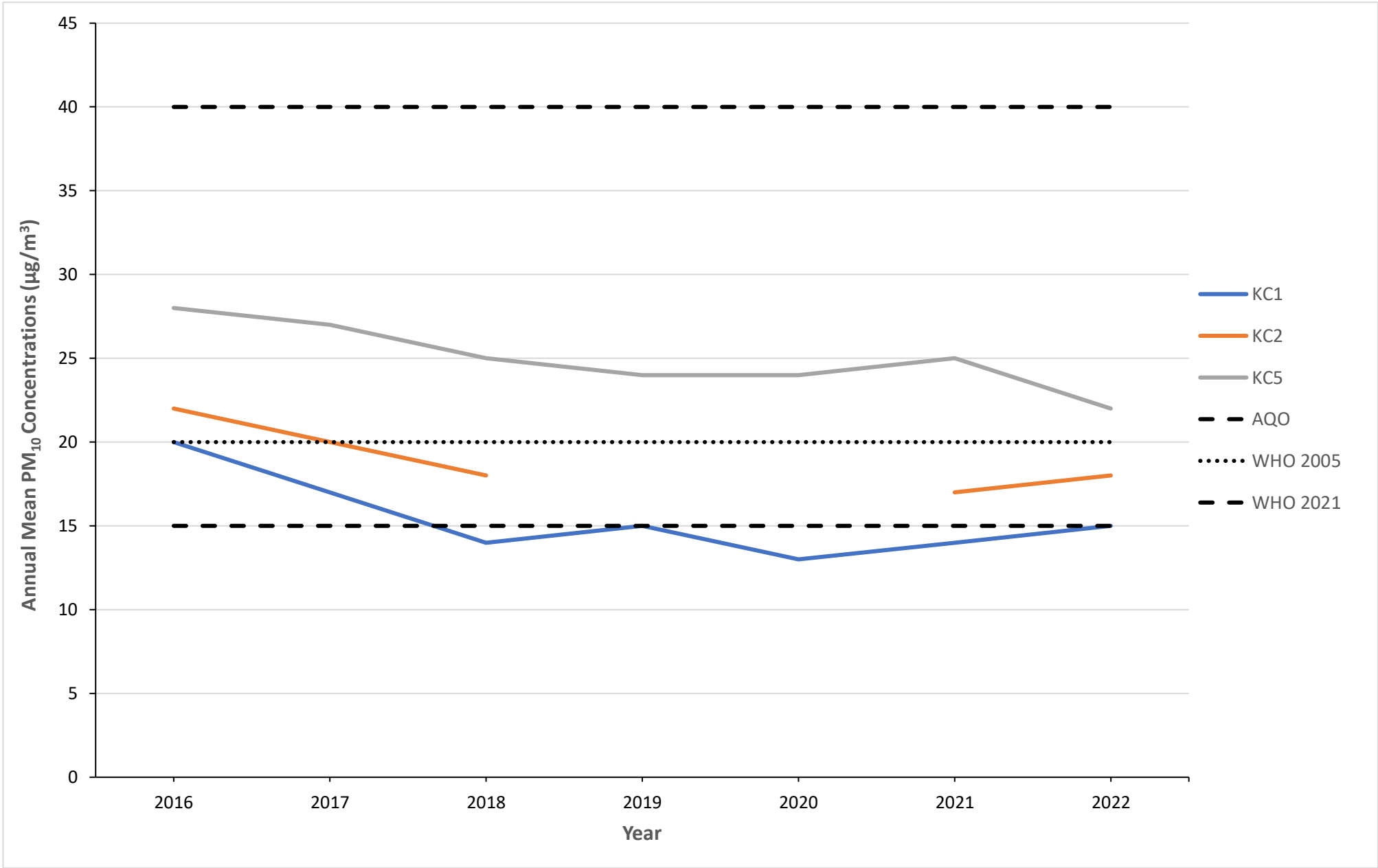


Table 9. PM_{10} Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM_{10} 24-Hour Means > 50 µg m^3

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2022 %[(b)]	2016	2017	2018	2019	2020	2021	2022
KC1	98.42	98.42	10	16	1	5	0	1	4
KC2	86.13	86.13	8	6	0	-	-	1	4
KC5	89.65	89.65	19	18	4 (33.2)	13	10	6	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 for 2018-2022. There was however a slight increase in the number of exceedances with 4 exceedances of the 24 hour mean at KC1 and KC2 in 2022 and whist there were 10 at KC5, this is lower than the permitted 35.

The 2005 WHO Guideline is 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 KC1, KC2 and KC5 would have met this objective.

Figure 13 displays the number of daily means in excess of the short term PM_{10} AQO across the KC1 and KC5 monitoring sites for the period of 2018-2022 and KC2 from 2021.

Figure 10: Number of PM_{10} Daily Means > 50 µg/m^3 at KC1, KC2 and KC5 between 2016-2022

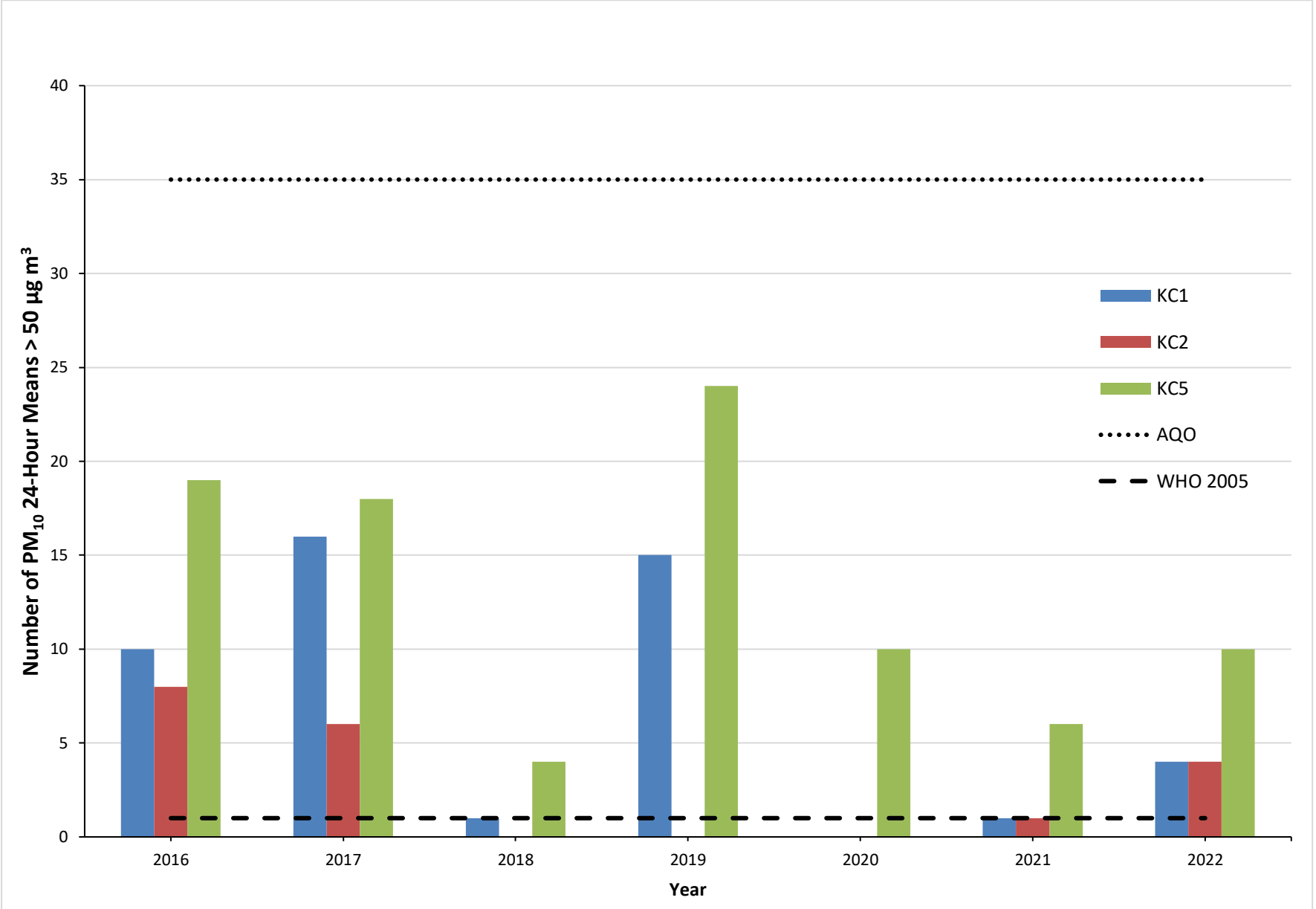


Table 10. Annual Mean $PM_{2.5}$ Automatic Monitoring Results (µg m^3)

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2022 %[(b)]	2016	2017	2018	2019	2020	2021	2022
KC1	98.42	98.42	12.1	12	9.2	10	8	9	9
KC2	85.71	85.71	25	25	-	-	-	6	10

Notes

The annual mean concentrations are presented as µg m^{-3}.
Exceedances of the $PM_{2.5}$ annual mean target of 10 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 25%.
(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

For previous reporting the annual mean NAQO has been 25 µg/m^3, however with the introduction of the new Environment Act 2021, this has since been tightened to 10 µg/m^3, which is in line with the 2005 WHO Annual Mean Guideline value, albeit with different dates by which to be achieved.

Compliance with the old NAQO of 25 µg/m^3 has been achieved historically at KC1 and KC2. Compliance with the new NAQO and WHO Guideline Value of 10 µg/m^3 has been met by KC1, although it has seen a marginal increase of 1 µg/m^3 since 2020. Both these have been met at KC2 for 2021 and 20202, however as discussed in the previous report due to the installation of the new BAM instrument in May 2021, the site only achieved a 60% data capture for the year so the 2021 result should be treated with caution as it is unlikely to truly represent conditions for that year.

Figure 14 overleaf presents KC1 concentrations between 2018 and 2022. KC2 will be added following further monitoring and once a trend can be identified.

Figure 11: Annual Mean $PM_{2.5}$ Automatic Monitoring Results at KC1 between 2016 and 2022

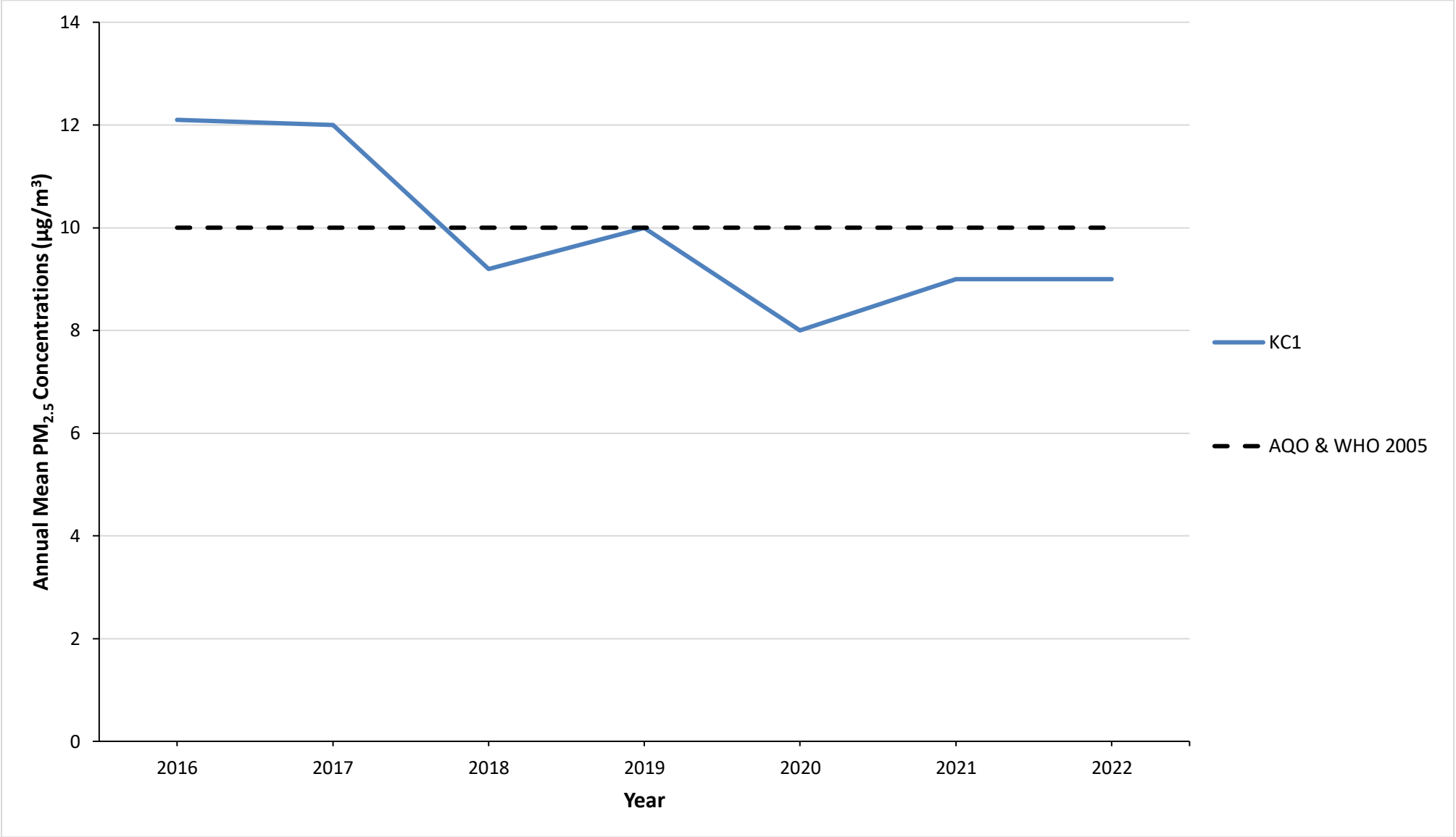


Table 11. SO_2 Automatic Monitoring Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2022 %[(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	90.45	90.45	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 Objective Results

During 2022, as was the case between 2018-2021, KC1 monitoring site achieved the 15-minute, 1-hour, or 24-hour SO_2 AQO concentration limits. However, as was reported in last year's Annual Status Report, the 2021 results should be treated with caution as the SO_2 monitor was replaced at the site in June 2021, which resulted in a lower data capture for the year (less than 75%).

Table 12. O_3 Automatic Monitoring Results: Comparison with 8-Hour Mean Objective, Number of 8-Hour Means >100 µg/m^3

Site ID	Valid data capture for monitoring period %(a)	Valid data capture 2022 %(b)	2018	2019	2020	2021	2022
KC1	98.37	98.37	**176**	**136**	**308**	**66**	**195**

Notes:
Exceedances of the O_3 8-hour mean objective (100 µg/m3 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 Objective Results

The 8-Hour Mean Objective was not met in 2022, as only 10 breaches of the objective are permitted per annum.

Figure 12: Number of O_3 8-Hour Mean Objectives > 100 µg/m^3 at KC1 between 2016-2022

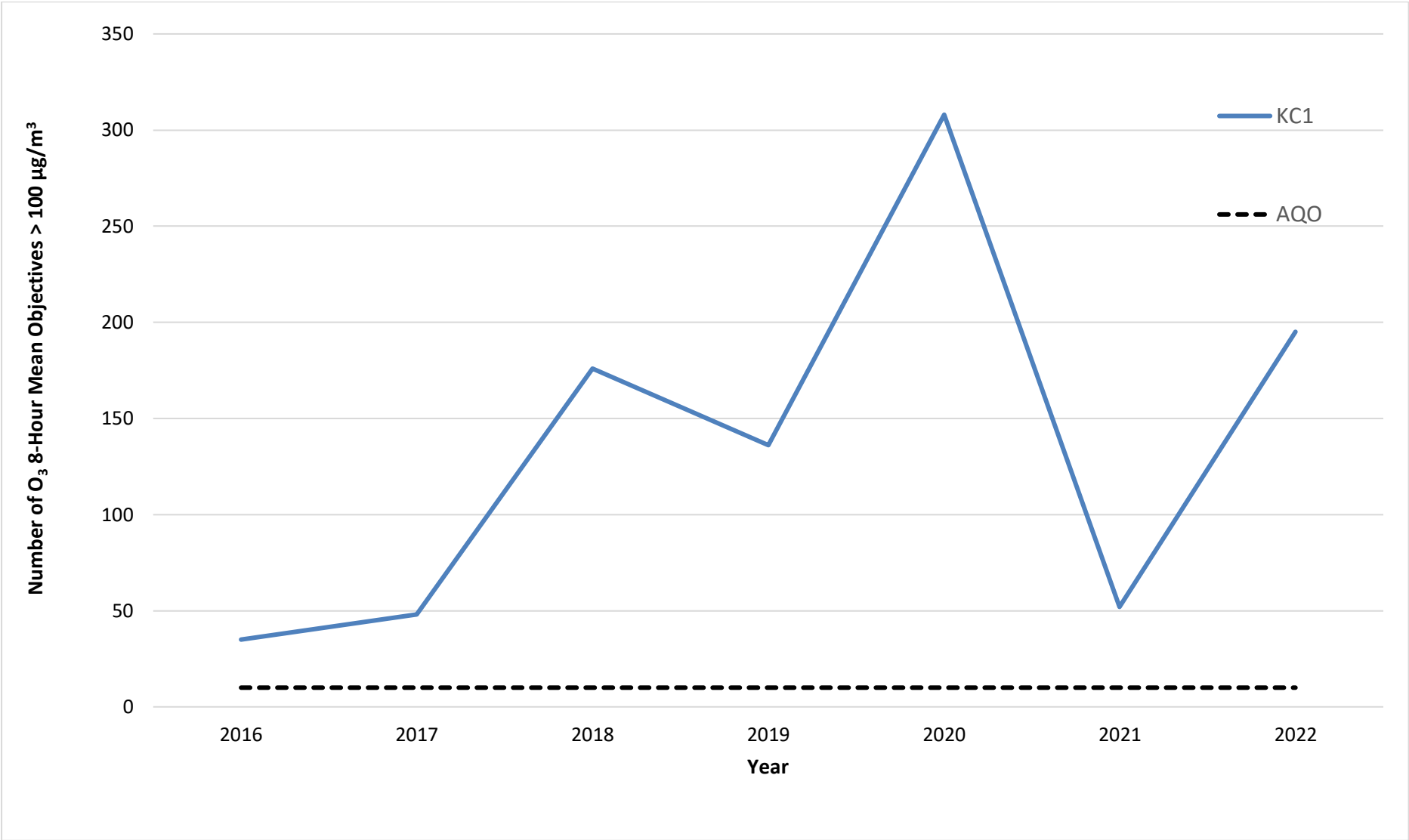


Table 13. Annual Mean Benzene Monitoring Results (µg m^3)

Year	KC01	KC02	KC03 (Discontinued)	KC04	KC05	KC0X
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
2021	0.47	0.39	-	0.40	0.40	0.62
2022	0.50	0.46	-	0.43	0.49	0.84

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 13 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 13 shown in italics) to be achieved by 31.12.2010.

Table 13 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; following this high monitored value, the concentration at the location reduced in both 2017 and 2018. Within 2022, as in 2021 and 2020, there were no exceedances of the 2010 AQO at any monitoring location.

2.13 Mobile Sensors

Kensington and Chelsea Council remains part of the Breathe London Network which in 2022 had 12 nodes deployed across the Borough, an increase of 3 nodes from 2021. Nodes BL1- BL9 were installed in 2021 and BL11-BL13 in 2022. A further five nodes were deployed in January and February 2023 (BL14 – BL17) to schools participating in the Mayor of London's Future Neighbourhoods Project, which alongside BL10, will be reported on in next year's Annual Status Report.

The network continues to be run by the Imperial College Projects Limited (Imperial College London) and nodes have been provided by their partner Clarity Movement Co and the Mayor of London. All the nodes have been co-located with London Air reference monitors. All scaled and

processed data is available to download on the individual Node information pages and through the API. Details of the nodes are in Table 14.

In 2021 the Council also purchased four mobile sensors to supplement its automatic monitoring network. Details of the nodes are in Table 14.

The data presented in Figures 17-23 from the mobile sensors give an indication of the local air quality rather than a definitive picture as these are not reference grade instruments.

Figure 13: Location of Breathe London Nodes and Vaisala Sensors

Table 14. Details of Mobile Sensors

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Height (m)	Pollutants Monitored	Mobile Sensor Type
BL1	Oxford Gardens Primary School	523720	181240	Roadside	Y	1	10	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL2	North Kensington	524041	181752	Background	Y	2	5	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL3	Al Manaar, Acklam Road	524731	181797	Roadside	Y	0.5	1.5	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL4	St Mary Abbots Primary School	525554	179655	Roadside	Y	1	50	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL5	Kensington High Street	525231	179383	Urban Traffic	Y	0.5	1	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL6	South Kensington Underground Station	526823	178830	Urban Traffic	Y	1	0.5	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL7	Royal Marsden Hospital	526921	178467	Urban Traffic	Y	0.5	5	2	NO_2 & $PM_{2.5}$	Clarity Node-S
BL8	Sloane Street	527831	179524	Urban Traffic	Y	0.5	3	4	NO_2 & $PM_{2.5}$	Clarity Node-S
BL9	Holy Trinity Church of England Primary School	528080	178466	Roadside	Y	0.5	5	1.5	NO_2 & $PM_{2.5}$	Clarity Node-S
BL10	Oakley Street	527329	177713	Kerbside	Y	0.5	0.5	2.5	NO_2 & $PM_{2.5}$	Clarity Node-S
BL11	Royal Brompton Hospital, Fulham Wing	526899	178410	Roadside	Y	0.5	2.0	2	NO_2 & $PM_{2.5}$	Clarity Node-S

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Height (m)	Pollutants Monitored	Mobile Sensor Type
BL12	Sloane Square	528049	178652	Roadside	Y	1.0	5.0	5	NO_2 & $PM_{2.5}$	Clarity Node-S
BL13	Warwick Road	525309	178406	Kerbside	Y	0.5	0.5	4	NO_2 & $PM_{2.5}$	Clarity Node-S
KCM01	Kensington High Street 1 (VS009)	525726	179690	Urban Traffic	Y	0.5	1	4	NO_2, PM_{10} & $PM_{2.5}$	Vaisala
KCM02	Kensington High Street 2 (VS010)	525273	179415	Urban Traffic	Y	0.5	1	4	NO_2, PM_{10} & $PM_{2.5}$	Vaisala
KCM03	Sedding Street (VS008)	528048	178781	Urban Traffic	Y	0.5	0.5	4	NO_2, PM_{10} & $PM_{2.5}$	Vaisala
KCM04	Holland Park Avenue / Norland Square (VS009)	524338	180083	Urban Traffic	Y	1	0.5	4	NO_2, PM_{10} & $PM_{2.5}$	Vaisala

Figure 14: Monthly Average NO_2 Concentrations for Breathe London School and Hospital Sites in 2022

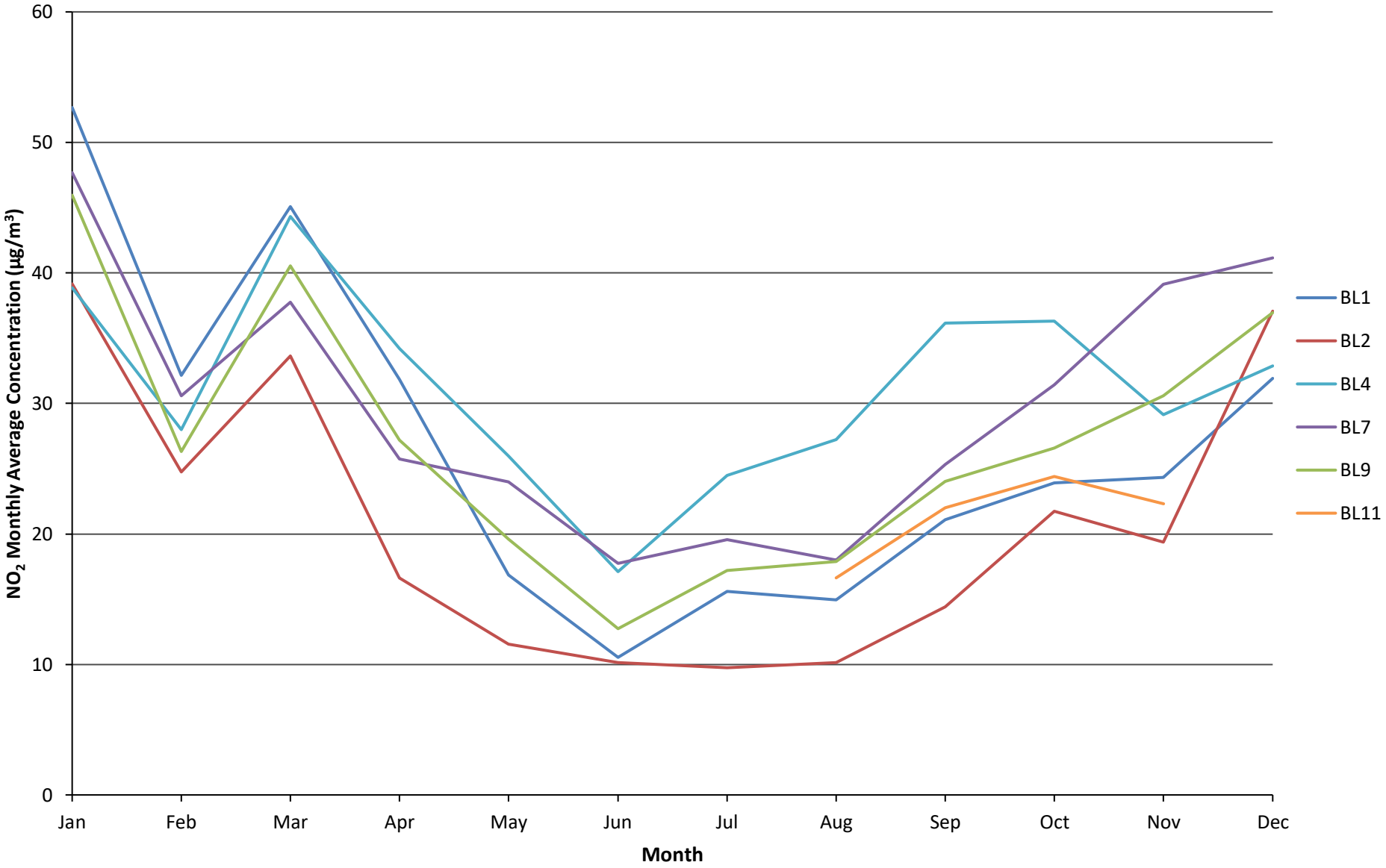


Figure 15: Monthly Average NO_2 Concentrations for Breathe London Road Sites in 2022

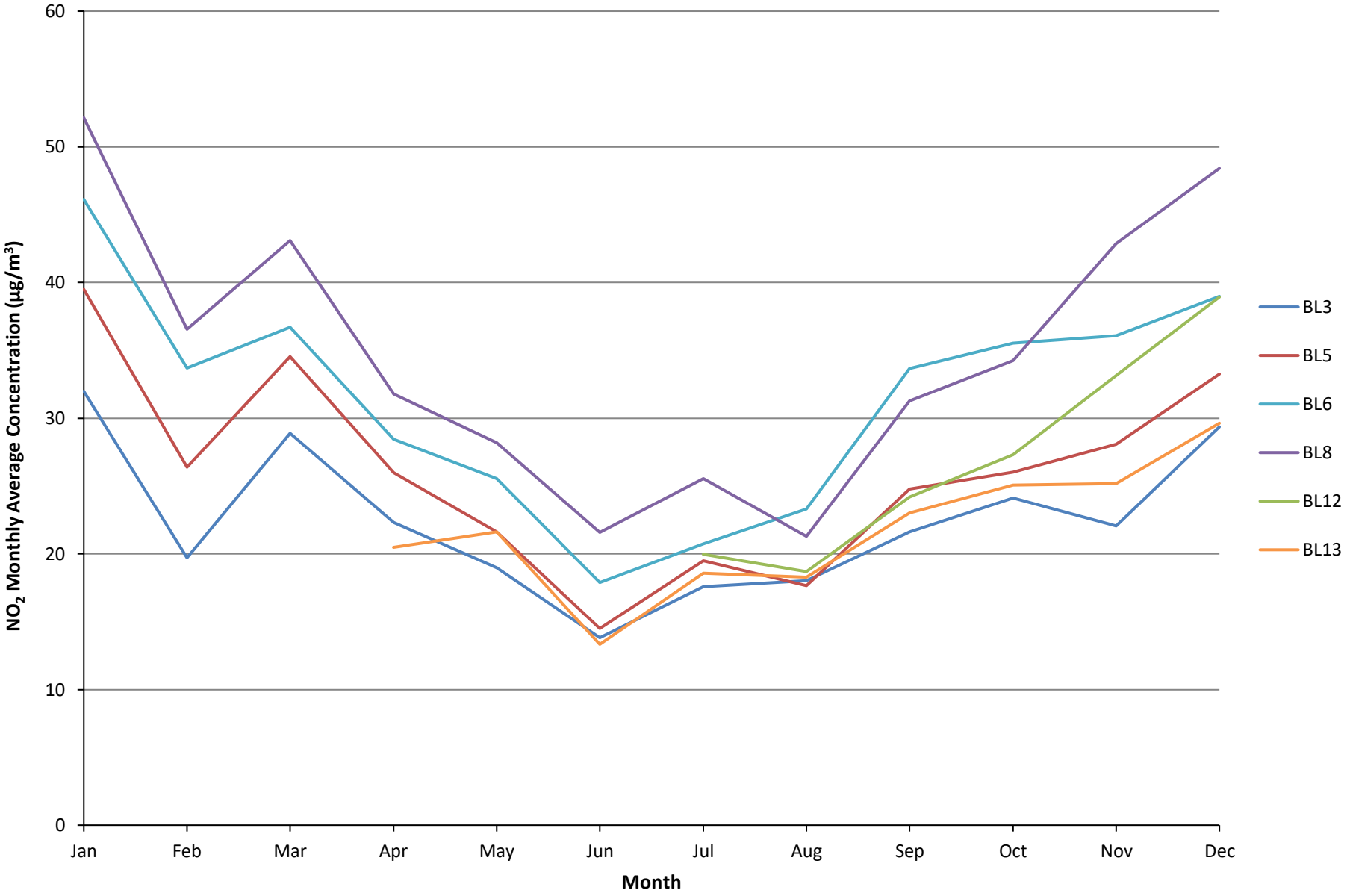


Figure 16: Monthly Average $PM_{2.5}$ Concentrations for Breathe London School & Hospital Sites in 2022

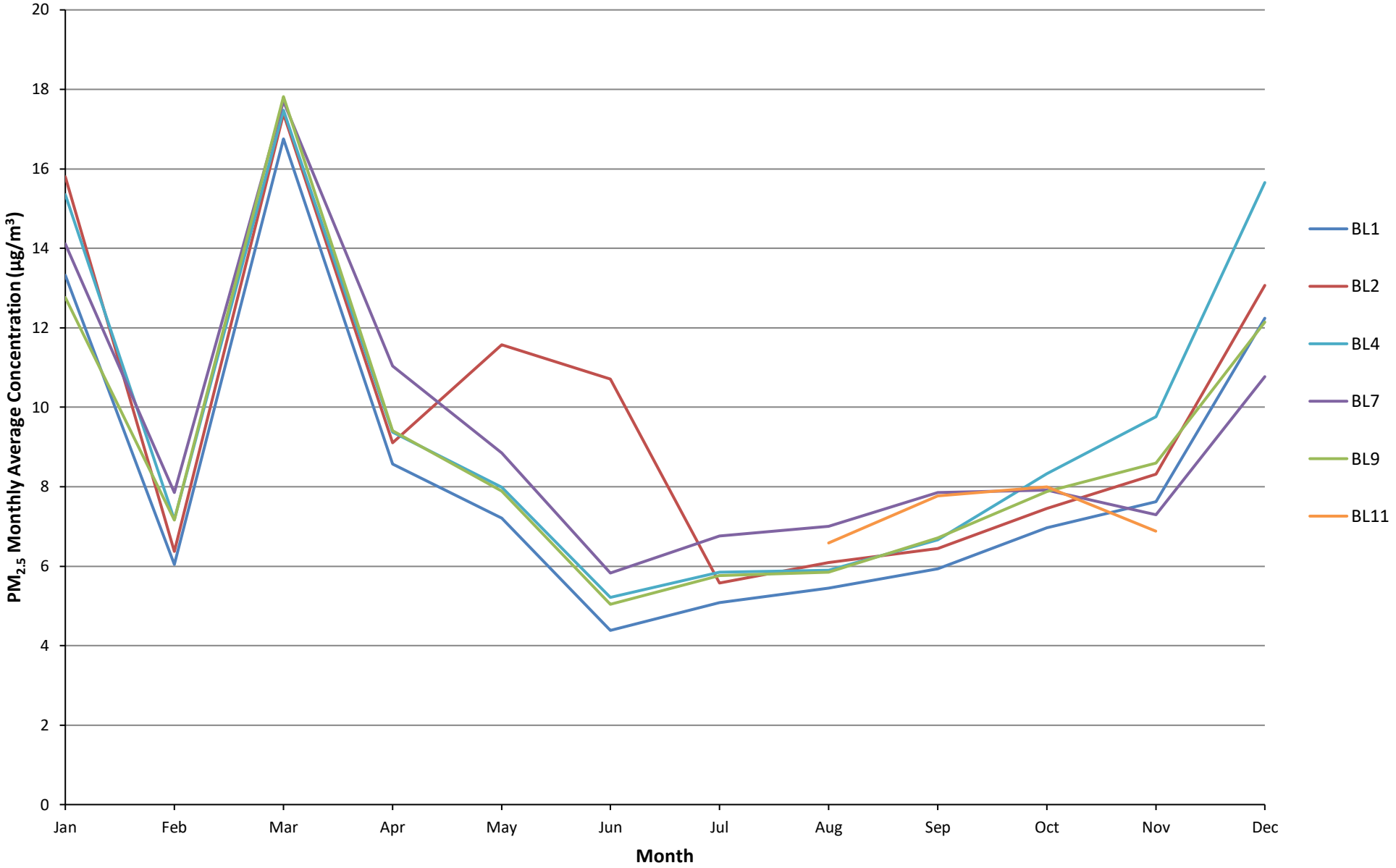


Figure 17: Monthly Average $PM_{2.5}$ Concentrations for Breathe London Road Sites in 2022

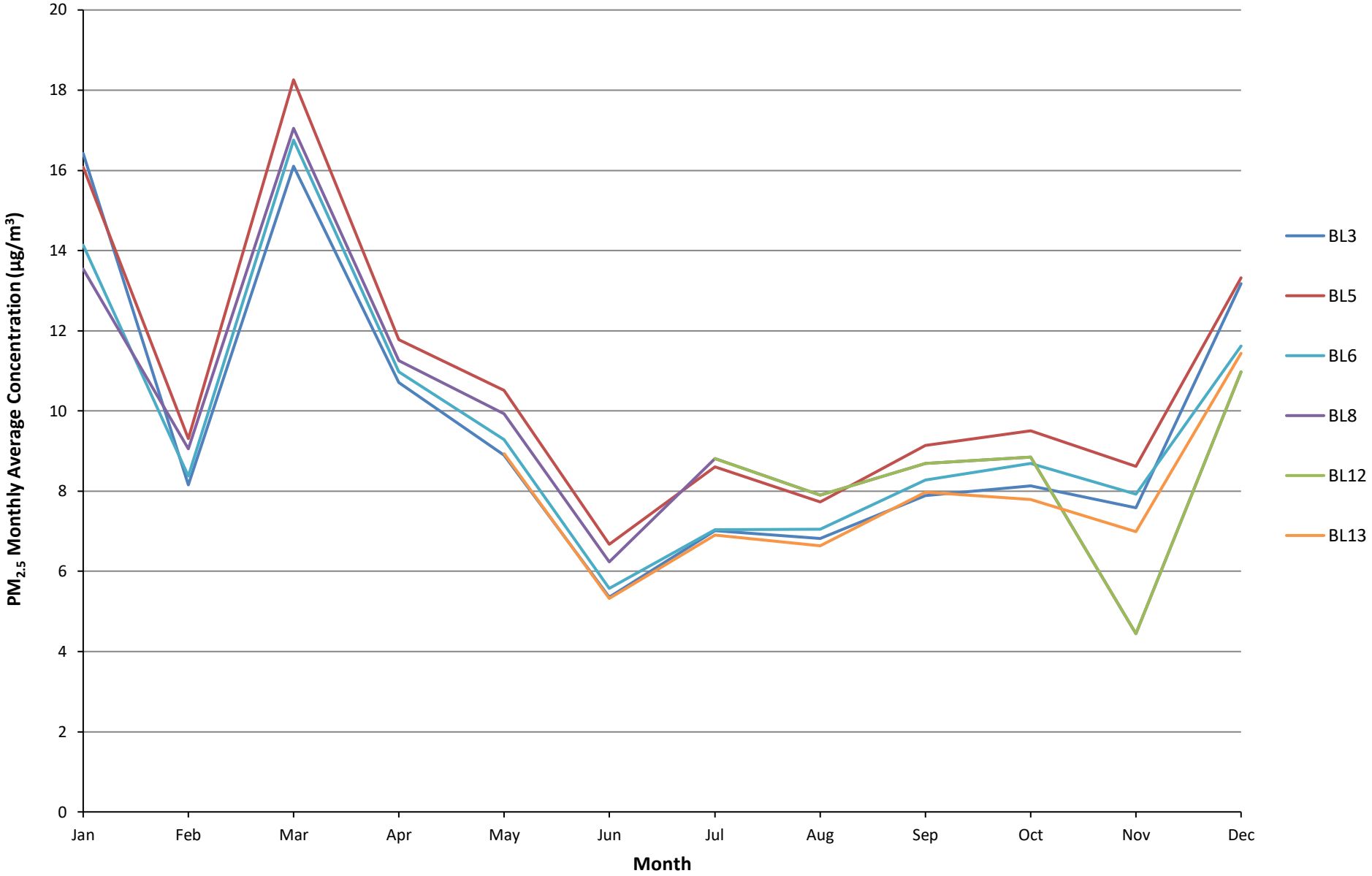


Figure 18: Monthly Average NO_2 Concentrations for KCM01-KCM04 in 2022

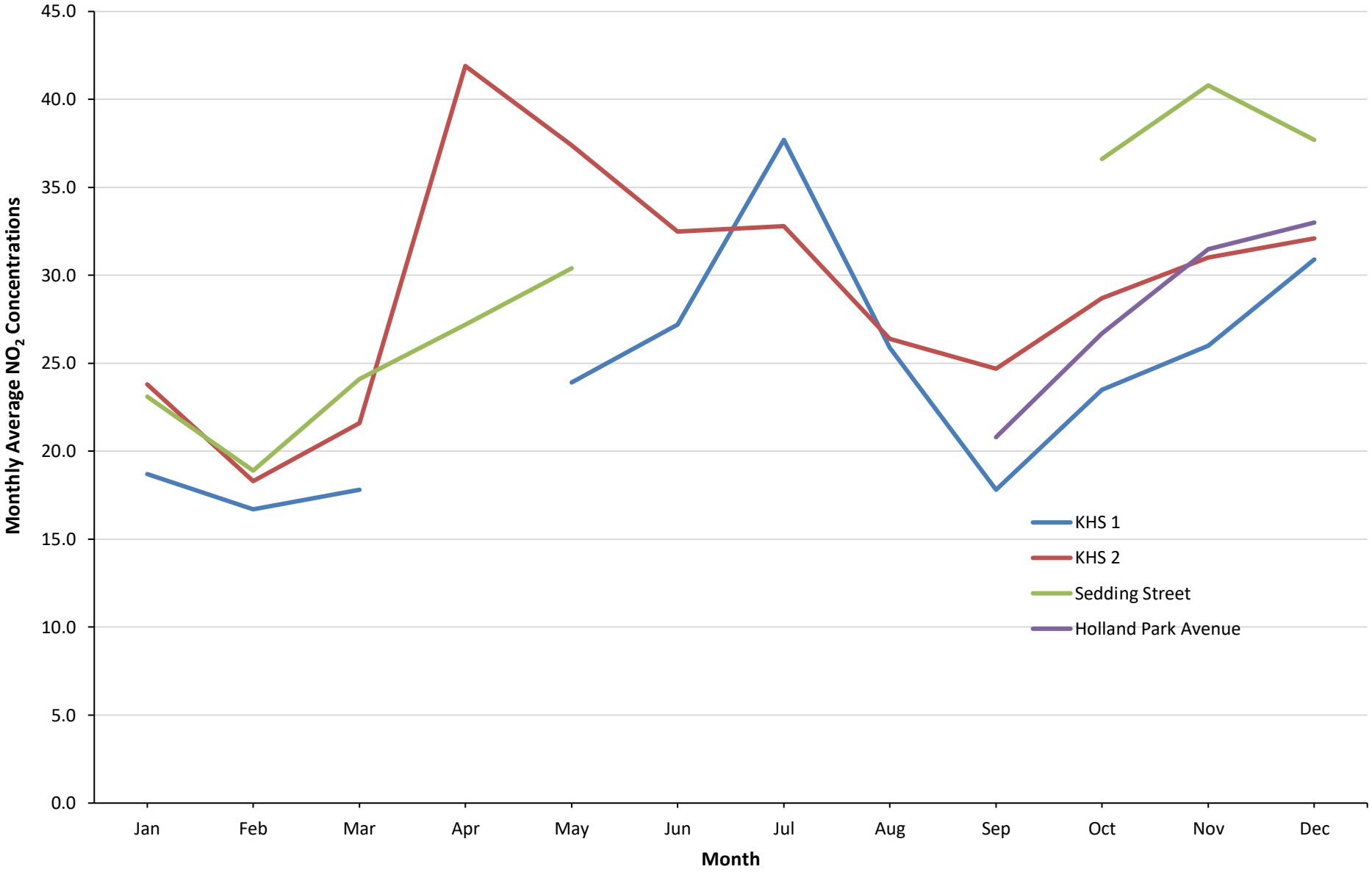


Figure 19: Monthly Average PM_{10} Concentrations for KCM01-KCM04 in 2022

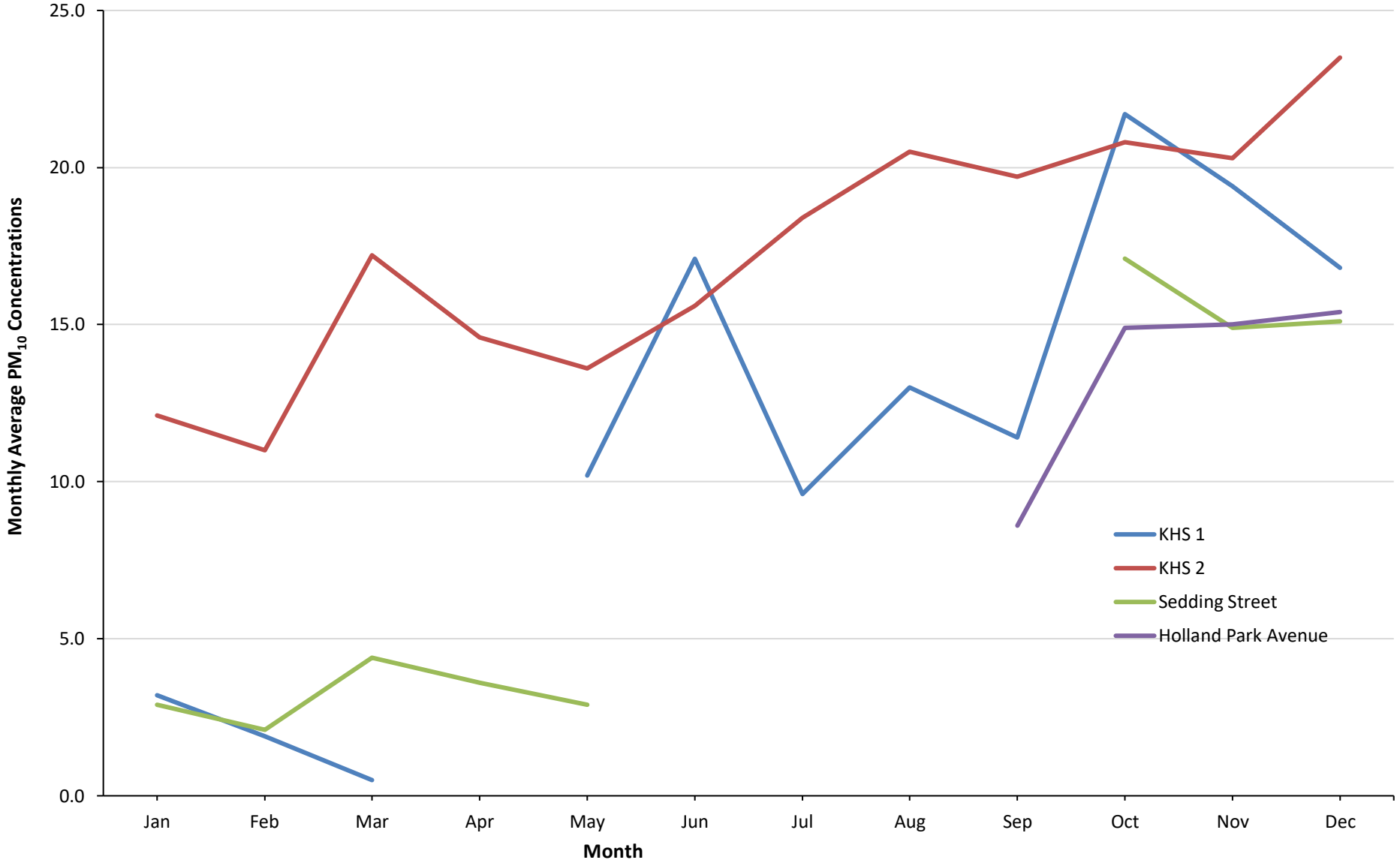
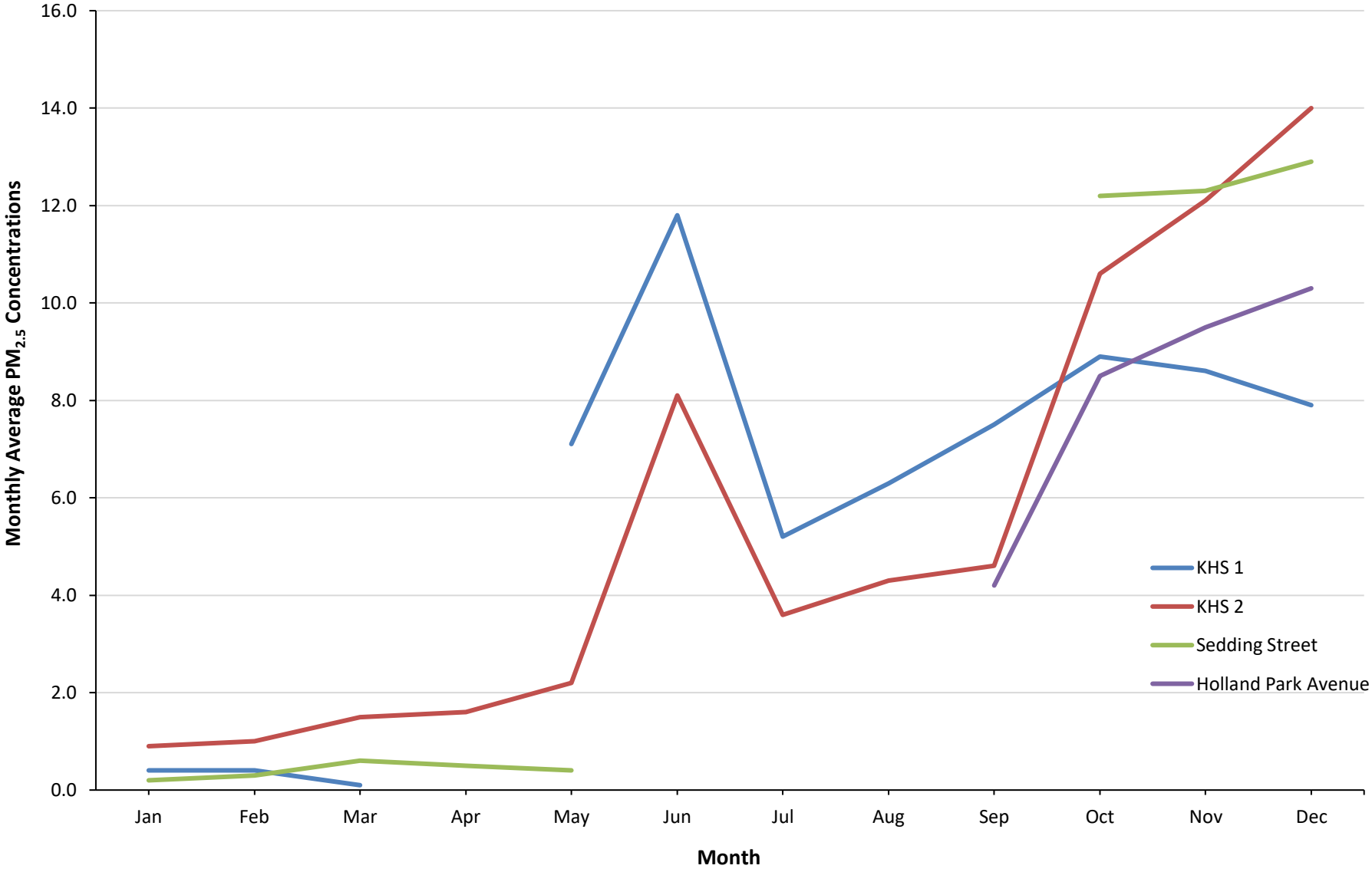


Figure 20: Monthly Average $PM_{2.5}$ Concentrations for KCM01-KCM04 in 2022



3. Action to Improve Air Quality

3.1 Air Quality Action Plan Progress

Table 15 provides a brief summary of Kensington and Chelsea's progress against the Air Quality Action Plan, showing progress made during 2022. The full action plan can be viewed at https://www.rbkc.gov.uk/media/document/air-quality-action-plan-2022-27

Table 15. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
M1	Monitoring and statutory duties	Continue to provide air quality pollutant monitoring across the borough via our five reference automatic monitoring stations and additional mobile sensors	• Retained 100% of automatic monitor network. • KC1 achieved an 89-98% Data Capture Rate across pollutants measured. • KC2 achieved an 86-88% Data Capture Rate across pollutants measured. • KC3 achieved a 93% Data Capture Rate across pollutants measured. • KC4 achieved a 99% Data Capture Rate across pollutants measured. • KC5 achieved a 90-98% Data Capture Rate across pollutants measured.
M2	Monitoring and statutory duties	Maintain Diffusion Tube Network	• Retained 100% of the NO_2 diffusion tube network. • NO_2 sites achieved between 72%-100% annual data capture rate. • Retained 100% BTEX Diffusion Tube Network. • All BTEX sites achieved a 100% annual data capture rate.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
M3	Monitoring and statutory duties	Review opportunities for expanding the monitoring network	• The Council installed an additional Vaisala mobile sensor on Holland Park Avenue in May 2022 (to bring the total of Vaisala monitors to four). Data from these can be found here Royal Borough of Kensington & Chelsea - Air Quality monitoring service (airqualityengland.co.uk) • We placed an order for a further five Breathe London sensors (installed in February 2023) which takes the total number of sensors to 17. Data from these can be viewed at Breathe London www.breathelondon.org • We intend to install a further 15 Breathe London sensors by or in the grounds of schools by the end of the 2023/24.
M4	Monitoring and statutory duties	Improve dissemination of data	• A review of all the Council's air quality related web pages has commenced New text has been drafted about air quality monitoring and smoke control and these pages will be updated first. At present, monitoring data is spread across several websites, and a new web page to bring it altogether will make it more accessible.
M5	Monitoring and statutory duties	Statutory reporting	• The 2021 ASR was produced and submitted to the GLA in May 2022. This can be viewed on the Council's website at https://www.rbkc.gov.uk/media/document/annual-status-report-2022-covering-2021
P1	Public health and awareness raising	Promotion of existing air quality messaging services	• At the end of 2022, the Council had 416 active subscribers, only a net increase of 7. • There were 22 alert days and 5,485 alert messages were sent by text, email or voicemail.
P2	Public health and awareness raising	Develop air quality messaging service	No action has been taken - work to hopefully commence in 2023.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
P3	Public health and awareness raising	Develop and embed alert service	As above.
P4	Public health and awareness raising	Increase awareness among NHS colleagues about impact of air pollution on health	The Council worked with two students from Imperial College in 2022 who completed their Masters projects on the following subject areas: • Empowering Community Professionals in the Royal Borough of Kensington and Chelsea: A possible approach to effective air pollution information communication • Talking Dirty: Exploring gaps in air pollution Risk communication for residents of RBKC We are now in the process of considering how best to take the recommendations forward.
P5	Public health and awareness raising	Sense Check	No action has been taken - work to hopefully commence in 2023.
P6	Public health and awareness raising	Promotion of clean air walking and cycling routes	Clean air route mapping for walking and cycling routes to schools, were recommended to 7 schools as part of the air quality and climate change audits delivered in the summer of 2022 for the GLA's Future Neighbourhoods programme
P7	Public health and awareness raising	Cycleways Map	Map is available at: https://www.rbkc.gov.uk/parking-transport-and-streets/cycling-and-walking/cycle-routes
P8	Public health and awareness raising	Promotion of smoking cessation to reduce smoking at home and the impact on indoor air quality	1214 smoke free home pledges were signed in 2022.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
P9	Public health and awareness raising	Support initiatives to improve indoor air quality	• A review of all the Council's air quality related webpages has begun. The pages will be updated in succession in 2023. • Officers from the Council's Pollution Regulatory Team gave a presentation on indoor air quality to the Council's Private Sector Housing Team.
P10	Public health and awareness raising	Discourage burning of logs and house coal	• Large scale publicity drive postponed due to the cost of living crisis. • New commercial and residential information leaflets have been drafted and web page is in the process of being updated. • Publicised the scientific study being supported by the London Wood Burning Working Group and contacted residents associations to complete environmental questionnaire.
P11	Public health and awareness raising	Engagement with Canal and Rivers Trust and canal boat owners	• New commercial and residential information leaflets have been drafted to replace current outdated leaflet available on the website but no engagement with canal boat owners has taken place as yet.
P12	Public health and awareness raising	Support NHS colleagues with audits in hospitals	To be taken forward in 2023.
P13	Public health and awareness raising	Combined sustainability leaflet	• A Sustainability Booklet for local business and Climate Change Brochure for residents are being developed as part of the Notting Dale Future Neighbourhoods 2030 programme. The content has been drafted submitted internally for approval. • The draft Climate Change webpage revisions have been submitted internally and are awaiting review and comment. This includes resources to support climate action as well as dedicated pages for the Business Environmental Charter, School Environmental Charter and the Notting Dale Future Neighbourhood Project.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			• An environmental hub page will be designed this year.
P14	Public health and awareness raising	Training for Council staff	Four officers have completed the Air Quality Domestic Fuel Regulations training so far, with more planning to complete it in 2023.
T1	Cleaner transport and active travel	Reduction in Council fleet operation emissions and for fleets of Council contractors	• Council's fleet was responsible for 38.5 tonnes CO2e and represents 0.3% of all Council emissions. • A review of the Council's mileage is underway and will be included as part of the Council Carbon Performance Report 2022/2023. • The eco driving training is currently on hold until a new certified trainer has been commissioned. The previous trainer from Energy Saving Trust has retired due to health issues and the training sessions scheduled had to be cancelled.
T2	Cleaner transport and active travel	Implementation of travel hierarchy across the Council to encourage active travel	• 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 new leasing contract/ agreements and to ensure that the Council's diesel fleet is being phase out and replaced with electric vehicles. • Regular meetings organised with the RBKC Fleet Manager to review the Council's fleet and ensure all fleet managers follow the travel hierarchy. • A proposal for a Council wide pool bike service and an extension from Pembroke Road to KTH has been developed. Will be investigating sources of funding to develop this service for Council staff.
T3	Cleaner transport and active travel	Grey Fleet Review	A grey fleet review is currently underway. The report has not been completed yet. A request has been submitted on getting access to key information such as: how much the Council is spending on grey fleet, how many Council employees are using it etc. and info on the vehicles/cars being used.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
T4	Cleaner transport and active travel	Cleaner Transport provision within Procurement	• A Working Group has been created to ensure that the new leasing contract which is being updated and procured will align with the Green Fleet Strategy. • Communication and emails have been sent to all departments to ensure they comply with the travel hierarchy and the Green Fleet Strategy. • The Climate Change Team has been working closely with the Procurement Team to update the new Sustainability and environmental Clauses and embed environmental KPIs in the contracts. • A review is underway to assess the carbon impact of all major contracts. • An environmental section has been introduced in the Sourcing Strategy and Climate Change Team is now one of the consultees of the Commercial Assurance Panel where all major contracts and papers are discussed.
T5	Cleaner transport and active travel	Bike by Default	The business environmental charter will include an action to 'Facilitate Sustainable Travel and Fleet' and 'facilitate active ways of travelling to all stakeholders for improved air quality, mental and physical health.' This includes the promotion of services such as 'Pedal Me'
T6a	Cleaner transport and active travel	Cycle Training for children and adults	824 lessons have been provided to adults and children; funding levels have not yet returned to pre-pandemic levels.
T6b	Cleaner transport and active travel	Re-start social cycle training programme	Programmed to be re-started in 2023.
T7	Cleaner transport and active travel	Dr Bike Surgeries	36 public Dr Bike sessions have been held monthly at three locations across the borough.
T8	Cleaner transport and active travel	Increase bike parking and tree planting	Scheme has experienced challenges with identifying locations suitable for tree placement due to utilities and basements under the carriageway. One hangar and tree combination is in progress at St Mark's Road.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
T9	Cleaner transport and active travel	Install additional cycle parking	50 new Cyclehoops, 24 new Sheffield stands and 8 new secure cycle hangars were installed.
T10	Cleaner transport and active travel	Build on existing programme of school streets	• Consulted on St Mark's Road School Street for Thomas Jones Primary School – scheme due to launch on 18 April 2023. • Also consulted on two additional schemes, one for St Charles Primary School (St Charles Square) and Instituto Espanol Canada Blanch (St Lawrence Terrace). These two schemes withdrew before their launch.
T11	Cleaner transport and active travel	Promotion of STARS school travel plans	• 19 schools achieved Gold accreditation, 1 at Silver and 1 at Bronze. • These figures apply to the 2021-22 school year. • School's ability to undertake travel plan activities were severely impacted by the Covid19 pandemic, but we expect participation to increase in 2022-23.
T12	Cleaner transport and active travel	20 mph borough	Boroughwide 20mph experimental order made permanent on 1st April 2022. This action is therefore complete.
T13	Cleaner transport and active travel	Work towards no diesel cars parked on our roads by 2030	Work on this action has not yet started.
T14	Cleaner transport and active travel	Review the provision of electric charging across the borough	• TfL has not procured a framework contract but instead in December 2022 released a template tender document which it recommended each borough use to procure chargers via the Crown Commercial Services procurement system. This is a priority for 2023. • Between January and December 2022 the Council installed 33 Source London charging points and 118 lamp column chargers. See also T14a on plans to expand rapid charging network.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
T15	Cleaner transport and active travel	Participation in the e-scooter trial and review of success	15 new rental e-scooter bays were implemented, bringing total capacity to 33 bays.
T16	Cleaner transport and active travel	Continue to take action to reduce idling engines	• Anti-idling signs are due to be installed at St Francis of Assisi in 2023 as part of the climate change and air quality audits completed for the Future Neighbourhoods programme. • Parking enforcement officers issued 533 leaflets to drivers about idling. • The Contracts and Enforcement Team recorded 123 interventions with drivers who were idling. No FPNs were issued as all drivers ceased to idle. Officers received and responded to 36 requests for signage.
T17	Cleaner transport and active travel	Continue to support the Mayor of London with the implementation of the extension of the Ultra-Low Emission Zone. Review GLA data and look at borough data for the proportion of parking permits issued to non-compliant vehicles.	Work to review GLA data has not yet started.
T18	Cleaner transport and active travel	Protection of bus services	• Following a robust consultation response by the Council to proposed removal of routes, the Central London Bus Review resulted in very few changes in the borough. • Nine routes in the borough are now zero emission.
T19	Cleaner transport and active travel	Assess impact on air quality of any major transport and public realm scheme implemented	Planning applications reviewed and recommendations provided to planning department.
T20a & b	Cleaner transport and active travel	Ensure assessment of new developments through updated local plan policies	Local Plan Partial Review was consulted on in 2022 with updates to policies proposed, including GB6 which relates to air quality. These will be submitted to the Planning Inspectorate early 2023 with further examination to follow.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
T21	Cleaner transport and active travel	Support businesses to reduce their emissions from deliveries	• The Business Environmental Charter draft has been completed and submitted internally for review. • The CAV4 project enabled the Council to work with the three museums (V&A, NHM & Science) and CRP to investigate delivery numbers, habits and trends. The project enabled the collaborative working of multiple teams across the museums to share knowledge, best practice and create new working relationships. The museums were able to update their procurement requirements to contain greater environmental requirements e.g. FORS Scheme.
T22	Cleaner transport and active travel	Carry out study into post Covid-19 travel patterns	Report was published by Centre for London in October 2022.
T23	Cleaner transport and active travel	Upgrade existing cycle routes	Feasibility studies and designs were undertaken for Quietway 2 and 15 with consultation to follow in Q4 2022-23 and through 2023-24. Modal filters for traffic segregation
T24	Cleaner transport and active travel	Modal filters for traffic segregation	No new modal filters implemented in 2022 but existing temp modal filter formalised through place making scheme at Chelsea Green.
T25	Cleaner transport and active travel	Removal of parking bays to facilitate al fresco dining	The majority of al fresco parklet terraces that were introduced in 2020 and 2021 were retained in 2022. The Council confirmed a policy of supporting such terraces during daylight savings time from 2023 onwards.
L1	Localised solutions	Improve walking and cycling access to White City	Development work on this project continues with Imperial College and LB Hammersmith and Fulham.
L2	Localised solutions	Shepherd's Bush to Notting Hill Cycleway	Work on scheme delayed until 2024, due to Highways Team capacity issues.
L3	Localised solutions	Active travel schemes at Kensal Canalside Opportunity Area	Approximate cycle route alignment is identified. Feasibility work on a walking and cycling bridge over the railway line continues.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
L4	Localised solutions	Two-way cycling schemes	• New schemes implemented at Nevern Road, Nevern Square, Trebovir Road, Park Walk and Pavilion Road. • A new cut-through scheme was also introduced at the western end of Phillimore Walk through to Holland Park Walk.
L5	Localised solutions	Provide green man facilities at all signalised junctions	• Chelsea Bridge Road / Lower Sloane Street junction upgraded to include pedestrian crossing facilities on all arms, and early release cycle signals. • Detailed design work carried out for Fulham Road / Beaufort Street and Drayton Gardens/Old Brompton Road.
L6a	Localised solutions	Reduction in museum delivery and servicing trips	The CAV4 project enabled the Council to work with the three museums (V&A, NHM & Science) and CRP to investigate delivery numbers, habits and trends. The project enabled the collaborative working of multiple teams across the museums to share knowledge, best practice and create new working relationships. The museums were able to update their procurement requirements to contain greater environmental requirements e.g. FORS Scheme.
L6b	Localised solutions	Feasibility study into the conversion of one coach parking space or delivery bay to include an EV charge point for museum deliveries.	Delivery delayed to 2024, due to Pollution Regulatory Team capacity issues.
L6c	Localised solutions	Review into the consolidation of waste, delivery, and servicing trips.	Delivery delayed to 2024, due to Pollution Regulatory Team capacity issues.
L7	Localised solutions	Work with schools on installing green screens and green infrastructure	Seven school site walkovers were undertaken in 2022, with (currently) one resulting in the implementation of a green screen. (Bousfield want to install a green screen).

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
L8	Localised solutions	Work with landowners on large streetscape improvements which include significant greening	A South Ken Zen Group Working Group has bene created working on 4 key themes: Zero Emissions, Nature Positive, Circular Economies and Travel. A plan and toolkit has been created which includes measures that will improve air quality and climate change that will be implemented by the Exhibition Road institutions and organisations.
L9	Localised solutions	Develop new place-making public realm projects to reduce traffic dominance	See T24 – Chelsea Green place-making scheme removed traffic lane from one side of the island.
L10	Localised solutions	Implement road closures on Portobello Road during market operating times to improve conditions for pedestrians and shoppers	Experimental traffic orders were made permanent on 22 November 2021.
L11	Localised solutions	Future Neighbourhoods programme	Four Breathe London Sensors have been ordered and delivered ready for deployment in early 2023.
E1	Emissions from developments and buildings	Continue to assess all planning applications for air quality impact and ensure that emissions from energy and heat sources in new developments are minimised	• 7 major applications, 125 minor applications have been reviewed and assessed for their impact on air quality, with conditions recommended where appropriate for Environmental Management Plans, dust risk assessments or management plans and air quality assessments and monitoring. • 15 applications for the discharge of conditions have been completed and pre-application advice has been provided for 16 applications.
E2	Emissions from developments and buildings	Ensure emissions from construction are minimised and the cumulative effects of numerous nearby developments are taken into consideration	• 7 Major Application Dust Risk Assessments Reviewed • 10 Discharge of Conditions for Construction / Environmental Management Plan / Air Quality Dust Management Plans Reviewed

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			• 56 Minor Applications requested via condition to provide a Dust Risk Assessment and / or Dust Management Plan • 18 applications requested via condition to monitor for construction dust generation
E3a	Emissions from developments and buildings	Non-Road Mobile Machinery (NRMM) - ensure that development sites NRMM requirements are understood and enforced through the planning system.	42 Conditions related to NRMM included (every application has an NRMM informative).
E3b	Emissions from developments and buildings	Pan-London NRMM Project	• 42 Conditions related to NRMM included (every application has an NRMM informative). • 1 developments registered and compliant. • 12 audits • 11 sites No NRMM • 0 Unregistered
E4	Emissions from developments and buildings	Air Quality Supplementary Planning Guidance – update existing SPG	Project start delayed until Autumn 2023 as awaiting for the New Local Plan to be adopted.
E5	Emissions from developments and buildings	Air Quality Neutral and Air Quality Positive – implement these policies	10 Air Quality Neutral Assessments reviewed.
E6	Emissions from developments and buildings	Completion of School Air Quality Audits	Seven air quality and climate change audits were undertaken in 2022. Moving forward, the Council will be enlisting a consultant to undertake audits in order to increase the number undertaken per annum. The School Environmental Charter draft has been completed and submitted internally for review.
E7	Emissions from developments and buildings	New development green space and infrastructure - ensure adequate, appropriate, and well-located green space and infrastructure is included in new developments.	All Major Applications reviewed for green space and infrastructure in conjunction with Climate Change and Biodiversity Teams.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
E8	Emissions from developments and buildings	Smoke Control Zones (SCZ's) - ensure that borough-wide SCZ's are promoted and enforced.	Review of all Councils air quality related webpages has begun so that they can be updated in succession in 2023.
E9	Emissions from developments and buildings	Emissions from Chimneys - issue authorisations for chimney heights for new appliances.	No new chimney height applications received in 2022.
E10	Emissions from developments and buildings	Prescribed process emission controls - carry out regular risk-based inspection processes and ensure authorisations are up to date.	Inspections of Part B permitted premises completed in accordance with requirements based on Risk Rating. New permits to be issued in 2023.
E11	Emissions from developments and buildings	Implementation of the Council's Climate Emergency Action Plan	• The delivery of the Climate Emergency Action Plan is underway – The Notting Dale Future Neighbourhoods 2030 programme has expanded from 30 projects to 42. We have received funding from the Mayor of London Future Neighbourhoods £1,4mil in Phase 1 and £780k in Phase 2. • The Retrofit Accelerator Programme Phase 1 has expanded to 6 schools and 3 Council buildings and an application for the Public Sector Decarbonisation Plan has been submitted last year, which has been successful and the Council was awarded £3,6 mil to deliver the Retrofit Accelerator Programme.
E12	Emissions from developments and buildings	Council Housing Action Plan development to implement the Housing Sustainability and Fuel Poverty Strategy	• A Housing Net Zero Board has been created internally and working programme has been created for key themes such as Biodiversity, Retrofitting/Net Zero, Fuel Poverty, Transport, Waste. • A list of actions and projects are underway and currently reported on a monthly basis.
E13	Emissions from developments and buildings	A new renewable heat network will secure Lancaster West Estate in becoming net zero carbon	Final Investment Decision for Phase 1 of the Notting Dale Heat Network is now scheduled for 9 July 2023, with first heat on in December 2024.
E14	Emissions from developments and buildings	Waste Management Sites - any new consents for waste management sites will address potentially dusty operations and require them to be enclosed within a building.	None received.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
WP1	Working in Partnership	Collaboration with GLA and TfL to support working groups and policies that will improve air quality	Membership of and contribution to the London Wood Burning Group continued in 2022.
WP2	Working in Partnership	Collaborative partnerships to take action to improve air quality	Ongoing work with Cross River Partnership. Awaiting start of new project. More information will be provided in next year's ASR.
WP3	Working in Partnership	Work with universities to support research and to aid our own understanding of sources and potential mitigation.	• Assisted Imperial College to identify participants in its INHALE project. • Worked with two MSC students on air pollution and risk communication.
WP4	Working in Partnership	Develop Environmental Steering Group of residents, businesses, and academic institutions.	• A Community Steering Group has been created as part of developing the Notting Dale Future Neighbourhoods 2030 programme. • The lessons learned and process will be followed to set up a borough-wide Environmental Working Group.

4. Planning Update and Other New Sources of Emissions

Table 16. Planning requirements met by planning applications in Kensington & Chelsea in 2022

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	11
Number of planning applications required to monitor for construction dust	17
Number of CHPs/Biomass boilers refused on air quality grounds	0 (None Received)
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	0 (None Received)
Number of developments required to install Ultra-Low NO_x boilers	2
Number of developments where an AQ Neutral building and/or transport assessments undertaken	11
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	1 agreement
Number of planning applications with CIL payments that include a contribution to improve air quality	Data not available
NRMM: Central Activity Zone, Canary Wharf and Opportunity Areas Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit Please include confirmation that you have checked that the development has been registered with the GLA through the relevant and that all NRMM used on-site is compliant with Stage IV of the Directive and/or exemptions to the policy.	0 Applications Received in the Central Activity Zone for 2022
NRMM: Greater London (excluding Central Activity Zone, Canary Wharf and Opportunity Areas) Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	42 Conditions related to NRMM included (every application has an NRMM informative). 1 development registered and compliant. 12 audits 11 sites No NRMM 0 Unregistered

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**.**

4.1 New or significantly changed industrial or other sources.

No new sources identified.

5. Additional Activities to Improve Air Quality

5.1 Royal Borough of Kensington and Chelsea Fleet

There are currently 130 vehicles in total within the RBKC fleet (including Housing), out of which 20 are fully electric and 18 are hybrid vehicles. In total electric and hybrid vehicles represent 29% of the total fleet, compared with 19% in 2021.

5.2 NRMM Enforcement Project

Between January 2022 and December 2022 the following audits were undertaken;

Table 17. Compliance Information from NRMM 2023 Financial Year Report

Compliance Information	
Total Audits	12
*Self-compliant	1
**Compliant	0
Non-compliant	0
No NRMM	11
Site Complete	0
Pending	0
Engagement Status	
Cold-Engaged	9
Not Cold-Engaged	3

Kensington and Chelsea will continue to support the NRMM Enforcement Project in 2023 and into 2024.

5.3 Air Quality Alerts

Kensington and Chelsea supports airTEXT which is a free air quality alert service. Alerts can be provided by SMS text message, email and voicemail for 3-day forecasts of air quality, pollen, UV and temperature across Greater London. The alerts are based on forecasts of expected ambient air quality over the next three days, to enable you to plan ahead. They also provide health advice and actions to take in reference to the different alerts. The website can be accessed at https://www.airtext.info/ or the application downloaded from the Google Play or Apple Store to your mobile phone.

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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 2021 was undertaken by Ricardo Energy and Environment, who have been employed by RBKC since November 2017. All real-time data from the monitoring stations were independently collected and validated on a daily basis. A combination of automatic and manual checks were 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 a BAM, and KC5 with a 1020 heated BAM. As per LLAQM guidance[1], 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 2022 were supplied and analysed by Gradko 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 2021 are presented in Table A.1 below.

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 – 2022

AIR PT AR049	AIR PT AR050	AIR PT AR0XX	AIR PT AR0XX
January – February 2022	**May – June 2022**	**TBC**	**TBC**
100%	100%	TBC	TBC

Notes
TBC denotes that the results have yet to be published on the DEFRA website.

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 operates well within the required level of performance in terms of accuracy and precision, as shown by the results presented in Table A.2.

Table A.2 Gradko NO_2 Network Field Inter-Comparison Results for 2022

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

3) 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 2022 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
1	05/01/2022	02/02/2022	35.6	35.1	34.6	35	0.5	2	1.3	34.8	100	Good	Good
2	02/02/2022	02/03/2022	18.8	19.1	21.3	20	1.4	7	3.4	16.9	90	Good	Good
3	02/03/2022	30/03/2022	30.8	28.1	33.3	31	2.6	8	6.5	26	100	Good	Good
4	30/03/2022	04/05/2022	20.5	16.9	19.4	19	1.8	10	4.6	17.4	100	Good	Good
5	04/05/2022	08/06/2022	15.8	17.1	15.5	16	0.8	5	2.1	13	100	Good	Good
6	08/06/2022	06/07/2022	13.6	13.3	14.3	14	0.5	4	1.3	11	100	Good	Good
7	06/07/2022	03/08/2022	14.4	13.9	14.5	14	0.3	2	0.8	10	100	Good	Good
8	03/08/2022	31/08/2022	16.8	17.6	17.4	17	0.4	2	0.9	12	100	Good	Good
9	31/08/2022	28/09/2022	19.7	21.2	18.7	20	1.3	6	3.1	17	100	Good	Good
10	28/09/2022	02/11/2022	23.6	24.5	20.9	23	1.9	8	4.6	19	100	Good	Good
11	02/11/2022	30/11/2022	22.5	22.6	25.5	24	1.7	7	4.2	18.5	100	Good	Good
12	30/11/2022	04/01/2023	26.0	28.1	27.3	27	1.1	4	2.6	26.1	100	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

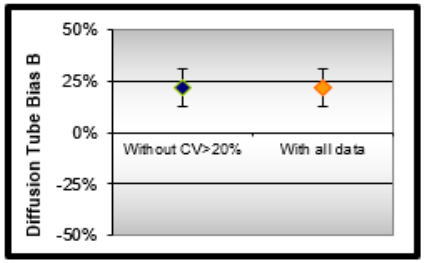
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	KC1 Sion Manning

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.79 - 0.92)
Bias B	17% (8% - 27%)
Diffusion Tubes Mean:	22 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	18 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	18 (17 - 20) μgm^{-3}

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

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.79 - 0.92)
Bias B	17% (8% - 27%)
Diffusion Tubes Mean:	22 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	18 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	18 (17 - 20) 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	05/01/2022	02/02/2022	49.3	47.3	49.3	49	1.1	2	2.8
2	02/02/2022	02/03/2022	43.1	40.1	42.2	42	1.6	4	3.9
3	02/03/2022	30/03/2022	53.8	53.5	49.1	52	2.6	5	6.5
4	30/03/2022	04/05/2022	36.6	38.1	37.8	37	0.8	2	2.0
5	04/05/2022	08/06/2022	38.6	39.0	29.7	36	5.2	15	13.0
6	08/06/2022	06/07/2022	36.0	37.3	37.4	37	0.8	2	2.0
7	06/07/2022	03/08/2022	33.4	31.9	34.3	33	1.2	4	3.1
8	03/08/2022	31/08/2022	35.9	35.4		36	0.3	1	2.7
9	31/08/2022	28/09/2022	36.9	39.0	37.9	38	1.0	3	2.6
10	28/09/2022	02/11/2022	40.8	39.8	40.4	40	0.5	1	1.3
11	02/11/2022	30/11/2022	46.9	42.6	41.7	44	2.8	6	7.0
12	30/11/2022	04/01/2023	44.5	45.4	47.0	46	1.3	3	3.2
13									

t 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
42.5	90	Good	Good
32.8	100	Good	Good
43.9	100	Good	Good
30.2	100	Good	Good
26	100	Good	Good
25	100	Good	Good
21	100	Good	Good
22	100	Good	Good
26	100	Good	Good
31	100	Good	Good
30.7	90	Good	Good
		Good	
Overall survey -->		Good precision	Good Overall DC

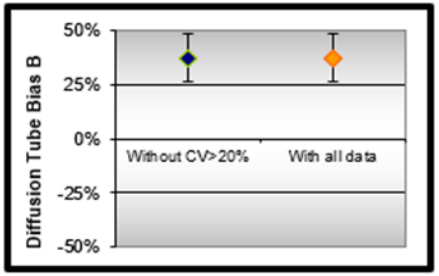
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	KC2 Cromwell Road

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 11 periods of data	
Bias factor A	0.74 (0.69 - 0.81)
Bias B	34% (24% - 45%)
Diffusion Tubes Mean:	40 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	30 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	30 (28 - 33) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.74 (0.69 - 0.81)
Bias B	34% (24% - 45%)
Diffusion Tubes Mean:	40 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	30 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	30 (28 - 33) μgm^{-3}



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Version 04 - February 2011

Figure A.3 National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/23

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2023

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By[1]	**Method** To undo your selection, choose (All) from the pop-up list	**Year**[5] To undo your selection, choose (All)	**Site Type**	**Local Authority**	**Length of Study (months)**	**Diffusion Tube Mean Conc. (Dm) (µg/m³)**	**Automatic Monitor Mean Conc. (Cm) (µg/m³)**	**Bias (B)**	**Tube Precision**[a]	**Bias Adjustment Factor (A) (Cm/Dm)**
Gradko	50% TEA in acetone	2022	KS	Marylebone Road Intercomparison	12	52	42	23.0%	G	**0.81**
Gradko	50% TEA in acetone	2022	R	City Of London	11	60	54	11.6%	G	**0.90**
Gradko	50% TEA in acetone	2022	UB	City Of London	12	28	23	23.7%	G	**0.81**
Gradko	50% TEA in Acetone	2022	KS	London Borough Of Croydon	12	41	37	11.1%	G	**0.90**
Gradko	50% TEA in Acetone	2022	R	Royal Borough Of Windsor And Maidenhead	12	30	26	13.9%	G	**0.88**
Gradko	50% TEA in Acetone	2022	R	Royal Borough Of Windsor And Maidenhead	12	27	27	-1.0%	G	**1.01**
Gradko	50% TEA in Acetone	2022	R	Sandwell Mbc	12	34	27	27.1%	G	**0.79**
Gradko	50% TEA in Acetone	2022	UB	Sandwell Mbc	12	21	19	11.9%	G	**0.89**
Gradko	50% TEA in acetone	2022		**Overall Factor**[3] **(14 studies)**				**Use**		**0.82**

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.

Table A.3. Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	03/23	0.80
2021	Local	03/22	0.83
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 2022 diffusion tube data set, the data capture for 2021 was below 75% at three monitoring sites, KC68 Cromwell Road and KC96 & KC97 on Kensington High Street.

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.4 and Table A.5. 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.

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.

To complete the NO_2 fall off with distance calculations a background value for each monitoring location is required. Background NO_2 concentrations for 2022 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.

Table A.4. Short-Term to Long-Term Monitoring Data Adjustment

Site ID	Annualisation Factor Sion Manning	Annualisation Factor Westminster	Annualisation Factor Priory Park South	Annualisation Factor Bloomsbury	Average Annualisation Factor	Raw Data Annual Mean (µg m^{-3})	Annualised Annual Mean (µg m^{-3})	Comments
KC68	0.9605	1.0014	0.9937	0.9521	0.9769	29.0	28.3	
KC96	1.0477	1.0108	1.0409	0.9985	1.0245	45.8	46.9	
KC97	1.0829	1.0493	1.0411	1.1073	1.0701	48.3	51.7	

Table A.5 NO_2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
KC33	1.1	2.1	40.5	29.7	39.1	Predicted concentration at Receptor within 10% the AQS objective.
KC38	1.7	2.7	36.1	29.7	35.4	
KC49	4.0	5.0	41.4	28.6	**40.6**	Predicted concentration at Receptor above AQS objective.
KC82	0.5	1.0	36.7	29.6	35.9	
KC84	0.5	1.0	38.8	29.6	37.6	Predicted concentration at Receptor within 10% the AQS objective.
KC89	0.5	1.0	40.0	29.6	38.8	Predicted concentration at Receptor within 10% the AQS objective.
KC91	0.5	1.0	44.1	29.6	**42.3**	Predicted concentration at Receptor above AQS objective.
KC92	0.5	1.0	37.6	29.6	36.6	Predicted concentration at Receptor within 10% the AQS objective.
KC93	0.5	1.0	43.4	29.6	**41.7**	Predicted concentration at Receptor above AQS objective.
KC94	1.0	1.5	41.6	29.6	**40.6**	Predicted concentration at Receptor above AQS objective.
KC95	0.3	0.8	42.1	29.6	**40.1**	Predicted concentration at Receptor above AQS objective.
KC96	1.0	1.5	37.7	29.6	37.0	Predicted concentration at Receptor within 10% the AQS objective.
KC97	0.5	0.8	41.5	29.6	**40.5**	Predicted concentration at Receptor above AQS objective.
KC98	0.5	1.0	44.6	29.6	**42.8**	Predicted concentration at Receptor above AQS objective.
KC99	0.5	1.0	44.0	29.6	**42.2**	Predicted concentration at Receptor above AQS objective.
KC100	0.5	1.0	40.8	29.6	39.4	Predicted concentration at Receptor within 10% the AQS objective.

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
KC101	0.5	1.0	40.4	29.6	39.0	Predicted concentration at Receptor within 10% the AQS objective.
KC102	1.0	1.5	40.3	29.6	39.4	Predicted concentration at Receptor within 10% the AQS objective.

Appendix B Full Monthly Diffusion Tube Results for 2022

Table B.1 NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
KC31	100	100.0	39.6	26.3	47.2	34.8	25.5	24.3	25.1	31.1	32.2	32.8	32.7	33.0	32.0	25.7
KC32	100	100.0	29.4	14.9	27.8	16.3	13.7	12.5	12.1	14.8	17.6	20.2	21.8	24.2	18.8	15.1
KC33	100	100.0	63.9	46.5	59.3	48.0	53.5	45.9	50.8	48.1	49.1	35.3	52.9	51.7	**50.4**	**40.5**
KC34	92.3	92.3	39.9	26.3	37.6	25.0	21.3		20.0	22.9	24.5	27.7	29.7	34.3	28.1	22.6
KC35	100	100.0	50.2	39.6	46.9	40.4	41.3	41.4	41.4	42.7	45.4	40.8	42.5	44.7	**43.1**	34.6
KC38	92.3	92.3	56.0	42.6	47.8	35.8	39.3	41.6	43.3	44.3		49.7	46.7	47.4	**44.9**	36.1
KC39	100	100.0	32.0	19.7	29.7	20.4	18.1	15.6	16.6	19.2	20.9	22.1	25.6	28.0	22.3	17.9
KC40	100	100.0	37.4	26.1	32.1	22.4	18.2	15.3	15.2	17.8	21.7	23.1	24.0	30.8	23.7	19.0
KC41	82.7	82.7	37.8	23.1	37.1	22.3		13.8	15.1	19.4		23.1	27.5	32.0	25.1	20.2
KC42	100	100.0	38.4	24.8	33.3	24.2	22.4	18.4	18.8	19.7	25.1	28.5	27.0	31.9	26.0	20.9
KC43	100	100.0	33.9	19.6	28.7	21.8	17.5	15.4	13.7	18.5	21.4	23.0	24.4	31.4	22.4	18.0
KC44	92.3	92.3	37.3	25.0		19.4	16.4	17.3	15.7	18.2	21.8	24.0	24.4	32.5	22.9	18.4
KC45	100	100.0	39.6	24.0	43.0	25.3	25.4	25.7	25.6	27.4	30.7	33.7	33.4	33.7	30.6	24.6
KC47	100	100.0	35.6	18.8	30.8	20.5	15.8	13.6	14.4	16.8	19.7	23.6	22.5	26.0	21.5	17.3
KC47	100	100.0	35.6	18.8	30.8	20.5	15.8	13.6	14.4	16.8	19.7	23.6	22.5	26.0	21.5	17.3
KC47	100	100.0	35.6	18.8	30.8	20.5	15.8	13.6	14.4	16.8	19.7	23.6	22.5	26.0	21.5	17.3
KC48	100	100.0	49.3	44.1	49.1	37.8	37.6	37.7	35.7	36.2	39.9	40.7	38.0	33.2	**40.0**	32.1
KC49	82.7	82.7	52.9	40.5	64.9		45.9	44.7		61.3	55.6	52.1	50.2	47.5	**51.6**	**41.4**
KC50	100	100.0	39.7	1.0	35.7	24.0	26.7	23.5	24.4	25.7	24.5	28.1	31.6	33.8	26.6	21.3
KC51	90.4	90.4	31.7	17.7	27.5	19.6	16.5	15.2	14.7	17.6	18.7	18.9	22.5		20.1	16.1
KC52	100	100.0	46.7	31.9	44.9	32.7	25.6	25.6	30.3	32.3	34.5	32.8	33.7	37.3	34.0	27.3
KC53	100	100.0	37.0	26.5	33.4	25.9	22.7	20.5	23.8	25.7	29.4	30.2	28.5	33.0	28.0	22.5
KC54	100	100.0	49.3	43.1	53.8	36.6	38.6	36.0	33.4	35.9	36.9	40.8	46.9	44.5	**41.3**	33.2
KC54	100	100.0	49.3	43.1	53.8	36.6	38.6	36.0	33.4	35.9	36.9	40.8	46.9	44.5	**41.3**	33.2
KC54	100	100.0	49.3	43.1	53.8	36.6	38.6	36.0	33.4	35.9	36.9	40.8	46.9	44.5	**41.3**	33.2
KC55	100	100.0	43.6	26.9	38.7	26.8	20.8	16.7	18.7	34.8	26.9	24.4	27.7	36.6	28.6	22.9
KC56	92.3	92.3	46.0	36.2	40.4	32.8	38.4	36.0	34.8		39.3	43.6	43.9	41.4	39.3	31.6
KC57	84.6	84.6		26.3	36.8	27.7	26.2	22.6	25.0		33.1	25.7	30.6	37.8	29.2	23.4

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
KC58	100	100.0	45.7	30.0	51.2	35.9	34.2	27.5	32.0	33.1	34.4	29.8	33.8	38.8	35.5	28.5
KC59	100	100.0	56.6	40.7	44.6	40.6	43.8	39.7	40.1	41.8	45.7	40.2	42.8	45.6	**43.5**	35.0
KC60	90.4	90.4	47.4	33.8	46.8		30.8	28.2	28.7	31.9	32.9	33.7	39.1	38.2	35.6	28.6
KC61	100	100.0	49.4	28.3	44.5	31.5	28.0	26.6	24.1	30.4	34.0	35.1	36.6	40.1	34.1	27.3
KC64	100	100.0	44.2	24.4	49.3	32.0	29.0	29.5	30.4	35.9	37.2	35.5	33.1	40.2	35.1	28.2
KC65	100	100.0	38.3	24.9	35.7	23.5	18.6	17.4	17.7	22.8	24.2	24.7	25.1	28.5	25.1	20.2
KC66	100	100.0	38.2	23.9	37.1	24.2	19.6	17.2	16.6	19.9	22.9	26.6	27.7	32.6	25.5	20.5
KC67	100	100.0	46.4	29.7	32.3	23.1	20.1	16.7	17.2	19.6	23.6	27.5	28.9	30.8	26.3	21.1
KC68	59.6	59.6	49.6	28.3		21.0	26.9	21.4			28.0			27.7	29.0	22.7
KC69	75	75.0	35.5	19.6	29.3		18.8		15.3	19.4		25.7	26.9	28.4	24.3	19.5
KC70	90.4	90.4	51.8	34.0	43.8	32.6		33.5	29.5	31.0	35.2	34.6	38.7	42.0	37.0	29.7
KC71	100	100.0	43.3	27.1	45.3	28.1	25.1	23.2	23.8	25.8	29.3	34.4	36.3	40.6	31.9	25.6
KC72	100	100.0	52.1	34.2	48.2	33.4	31.4	31.8	33.2	33.8	40.1	36.8	35.7	43.4	37.8	30.4
KC73	90.4	90.4	45.7	26.1	42.4	25.5		21.5	22.3	23.2	31.3	28.7	27.1	37.3	30.1	24.2
KC74	100	100.0	50.7	28.8	38.6	27.9	27.2	25.9	25.5	31.2	33.4	34.8	33.2	37.4	32.9	26.4
KC75	100	100.0	49.6	27.3	44.7	33.2	29.8	26.1	32.2	35.1	35.2	31.2	35.2	41.2	35.1	28.2
KC76	100	100.0	49.1	31.0	36.1	33.1	29.5	24.7	27.2	32.5	33.8	29.5	34.5	44.5	33.8	27.1
KC77	100	100.0	40.0	21.3	35.2	22.2	17.6	15.3	15.3	17.1	21.3	25.1	27.3	32.1	24.2	19.4
KC78	92.3	92.3	45.6	28.5	35.2	23.4	22.4		17.8	21.6	26.6	27.7	32.6	40.2	29.2	23.5
KC79	100	100.0	41.0	24.8	32.5	24.0	21.4	19.1	19.3	21.5	25.2	27.0	28.8	33.0	26.5	21.3
KC80	92.3	92.3	38.9		32.4	22.8	20.7	18.2	16.1	19.9	23.1	26.0	27.6	33.6	25.4	20.4
KC82	73.1	73.1	60.9	43.6	53.5	39.6	45.9	43.0	40.8	42.8	41.6				**45.7**	36.7
KC83	100	100.0	57.0	33.9	39.7	37.1	29.6	31.6	31.3	35.8	37.4	41.4	40.2	39.1	37.8	30.4
KC84	100	100.0	60.3	40.9	47.6	47.2	49.6	43.4	44.1	46.9	49.4	44.8	54.5	50.4	**48.3**	38.8
KC85	100	100.0	52.5	41.9	49.1	42.7	38.2	32.4	36.4	38.7	41.3	36.4	39.0	42.6	**40.9**	32.9
KC86	100	100.0	60.7	32.9	43.2	46.9	40.0	36.4	38.5	41.6	30.3	32.6	51.9	47.1	**41.9**	33.6
KC87	90.4	90.4	52.6	37.8	44.1		74.3	32.9	36.2	38.5	39.5	34.0	38.3	47.4	**43.2**	34.7
KC88	100	100.0	49.4	40.3	56.1	41.0	40.3	35.5	36.0	35.7	32.3	37.5	47.8	50.0	**41.8**	33.6
KC89	100	100.0	61.4	60.8	59.8	50.2	48.0	42.5	46.3	47.5	50.6	43.9	49.3	37.8	**49.8**	**40.0**
KC90	100	100.0	58.4	43.9	48.8	48.3	45.1	42.5	42.2	44.2	46.4	42.3	12.5	55.4	**44.2**	35.5
KC91	100	100.0	68.7	52.4	62.3	58.3	57.8	54.0	50.8	48.6	42.8	47.9	56.6	58.6	**54.9**	**44.1**
KC92	82.7	82.7	48.3		58.8	47.7	43.9	41.4	46.4	48.3	45.8		44.6	42.6	**46.8**	37.6

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
KC93	92.3	92.3	59.8	32.5	56.5	52.5	58.0	49.4	53.7	48.1		75.6	49.4	59.4	**54.1**	**43.4**
KC94	100	100.0	60.1	47.8	55.2	53.7	54.5	49.3	52.8	48.4	51.9	42.0	51.9	53.7	**51.8**	**41.6**
KC95	100	100.0	65.0	56.3	52.9	54.9	55.9	47.1	51.4	54.0	49.8	47.3	45.6	49.3	**52.4**	**42.1**
KC96	32.7	32.7	56.3				43.6		42.1	41.2					**45.8**	37.7
KC97	59.6	59.6		49.7	52.3	46.7	51.7	47.0	45.9					44.8	**48.3**	**41.5**
KC98	100	100.0	61.6	50.3	59.6	54.4	53.7	60.7	55.0	51.6	53.5	54.5	53.4	58.5	**55.6**	**44.6**
KC99	92.3	92.3	60.0	47.6	75.6	52.3	53.5	49.2	52.2	47.5	49.7	55.8		58.5	**54.7**	**44.0**
KC100	100	100.0	54.6	44.9	64.6	48.6	49.3	47.1	50.1	47.3	44.9	52.7	53.5	52.4	**50.8**	**40.8**
KC101	84.6	84.6	71.8			46.4	49.1	47.8	49.5	48.0	46.8	47.3	46.5	49.3	**50.2**	**40.4**
KC102	92.3	92.3	53.1	31.9		49.5	54.4	50.6	50.5	50.4	50.6	52.4	55.3	53.3	**50.2**	**40.3**
KC103	100	100.0	48.8	40.4	48.5	35.0	34.6	27.3	27.7	28.7	31.9	33.4	35.0	39.8	35.9	28.9
KC104	100	100.0	51.8	36.2	50.8	42.4	40.7	37.0	35.9	37.6	35.2	37.7	41.2	43.3	**40.8**	32.8
KC105	100	100.0	52.8	38.5	54.6	42.1	41.1	36.6	39.0	40.6	40.9	39.1	44.8	42.6	**42.7**	34.3
KC106	100	100.0	55.1	37.0	51.1	38.4	38.9	36.5	37.5	37.6	39.5	39.5	44.1	47.8	**41.9**	33.7
KC107	84.6	84.6	48.4			39.8	32.3	20.3	35.2	42.2	37.9	35.9	34.8	41.6	36.8	29.6
KC108	100	100.0	52.5	34.0	50.4	38.4	33.8	31.1	31.9	34.3	35.4	34.7	33.8	35.5	37.2	29.8
KC109	100	100.0	47.8	54.1	48.4	37.5	38.1	35.3	33.0	39.9	40.1	36.9	38.6	41.8	**41.0**	32.9
KC110	100	100.0	49.0	37.4	50.6	35.0	34.1	32.2	27.7	31.1	35.3	37.5	35.6	40.4	37.1	29.8
KC111	100	100.0	51.3	33.5	42.2	31.7	33.3	31.4	28.3	29.2	35.6	33.3	36.1	39.9	35.5	28.5

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 25%.

(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%).