



2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995
Local Air Quality Management, as amended by the
Environment Act 2021

Date: June, 2023

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Summary: Air Quality in Our Area

Nitrogen dioxide levels have improved since the pre-pandemic situation. That said monitoring suggests an increase in regional pollution levels since 2020 or 2021. The two previous calendar years were influenced by changes in travel behaviours. During 2022 services have rebounded with an increase in some vehicle types in and around travel corridors running through our six Air Quality Management Areas (AQMAs).

This year Bureau Veritas have produced a complementary report that present results from the Sussex monitoring network for Nitrogen Dioxide (NO₂), fine Particulate Matter (PM_{2.5} and PM₁₀), Sulphur Dioxide (SO₂) and Ozone (O₃).

The City Council continues with its automatic analyser located next to the bus ultra-low emissions zone set back from North Street. DEFRA automatic analysers for oxides of nitrogen, particles, and ozone are in Preston Park. The University of Brighton continues to monitor pollutants at Falmer.

For 2022 calendar year the city council has submitted to DEFRA verified results for eighty-two Nitrogen Dioxide (NO₂) diffusion tubes. Additions include pre-scheme (baseline); road and kerbside monitoring prior to possible cycle lanes and Low Traffic Neighbourhood (LTN) area in Hanover and Tarn.

Subject to the required procurement approvals funded is allocated to install additional automatic monitoring stations for daily and hourly pollutant monitoring. This will also help enable the verification of real-time sensors across the city.

Since the last annual report, the city council has undergone a detailed consultation on its Air Quality Action Plan (AQAP). Members at committee approved the plan for the period 2022 to 2027, with more stringent air quality targets. Options remain to review or amend the city's smoke control areas. Most recently members have decided to enforce vehicle anti-idling a measure aimed at reducing emissions and fumes.

Between December 2022 and May 2023 Brighton & Hove buses have completed another round (52) bus exhaust upgrades for cleaner buses. The benefits of these additional buses achieving ultra-low emission standards is set to be recorded by our local monitors from 2023 onwards. This report present monitoring prior to this most recent intervention.

Below is a commentary on each Air Quality Management section with a consideration of vehicle count changes in recent years up to the end of 2022. More detailed charts on long term changes to pollution are presented in the main body of the report.

Citywide and Background Air Quality

Particulate levels across the city are close to achieving 2040 national targets proposed at $10 \mu\text{g}/\text{m}^3$ as an annual average for $\text{PM}_{2.5}$ (airborne particles less than 2.5 microns). A reduction in concentrations will have benefits for health at a individual and population level. Monitoring suggests particulate levels are higher in built-up areas compared to the South Downs National Park. Based on the monitoring to date particulate levels are not higher next to local roads which suggests a variety of near and far emission sources contribute to local air quality. Road traffic including motorways contribute to secondary atmospheric pollution including particulates composed of nitrates. Sulphurous fuels and emissions have diminished substantially compared to historical levels. The monitoring we have so far indicates that particulate concentrations have not improved in recent years. Caution is required when comparing different particulate monitoring methods. A funded project is working to upgrade the particulate monitoring network across Sussex. The purpose of improved monitoring is raised awareness and community engagement.

Nitrogen Dioxide (NO_2) concentrations at background sites such as across suburbs have gradually improved since 2010 and 2017, that said there is a slight regional increase in outdoor NO_2 since 2020_2021. In Brighton & Hove this has been monitored in Portslade (Vale Park), Preston Park (North Brighton), Pavilion Gardens (City Centre) and most recently on Rottingdean Sea Front. All background monitors are remote from roads, outside of the designated AQMAs and represent the regional air quality situation.

A270 Old Shoreham Road (OSR Outside of AQMA)

Since 2021 a diffusion tubes survey has monitored kerbside and roadside NO_2 next to the Old Shoreham Road (A270) in Portslade (western part of the local authority). Its purpose was to provide an effective baseline ahead of a potential cycle lane that aims to promote sustainable travel and reduce carbon. Where vehicle accelerate eastbound from the Lock Hill junction diffusion tubes at the kerbside railings record high levels of NO_2 . The concentrations dissipate within one to eight metres. It is recommended that monitoring continues near to the boundary of Brackenbury primary school. Outside the AQMA at relevant receptors NO_2 is compliant with air quality standards.

A259 Kingsway (Outside of AQMA)

Since 2021 a diffusion tubes survey has monitored kerbside and roadside NO₂ next to Kingsway (A259). It provides monitoring ahead of a possible extended cycle lane that aims to promote sustainable travel, reduce fuel consumption and carbon. Annualised levels of NO₂ monitored 2021 and the full calendar year 2022 indicate that NO₂ is close to half the national air quality standards and easily meets the more ambitious AQAP target of 30 µg/m³. Further intervention and improvement would help work towards World Health Organisation (WHO) guidelines for air quality.

Hanover and Tarner Pilot Low Traffic Neighbourhood (LTN majority outside the AQMA)

To determine a pre-scheme, baseline for outdoor air quality a diffusion tube monitoring survey has been carried out for potential Hanover and Tarner LTN area and its boundary roads.

2022 (annualised) results indicate outdoor Nitrogen Dioxide (NO₂) in this area is most concentrated at the base of the slope, at the frontages of properties adjacent to the A23 (Grand Parade 41 and 38 µg/m³) and A270 (Lewes Road 46 and 42 µg/m³) that is part of AQMA1. At the rear of roadside buildings, recorded NO₂ concentrations drop-off substantially by half. For this reason, new ground floor flats at roadside (since 2007) are designed to have their ventilation air intakes at the back.

Between 2001 and 2008 diffusion tubes monitored NO₂ outside Elm Grove Primary School. Over this eight-year period the average was 33 µg/m³ NO₂ (maximum 38 µg/m³ in 2004 minimum 30 µg/m³ in 2008). At the same location in 2022, resumption of NO₂ monitoring outside the school indicated close to 26 µg/m³. This outdoor concentration complies with the ambitious target of 30 µg/m³ set out in the City Council's 2022 AQAP.

NO₂ at upslope and mid-slope locations in Hanover set back from main roads indicate levels are 18 to 20 µg/m³, the same as Pavilion Gardens (urban background). This level of NO₂ in outdoor air is less than half (46%) of national air quality standards.

AQMAs

The following sections refer to vehicular traffic trends and NO₂ monitors along travel corridors in the Air Quality Management Areas last amended and designated in 2020.

Trend graph for NO₂ pollution concentrations in around the AQMAS are given in the main body of the report.

AQMA1 A2010 Around Brighton Railway Station

The main railway station is an important transport interchange. Automatic traffic counters on Queens Road (south of Brighton train station) record a reduction in car and van counts since 2018/19. Bus counts have been relatively constant. As train activity increases service vehicles flows around the station have recovered compared with 2020, but not to pre-pandemic levels. This observation suggests behavioural change (since Q1 of 2020) with less commuting compared to the years prior to the pandemic. Taxi pick-up has moved to the east side of the train station which would partly explain the reduction in car trips on Queens Road. Vehicular numbers in combination with the proportion of ultra-low and zero vehicles influences road traffic emissions and roadside air quality.

AQMA1 North Laine through traffic

Frederick Street-Gloucester Road east of Brighton railway station is an important access route that services residences and the pedestrianised Brighton Laines. Interestingly traffic counters since 2018 record a significant decrease in the number of cars using the link. There has been an increase in goods vehicles both vans and lorries suggesting a switch to deliveries. In this case source apportionment changes as the local air quality stays the same since 2020.

AQMA1B2066 Bus Ultra-low Emission zone

Weekday bus counts on North Street are ordinarily constant. A reduction has been recorded from nearly 2800 a day in 2019, 2367 for 2020, back up to almost 2500 a day in 2022. With the introduction of zero capable hybrid buses (2018 and 2019) and a higher proportion of ultra-low vehicles the bus fleet is becoming cleaner. Further improvements such as exhaust upgrades have been delivered during 2023. Lorry counts on North Street have declined. Car counts on North Street had a daily average in 2019 of almost 3100, 2300 in 2020 recovered to 2900 in 2022. NO₂ along the ULEZ travel corridor has improved substantially over the past five and ten years. The smaller increase in NO₂ monitored in 2022 (compared to previous years) is also recorded regionally.

AQMA1 A23 Valley Gardens

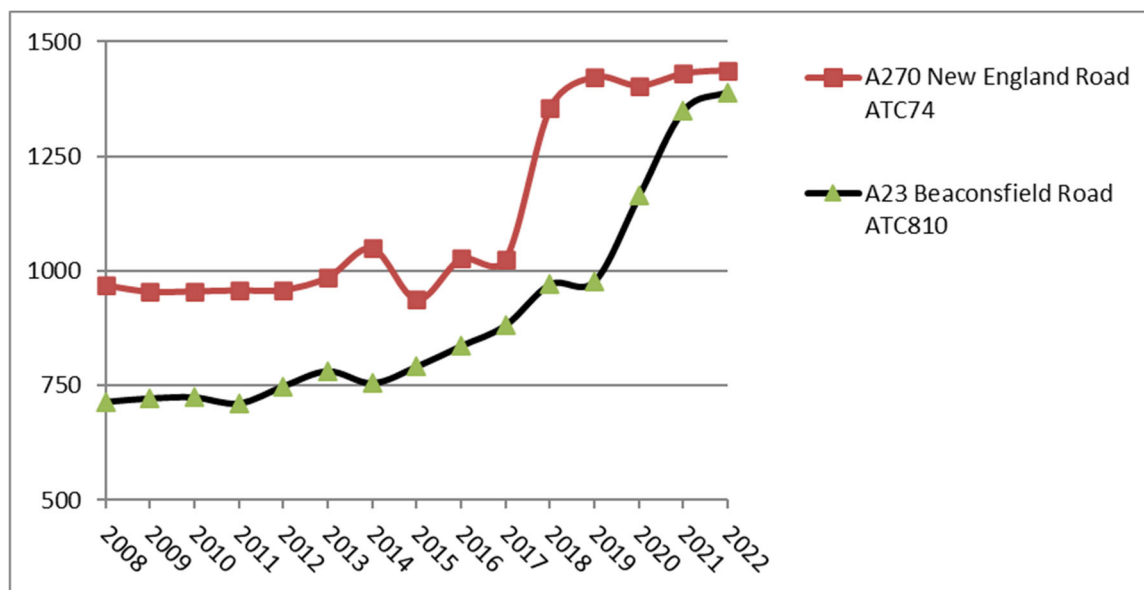
From September 2019 the western side of Valley Gardens has been allocated to buses and taxis and the eastern side to general traffic two-ways; northbound and southbound. This helped to accelerate the rate of improvement in NO₂ on the east side and the amount

if traffic using the A23 into Brighton. Around Valley Gardens, NO₂ reduced substantially between 2010 and 2020, the smaller increase since 2020 is also recorded in other areas. Further improvements are required to easily comply with national air quality standards and push towards WHO guidelines. 40 µg/m³ NO₂ (UK standard exceedance) is recorded on one of three Grand Parade façade diffusion tubes in 2022.

AQMA1 A23 / A270 Preston Circus

Monitoring of vehicles along Beaconsfield Road (A23) shows a long-term decline in the count of cars from 14,000 per day in 2013 to 11,000 in 2022. There is a gradual reduction in the number of daily lorries using this section of the A23 from 620 in 2014 to 438 in 2022. Conversely the number of average daily buses has increased from 138 in 2011 to 243 in 2019, since falling back to 183 in 2022. Noticeably the number of vans (light goods) has increased as follows:

Weekday average van (Light Goods) counts in the AQMA near Preston Circus



Most vans will be older diesels that contribute to oxide of nitrogen emissions. That said light goods vehicle deliveries can save car and lorry trips. Following a dip during the pandemic car counts on New England Road were higher in 2022 compared with 2018, NO₂ has reduced considerably since 2010 with a smaller uptick since 2021.

AQMA1 A270 Lewes Road

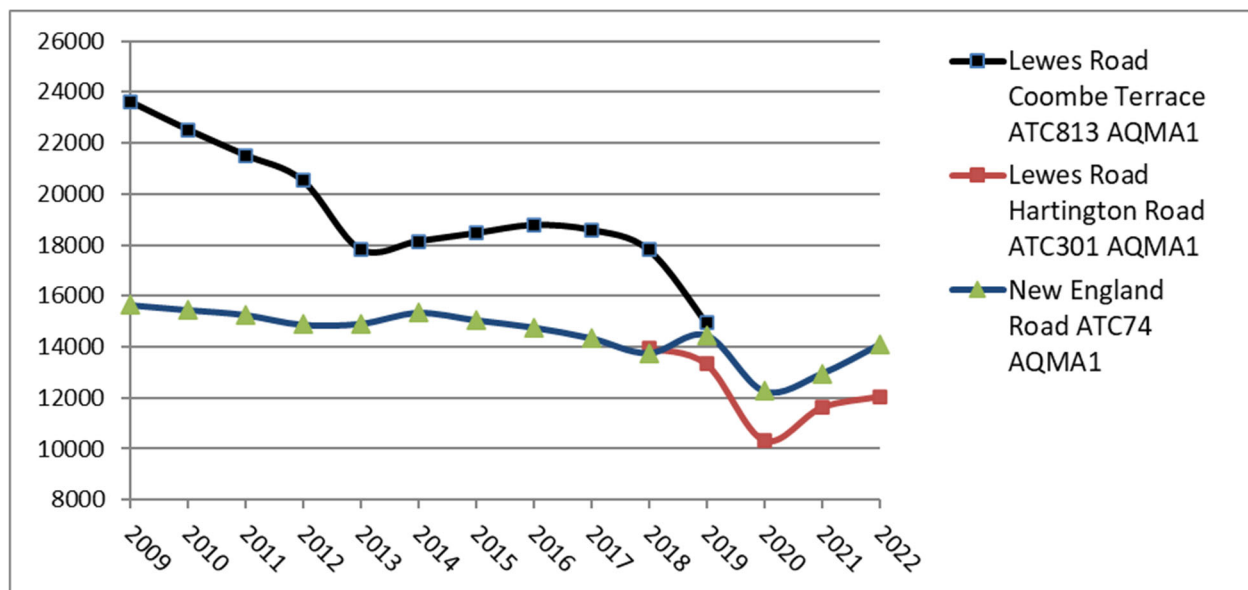
This is the link between the City Centre the University of Brighton and the University of Sussex. Buses constantly shuttle both ways day and night. Late 2022 the fifteen-year-old bendy buses were taken out of service and replaced with ultra-low vehicles. This reduction

in emissions will influence roadside pollution and the benefits of this change will be monitored 2023.

In terms of planning the Lewes Road travel corridor is typically maisonettes, with retail ground floor and roadside residential use from ground floor upwards. There are many take-away food outlets. Vehicle counters record an increase in motorbikes and vans most likely involved in servicing and deliveries. Recent monitoring indicates exceedance of national NO₂ standards within 125 meters of Elm Grove and Vogue Gyratory junctions. NO₂ levels have gradually improved long term and further improvement is required. On Hollingdean Road demolition of roadside terraces and replacement with new developments will change how air circulates in the street and further pollution monitoring is scheduled since NO₂ exceedance was monitored 2002 to 2019.

There is long term decrease in cars using the A270 with a smaller increase since 2020. Explanations of charts and graphs are provided in alt text.

Long term weekday annual average car counts in the AQMA along the A270

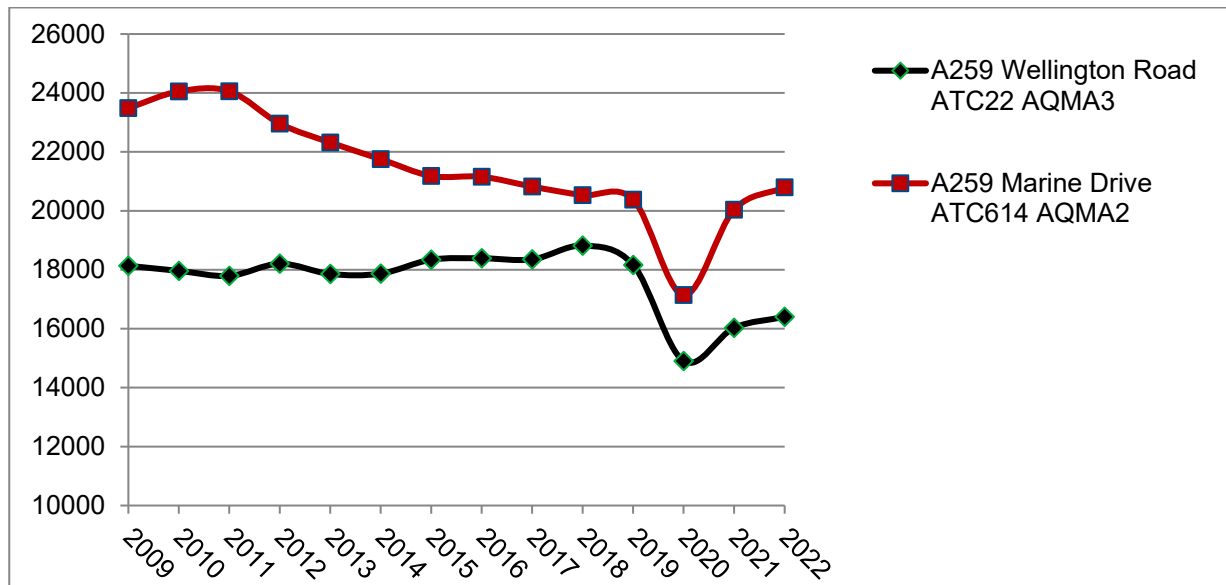


AQMA2 B2123 / A259 Rottingdean

Counters in Rottingdean High Street since 2020 show car and van counts have declined. At the same time the weekday count of lorries (heavy goods) has increased.

Long term counts of cars on the A259 show a gradual decrease as follows:

Long term weekday annual average car counts in the AQMAs along the A259



Roadside NO₂ levels in Rottingdean (chart in the main report) have decreased substantially since 2010, 2017 and 2018. An increase in NO₂ is monitored for 2022 compared to 2020 and 2021. Further improvement is required to close the difference between roadside and background levels and achieve better than the 30 µg/m³ target set out in the City Council's 2022 Air Quality Action Plan (AQAP).

AQMA3 A259 / A293 South Portslade

The above graph is also relevant to AQMA3 in the west of the local authority area. Lorries (heavy goods haulage from the Shoreham port inland) along the A259 in Portslade have declined from 934 weekday average in 2019 to 800 for average weekdays in 2022. Vans (light goods) have also decreased in this area suggesting reduced activity for industries in the port area. It appears to be the opposite trend to vans and motorbikes associated with take-aways and home deliveries. Along Wellington Road buses have increased from 337 average weekday in 2018 to 463 in 2021 and 416 in 2022. After long term improvement there is an increase in monitored NO₂ in 2022 compared to 2021 (a trend graph is included in the body of the report).

AQMA4 Sackville Road

The development site adjacent to Sackville Road was not fully used prior to major construction. A traffic survey is required to determine long term trends in the various vehicle types. NO₂ has improved since 2010, 2013 and 2016. The NO₂ annual mean for 2022 indicates an increase compared with 2020 and 2021. Monitoring indicates pollution is lower than the pre-pandemic situation.

AQMA5 A23 Preston Road South Road and the Drove

A traffic survey is required to determine long term trends in various vehicle types using The Drove west of the railway in AQMA5. NO₂ has been slow to improve near the hairpin hill climb linking with Millers Road a trend chart is included in this report.

AQMA6 Eastern Road, Royal Sussex County Hospital

The hospital includes trauma, cancer care and neo-natal units. Improvement in air quality in the area will benefit health at a population level including people spending time in the infirmary. Monitoring suggests heavy construction traffic required for the hospital re-build contributed to higher roadside NO₂ 2016 to 2018. Long-term improvement has been monitored in NO₂ at the façade adjacent to Eastern Road, near the main hospital buildings. The national standard and AQAP target are met. Further improvement is required for this AQMA and surroundings to work towards WHO health guidelines. Hybrid buses operate in zero emission mode outside the hospital.

Officers have recommended that Combined Heat and Power gas combustion with emission at height at the hospital is refused by planning and gas combustion is phased out.

Air Quality in Brighton and Hove City Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}. That said, Brighton has a cosmopolitan centre with relatively high pollution levels, compared with less affluent outer areas (such as Whitehawk) with well-ventilated cleaner air. During the life course, to varying degrees inhalation of smoke and gases can affect everyone's health.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

² Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Air quality appraisal: damage cost guidance, January 2023

million in 2017⁴. Where pollutant levels are at risk of exceeding established standards (1995 objective that became legal standards in 2010) the City Council has declared six [AQMA interactive map \(defra.gov.uk\)](#) select NO₂ and zoom into the local detail. Whilst Brighton & Hove AQMAs are small compared to London and Birmingham, population density and visitor numbers are very high, so thousands of people are affected, by air quality in these areas. The last declaration can be found at: [Brighton & Hove AQMA Orders 2020](#).

[How Brighton & Hove manages air quality](#) is complimented with joint working with [Sussex- Air Promoting better Air Quality in Sussex](#). In particular we welcome ties with local bus operators, The NHS, asthma care, The Director of Public Health, Universities, DfT, [Home - Defra, UK](#), The [Office for Zero Emission Vehicles - GOV.UK \(www.gov.uk\)](#), The Environment Agency, and Highways England. The Air Quality Action Plan has been approved by committee and sent to DEFRA for appraisal.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan⁵ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁶ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMA) are designated due to elevated concentrations heavily influenced by transport emissions.

⁴ Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

⁵ Defra. Environmental Improvement Plan 2023, January 2023

⁶ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Since Covid-19 travel restrictions, some travel behaviours have continued. Transport, motorway-use, and tourism have shown recovery. It is a potential risk for city space and emission rates if the market favours larger more powerful cars and vans. We are aware that the vehicle fleet is becoming older, the average age of a car in the UK is ten years old and for many it is a financial challenge for (households and smaller businesses) to invest in nearly new vehicles with lower emission rates. That said supply of new vehicles and parts has improved compared with twelve months ago. Electric has a larger share of new car and van market.

The council has consulted on the Local Transport Plan, Local Cycling and Walking Infrastructure Plan and the Air Quality Action Plan. One of the findings is that three-quarters of respondents (mostly local residence) ranked reducing pollution and improving air quality as one of their highest priorities.

Road Number Diffusion Tube ID Year sampling started at site	Site Name or Street	NO2 Bias Adjusted (0.93) and Annualised Distance Corrected to Exposure
A270 E07-2019	Lewes Road north of Elm Grove	46.3
A270 C26-2022	New England Road under the bridge	44.2
A270 E08-1996	Lewes Road near Inverness Road	43.7
A23 C18-2010	Oxford Street London Road	42.8
LTN2-2022	Lower Elm Grove near Lewes Road	42.0
A270 C25-2010	New England West of Argyle Road	41.5
B2066 C11-2007	North Street Central	41.5
A23 E16-2015	Grand Parade Middle	40.7
B2066 C11-2012	North Street East of Clock Tower	40.5
A270 C24-2015	New England Road Elder Place	40.4
A259 W17-2009	Wellington Road Church Road	39.8
A23 C18-2019	London Road Brunswick Row	39.5
A270 W05-2006	Old Shoreham Road Terrace and Hill	38.0
A23 E16-1996	Grand Parade North	37.8
A23 C17-2012	Cheapside	37.7
A23 C21-2005	Viaduct Terrace	37.5
A23 E17-2003	Grand Parade South	36.8
C-Link E02-2012	The Drove linked with South Street	35.9
C-Link E12-2022	Hollingdean Road	35.7
A259 W16-2020	Wellington Road East	35.6
B2066 C04-2010	Castle Square	34.9
A2010 C12-2010	Queens Road South of Church Street	34.8
A2010 W01-2005	Queens Road North	34.8
C-Link E17-2018	Edward Street South Side	34.7
A270 OSR15	Old Shoreham Road Railings North	34.6
A2010 W04-2006	Chatham Place	34.5
LTN12-2022	Richmond Parade	34.3
A2010 W03-2006	Terminus Road Terrace and Hill	34.1
B2066 C10-2012	North Street near Ship Street	34.1
A259 W19-2009	Trafalgar Road Portslade	33.4
A23 C20-2005	Ditchling Road Viaduct Terrace	33.3
A270 OSR13	Old Shoreham Road Brackenbury	33.3
B2199 C28-2010	Frederick Place, North Laine	33.3
A270 E14-2019	Lewes Road on Pelham Terrace	33.1
A270 E10-2015	Vogue Gyrotory Island	32.9
A2023 W21-2010	Sackville Road Hove Park Tavern	32.8
A270 OSR1	Old Shoreham Road Benfield School	32.8
A23 C19-2021	Oxford Street Ditchling Road	32.7
A23 C16-2013	York Place	32.6
C-Link C13-2014	Lower Dyke Road	32.1
A23 C02-2022	Old Steine West	31.6
LTN9-2022	Egremont Place Middle	31.6
LTN13-2022	Lower Southover Street	31.4
A23 E02-2009	Preston Road near Preston Drove	31.3
A23 C23-2005	London Road Rose Hill Terrace	31.2
A23 E06-2020	Beaconsfield Road	31.1
C-Link E17-2022	Edward Street North Side	30.8
A23 E01-2016	Preston Road near Preston Circus	30.4
B2123 E23-2010	Rottingdean High Street West	30.2
A270 E15-2012	Lewes Road on Coombe Terrace	29.9
A23 C15-2005	Gloucester Place	29.8
A259 E25-2018	Rottingdean Marine Drive	29.7
B2066 W11-2020	Western Road	29.6
B2123 E22-2009	Rottingdean High Street East	29.5
A23 C09-2005	Marlborough Place	29.3
A270 E40-2022	Hartington Road near Lewes Road	28.8
B2123 E30-2020	Rottingdean High Street Mid	28.7
LTN8-2022	Egremont Place Top	28.1
A23 C01-2020	Old Steine St James Street Corner	28.0
A270 OSR5	Old Shoreham Road Foredown Drive	28.0
B2066 W10-2006	Western Road near Sillwood Road	27.3
LTN1-2022	Lower Franklin Road	26.5
LTN4-2022	Roadside Elm Grove Primary School	25.7
C-Link E18-2021	Eastern Road near Sudley Place	25.2
A270 OSR11	Old Shoreham Road Railings South	25.2
A270 OSR3	Old Shoreham Road Benfield Way	23.7
LTN14-2022	Middle Southover Street	23.6
A259 Kingsway4	Kingsway Traffic Light	22.9
A259 Kingsway2	Kingsway Sugardough	21.6
LTN10-2022	Carlton Hill next to school	21.3
A270 OSR7	Old Shoreham Road Library	21.2
LTN7-2022	Orchard Nursery Queen Park Road	20.9
A270 OSR9	Old Shoreham Rd Victoria Play Park	20.7
LTN11-2022	Morley Street	20.5
LTN5-2022	Upper Islingword Road	19.6
LTN6-2022	Top of Southover Street	19.4
C05-2012	Pavilion Gardens	18.6
A270 W14-2021	Old Shoreham Road Margery Road	18.3
LTN3-2022	Lower Islingword Road	18.3
A259 W18-2010	Vale Park	16.4
B2123 E31-2020	Rottingdean Vicarage Lane	16.0
E32-2020	Rottingdean Sea Front	14.5

Conclusions and Priorities

The Table on the right shows the ranked order of diffusion tube results Brighton & Hove 2022 (highest at the top).

The top priorities to improve air quality and achieve air quality compliance in AQMA1: east to west A270 link that is Lewes Road and New England Road. For the A23; London Road, Grand Parade and Viaduct Road.

For the ULEZ B2166; North Street. For the A259.

AQMA3 A259 an A293 Portslade. Elsewhere the AQMA5 the Drove west of the railway.

All AQMAs would benefit from reduced emissions and further improvements in roadside air quality.

This will also help to improve air quality across the suburbs and citywide.

Local Engagement and How to get Involved

There was strong support for measure in the air quality action plan.

Everyone can do a little bit to help improve local air quality in the city or their neighbourhood. For example, the travel and heating choices we all make have an adverse or beneficial impact on the air everyone breathes:

Healthy Travel Choice Hierarchy

1. Active Travel – walking, cycling and roller booting
2. Battery assisted bicycles
3. Public Transport
4. Electric car or van
5. Battery vehicle with a range extender
6. Petrol-electric hybrid
7. Small Petrol engine
8. Diesel Hybrid
9. Diesel with effective exhaust mitigation
10. Diesel without exhaust mitigation

Healthy Heating and Cooling Hierarchy

1. Renewably generated electricity without combustion with passive house and grid balancing energy storage
2. Electric grid or local microgeneration without emissions to air
3. Biogas Fired Boilers (Ultralow NO_x)
4. Natural Gas Fired Boilers (Ultralow NO_x)
5. Combined Heat and Power gas combustion (emits NO_x and CO₂)
6. Pellet Stoves (that emit low PM & NO_x)
7. Log Burning with risk of smoke
8. Diesel Generators that emit smoke and NO_x
9. Heavy fuel oil with various emissions
10. Coal with sulphurous emissions

Local Responsibilities and Commitment

This ASR was prepared by air quality officer in City Transport at Brighton & Hove Council.

Support for air quality improvement comes from:

City Transport, Parking Strategy, Environmental Health, Environmental Enforcement, Public Health, City Clean and City Parks, Tourism, Planning, Fleet Management, Taxi Licencing, Trading Standards, Equalities, Performance and Communications.

Following [Air Quality Action Plan \(brighton-hove.gov.uk\)](https://www.brighton-hove.gov.uk/air-quality-action-plan), our schedule is to approve 2022 appraised ASR by:

Assistant Director of City Transport and the Director of Public Health participate in the City's Quality Programme Board (AQPБ).

If you have any comments about air quality or the content of this report, please send them to: ProjectsTransport.Projects@brighton-hove.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Brighton and Hove City Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine if air quality standards are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Brighton and Hove City Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

Air Quality Management Areas

Air Quality Management Areas (AQMA(s)) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. This can take longer when detailed consultation take place for associated Transport schemes and policies. The AQAP should specify how air quality targets will be achieved and surpassed and provide dates by which measures will be carried out can be found in Table 2.1. The table presents a description of six AQMA(s) that are currently designated within Brighton and Hove City Council [Appendix D: Map\(s\) of Monitoring Locations and AQMA\(s\)](#) provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMA(s). The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- AQMA1: NO₂ annual and hourly mean
- AQMA(s) 2 to 6: NO₂ annual mean

The next review of the AQMA(s) is due 2026 after 2025 annual data is available.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Brighton & Hove AQMA1	2013 Amended November 2020	NO2 Annual Mean	Includes four main arterial routes connecting Brighton & Hove City Centre, that is: B2066-ULEZ and part of the A23, A270, A2010 and adjacent land use.	YES indirectly as motorway and trunk roads feed traffic onto the local road network	84.6	46.3	Not compliant	2022 AQAP Environment Transport Committee	Air Quality Action Plan 2022 APX. n 2.pdf (brighton-hove.gov.uk)
Brighton & Hove AQMA1	2013, Amended November 2020	NO2 1 Hour Mean	Includes four main arterial routes connecting Brighton & Hove City Centre, that is: B2066 ULEZ and part of the A23, A270, A2010 and adjacent land use.	YES indirectly as motorway and trunk roads feed traffic onto the local road network	114.8	54.1	For the hourly mean three years, including 2020 and 2021,	2022 AQAP Environment Transport Committee	All units µg/m3
Brighton & Hove AQMA2	2013 Amended November 2020	NO2 Annual Mean	Rottingdean High Street (B2123) from the A259 junction to the T-junction with Vicarage Lane.	YES indirectly as motorway and trunk roads feed traffic onto the local road network	47	30.2	Four years, including 2020 and 2021. Needs further improvement to meet	Various Committees	

							AQAP targets		
Brighton & Hove AQMA3	Nov-20	NO2 Annual Mean	South West Portslade including housing surrounding the A259 and A293 haulage route from Shoreham Port Inland. NOx contributions from general traffic, buses, HGV and wharf side industry.	YES indirectly as motorway and trunk roads feed traffic onto the local road network	51.1	39.8	Not compliant	2022 AQAP Environment Transport Committee	
Brighton & Hove AQMA4	Nov-20	NO2 Annual Mean	Premises adjacent with the Old Shoreham Road (A270) and Sackville Road (A2033) Junction.	YES indirectly as motorway and trunk roads feed traffic onto the local road network	47.7	32.8	Three years, including 2020 and 2021	2022 AQAP Environment Transport Committee	
Brighton & Hove AQMA5	Nov-20	NO2 Annual Mean	Part of the Drove, South Road Preston Road part of the A23 and adjoining properties.	YES indirectly as motorway and trunk roads feed traffic onto the local road network	50.7	35.9	Not compliant	2022 AQAP Environment Transport Committee	

Brighton & Hove AQMA6	Nov-20	NO2 Annual Mean	Eastern Road outside of the Royal Sussex County Hospital. Mixed road traffic, gas combustion and long-term construction.	YES	42.2	25.2	Four years, including 2020 and 2021.	2022 AQAP Environment Transport Committee	
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☒ Brighton and Hove City Council confirm the information on UK-Air regarding their AQMA(s) is up to date, AQMA 6 needs to be published (changed from draft). All six AQMAs are included on the DEFRA interactive map.

☒ Brighton and Hove City Council confirm that all current AQAPs have been submitted to Defra

Progress and Impact of Measures to address Air Quality in Brighton & Hove City Council

Defra's appraisal of last year's ASR acknowledged that the city council has six AQMAs in its jurisdiction. 54 tubes were reported for 2021, including Transport Projects this figure has risen to 82 for 2022. It was acknowledged that the ASR contains a list of measures to further improve air quality. Quality Assurance and quality control procedures have been applied for the diffusion tube bias adjustment (in 2021 a national factor in 2022 a local factor). For 2021 and 2022 annualisation factor has been applied to sites with data capture below 75%, for example Low Traffic Neighbourhood (LTN) tubes started from 1st July for the second half of the 2022 calendar year.

The DEFRA appraisal stated that there were no exceedances at a relevant receptor in 2021, the council subsequently pointed out that diffusion tube monitoring on Lewes Road is located at relevant building-line facades and has been reported as such since 1996. Past DEFRA appraisals have asked BHCC what monitoring occurs outside the designated AQMAs and this is set out clearly in the latest ASR. It is important that members understand that the AQMAs are declared for the highest pollution concentrations, monitoring happens in a variety of settings across the city.

Diffusion tubes along the Old Shoreham Road in Portslade (near AQMA3) started for the 2nd half of 2021 as a separate project. These results have been annualised and reported in the 2022 ASR for the first time. The project is seeking to determine before and after a potential intervention (cycle lane) for this reason diffusion tubes are not positioned at relevant receptors and are at varying distances back from the carriageway. The monitoring will not continue. A resultant recommendation is to have a sensor at the boundary of the nearby primary school.

Brighton and Hove City Council has taken forward direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More than twenty summarised measures are included within Table 2.2, with the type of measure and the progress Brighton and Hove City Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans Local Transport Plan and Local Walking and Cycling Infrastructure Plan. Key completed measures are:

- Exhaust upgrade of buses to ultra-low emission standard (euro-VI) started late 2022, with majority completed in Q1 or Q2 of 2023.
- Partners are working with festivals, events and schools to raise awareness of sustainable travel, reducing emission and air quality.
- Environmental Health has received a small amount of funding for smoke control in smoke control areas
- Committee has agreed to environmental enforcement of persistent engine idling.

Brighton and Hove City Council expects the following measures to be completed over the course of the next reporting year: Installation of new automatic monitoring stations and sensors for multiple pollutants to include oxides of nitrogen Particulate Matter PM₁₀ and PM_{2.5}. Sophisticated smart cameras to determine traffic flow and emission categories in and around the AQMAs.

Brighton and Hove City Council worked to implement these measures in partnership with the following stakeholders during 2022:

The principal challenges and barriers to implementation that Brighton and Hove City Council anticipates facing are stratifying procurement rules and spending grant funds within limited timescales and permissions for allocating revenue to progress projects.

The traffic dynamic is changing with fewer cars. Vans, minibuses and construction vehicles in some places are increasing. Older diesel vehicles have higher emission rates than petrol cars. Further interventions will help achieve compliance everywhere prior to the next scheduled review of the AQMAs. Brighton and Hove City Council requires a nudge towards zero emission vehicles to complement the measures (including active travel) stated in Table 2.2 to achieve interim World Health Organisation guidelines. Considerable progress has been made with slow, fast and rapid electromotive charging facilities in the city.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Ultralow and Zero Emission Zone for buses	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2019	2022	Local Authority Environmental Health, Local Authority Transport Dept.	DfT DEFRA SCRIF	NO	Funded	£1 million - £10 million	Implementation	15 to 20 µg/m3 NO2 Estimations	Fleet Improvement	Advance beyond 2015 LEZ, Meet and surpass bus emission standards set by the 2019 ULEZ	Completed 2023 after 2022 monitoring.
2	Zero Tailpipe Fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2019	2022	Local Authority Transport Dept.	Low Interest Loan	NO	Funded	£1 million - £10 million	Implementation	1 to 2 µg/m3 NO2	Zero Emission Council Fleet	Funded with carbon reduction	Availability of Vehicles
3	Bus Retrofit	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2013	2021	Local Bus Operators	Defra, SCRIF, Local Bus Operators	YES	Funded	£1 million - £10 million	Implementation	15 to 20 µg/m3 NO2 Estimations	Lower NO ₂ kerbside and roadside	Implementation on-going	Fourth Phase Completed Mid-2023
4	Better Aligned Tracking	Promoting Low Emission Transport	Other	2021	2023	Brighton & Hove and University of London	University	NO	Partially Funded	£500k - £1 million	Planning	1 to 3 µg/m3 PM2.5	Outcome of Discussions	Meetings	Monitoring benefits cause and effect hard to prove
5	Construction Environment Management Plans	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2021	2023	Planning and Developers	Developers	NO	Funded	£50k - £100k	Implementation	1 to 3 µg/m3 PM2.5	Reduction of HGV in the AQMA	Implemented on several major developments	Limited number of routes
6	Promoting e-cargo bikes	Freight and Delivery Management	Other	2020	2022	All Departments and Companies	DfT	NO	Partially Funded	£100k - £500k	Implementation	1 to 2 µg/m3 NO2	Increased bike-use modal shift	Bike share a success. E-bikes and western expansion coming soon.	Officer Time
7	Zero Emission Active Travel	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2018	2021	Local Authority Transport Dept.	DfT	NO	Funded	£1 million - £10 million	Implementation	1 to 3 µg/m3 NO2	Increased bike-use modal shift	Sea Front Bike Lane. Reallocation of Space. Temporary Cycle Lanes	Consensus
8	Reducing the need to travel	Promoting Travel Alternatives	Encourage / Facilitate homeworking	2019	2021	All Departments and Companies	Various	NO	Funded	< £10k	Implementation	1 to 5 µg/m3 NO2	Less traffic due to commuting	Success Since Lockdown	Commuting vehicle trips not fully revived after Covid-19 travel restrictions
9	Car Share	Alternatives to private vehicle use	Car Clubs	2017	2020	All Departments and Companies	Private	NO	Funded	£100k - £500k	Completed	1 µg/m3 NO2	Viable Car Clubs	Good Uptake Companies and Households	Established
10	Bus Access	Transport Planning and Infrastructure	Bus route improvements	2015	2022	Local Authority Transport Dept and Bus Company	Local Authority Transport Dept and Bus Company	NO	Partially Funded	£1 million - £10 million	Planning		Bus Priority	Gradual	Limited Space Funding for BSIP strategy
11	Cycle Access	Transport Planning and Infrastructure	Cycle network	2018	2021	Local Authority Transport Dept.	DfT	NO	Partially Funded	£1 million - £10 million	Implementation		Increased bike use	Accelerated Progress	Ongoing

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
12	Bike Share and e-bikes	Transport Planning and Infrastructure	Public cycle hire scheme	2018	2021	Local Authority Transport Dept.	Private	NO	Funded	£1 million - £10 million	Implementation		Increased bike use	Good Uptake	Time to Implement
13	Transport Mode Interchange	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2018	2020	Local Authority Transport Dept.	DfT	NO	Funded	£1 million - £10 million	Completed			Good Progress	Declined Rail use 2020
14	Planning Policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2022	Planning and Transport	Planning	NO	Funded	£50k - £100k	Completed			Supporting Policies	Established
15	Emission Georeference	Vehicle Fleet Efficiency	Testing Vehicle Emissions	2018	2020	Local Bus Operators	Bus Operators	NO	Funded	£1 million - £10 million	Completed	1 to 5 µg/m3 NO2	NO2 Reduction	Second Phase	Relevant to 54/350 regular buses
16	Shoreham Power Station Permit	Environmental Permits	Large Combustion Plant Permits and National Plans going beyond BAT	2010	2015	Environment Agency	Power Company	NO	Funded	£100k - £500k	Completed		Low Emission Contribution from Chimney	Established	Permit condition for ultralow NOx. Avoid permitting new ones in AQMAs
17	Smoke Control	Public Information	Via the Internet	2020	2022	Communication and Air Quality	BHCC	NO	Not Funded	< £10k	Implementation	1 µg/m3 PM2.5	Alternatives to solid fuel burning	Second Phase	Seasonal Updates
18	Air Quality Monitoring	Public Information	Via the Internet	2020	2024	Local Authority Transport Dept.	tbc	NO	Not Funded	£100k - £500k	Planning		Information	New Funding	Requires quality assured data and procurement approvals
19	Construction Plans	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2015	2024	Developers	Developers	NO	Partially Funded	£50k - £100k	Implementation	1 µg/m3 NO2	Less HGV in the AQMA	Progress with Long Term Construction	Improvements in Non-Road Mobile Machinery
20	Rapid Electromotive Chargers	Promoting Low Emission Transport	Taxi emission incentives	2019	2021	Local Authority Transport Dept.	Office of Low Emission Vehicles	NO	Partially Funded	£500k - £1 million	Implementation	1 to 3 µg/m3 NO2	On Street Facilities	Good Progress	Further charging facilities to come
21	Ultralow NOx and Zero	Promoting Low Emission Plant	Emission control equipment for small and medium sized stationary combustion sources / replacement of combustion sources	2018	2021	Planning and Air Quality	Developers	NO	Partially Funded	£50k - £100k	Implementation	1 to 2 µg/m3 NO2	Ultralow Emission Boilers and Alternatives	Good Progress	Ambition to phase out gas combustion around the AQMA, refuse permission for new ones
22	Working with Schools and Events	Public Information	Other	2019	2021	Local Authority Transport Dept and Sussex Air Quality Partnership	DEFRA Air Quality Grant	YES	Funded	£100k - £500k	Implementation	1 µg/m3 NO2	Improved Awareness active & zero emission travel	Interactive Across Sussex	Air Quality is good around Brighton & Hove schools
23	Taxi EV	Promoting Low Emission Transport	Taxi emission incentives	2018	2023	Sussex Wide	DEFRA	YES	Funded	£10k - 50k	Implementation	1 µg/m3 NO2	More Sussex licenced vehicles ultra-low or zero	Interactive Across Sussex	Sussex Taxi Survey
24	Anti Idling enforcement	Promoting Low Emission Transport	Other	2023	2023	City Transport Environmental Enforcement	BHCC	NO	Funded	£10k - 50k	Completed	1 to 2 µg/m3 NO2	Greater awareness of environmental crime	Agreed by Committee	Implemented 2023

PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Whilst the tiny airborne particles are not defined by composition or toxicology, when inhaled they can be drawn deep into the respiratory tract, crossing over into the blood stream. PM_{2.5} is referred to in section 6.49 of the Joint Strategic Needs Assessment (JSNA)ⁱ and is linked with the Public Health Outcomes Framework (PHOF)ⁱⁱ. PHOF sets out a vision for public health “to protect the nations health and improve the health of the poorest fastest”.

Brighton & Hove is taking the following measures to address PM_{2.5}:

- Leading the Sussex air quality partnership in upgrading the particulate monitoring network for PM_{2.5} and PM₁₀, and other pollutants also to support real-time nodes across the city. This is a Carbon Neutral Funded project supported by DEFRA, Lot 2 Awareness Raising and community engagement.
- The phasing out of pre-euro-V emission standard buses (registered before October 2008) reduces particulate emissions from the frequent bus fleet. Older buses remain for rail replacement services, driver training or heritage days. City council, taxi and haulage fleets have also made progress in phasing out pre-euro 5 vehicles.
- Scheduled for 2023 >95% of regular bus services will surpass the ULEZ, euro-VI emission standards this will further reduce oxides of nitrogen that are precursors to the formation of nitrate particles in the atmosphere, and also help reduce N₂O a potent greenhouse gas
- The Council is in talks with University of London regarding improving true wheel alignment and tyre pressure to reduce tyre and road wear and particulate releases to air

- Construction Environment Management Plans have progressively more stringent emissions standards for Non-Road Mobile Machinery that includes bulldozers, dumpers, and cranes, it recommended going forwards these standards are enforced especially on major projects, development areas, in or near AQMAs
- Static diesel generators are discouraged for building and road work events, especially those in the city centre that are likely to last more than a few days
- Members have requested that officers research the advantages of Smoke Control Areas (SCA). Parliament approved amendments to the Environment Act (2021) sets out stronger powers for Local Authorities. In 2023 funding is allocated to Brighton & Hove, Environmental Health for enforcement of its existing SCAs. Officer training on smoke control has also been made available in 2023.
- In the interests of communal health, the council issued a series of public statements discouraging indoor and outdoor domestic burning during the Covid-19 pandemicⁱⁱⁱ.
- Further press releases on reducing seasonal burning and a new pamphlet outlining the risks of air pollutants due to bonfires in the city.
- To complement Defra's automatic urban rural monitoring network (site at Preston Park) the City Council has for several years monitored PM_{2.5}
- Further guidance is available under the PM_{2.5} and Action Planning section of Technical Guidance LAQM.TG16 (Chapter 2).

During 2022 Preston Park recorded 30 days with moderate PM_{2.5} and North Street 8.

At Preston Park concentrations more than the WHO daily recommended level of 10 µg/m³ annual mean, DEFRA's national target to be met by 2040. Further details are given in Table A8. 2021 WHO recommendations and interims have been published since the writing of the 2020 ASR and these have been adopted in the 2022 AQAP.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken up to and including 2022 by Brighton and Hove City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented (in tables) for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed. Most of the charts for each AQMA track long term trends since 2010 (or before) and compare the annual concentrations to the most locally monitored background.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Brighton and Hove City Council (BHCC) undertook automatic (continuous) monitoring at two sites during 2022, with Lewes Road contract ceasing in March of that year. In addition, the park monitor in Preston Park is run by DEFRA as part of the UK Automatic Urban Rural Network (AURN). Monitoring is available from the University of Brighton [You can now check air quality - online \(brighton.ac.uk\)](https://www.brighton.ac.uk/you-can-now-check-air-quality-online) at their Falmer campus south of the A27 trunk road and the Brighton to Lewes railway. Table A.1 in Appendix A shows the details of the automatic monitoring sites. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead. The [Sussex Air Network](#) page presents automatic monitoring results for Brighton and Hove and across the county with Preston Park and other AURN results also available through [Data Archive - Defra, UK](#). The council is seeking to expand its automatic monitoring and real-time for 2024.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

BHCC undertook non- automatic (i.e. passive) monitoring of NO₂ at 82 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the UK air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year. For Lewes Road more than 18 hourly exceedance was last recorded by the automatic analyser in 2017, followed by a near miss in 2018 and no hours above 200µg/m³ from 2018 up to the end of monitoring at the site March 2022. 10 exceedances versus that standard of 18 were recorded at the North Street automatic analyser in 2022.

Annual mean NO₂ greater than 60µg/m³, indicates that an exceedance of the 1-hour mean objective where that is monitored. At North Street diffusion tube monitoring suggested this last hourly exceedance happened in 2016 with a near miss in 2017 and 2018. Recorded concentrations have complied with this standard for the past four years.

For London Road monitoring suggest hourly exceedance last occurred in 2019 with much lower concentrations since that time. The widening of the footway may have helped to separate distance between road traffic emissions and pedestrians and the bus fleet is cleaner since 2019.

Outside of AQMA1 $60\mu\text{g}/\text{m}^3$ has been recorded at the kerb of Old Shoreham Road, Portslade in 2022. This kerbside sample position on the railings is a few centimetres from the carriageway and is not a location where people will be present for the averaging period. Its purpose is to check potential before and after should a cycle lane be added. The site is open and not in street canyon, DEFRA's distance correction tool indicates much lower concentrations on the footway where monitoring continues.

Further improvement and monitoring is required to be certain that the hourly NO_2 standard is complied with throughout Brighton & Hove. That said road traffic, combined heat and power and gas boilers contribute to short-term oxides of nitrogen.

The annual average standard $40\mu\text{g}/\text{m}^3$ (without decimal place) continues to be exceeded at the following locations in designated AQMAs as follows:

- **Lewes Road AQMA1 A270**
- **New England Road AQMA1A270**
- **London Road AQMA1A23**
- **North Street AQMA1 B20266**
- **Grand Parade AQMA1A23**
- **Wellington Road AQMA3 A259**

(> $36\mu\text{g}/\text{m}^3$ within 10%) of the UK NO_2 standard is also recorded at Cheapside, Viaduct Terrace (continuation of Viaduct Road) Old Shoreham Road continued from New England Road all in AQMA1 and The Drove AQMA5 and Hollingdean Road connected to Lewes Road.

As the NO_2 AQMA were amended late 2020, DEFRA guidance requests a review after five years of monitoring data. More stringent interim guidelines and targets are set out in the BHCC's 2022 AQAP shared with DEFRA.

3.1.4 Particulate Matter (PM_{10})

Since 2015 Brighton & Hove has monitored $\text{PM}_{2.5}$ instead of PM_{10} . The relatively coarse fraction of airborne particulate was more likely to comply with national standards. The

preference for PM_{2.5} monitoring aligned more closely with broader public health outlook. As funding is now available the council is scheduled to monitor both PM₁₀ (throat and upper respiratory impacts) and PM_{2.5} (influence on the blood stream when inhaled). We know that particulate levels are lower in the South Down National Park compared to the conurbation. The evidence to date suggests particles are not more concentrated at roadside and further work aims to better understand particulate levels across the city and county. The aim is also to distinguish where local and regional emissions influence local air quality.

3.1.5 Particulate Matter (PM_{2.5})

Table A.6 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years. Further improvement is required to certainly surpass 2010 WHO guidelines and work towards 2021 WHO guidelines for annual and daily averages and the interim targets set out in BHCC's AQAP.

3.1.6 Sulphur Dioxide (SO₂)

Sulphur Dioxide levels have been found to comply with national standards and world health guidelines across the Greater Brighton area. Reduced coal burning, ultralow sulphur petrol and diesel (2007) and fewer diesel trains have helped bring down levels of sulphurous gas and particles. The University of Brighton received a £250K research fund for monitoring. Results for SO₂ and other pollutants can be found at: [Air Quality - last 24 hours \(brighton.ac.uk\)](https://www.brighton.ac.uk/air-quality/). The monitoring station is in a field at Falmer (south of the A27 and Brighton to Lewes railway) and included in the summary appendix of Brighton & Hove automatic analysers.

The city council plans to introduce SO₂ monitoring in AQMA1 (City Centre) and AQMA3 (set back from the A259 and harbour). This can monitor progress in the reduction of marine emissions set out in the national air quality strategy. Results can be compared to the Automatic Rural Network monitor at Lullington Heath in the South Downs National Park.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
BH6	Lewes Road South of Vogue Gyratory	Roadside	532082	105694	NO ₂ , PM _{2.5}	YES	API Chemiluminescent, TEOM	1	1.5	3
BH10	North Street near Ship Street	Roadside	530995	104271	NO ₂ , PM _{2.5}	YES	API Chemiluminescent	0	6	3.5
BH0	Preston Park AURN	Urban Background	530526	106218	NO ₂ , PM _{2.5} , O ₃	NO	API Chemiluminescent, Partisol	N/A	200	5
UB	University of Brighton	Suburban	534647	108503	NO ₂ , PM ₁ , PM _{2.5} , PM ₁₀ , SO ₂ , nitrous acid, formaldehyde	NO	Differential Optical Absorption Spectroscopy	N/A	~150	3.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites Nitrogen Dioxide Diffusion Tubes

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
A23 C01-2020	Old Steine St James Street Corner	Roadside	531361	104040	No	0.0	8.0	4.0
A23 C02-2022	Old Steine West	Roadside	531255	104062	AQMA1 ULEZ	0.0	7.0	2.5
B2066 C04-2010	Castle Square	Roadside	531228	104088	AQMA1 ULEZ	0.0	5.7	3.0
C05-2012	Pavilion Gardens	Urban Background	531230	104260	No	0.0	102.0	2.0
B2066 C10-2012	North Street near Ship Street	Roadside	530995	104271	AQMA1-ULEZ	0.0	6.1	2.5
B2066 C11-2007	North Street Central	Roadside	530947	104284	AQMA1-ULEZ	0.0	6.5	3.5
B2066 C11-2012	North Street East of Clock Tower	Kerbside	530890	104302	AQMA1-ULEZ	5.0	1.0	4.0
A2010 C12-2010	Queens Road South of Church Street	Roadside	530900	104451	AQMA1-A2010	0.0	4.2	3.0
A2010 W01-2005	Queens Road North	Roadside	530969	104785	AQMA1-A2010	0.0	4.2	3.0
C-Link C13-2014	Lower Dyke Road	Roadside	530770	104363	AQMA1-ULEZ	0.0	4.5	2.5
A23 C09-2005	Marlborough Place	Roadside	531302	104392	AQMA1-A23	0.0	4.3	3.0
A23 C15-2005	Gloucester Place	Roadside	531401	104669	AQMA1-A23	0.0	8.4	3.0

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
A23 C16-2013	York Place	Roadside	531400	104844	AQMA1-A23	0.0	4.9	3.0
A23 C17-2012	Cheapside	Roadside	531364	104982	AQMA1-A23	0.0	3.4	2.5
A23 C18-2019	London Road Brunswick Row	Roadside	531369	105042	AQMA1-A23	1.0	4.0	2.5
A23 C18-2010	Oxford Street London Road	Roadside	531373	105136	AQMA1-A23	0.0	3.0	2.5
A23 C19-2021	Oxford Street Ditchling Road	Roadside	531472	105161	AQMA1-A23	0.0	3.3	2.5
A23 C20-2005	Ditchling Road Viaduct Terrace	Roadside	531496	105315	AQMA1-A23	0.0	4.7	2.0
A23 C21-2005	Viaduct Terrace	Roadside	531451	105356	AQMA1-A23	0.0	3.6	3.0
A23 C23-2005	London Road Rose Hill Terrace	Roadside	531189	105375	AQMA1-A23	0.0	5.4	3.0
A270 C24-2015	New England Road Elder Place	Roadside	531101	105443	AQMA1-A270	0.0	3.6	2.5
A270 C25-2010	New England West of Argyle Road	Roadside	530985	105419	AQMA1-A270	0.0	3.5	2.5
A270 C26-2022	New England Road under the bridge	Kerbside	530870	105354	AQMA1-A270	1.5	3.0	2.5
B2199 C28-2010	Frederick Place, North Laine	Suburban	531032	104843	AQAMA1, North Laine	0.0	2.8	3.5
A23 E01-2016	Preston Road near Preston Circus	Roadside	531101	105498	AQMA1-A23	0.0	2.5	2.5

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
A23 E02-2009	Preston Road near Preston Drove	Roadside	530233	106515	AQMA5-A23	0.0	4.0	2.5
C-Link E02-2012	The Drove linked with South Street	Roadside	530063	106368	AQMA5 C-Link	0.0	2.6	2.0
A23 E06-2020	Beaconsfield Road	Roadside	531107	105595	AQAMA1-A23	0.0	3.8	2.0
A270 E07-2019	Lewes Road north of Elm Grove	Roadside	531838	105349	AQMA1-A270	0.0	2.9	2.0
A270 E40-2022	Hartington Road near Lewes Road	Suburban	532095	105679	AQMA1-A270	0.0	5.0	2.5
A270 E08-1996	Lewes Road near Inverness Road	Roadside	532090	105752	AQMA1-A270	0.0	4.4	2.5
A270 E10-2015	Vogue Gyratory Island	Roadside	532126	105838	AQMA1-A270	0.0	3.0	2.5
C-Link E12-2022	Hollingdean Road	Roadside	532064	105939	AQMA1-A270 Area + C-Link	0.0	4.5	2.5
A270 E14-2019	Lewes Road on Pelham Terrace	Roadside	532377	106314	AQMA1-A270	0.0	3.4	2.5
A270 E15-2012	Lewes Road on Coombe Terrace	Roadside	532300	106159	AQMA1-A270	0.0	3.7	2.5
A23 E16-1996	Grand Parade North	Roadside	531465	104629	AQAMA1-A23	0.0	4.4	2.5
A23 E16-2015	Grand Parade Middle	Roadside	531426	104514	AQAMA1-A23	0.0	3.6	2.5
A23 E17-2003	Grand Parade South	Roadside	531394	104338	AQAMA1-A23	0.0	5.0	3.0

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
C-Link E17-2018	Edward Street South Side	Roadside	531408	104233	AQAMA1-A23 + C-Link	0.0	1.6	2.0
C-Link E17-2022	Edward Street North Side	Roadside	531430	104247	AQAMA1-A23 + C-Link	0.0	5.0	2.0
C-Link E18-2021	Eastern Road near Sudley Place	Roadside	532759	103810	AQMA6	0.0	2.4	2.0
B2123 E22-2009	Rottingdean High Street East	Roadside	536970	102280	AQMA2 C-Link	0.0	0.2	2.0
B2123 E23-2010	Rottingdean High Street West	Roadside	536966	102273	AQMA2-B2123	0.0	0.2	2.5
A259 E25-2018	Rottingdean Marine Drive	Roadside	537014	102238	Boundary AQMA2-A259	0.0	2.7	2.5
B2123 E30-2020	Rottingdean High Street Mid	Roadside	536947	102341	AQMA2-B2123	0.0	1.8	2.0
B2123 E31-2020	Rottingdean Vicarage Lane	Roadside	536932	102454	AQMA2-B2123	0.0	1.5	2.5
E32-2020	Rottingdean Sea Front	Urban Background	537011	102099	No	0.0	112.0	2.0
A2010 W03-2006	Terminus Road Terrace and Hill	Roadside	530963	104994	AQMA1-A2010	0.0	3.5	3.5
A2010 W04-2006	Chatham Place	Roadside	530808	105340	AQMA1-A270	0.0	3.4	3.0
A270 W05-2006	Old Shoreham Road Terrace and Hill	Roadside	530778	105362	AQMA1-A270	0.0	3.6	3.5
B2066 W10-2006	Western Road near Sillwood Road	Roadside	530302	104415	AQMA1-ULEZ	0.0	4.5	3.5

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
B2066 W11-2020	Western Road	Roadside	530154	104444	AQMA1-ULEZ	0.0	4.0	2.5
A270 W14-2021	Old Shoreham Road Margery Road	Roadside	526761	105809	No	0.0	4.4	2.0
A259 W16-2020	Wellington Road East	Roadside	526233	104860	AQMA3-A259	0.0	3.0	2.5
A259 W17-2009	Wellington Road Church Road	Roadside	525931	104961	AQMA3-A259	0.0	3.0	2.0
A259 W18-2010	Vale Park	Urban Background	525970	105230	No	0.0	97.0	2.5
A259 W19-2009	Trafalgar Road Portslade	Roadside	525658	105695	AQMA3-A293	0.0	3.9	3.0
A259 W21-2010	Sackville Road Hove Park Tavern	Roadside	528388	105936	AQMA4-A2023	0.0	3.4	2.5
LTN1-2022	Lower Franklin Road	Suburban	532039	105541	No	2.5	2.0	2.5
LTN2-2022	Lower Elm Grove near Lewes Road	Roadside	531823	105287	AQMA1-A270	0.0	2.5	2.5
LTN3-2022	Lower Islingword Road	Suburban	531900	105198	No	0.0	1.0	2.5
LTN4-2022	Roadside Elm Grove Primary School	Roadside	532278	105233	No	2.5	1.5	2.5
LTN5-2022	Upper Islingword Road	Suburban	532124	104850	No	0.0	1.0	2.5
LTN6-2022	Top of Southover Street	Suburban	532065	104734	No	0.0	1.5	2.5

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
LTN7-2022	Orchard Nursery Queen Park Road	Roadside	531987	104575	No	0.0	2.0	2.5
LTN8-2022	Egremont Place Top	Roadside	531910	104322	No	2.5	1.5	2.5
LTN9-2022	Egremont Place Middle	Roadside	531880	104243	No	2.5	1.0	2.5
LTN10-2022	Carlton Hill next to school	Suburban	531642	104366	AQMA1 steep hill near boundary	0.0	2.0	2.5
LTN11-2022	Morley Street	Suburban	531457	104546	AQAM1-A23 near boundary	0.0	2.0	2.5
LTN12-2022	Richmond Parade	Roadside	531505	104698	AQAM1-A23 near boundary	0.0	3.0	2.5
LTN13-2022	Lower Southover Street	Roadside	531654	105072	AQAM1-A23 near boundary	0.0	2.5	2.5
LTN14-2022	Middle Southover Street	Roadside	531725	105005	No	0.0	1.0	2.5
A259 Kingsway2	Kingsway Sugardough	Roadside	528602	104416	No	0.0	3.0	2.5
A259 Kingsway4	Kingsway Traffic Light	Roadside	528601	104420	No	2.5	1.0	2.5
A270 OSR1	Old Shoreham Road Benfield School	Roadside	526241	105811	No	0.0	3.0	2.5
A270 OSR3	Old Shoreham Road Benfield Way	Roadside	526237	105830	No	2.5	1.5	2.5
A270 OSR5	Old Shoreham Road Foredown Drive	Roadside	526021	105832	No	2.5	1.5	2.5

Road Number Diffusion Tube ID Year sampling started at site	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Height (m)
A270 OSR7	Old Shoreham Road Library	Roadside	526026	105832	No	0.0	3.0	2.5
A270 OSR9	Old Shoreham Rd Victoria Play Park	Roadside	525730	105849	No	0.0	4.0	2.5
A270 OSR11	Old Shoreham Road Railings South	Kerbside	525729	105852	No	5.0	0.2	0.5
A270 OSR13	Old Shoreham Road Brackenbury	Roadside	525698	105872	AQMA3-A293 + A270 near boundary	2.0	2.5	2.5
A270 OSR15	Old Shoreham Road Railings North	Kerbside	525700	105869	AQMA3-A293 + A270 near boundary	8.5	0.2	0.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

(3) For 2022, B2066 C10-2012 is the only triplicate co-located site. OSR (Old Shoreham Road) and Kingsway temporary surveys are the average of duplicate tubes.

Table A.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
BH6	532082	105694	Roadside	99.9	19	37.8	26.9	18.9	18.3	22.3
BH10	530995	104271	Roadside	95.6	95.6	49.5	45.7	32.6	29.3	34.6
BH0	530526	106218	Urban Background	99.5	99.5	16.3	15.2	10.9	12.3	12.6

☒ Annualisation has been conducted where data capture is 19% to provide an indicative trend chart for BH6 that stated 2012 and ceased March 2022. Annualisation was not required at other automatic analysers.

☒ Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**. The interim target set out in the AQAP is 30µg/m³.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
A23 C01-2020	531361	104040	Roadside	Same as to right	97.8			25.1	26.0	28.0
A23 C02-2022	531255	104062	Roadside		97.8					31.6
B2066 C04-2010	531228	104088	Roadside		91.2	48.2	43.5	33.6	30.6	34.9
C05-2012	531230	104260	Urban Background		97.8	22.0	21.0	16.9	16.3	18.6
B2066 C10-2012	530995	104271	Roadside		97.8	45.5	41.3	32.3	29.9	34.1
B2066 C11-2007	530947	104284	Roadside		89.0	54.6	48.5	35.0	35.8	41.5
B2066 C11-2012	530890	104302	Kerbside		61.3	90.8	77.4	51.2	47.6	54.1
A2010 C12-2010	530900	104451	Roadside		97.8	45.3		30.4	29.1	34.8
A2010 W01-2005	530969	104785	Roadside		80.2	41.1	34.0	25.8	28.3	34.8
C-Link C13-2014	530770	104363	Roadside		81.9	40.5	36.6	31.2	29.1	32.1
A23 C09-2005	531302	104392	Roadside		97.8	47.2	41.1	27.5	28.1	29.3
A23 C15-2005	531401	104669	Roadside		97.8	37.1	38.0	29.4	27.6	29.8
A23 C16-2013	531400	104844	Roadside		89.3	38.9	37.7	26.6	28.5	32.6
A23 C17-2012	531364	104982	Roadside		89.3	53.9	49.0	37.5	35.0	37.7
A23 C18-2019	531369	105042	Roadside		97.8		61.8	44.8	39.1	41.0
A23 C18-2010	531373	105136	Roadside		91.2	54.7	52.6	39.7	36.6	42.8
A23 C19-2021	531472	105161	Roadside		79.9	39.2	36.5	29.0	31.2	32.7
A23 C20-2005	531496	105315	Roadside		97.8	40.7	36.8	31.0	29.9	33.3
A23 C21-2005	531451	105356	Roadside		97.8	49.7	44.6	36.5	36.3	37.5
A23 C23-2005	531189	105375	Roadside		97.8	43.1	39.5	30.6	28.3	31.2
A270 C24-2015	531101	105443	Roadside		97.8	51.1	44.0	38.3	37.5	40.4
A270 C25-2010	530985	105419	Roadside		97.8	44.3	42.7	38.6	37.5	41.5
A270 C26-2022	530870	105354	Kerbside		89.3					47.9
B2199 C28-2010	531032	104843	Suburban		97.8	42.9	37.7	33.5	33.1	33.3
A23 E01-2016	531101	105498	Roadside		97.8	41.9	34.3	30.2	28.9	30.4
A23 E02-2009	530233	106515	Roadside		97.8	41.1	34.7	31.4	28.3	31.3
C-Link E02-2012	530063	106368	Roadside		81.0	42.0	39.2	35.7	34.4	35.9
A23 E06-2020	531107	105595	Roadside		97.8			27.5	27.0	31.1
A270 E07-2019	531838	105349	Roadside		97.8		51.0	46.5	45.8	46.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
A270 E40-2022	532095	105679	Suburban		97.8					28.8
A270 E08-1996	532090	105752	Roadside		97.8	52.6	48.7	42.5	41.1	43.7
A270 E10-2015	532126	105838	Roadside		97.8	40.8	38.0	33.5	31.3	32.9
C-Link E12-2022	532064	105939	Roadside		97.8					35.7
A270 E14-2019	532377	106314	Roadside		97.8		35.0	31.7	28.6	33.1
A270 E15-2012	532300	106159	Roadside		90.1	40.7	37.4	34.0	29.2	29.9
A23 E16-1996	531465	104629	Roadside		90.9	41.4	42.3	37.4	35.3	37.8
A23 E16-2015	531426	104514	Roadside		97.8	44.8	42.3	41.4	38.3	40.7
A23 E17-2003	531394	104338	Roadside		97.8	46.8	43.8	34.0	33.2	36.8
C-Link E17-2018	531408	104233	Roadside		97.8	40.4		36.2	33.8	34.7
C-Link E17-2022	531430	104247	Roadside		90.9					30.8
C-Link E18-2021	532759	103810	Roadside		89.6	35.0	28.8		23.6	25.2
B2123 E22-2009	536970	102280	Roadside		97.8	36.2	32.7	28.4	26.6	29.5
B2123 E23-2010	536966	102273	Roadside		97.8	37.2	35.2	31.7	27.8	30.2
A259 E25-2018	537014	102238	Roadside		64.6	35.5	31.7	27.2	27.5	29.7
B2123 E30-2020	536947	102341	Roadside		90.9			26.0	25.8	28.7
B2123 E31-2020	536932	102454	Roadside		97.8			16.5	15.0	16.0
E32-2020	537011	102099	Urban Background		97.8			13.5	12.2	14.5
A2010 W03-2006	530963	104994	Roadside		97.8	40.4	37.5	31.4	31.7	34.1
A2010 W04-2006	530808	105340	Roadside		97.8	39.9	39.0	31.8	28.6	34.5
A270 W05-2006	530778	105362	Roadside		97.8	44.5	38.1	34.0	34.0	38.0
B2066 W10-2006	530302	104415	Roadside		97.8	41.4	38.0	28.0	24.5	27.3
B2066 W11-2020	530154	104444	Roadside		97.8			26.7	26.6	29.6
A270 W14-2021	526761	105809	Roadside		97.8				16.1	18.3
A259 W16-2020	526233	104860	Roadside		90.9			35.9	30.6	35.6
A259 W17-2009	525931	104961	Roadside		75.0	42.0	39.2	35.4	34.2	39.8
A259 W18-2010	525970	105230	Urban Background		97.8	20.2	18.4	17.0	15.0	16.4
A259 W19-2009	525658	105695	Roadside		73.6	41.7	39.9	34.4	31.7	33.4
A259 W21-2010	528388	105936	Roadside		97.8	36.6	34.6		28.3	32.8
LTN1-2022	532039	105541	Suburban	100	50.8					26.5
LTN2-2022	531823	105287	Roadside	84	42.0					42.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
LTN3-2022	531900	105198	Suburban	100	50.8					18.3
LTN4-2022	532278	105233	Roadside	100	50.8					25.7
LTN5-2022	532124	104850	Suburban	100	50.8					19.6
LTN6-2022	532065	104734	Suburban	100	50.8					19.4
LTN7-2022	531987	104575	Roadside	100	50.8					20.9
LTN8-2022	531910	104322	Roadside	100	50.8					28.1
LTN9-2022	531880	104243	Roadside	100	50.8					31.6
LTN10-2022	531642	104366	Suburban	85.2	42.6					21.3
LTN11-2022	531457	104546	Suburban	100	50.8					20.5
LTN12-2022	531505	104698	Roadside	100	50.8					34.3
LTN13-2022	531654	105072	Roadside	83	41.5					31.4
LTN14-2022	531725	105005	Roadside	83	41.5					23.6
A259 Kingsway2	528602	104416	Roadside	Same as to right	97.8				19.5	21.6
A259 Kingsway4	528601	104420	Roadside		97.8				19.9	22.9
A270 OSR1	526241	105811	Roadside		97.8				28.6	32.8
A270 OSR3	526237	105830	Roadside		89.0				20.6	23.7
A270 OSR5	526021	105832	Roadside		97.8				24.9	28.0
A270 OSR7	526026	105832	Roadside		97.8				18.6	21.2
A270 OSR9	525730	105849	Roadside		97.8				18.2	20.7
A270 OSR11	525729	105852	Kerbside		97.8				22.5	25.2
A270 OSR13	525698	105872	Roadside		97.8				31.8	36.5
A270 OSR15	525700	105869	Kerbside		97.8				31.6	34.6

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22

☒ Diffusion tube data has been bias adjusted

☒ Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction

Notes:

The annual mean concentrations are presented as $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

A series of graphs showing long term trends in Nitrogen Dioxide at roadside compared with background (not near a road) declining since 2010 to 2020, in most cases and uptick 2022 as some vehicle numbers recover (presented in the summary section of this report).

Figure A.2 –AQMA1 A2010 Brighton Railway Station

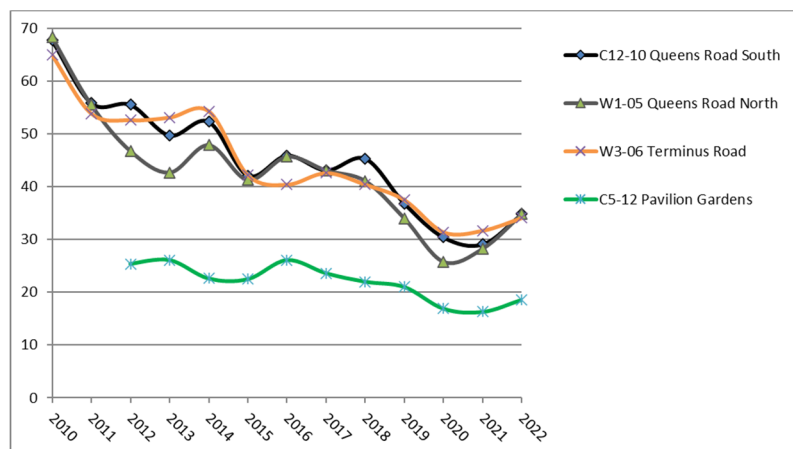


Figure A.3 –AQMA1 ULEZ Kerbside (above pedestrian pavement)

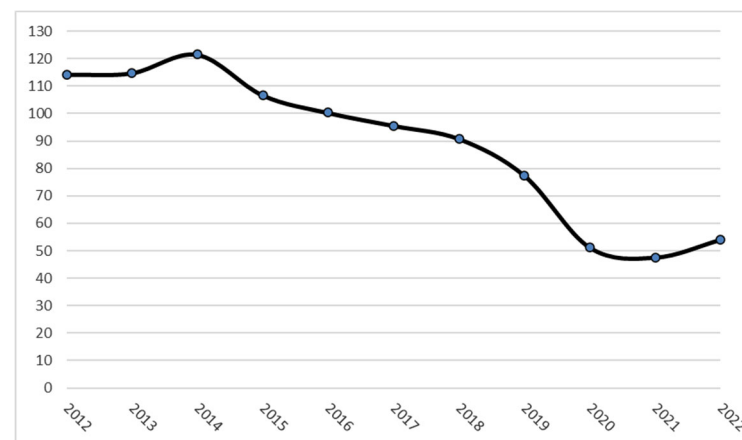


Figure A.4 –AQMA1 Frederick Place, North Laine

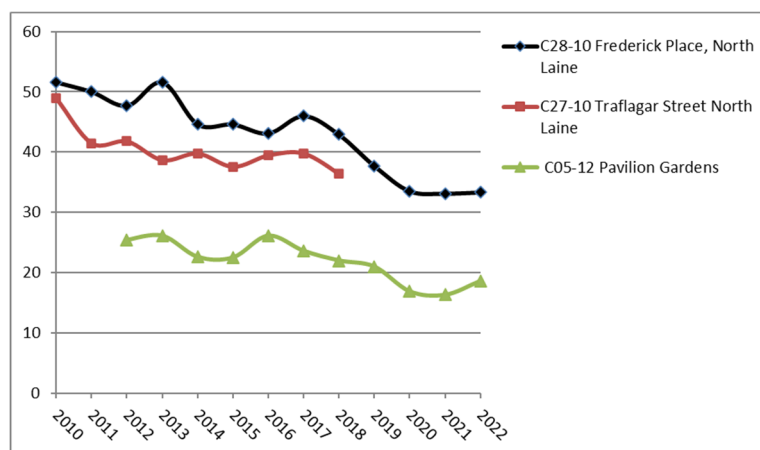


Figure A.5 AQMA1 ULEZ B2066 roadside and background

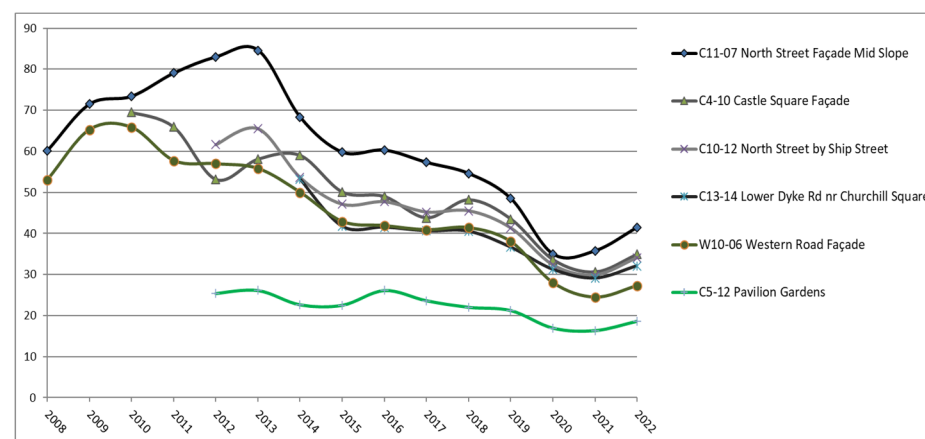


Figure A.6 –AQMA1 A23 Valley Gardens West Side

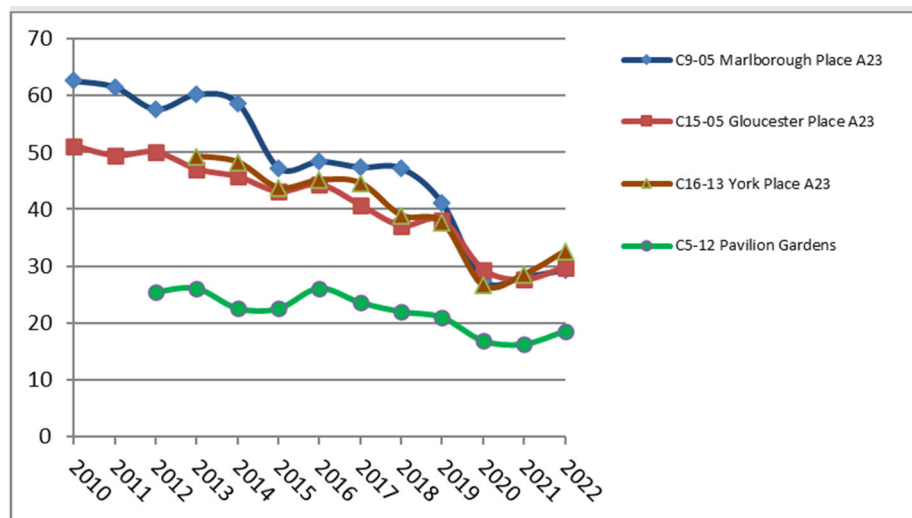


Figure A.7 A23 AQMA1 Valley Gardens East Side

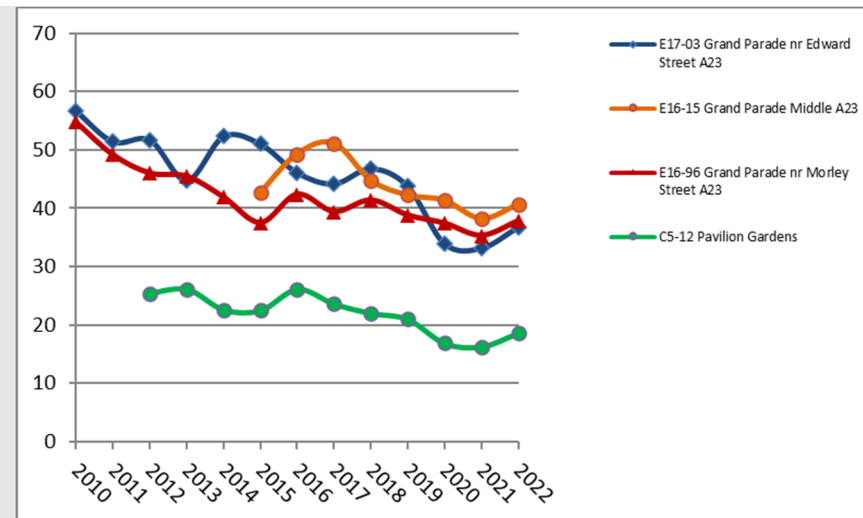


Figure A.8 –AQMA1 A23 London Road

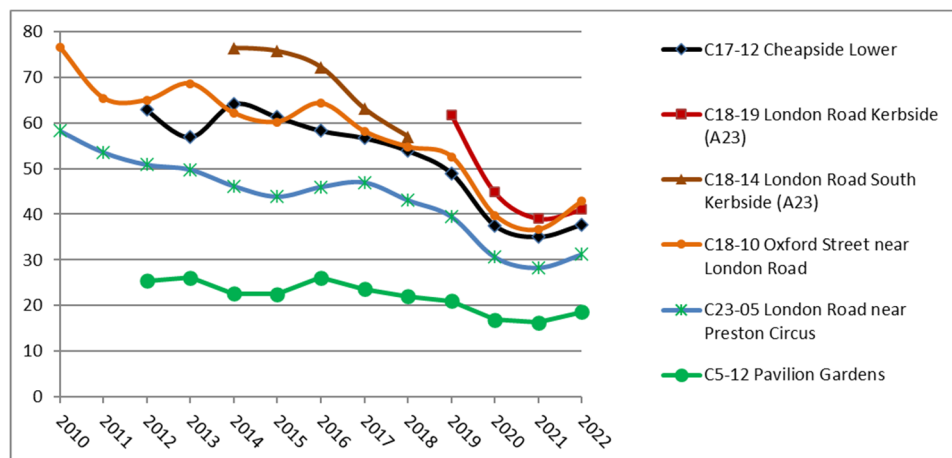


Figure A.9 –AQMA1 A23 Via Preston Circus

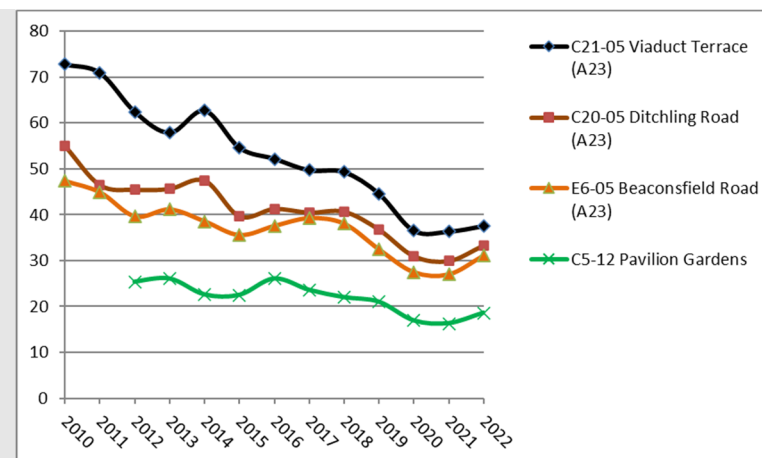


Figure A.10 –AQMA1 A270 New England Road

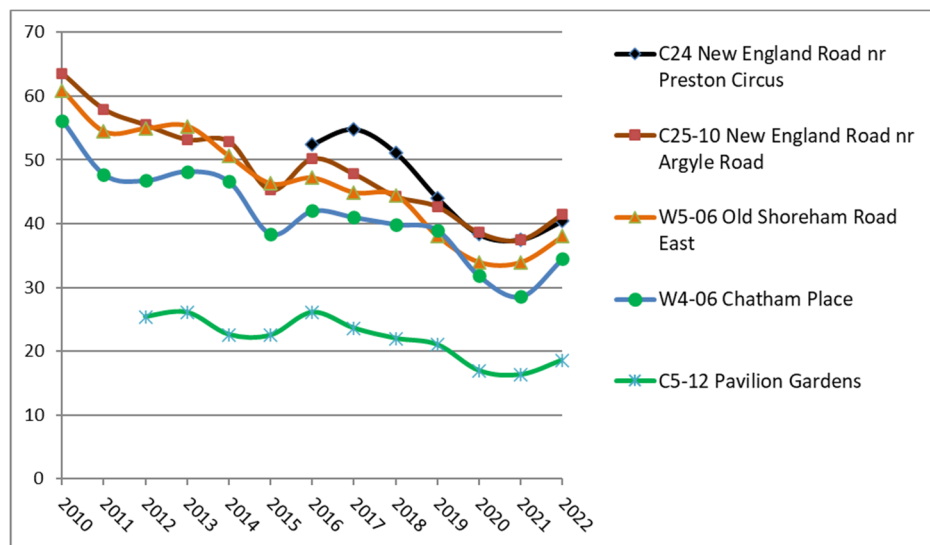


Figure A.11 –AQMA1 A270 Lewes Road South

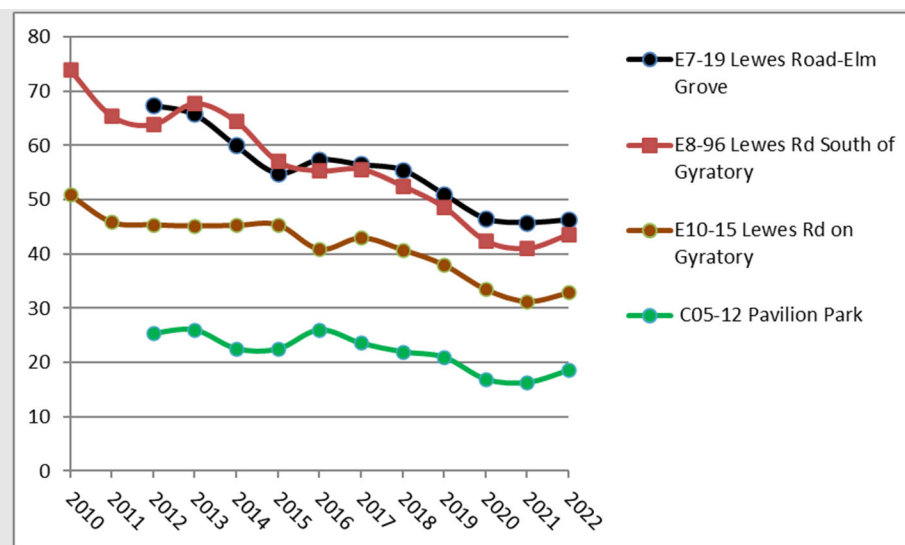


Figure A.12 –AQMA1 A270 Lewes Road Mid

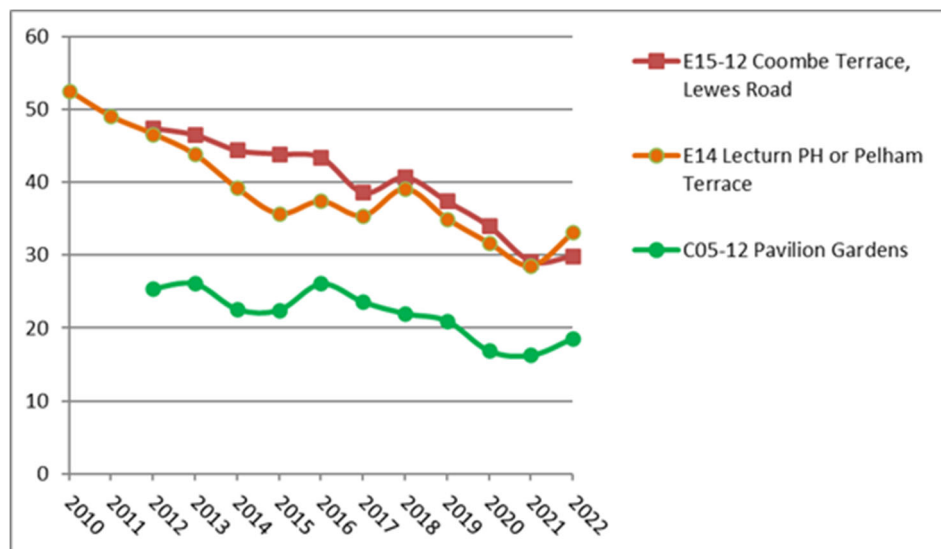


Figure A.13 –AQMA2 B2166 + A259 Rottingdean

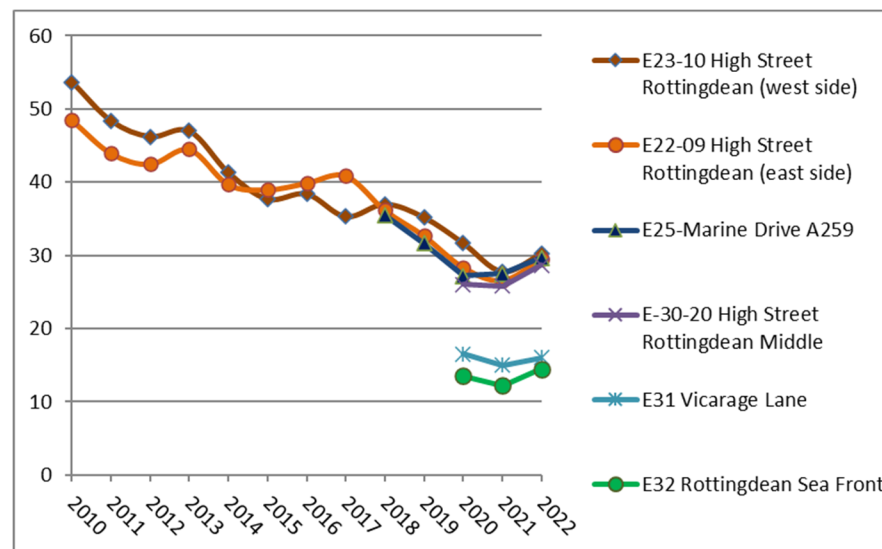


Figure A.14 –AQMA3 A259 Wellington Road and A293

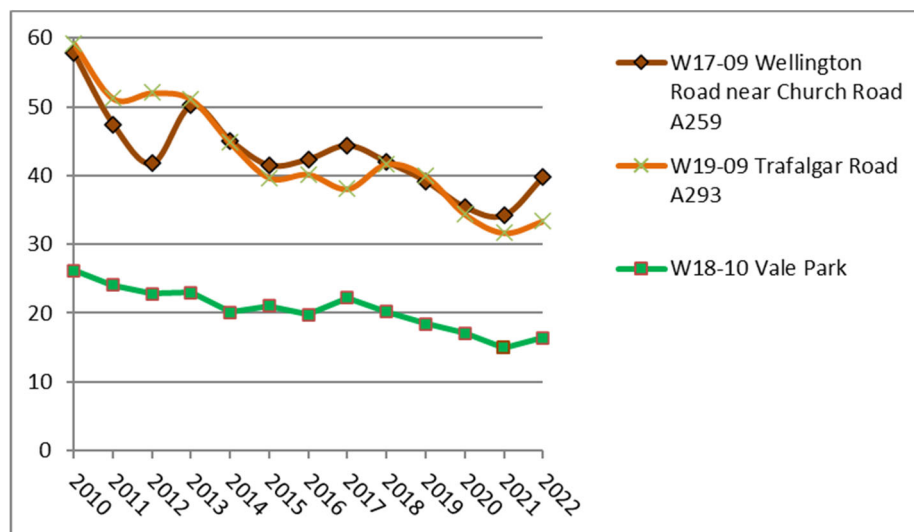


Figure A.15 –AQMA4 A2023 Sackville Road and A293

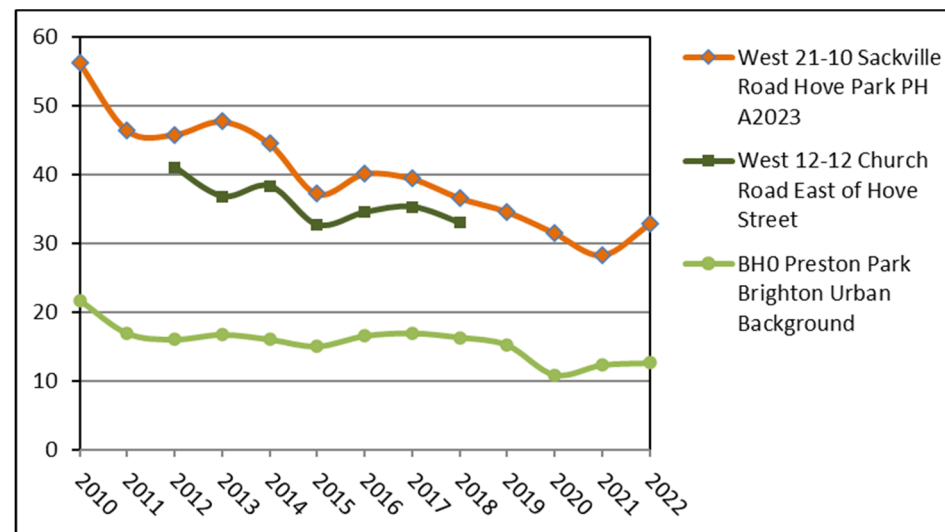


Figure A.16 –AQMA5 A23 Preston Road and The Drove

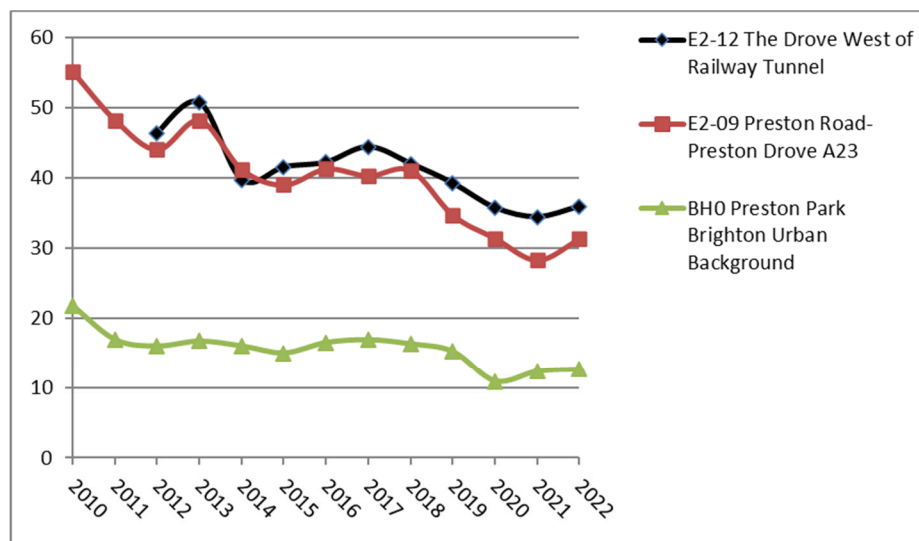


Figure A.17 –AQMA6 Eastern Road Hospital with St James Street

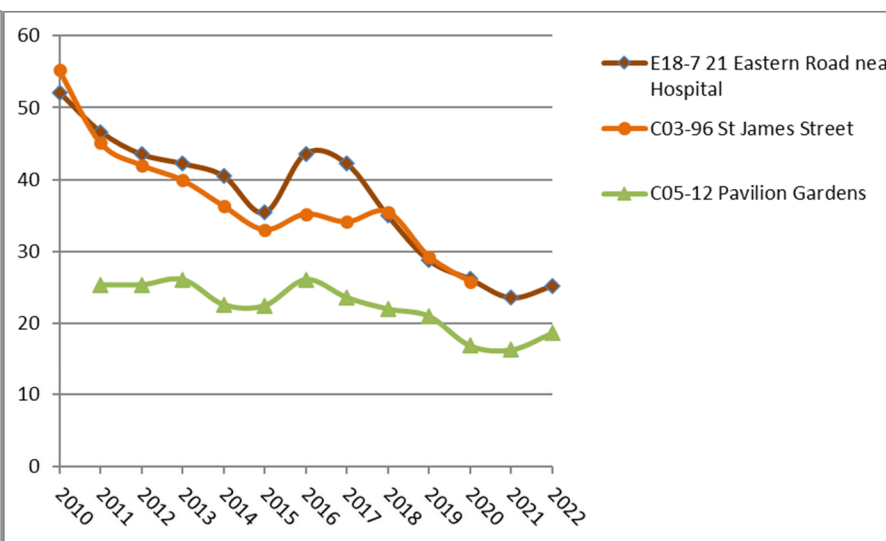


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200 µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
BH10	530995	104271	Roadside	95.6	95.6	3	0	0	0	10

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/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.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

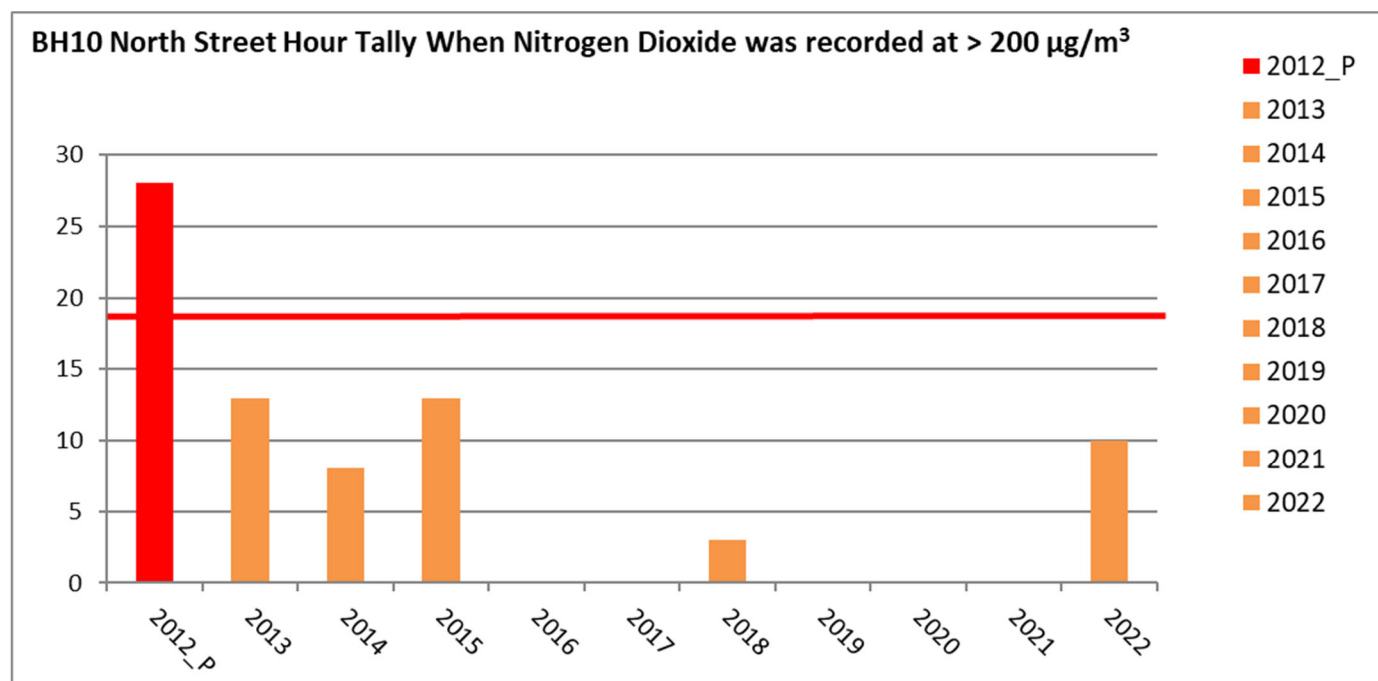
Figure A.18 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

Table A.6 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
BH10 TEOM	530995	104271	Roadside	91	91	10.3	9.8	8.4	10.2	9.4
BH0 AURN Partisol	530526	106218	Urban Background	replaced with analyser below		8.9	9.2			
BH0 AURN BAM from 2020	530526	106218	Urban Background	94	94			9.6	9.9	11.1

 **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

Notes:

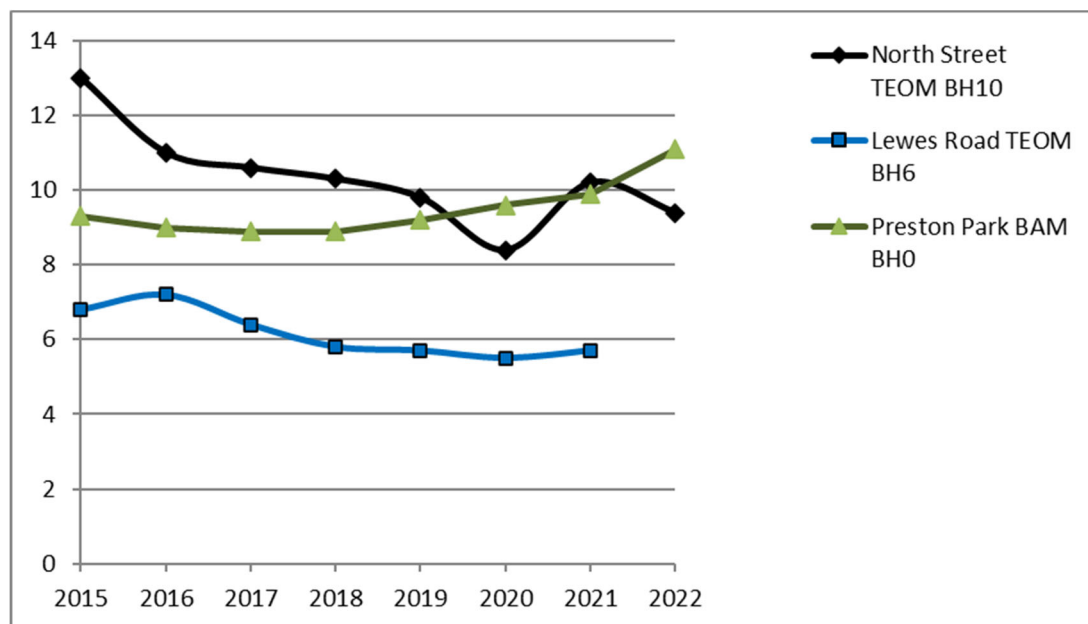
The annual mean concentrations are presented as µg/m³.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Note the Preston Park particulate analyser switched from a Partisol to a BAM which is a different monitoring method to the TEOM at North Street and the DOAS at the University of Brighton. The new monitoring projects being taken forward will need to use approved referenced methods for monitoring particles so direct network comparisons can be made. The annual percentage of data capture for Preston Park has improved since monitoring started so caution should be made when comparing years in the trend line.

Figure A.19 – Indicative Trends in Annual Mean PM_{2.5} Concentrations (various monitoring methods)

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³)

Road DT ID 1st Year	X OS Grid Ref (Eastin g)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.93)	Annual Mean: Distance Corrected to Nearest Exposure
A23 C01-2020	531361	104040	36.2	26.9	36.2	25.0	24.5	29.2	29.0	30.3	36.5	25.8	27.6	34.1	30.1	28.0	-
A23 C02-2022	531255	104062	47.1	32.7	36.2	31.0	30.7	29.7	27.4	30.6	39.9	29.4	35.8	37.8	34.0	31.6	-
B2066 C04-2010	531228	104088	42.3	35.1	35.6	34.8	38.4		37.3	37.6	41.8	36.3	38.1	35.1	37.5	34.9	-
C05-2012	531230	104260	27.4	19.2	23.4	19.0	16.7	15.3	16.0	18.3	20.3	18.2	18.9	26.9	20.0	18.6	-
B2066 C10-2012	530995	104271	40.8	30.3	38.1	37.7	38.0	37.5	36.4	38.1	39.0	32.9	35.2	35.9	36.7	34.1	-
B2066 C11-2007	530947	104284	51.0	43.3	42.6	41.7	46.1	46.0	41.5	43.9	45.8	41.9	46.9		44.6	41.5	-
B2066 C11-2012	530890	104302	63.0	51.4	55.0	53.8		68.9			52.7	62.1	68.0		59.4	54.1	40.5
A2010 C12-2010	530900	104451	40.6	30.2	38.6	39.1	34.7	36.6	37.2	38.5	47.4	34.3	34.5	36.9	37.4	34.8	-
A2010 W01-2005	530969	104785	44.7	32.1	45.7	43.1	31.6	37.7		34.8		32.8	32.2	39.1	37.4	34.8	-
C-Link C13-2014	530770	104363	41.8		35.3	32.0	35.2	37.9	35.5	34.0		30.5	30.6	32.7	34.6	32.1	-
A23 C09-2005	531302	104392	42.5	25.2	34.2	29.8	28.6	33.0	27.9	29.9	32.9	27.8	33.6	32.7	31.5	29.3	-
A23 C15-2005	531401	104669	41.5	28.6	30.2	27.5	32.0	30.1	30.2	28.9	34.0	30.6	36.0	34.5	32.0	29.8	-
A23 C16-2013	531400	104844	35.8	30.5	38.5	33.0	35.1	35.3	33.4	33.6	36.2		36.2	37.6	35.0	32.6	-
A23 C17-2012	531364	104982	38.6	29.6	39.3	31.7	31.1	47.4	34.7	41.5	49.0		54.6	48.2	40.5	37.7	-
A23 C18-2019	531369	105042	46.7	38.9	42.9	41.6	43.7	41.3	42.0	45.9	46.8	44.1	44.4	51.1	44.1	41.0	39.5
A23 C18-2010	531373	105136	41.2	39.7	51.2	44.9	43.1		40.9	47.9	52.9	43.0	54.1	47.2	46.0	42.8	-
A23 C19-2021	531472	105161	41.5	36.2	36.2	33.9	33.1	31.8			37.9	28.9	34.4	38.0	35.2	32.7	-
A23 C20-2005	531496	105315	38.3	28.9	42.6	34.8	31.0	41.5	31.5	41.6	38.1	30.4	34.3	36.9	35.8	33.3	-
A23 C21-2005	531451	105356	42.7	35.6	42.7	36.1	42.6	30.7	40.0	45.5	44.1	40.8	44.9	38.5	40.4	37.5	-
A23 C23-2005	531189	105375	42.6	33.9	32.5	28.2	30.2	34.5	31.0	25.4	36.1	32.7	38.5	37.0	33.6	31.2	-
A270 C24-2015	531101	105443	49.6	40.1	43.2	39.3	36.2	43.6	36.3	42.4	46.4	43.2	50.4	50.3	43.4	40.4	-
A270 C25-2010	530985	105419	49.5	37.8	42.6	41.1	44.6	55.2	42.3	46.6	49.4	39.3	44.5	42.7	44.6	41.5	-
A270 C26-2022	530870	105354	57.1	53.3	55.4	47.5	52.3	31.1	58.5		58.4	53.0	53.7	46.7	51.5	47.9	44.2
B2199 C28-2010	531032	104843	47.3	33.5	36.3	31.0	35.4	29.5	34.5	34.8	39.7	31.5	37.9	38.1	35.8	33.3	-
A23 E01-2016	531101	105498	34.8	32.7	38.3	36.9	26.9	29.3	30.4	36.2	34.0	28.5	32.1	32.6	32.7	30.4	-
A23 E02-2009	530233	106515	40.8	33.4	31.4	29.5	32.6	33.9	30.9	35.7	31.8	32.5	34.9	36.6	33.7	31.3	-
C-Link E02-2012	530063	106368	42.6	37.7	43.8	39.1	36.8	43.4	32.2			32.7	39.2	38.2	38.6	35.9	-

Road DT ID 1st Year	X OS Grid Ref (Eastin g)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.93)	Annual Mean: Distance Corrected to Nearest Exposure
A23 E06-2020	531107	105595	44.0	38.5	32.6	27.9	30.2	34.2	30.8	28.5	32.4	28.2	36.9	36.7	33.4	31.1	-
A270 E07-2019	531838	105349	58.2	46.8	54.3	53.8	47.4	47.6	45.1	51.1	40.8	48.9	51.0	52.1	49.8	46.3	-
A270 E40-2022	532095	105679	39.6	30.2	33.4	30.7	28.8	27.0	24.8	32.0	30.6	28.9	31.6	34.3	31.0	28.8	-
A270 E08-1996	532090	105752	56.8	53.2	44.2	43.6	47.1	45.4	39.7	43.8	49.6	45.8	49.9	44.5	47.0	43.7	-
A270 E10-2015	532126	105838	38.2	34.3	33.6	32.9	35.0	35.0	30.8	35.7	34.5	35.4	40.5	38.1	35.3	32.9	-
C-Link E12-2022	532064	105939	42.6	37.5	36.5	31.6	38.9	40.8	35.1	32.3	44.1	39.4	45.8	36.0	38.4	35.7	-
A270 E14-2019	532377	106314	35.6	32.8	44.0	35.7	32.7	36.6	30.7	39.6	33.4	34.4	33.9	38.2	35.6	33.1	-
A270 E15-2012	532300	106159	33.0		40.2	33.6	33.5	34.9	32.5	36.6	20.2	33.1	34.2	21.8	32.1	29.9	-
A23 E16-1996	531465	104629	39.3	35.5	44.0		35.4	43.6	40.4	46.1	42.3	38.4	37.2	45.4	40.7	37.8	-
A23 E16-2015	531426	104514	44.5	35.1	48.3	41.0	42.6	46.6	41.8	49.8	44.0	40.3	42.2	48.6	43.7	40.7	-
A23 E17-2003	531394	104338	39.4	30.9	44.1	41.0	36.7	44.1	41.7	48.6	38.5	32.5	39.5	37.2	39.5	36.8	-
C-Link E17-2018	531408	104233	43.8	32.4	37.8	35.9	39.1	41.1	39.3	38.5	33.3	38.0	27.5	41.3	37.3	34.7	-
C-Link E17-2022	531430	104247	41.4	25.4	34.6		29.1	29.8	26.8	33.0	42.2	24.5	40.7	36.7	33.1	30.8	-
C-Link E18-2021	532759	103810	37.0	24.3		35.9	26.8	25.7	26.7	25.1	30.2	22.1	23.6	20.5	27.1	25.2	-
B2123 E22-2009	536970	102280	38.3	25.6	34.5	32.0	30.0	32.3	32.0	36.7	32.6	27.3	25.4	33.7	31.7	29.5	-
B2123 E23-2010	536966	102273	30.7	26.1	31.5	29.7	36.6	38.9	34.3	36.0	32.4	28.9	29.5	34.6	32.4	30.2	-
A259 E25-2018	537014	102238	43.5	24.6	37.9	33.0	28.9	30.9	30.3		33.1				32.8	29.7	-
B2123 E30-2020	536947	102341	36.1	25.1	37.2		27.6	30.9	29.8	36.8	30.8	25.5	23.8	36.3	30.9	28.7	-
B2123 E31-2020	536932	102454	21.5	14.6	18.5	19.8	15.9	17.3	15.2	16.8	16.5	15.7	15.9	18.9	17.2	16.0	-
E32-2020	537011	102099	20.0	15.7	20.8	15.1	14.6	13.6	12.5	14.4	14.8	13.4	13.9	18.9	15.6	14.5	-
A2010 W03-2006	530963	104994	44.4	33.1	38.9	33.8	36.3	38.2	33.2	35.9	38.2	31.8	37.3	38.9	36.7	34.1	-
A2010 W04-2006	530808	105340	47.3	34.8	39.0	36.0	32.6	28.7	29.5	39.0	38.2	32.3	46.5	41.5	37.1	34.5	-
A270 W05-2006	530778	105362	49.6	37.8	45.0	42.0	37.8	37.6	36.4	46.1	39.8	34.0	42.0	41.6	40.8	38.0	-
B2066 W10-2006	530302	104415	36.3	31.0	30.4	24.9	28.3	29.2	28.2	26.9	26.3	27.7	29.6	33.4	29.4	27.3	-
B2066 W11-2020	530154	104444	36.9	31.8	33.8	28.3	30.7	31.5	29.3	31.6	31.4	28.2	30.7	37.3	31.8	29.6	-
A270 W14-2021	526761	105809	28.5	19.4	23.7	18.4	17.2	15.1	15.0	17.3	17.8	16.3	22.8	24.1	19.6	18.3	-
A259 W16-2020	526233	104860	52.4	34.6	38.7		39.4	38.8	38.0	36.0	36.9	33.3	37.0	35.4	38.2	35.6	-
A259 W17-2009	525931	104961	47.3		51.2	37.4	41.1		40.6		41.5	37.0	38.8	50.3	42.8	39.8	-
A259 W18-2010	525970	105230	24.2	17.7	21.0	16.6	9.2	14.2	13.3	14.7	15.3	15.3	20.9	28.6	17.6	16.4	-
A259 W19-2009	525658	105695	46.6	33.8	33.7	30.9	36.7	36.2	33.2	34.3				37.5	35.9	33.4	-
A259 W21-2010	528388	105936	42.5	31.4	34.0	31.2	32.6	33.9	32.0	36.4	36.3	35.5	38.5	39.0	35.3	32.8	-

Road DT ID 1st Year	X OS Grid Ref (Eastin g)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.93)	Annual Mean: Distance Corrected to Nearest Exposure
LTN1-2022	532039	105541							20.9	26.8	26.8	24.5	29.2	30.0	26.4	26.5	-
LTN2-2022	531823	105287							29.8	40.0	36.7	33.1	38.7		35.7	42.0	-
LTN3-2022	531900	105198							14.1	15.3	20.1	14.2	20.8	24.3	18.1	18.3	-
LTN4-2022	532278	105233							21.1	25.6	25.0	24.7	25.3	31.5	25.5	25.7	-
LTN5-2022	532124	104850							16.1	18.4	19.3	18.1	19.8	25.4	19.5	19.6	-
LTN6-2022	532065	104734							15.1	17.4	18.8	18.0	20.6	25.5	19.2	19.4	-
LTN7-2022	531987	104575							16.7	19.5	19.5	18.0	22.4	28.6	20.8	20.9	-
LTN8-2022	531910	104322							28.9	29.2	24.7	23.8	27.6	33.1	27.9	28.1	-
LTN9-2022	531880	104243							26.8	29.1	30.2	35.4	29.8	37.2	31.4	31.6	-
LTN10-2022	531642	104366							15.7	16.1		18.9	23.0	35.3	21.8	21.3	-
LTN11-2022	531457	104546							21.4	18.2	19.3	17.2	19.5	26.4	20.3	20.5	-
LTN12-2022	531505	104698							35.6	32.7	31.6	29.3	34.1	41.0	34.1	34.3	-
LTN13-2022	531654	105072								26.8	32.7	29.4	35.0	37.8	32.3	31.4	-
LTN14-2022	531725	105005								20.0	24.5	21.7	24.4	31.0	24.3	23.6	-
A259 Kingsway2	528602	104416	33.1	22.1	23.2	21.7	22.4	18.8	20.9	21.6	22.0	19.9	22.2	30.7	23.2	21.6	-
A259 Kingsway4	528601	104420	36.2	23.4	24.6	22.8	23.9	20.0	22.4	22.3	22.1	21.9	25.3	30.2	24.6	22.9	-
A270 OSR1	526241	105811	46.2	34.0	37.0	37.3	34.0	25.5	30.1	31.6	36.9	33.7	36.3	40.0	35.2	32.8	-
A270 OSR3	526237	105830	33.4	23.8	26.7	25.6	24.7	19.7	22.5	24.9	24.3	25.7	29.5		25.5	23.7	-
A270 OSR5	526021	105832	43.4	27.9	36.8	31.3	28.2	21.7	25.2	27.1	30.0	26.2	29.3	34.2	30.1	28.0	-
A270 OSR7	526026	105832	32.6	20.8	25.3	23.9	20.9	16.5	18.1	20.6	23.2	21.5	25.7	24.3	22.8	21.2	-
A270 OSR9	525730	105849	35.1	22.9	23.3	21.1	18.8	14.2	15.4	18.7	21.9	19.0	26.9	29.7	22.3	20.7	-
A270 OSR11	525729	105852	41.5	27.3	29.5	28.0	22.3	18.4	19.4	23.2	27.1	24.4	30.7	33.0	27.1	25.2	-
A270 OSR13	525698	105872	49.3	37.9	39.6	43.4	38.8	32.3	37.3	37.2	37.6	38.6	37.7	40.9	39.2	36.5	33.3
A270 OSR15	525700	105869	81.4	59.3	63.1	73.9	73.1	55.4	67.4	59.8	66.0	62.7	62.9	68.9	66.2	61.5	34.6

☒ All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22

☒ Local bias adjustment factor used

☒ National bias adjustment factor used

☒ Where applicable, data has been distance corrected for relevant exposure in the final column

☒ Brighton and Hove City Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New of Change Source Identified Within Brighton & Hove During 2022

This is discussed in the public facing summary at the beginning of the report. In some places there has been an increase in the number of vehicles since the travel restriction associated with the pandemic 2020 and the legacy of travel changes into 2021. Whilst the market share of ultra-low and zero vehicles has increased slightly, on average vehicles are older and larger. Buildings flanking Hollingdean Road (part of AQMA1) have been demolished and replaced with larger ones set further back from the carriageway.

Additional Air Quality Works Undertaken Brighton & Hove During 2022

During 2021 twenty-five additional double decker buses have been exhaust upgraded. A further 52 were upgraded from late 2022 and completed in the first half of 2023. Various Transport and Parking consultation have been carried out. A new Air Quality Action Plan has been prepared has received positive feedback from public consultation and the Air Quality Action Plan was approved by committee.

QA/QC of Diffusion Tube Monitoring

- Gradko International diffusion tubes have been consistently used for many years by Sussex Local Authorities using the 20% TEA in water (method)
- 2022 diffusion tube monitoring covered twelve periods for the calendar year. Exposure periods typically alternated between four- and five-weeks.
- Annualisation has been carried out for LTN tubes that started in the second half of the year and 2/82 that missed four periods
- Accreditation of the diffusion tube monitoring method consistent with previous years is as follows:



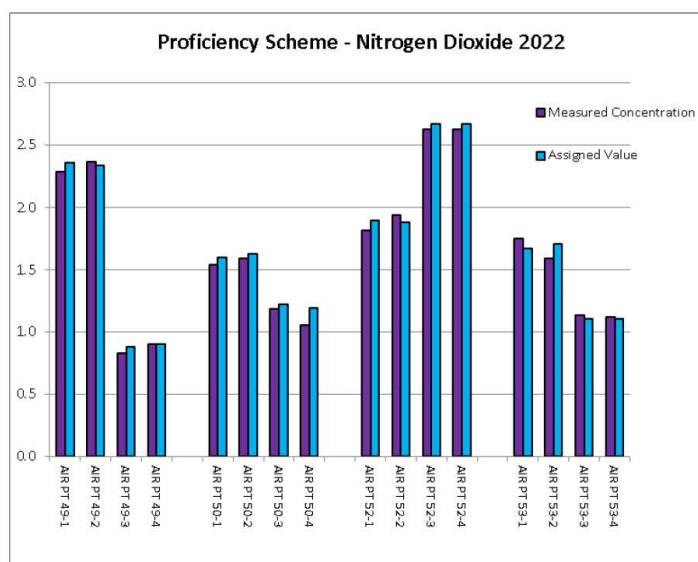
(A division of Gradko International Ltd.)

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 email: diffusion@gradko.com

AIR PT Nitrogen Dioxide Proficiency Scheme Results 2022

Methods: GLM 7 – CARY 60 Spectrophotometer

AIR PT Proficiency Scheme - Nitrogen Dioxide 2022					
Date	Round	Assigned value	Procedure GLM 7		
			Measured concentration	z-Score	% Bias
Feb-22	AIR PT 49-1	2.36	2.29	-0.4	-3.0%
Feb-22	AIR PT 49-2	2.34	2.37	0.2	1.3%
Feb-22	AIR PT 49-3	0.88	0.83	-0.65	-5.7%
Feb-22	AIR PT 49-4	0.9	0.9	0.0	0.0%
May-22	AIR PT 50-1	1.6	1.54	-0.5	-3.8%
May-22	AIR PT 50-2	1.63	1.59	-0.29	-2.5%
May-22	AIR PT 50-3	1.22	1.18	-0.44	-3.3%
May-22	AIR PT 50-4	1.19	1.05	-1.48	-11.8%
Aug-22	AIR PT 52-1	1.90	1.82	-0.56	-4.2%
Aug-22	AIR PT 52-2	1.88	1.94	0.43	3.2%
Aug-22	AIR PT 52-3	2.67	2.63	-0.2	-1.5%
Aug-22	AIR PT 52-4	2.67	2.63	-0.2	-1.5%
Oct-22	AIR PT 53-1	1.67	1.75	0.64	4.8%
Oct-22	AIR PT 53-2	1.71	1.59	-0.94	-7.0%
Oct-22	AIR PT 53-3	1.1	1.13	0.36	2.7%
Oct-22	AIR PT 53-4	1.1	1.12	0.24	1.8%



Diffusion Tube Annualisation

Table C.1 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Preston Park	Annualisation Factor Lullington Health	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
B2066 C11-2012	0.9854	0.9732	0.9793	59.4	58.1
A259 E25-2018	1.0142	0.9314	0.9728	32.8	31.9
LTN1-2022	1.0490	1.1157	1.0824	26.4	28.5
LTN2-2022	1.1915	1.3413	1.2664	35.7	45.2
LTN3-2022	1.0490	1.1157	1.0824	18.1	19.6
LTN4-2022	1.0490	1.1157	1.0824	25.5	27.6
LTN5-2022	1.0490	1.1157	1.0824	19.5	21.1
LTN6-2022	1.0490	1.1157	1.0824	19.2	20.8
LTN7-2022	1.0490	1.1157	1.0824	20.8	22.5
LTN8-2022	1.0490	1.1157	1.0824	27.9	30.2
LTN9-2022	1.0490	1.1157	1.0824	31.4	34.0
LTN10-2022	1.0444	1.0608	1.0526	21.8	22.9
LTN11-2022	1.0490	1.1157	1.0824	20.3	22.0
LTN12-2022	1.0490	1.1157	1.0824	34.1	36.9
LTN13-2022	0.9926	1.0947	1.0436	32.3	33.8
LTN14-2022	0.9926	1.0947	1.0436	24.3	25.4

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance about the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Brighton and Hove City Council have applied a local bias adjustment factor of 0.93 to the 2002 monitoring data. A summary of bias adjustment factors used by Brighton and Hove City Council over the past five years is presented in Table C.2. The March version of the national bias correction included some Sussex factors that had not been verified so could not be used.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	N/A	0.93
2021	National	03/21	0.84
2020	National	06/20	0.92
2019	National	06/19	0.93
2018	National	06/18	0.93

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	12
Bias Factor A	0.93 (0.85 - 1.03)
Bias Factor B	7% (-2% - 17%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	
Mean CV (Precision)	36.7
Automatic Mean ($\mu\text{g}/\text{m}^3$)	4.7%
Data Capture	
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	34.1

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results, the site is within the ULEZ and AQMA and is therefore a representative location for the local tubes and has excellent data capture for 2022.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with

distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Table C.4 – NO₂ Fall off With Distance Calculations (concentrations presented in µg/m³)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
B2066 C11-2012	1.0	6.0	54.1	16.6	40.5	<i>Predicted concentration at Receptor above AQS objective.</i>
A23 C18-2019	4.0	5.0	41.0	16.6	39.5	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>
A270 C26-2022	3.0	4.5	47.9	12.0	44.2	<i>Predicted concentration at Receptor above AQS objective.</i>
A270 OSR13	2.5	4.5	36.5	14.6	33.3	
A270 OSR15	0.2	8.7	61.5	14.6	34.6	

QA/QC of Automatic Monitoring

This is provided in the annual report on the Sussex monitoring network provided by Bureau Veritas.

PM₁₀ and PM_{2.5} Monitoring Adjustment Not applied

Automatic Monitoring Annualisation

Most monitoring locations within Brighton & Hove recorded data capture of greater than 75% therefore it was not required to annualise. For the long term trend chart, indicatively an annualization factor of 0.767 (derived from Preston Park AURN) was applied to BH6, Lewes Road data.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 –Brighton & Hove boundary ultra-low emission zone automatic monitoring stations NOx and PM_{2.5}

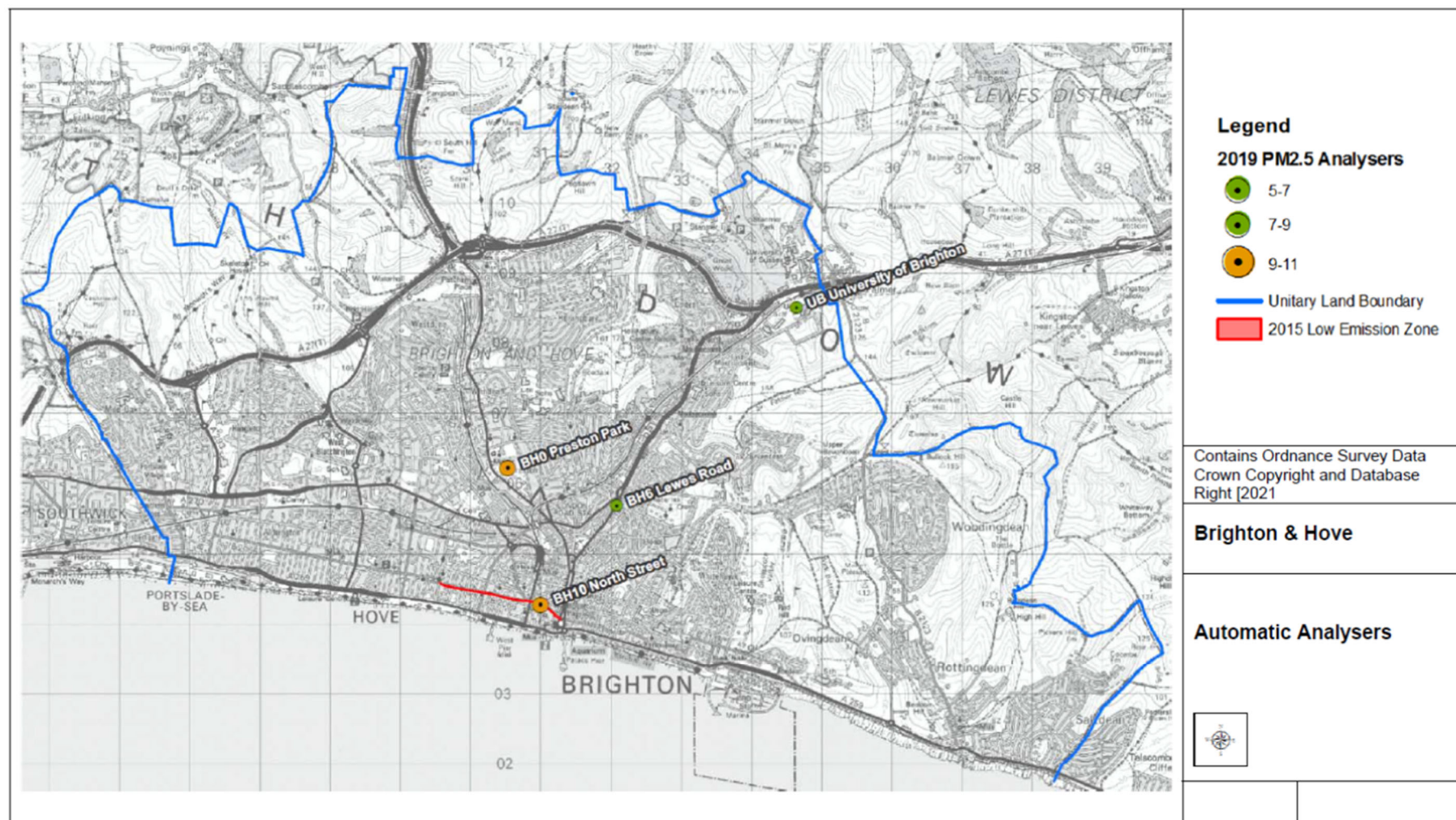


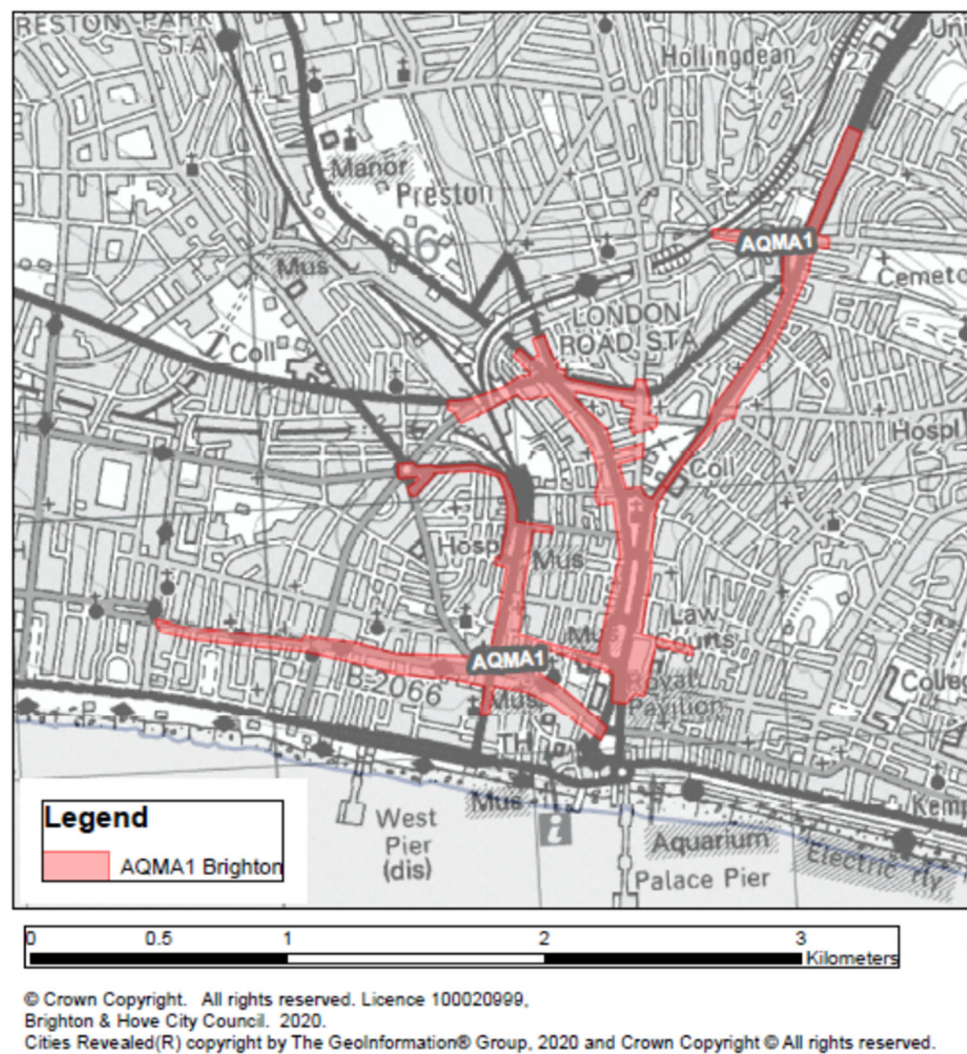
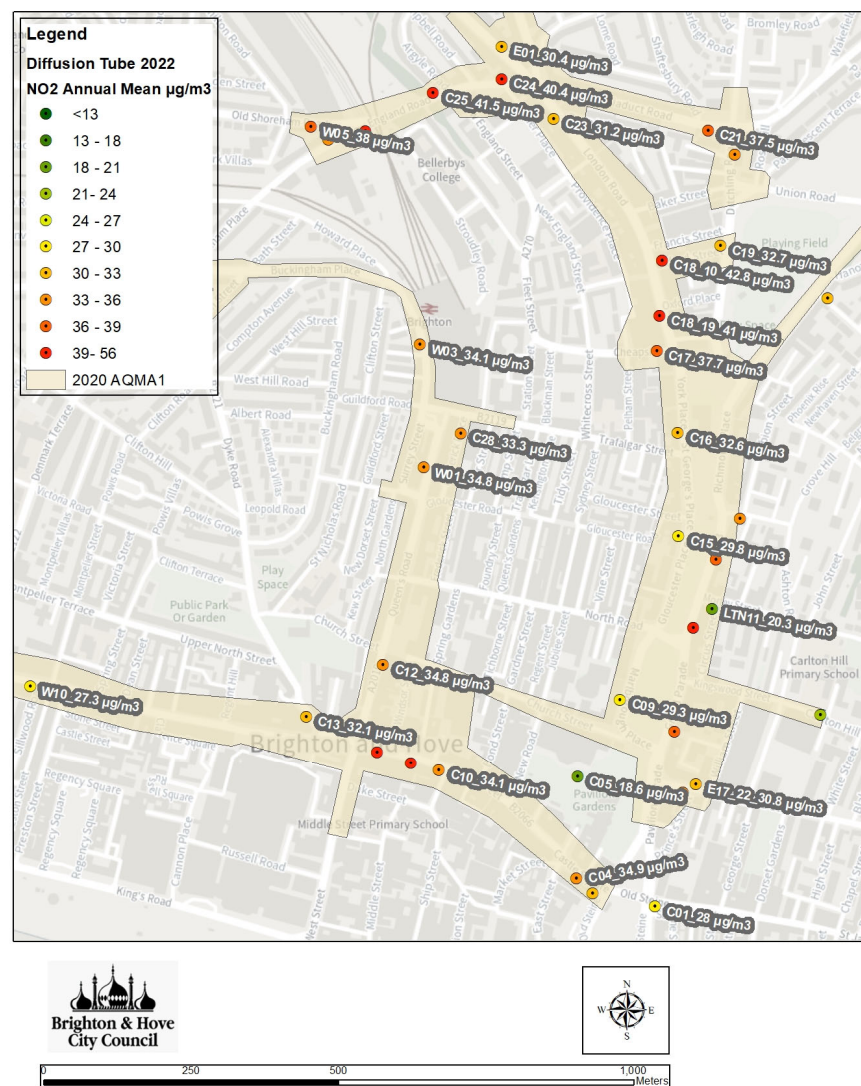
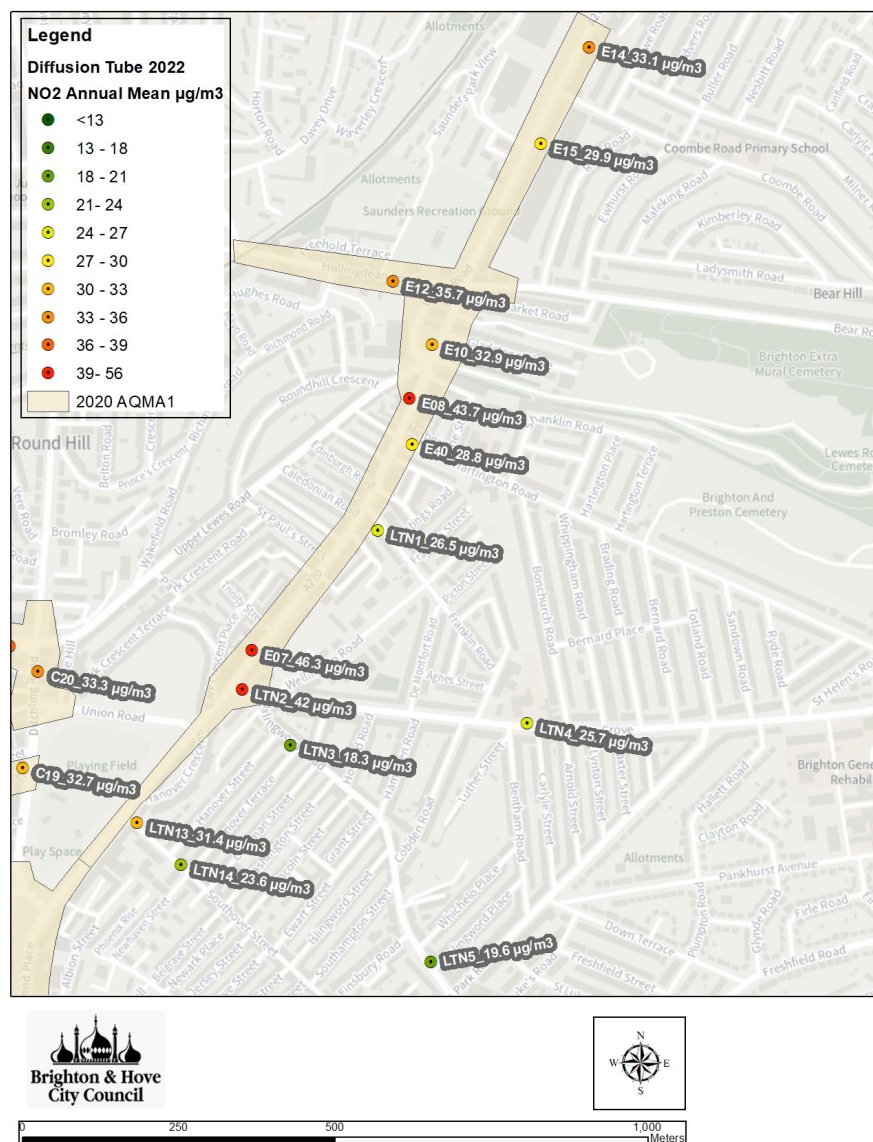
Figure D.2 –AQMA1 2020 Designation

Figure D.3 –AQMA1 City Centre B2066 ULEZ A2010 Brighton Rail Station, A23 Valley Gardens London Road Viaduct Road and Ditchling Road A270 New England Road with Preston Circus Diffusion Tubes with 2022 Concentrations



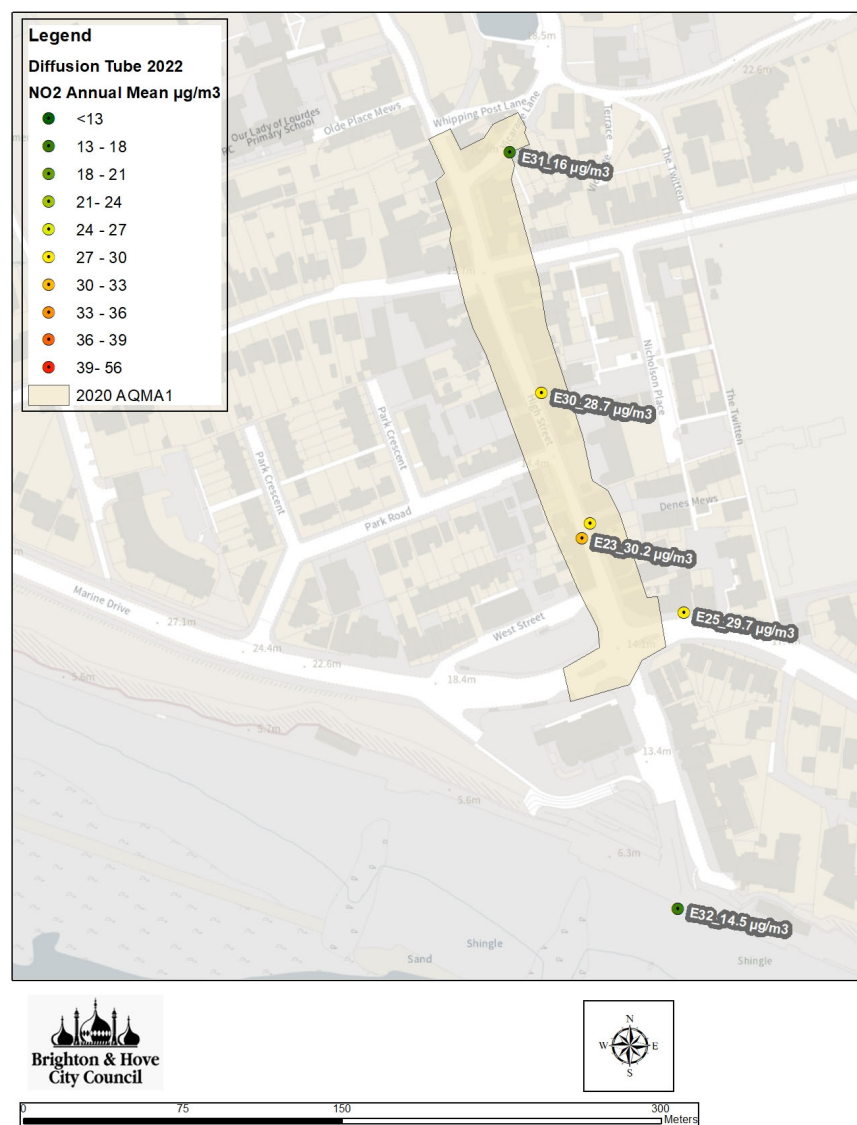
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Figure D.4 –AQMA1 A270 Lewes Road and Hollingdean Road Diffusion Tubes with 2022 Concentrations



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Figure D.5 –AQMA2 A259 and B2123 Rottingdean Diffusion Tubes with 2022 Concentrations



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Figure D.6 –AQMA3 A259 and A293 Portslade Diffusion Tubes with 2022 Concentrations

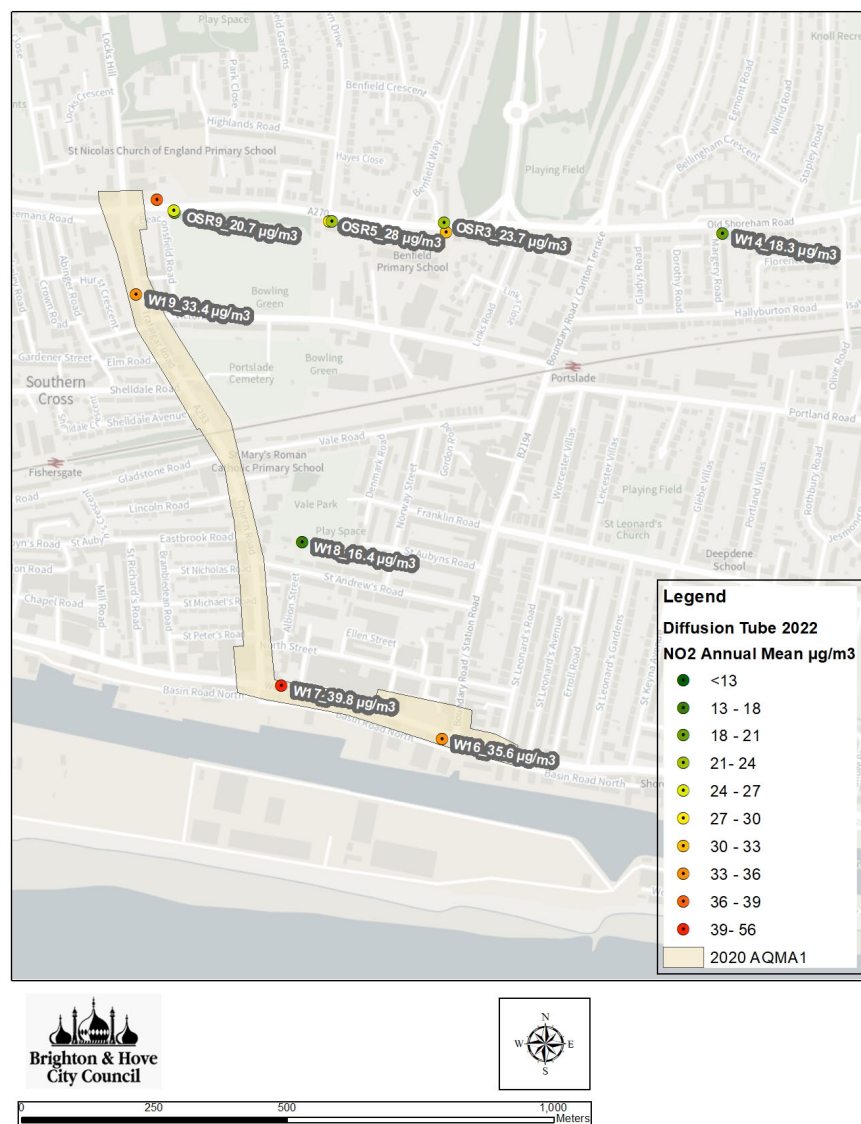
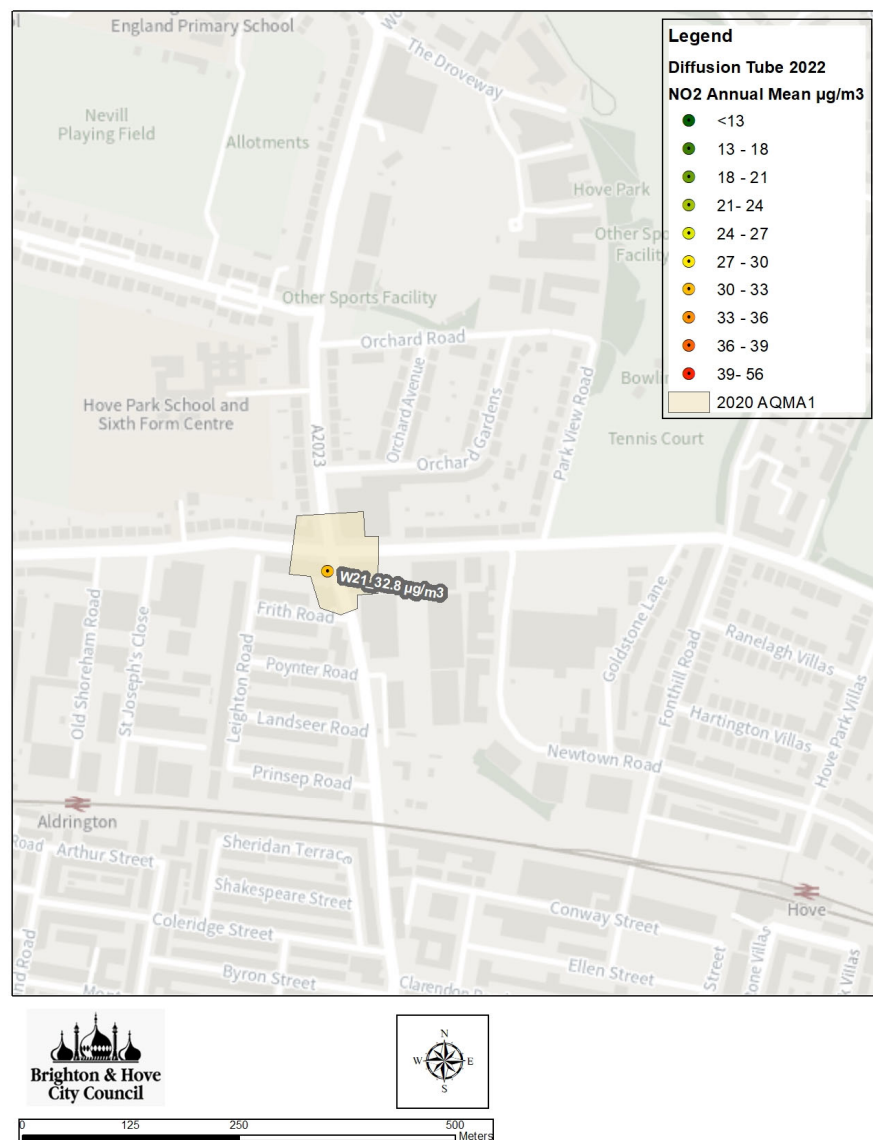
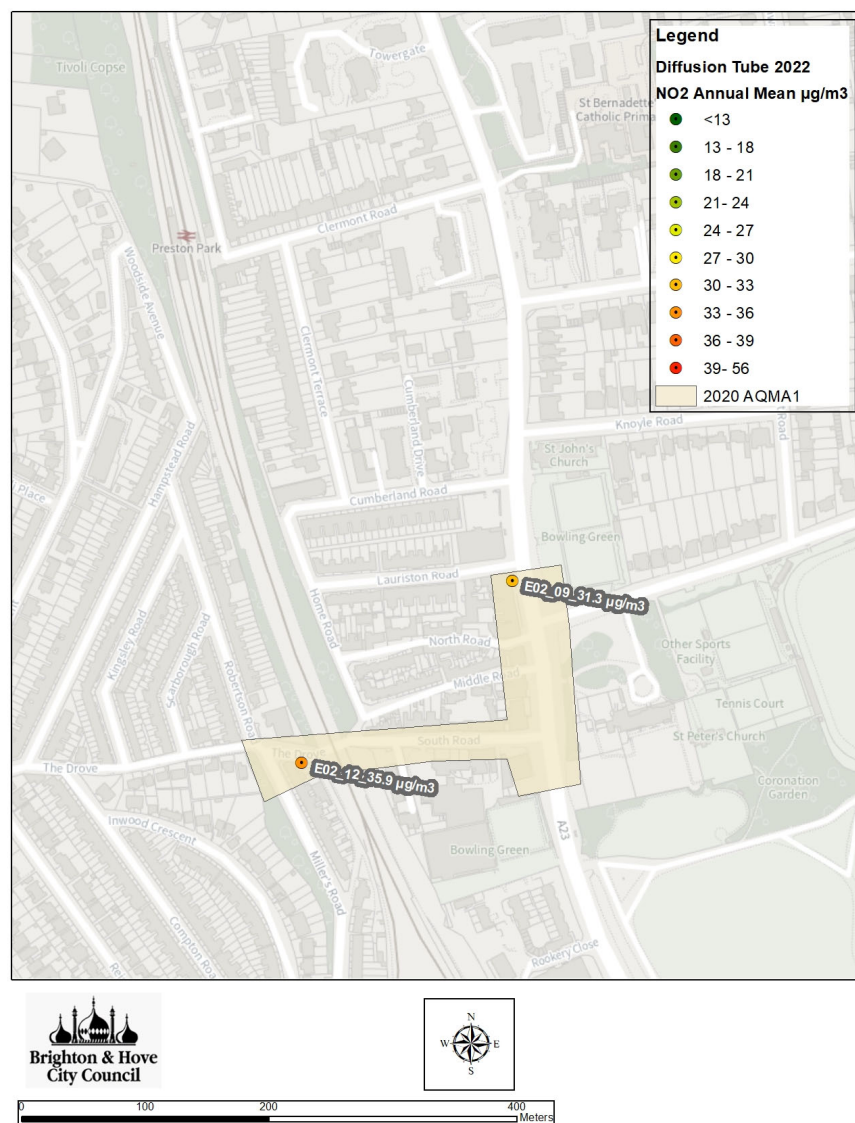


Figure D.7 –AQMA4 A2023 Diffusion Tube with 2022 Concentrations



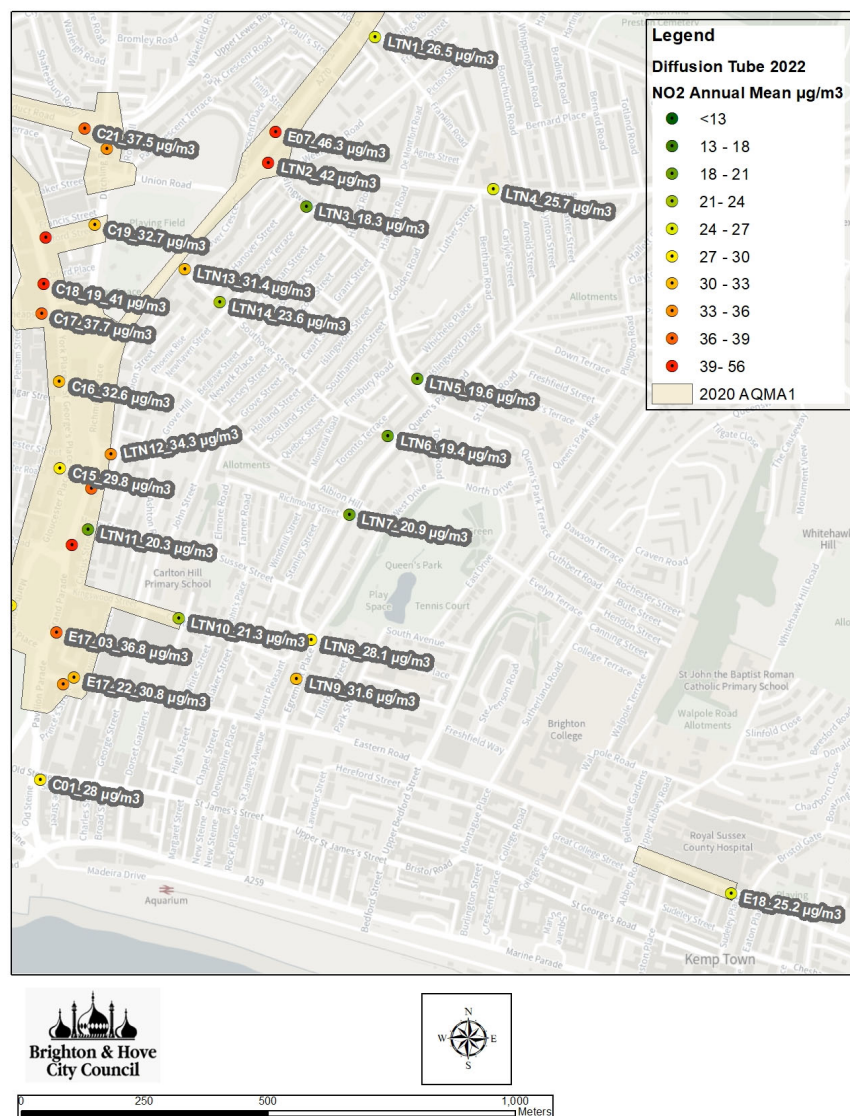
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Figure D.8 –AQMA5 A23 Preston Road The Drove Diffusion Tubes with 2022 Concentrations



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Figure D.9 –AQMA6 Eastern Road Hospital and LTN Diffusion Tubes with 2022 Concentrations



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Appendix E: Summary of Air Quality Objectives in England

The 1995 Environment Act objectives became binding standards in 2010. The City Council set out more ambitious targets in its 2022 Air Quality Action Plan approved by committee.

Table E.1 – Air Quality Objectives in England⁷

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO ₂)	40µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM ₁₀)	40µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO ₂)	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO ₂)	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
ADMS-Urban	Atmospheric Dispersion Model System
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air Quality Annual Status Report
ATC	Automatic Traffic Counter
AURN	UK Automatic Urban Rural air Monitoring Network
CAZ	Clean Air Zone
CEMP	Construction Environment Management Plans
COMEAP	Committee on the Medical Effects of Air Pollutants
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EFT	Emission Factor Toolkit
EMIT	Atmospheric Emissions Inventory Toolkit
EU	European Union
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
LAQM (TG)16	LAQM Technical Guidance 2016
LAQM (PG)16	LAQM Policy Guidance 2016
LGV	Light Goods Vehicle
NRMM	Non Road Mobile Machinery
NAEI	National Atmospheric Emissions Inventory
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen usually an emission rather than an outdoor concentration

Abbreviation	Description
NPL	National Physical Laboratory
PHE	Public Health England
PHOF	Public Health Outcomes Framework
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SCA	Smoke Control Zone
Section 106	Section 106 Planning Agreement Under Town and Country Planning Act
SO ₂	Sulphur Dioxide
ULEZ	Ultralow Emissions Zone

References

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 - World Health Organisation outdoor air pollution guidelines found at: [Ambient \(outdoor\) air pollution \(who.int\)](https://www.who.int/air-pollution/outdoor-air-pollution-guidelines)
 - National Air Quality Strategy found at: [Revised national air quality strategy - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/consultations/revised-national-air-quality-strategy)
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