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: 30 June 2023

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Since completing the ASR 2023 report at the end of June, the monitoring results have been adjusted by Bureau Veritas due to a revised calibration process. This process has not significantly affected the conclusions or the long-term trends. The tables of data in Appendix A and the text in section 3 have been updated to reflect the revised results. The data in Appendix B did not require adjustment.

Executive Summary: Air Quality in Our Area

Air Quality in Chichester District

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].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Air quality across most of Chichester district is generally good however there are roads in and adjacent to Chichester city and within Midhurst where the air quality is less good and there are elevated concentrations of pollutants. The main pollutant of concern under the Local Air Quality Management regime is nitrogen dioxide (NO_2), the key source being road traffic. Another emerging pollutant of concern is $PM_{2.5}$ and local authorities are expected to work towards reducing emissions of this pollutant, see further information below.

The latest monitoring data indicates that concentrations of NO_2 have generally decreased over the last five years and two of the Air Quality Monitoring Areas (AQMAs) in the district were revoked in 2022. The remaining AQMAs are located at:

- St Pancras, Chichester
- Rumbolds Hill, Midhurst

Air quality in the remaining AQMAs was in compliance with the National Objectives during 2022 and if this trend were to continue, the remaining AQMAs may be revoked in the future.

The Council revised and published its Air Quality Action Plan (AQAP) during 2021/2022 and it includes actions designed to tackle both NO_2 and $PM_{2.5}$.

Air quality is recognized by the Council as an important public health issue and DEFRA air quality grant has been awarded to the Council to replace the TEOM analyser with a $PM_{10}/PM_{2.5}$ analyser (expected later in 2023). The Council has also invested in electric vehicles and electric bikes for staff to use for work related journeys.

The Council continues to work with partners both internal and external to improve air quality and progress is being made on developing a feasibility design for one of the Local

[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

[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

Cycling and Walking Infrastructure Plan (LCWIP) routes in the west of the City. This work is being undertaken by WSCC and its consultants in partnership with CDC.

We have assisted our planning policy team in producing a GIS layer of proposed cycle infrastructure for the revised Chichester Local Plan. This layer will provide background evidence to assist in prioritising routes in the Council's Infrastructure Business Plan thus enabling funding to be allocated in the future.

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 Plan[5] 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 Zero[6] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is important given that Chichester District's Air Quality Management Areas (AQMAs) are designated due to elevated airborne pollutant concentrations significantly influenced by transport emissions.

Key completed actions by CDC during 2022 are as follows:

- Delivery of two electric bikes equipped such that staff can make work related journeys on them.
- Delivery of a pilot two-car electric pool car fleet for CDC staff to use for work related journeys. The cars are available for the public to use out of office hours including weekends.
- Installation of a covered cycle parking facility at East Pallant House for use by staff and members of the public.
- Completion of a GIS layer of cycle routes to link with the revised Local Plan which has been published for public consultation (March 2023).
- Supporting WSCC in its development of cycle routes in the Chichester to Bognor Regis corridor and Oving Road corridor to the east of Chichester City.
- Joined WSCC's concession contract with Connected Kerb for the design, installation and operation of an EV charge point (EVCP) network both on-street and in selected Council's car parks. The first on-street EVCP's will be live in Chichester District this summer and it is anticipated that delivery of EVCP's within the car parks will be within this financial year.
- We continued to run and maintain two air quality monitoring stations during 2022 and have published the monitoring information at http://sussex-air.net – this work is used within the air Alert forecasting service (see measure 16 in Table 2.2).
- We continue to monitor 20 sites using NO_2 diffusion tubes.

[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

We continue our partnership working with WSCC, Sussex-Air and Chichester & District Cycle Forum.

Conclusions and Priorities

The 2022 monitoring of NO_2 and PM_{10} shows no exceedances of Air Quality Standards at either of the two real-time monitoring stations. At all the diffusion tube locations the UK's NO_2 air quality annual mean Objective of 40 µg/m^3 was met (both within and outside AQMAs).

We are not aware of any new developments within the district that will have a significant air quality impact in the future although there are areas where significant residential development could result in future traffic volumes that could have an impact on local air quality.

The AQAP was updated during 2021 and the Council's priorities for the next five years are detailed in the document and summarised in Section 2.2 of this report.

Local Engagement and How to get Involved

The public can get involved by supporting behavioural change initiatives such as car sharing, walking, cycling, using public transport, joining the Car Club, buying zero emissions vehicles for personal and commercial travel and turning petrol/diesel engines off when stationary. Other initiatives such as minimising wood burning, only burning dry, well-seasoned wood and composting instead of having bonfires can also reduce air pollution.

The Chichester and District Cycle Forum provides information on local cycling opportunities and campaigns on behalf of cyclists. The Forum is open to the public and further information can be obtained by emailing: environmentalprotect@chichester.gov.uk

The Environmental Protection team regularly provides updates to Members of the Council regarding progress on implementing the AQAP and provides details on the staff intranet/website regarding air quality issues and campaigns.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection Team at Chichester District Council with the support and agreement of the following officers and departments:

West Sussex Highways, Transport and Planning departments

This ASR has been submitted for approval to:

Andrew Frost – Director Planning and Environment, CDC

Cllr Jonathan Brown – Deputy Leader of the Council and Cabinet Member for Environmental Strategy

This ASR has not been signed off by a Director of Public Health but has been made available to the appropriate officer and relevant comments have been included in this report.

If you have any comments on this ASR please send them to Kate Simons at:

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1 Local Air Quality Management

This report provides an overview of air quality in Chichester District 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 whether or not the air quality objectives 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 statutory requirement showing the strategies employed by Chichester District 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

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) 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. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of AQMAs declared by the Council can be found in Table 2.1. The table presents a description of the two AQMAs extant within Chichester District during 2022. Note that two previous AQMAs were revoked in May 2022 (Orchard Street and Stockbridge roundabout, Chichester AQMAs). Appendix D: Maps of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean

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
St Pancras AQMA	17-May-07	NO_2 Annual Mean	An area along St Pancras, Chichester between Eastgate Square and New Park Road. Note St Pancras forms a street canyon in this section.	NO	48.3	36.4*	3 years	CDC AQAP 2022	https://www.chichester.gov.uk/pollutioncontrolairquality

Rumbolds Hill AQMA	17-Jan-20	NO_2 Annual Mean	An area along Rumbolds Hill, Midhurst between the A272 at its southern end and the junction of North Street (A286) and Knockhundred Row at its northern end.	NO	42	31.6*	3 years	CDC AQAP 2022	as above

* This is a non-exceedance

☒ **CDC confirms the information on UK-Air regarding their AQMAs is up to date.**

☒ **CDC confirms that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Chichester District

Defra's appraisal of last year's ASR concluded

- That no comparison of the local bias adjustment factor to the national bias adjustment factor had been provided. In this year's report a comparison has been made, see Appendix C.
- It was requested that an explanation for the use of local bias adjustment factor over the national factor is included. In this year's report an explanation has been provided, see Appendix C.
- The revocation of the two AQMAs and a link to the new AQAP had not been added to the UK-air website – this has now been added.
- It was suggested that a review of AQMA boundaries and the monitoring network should be carried out. This work has been included within this year's report. This has been done and has resulted in two changes: a diffusion tube monitoring position at Tangmere adjacent the A27 and another diffusion tube monitoring position at Westgate, Chichester.

Chichester District Council (CDC) has taken forward a number of 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. Twenty-three measures are included within Table 2.2, with the type of measure and the progress CDC has 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 detailed within Table 2.2.

More detail on these measures can be found in our respective Air Quality Action Plan (AQAP) and Chichester City Local Cycling and Walking Infrastructure Plan (LCWIP). Key completed measures are:

- Delivery of two electric bikes equipped such that staff can make work related journeys on them.
- Delivery of a pilot two-car electric pool car fleet for CDC staff to use for work related journeys.
- Joined WSCC's concession contract with Connected Kerb (CK) for the design, installation and operation of an EV charge point (EVCP) network both on-street and in selected Council's car parks. The first on-street EVCP's will be live in Chichester District this summer and it is anticipated that delivery of EVCP's within the car parks will be within this financial year.
- Installation of a covered cycle parking facility at East Pallant House for use by staff and members of the public.
- Completion of a GIS layer of cycle routes to link with the revised Local Plan which has been published for public consultation (March 2023).
- Supporting WSCC in its development of strategic transport investment programme (STIP) cycle routes in the Chichester to Bognor Regis corridor and Oving Road corridor to the east of Chichester City.

- We continued to run and maintain two air quality monitoring stations during 2022 and have published the monitoring information at http://sussex-air.net – this work is used within the air Alert forecasting service (see measure 16 in Table 2.2).
- We continue to monitor 20 sites using NO_2 diffusion tubes.
- We continue our partnership working with WSCC, Sussex-Air and Chichester & District Cycle Forum.

CDC expects the following measures to be completed over the course of the next reporting year:

- Installation of a dual $PM_{2.5}$ /PM_{10} monitor within the Stockbridge air quality monitoring station to replace the decommissioned TEOM analyser.
- To associate the Sussex-air Air Quality and Emissions Guidance for Sussex within the Council's planning process.
- To expand the Car Club in Chichester city by tendering for an additional car to be in place in 2024.
- To continue to support our partners, particularly WSCC, with respect to developing an initial design/feasibility study for one of the cycle routes in the Chichester City LCWIP (Route K).
- To continue to work to implement our policy that 'all new council cars and vans shall be electric unless there is a business reason as to why not'. We are in the process of procuring an EV van for our Environmental Protection and Facilities teams.
- To bid for grant monies that facilitate the implementation of actions within the revised AQAP.

CDC's priorities for the coming year are:

- To install a dual $PM_{2.5}$/ PM_{10} monitor within the Stockbridge air quality monitoring station.
- To support our partners, particularly WSCC, with respect to developing an initial design/feasibility study for one of the cycle routes in the Chichester City LCWIP (Route K) and further supporting work on WSCC STIP cycle route proposals.
- To continue to work with WSCC and CK for the delivery of an on-street and in Council car parks network of EVCPs. Internally we are working with our Car Parks team on this long-term project.
- To work with colleagues in Sussex-air for the update of the group's air quality planning guidance document.
- To encourage use of the electric pool cars and electric pool bikes by staff for work related journeys.

CDC worked to implement these measures in partnership with the following stakeholders during 2022:

- WSCC Highways/Transport Teams
- Neighbouring District and Borough Councils
- National Highways
- Public Health Team at WSCC
- Sussex-air members.

The principal challenges and barriers to implementation that CDC anticipates facing are:

- Availability of funding for LCWIP and AQAP projects.
- Availability of WSCC highways staff resources to deliver multiple LCWIP schemes.

Progress on the following measures has been slower than expected due to:

- The launch of an additional Car Club car continues to be delayed due to changes in travel patterns following the pandemic.

CDC anticipates that both the St Pancras, Chichester and Rumbolds Hill, Midhurst AQMAs are on target to be compliant with the NO_2 annual mean air quality standard in 2024 as predicted by our air quality modelling carried out in 2020 (the model outputs are discussed in detail in the Council's Air Quality Action Plan).

The measures stated above and in Table 2.2 will help to contribute towards compliance with the air quality standard in the two remaining AQMA's and no further measures are anticipated being required for compliance to be reached in 2025.

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	Set up Air Quality Working Group	Promoting Travel Alternatives	Other	2008	2030	CDC	CDC	NO	Not Funded		Implementation	n/a	2 meetings per year	18 meetings held to date	Reports to Environment Panel at CDC
2	Cleaner vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2012	2025	WSCC/CDC	WSCC/CDC	NO	Partially Funded	£50k - £100k	Implementation		No. of electric vehicle recharging points	installed a total of 18 recharging points in Chichester district having secured funding in 2019 from OLEV. Part of regional network of rapid charging points through Sussex-air project.	WSCC has set up a partnership of district and borough councils across the county to procure a supplier to deliver a charge point network under a Concession contract. CDC joined the Connected Kerb contract Oct 2022. There are some on-street initial installs delivered and discussions are advanced for numerous off-street installs (CDC car parks) and further on-street too.
3	Planning policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2012	2022	CDC	CDC	NO	Not Funded		Implementation		No. of planning conditions imposed on planning consultations	Sussex-air produced Planning Guidance and Low Emissions Strategy and in discussion with CDC Policy Planners regarding adopting LES approach. Sussex-air is in the process of reviewing the guidance. and it is included within draft Local Plan.	WSCC revised parking standards (2019) are applied as necessary (relating to cycle parking facilities) and BC Regulations Part S applied with respect to EV charging points
4	Cycling and walking initiatives	Promoting Travel Alternatives	Promotion of cycling	2012	2021	CDC/WSCC	CDC/WSCC	NO	Partially Funded	£50k - £100k	Completed		% increase in cycling	Stable levels of cycling from 2021- 2022 on	Capability Funding received by WSCC being

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														most routes (loops being re cut on one route as faulty). LCWIP for Chichester City adopted April 2021. WSCC has produced revised strategic LCWIP which should be adopted in 2023. Successful bid by CDC for pooled business rates funding to fund this work (£70k). EP team member supports local parish group which aims to provide green infrastructure in south of district.	used to develop concept designs for one of CDC's active travel schemes. WSCC aiming to bid for ATE funding in 2023/24 for schemes that have a completed concept design. WSCC received funding for 2022/23 for new Toucan crossing on A259 between Chichester and Bognor Regis to improve crossing for cyclists and pedestrians now implemented. WSCC also developing STIP cycle routes for routes around the City and along key radial routes.
5	Car Clubs	Alternatives to private vehicle use	Car Clubs	2012	2024	CDC/WSCC	CDC/car club operator	NO	Partially Funded	£10k - 50k	Planning		Utilisation rate of cars to be 20%	7 cars available within Chichester City (2 used by CDC staff in working hours and available to the public out of hours) Development worker employed 2014-16 to promote Club, utilisation rate increasing throughout 2019 and ranged from 11 - 20% depending on car location. £13k monies available to fund new vehicle.	Proposing to introduce new car to fleet in 2023/24 depending on utilisation rates increasing again.
6	School travel plans	Promoting Travel Alternatives	School Travel Plans	2012	2030	WSCC/CDC	WSCC	NO	Not Funded		Planning		% children travelling to school by sustainable means	Living Streets project engaged with 5 primary schools in the District and staff and students at	WSCC has received Capability Fund monies to enable future work in this area.

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
														Chichester University between 2018 - 2021.	
7	WSCC and CDC travel plans	Promoting Travel Alternatives	Workplace Travel Planning	2012	2030	WSCC/CDC	WSCC/CDC	NO	Not Funded		Implementation		% WSCC and CDC staff travelling by sustainable means	WSCC grey fleet business mileage was 5.7 million km below 6.0 million km target. Easit scheme at WSCC and CDC to encourage rail use. Cycle to work scheme at CDC with a £3K limit for ebikes	WSCC Pool fleet mileage: Petrol pool – 2,007,526 km, Hybrid pool – 735,625 km. EV pool – 49,489 km, (diesel unknown) Total 5,731,410 km. Train travel 1,605,648 km at WSCC. Significant increase from 2021 in hybrid pool fleet mileage and train mileage.
8	Business travel plans	Promoting Travel Alternatives	Workplace Travel Planning	2012	2030	WSCC	WSCC	NO	Not Funded		Implementation		Travel Plans implemented within target time period	Over 46 Travel Plans submitted since 2009 and EASIT group set up supported by large organisations to promote sustainable travel measures.	1 business plan submitted in 2022
9	Residential travel plans	Promoting Travel Alternatives	Personalised Travel Planning	2012	2030	WSCC	WSCC	NO	Not Funded		Implementation		Travel Plans implemented within target time period	Over 47 Travel Plans have been submitted since 2009	Additional 3 plans during 2022
10	TravelWise/smarter choices	Public Information	Via the Internet	2012	2030	WSCC/CDC	WSCC	NO	Not Funded		Implementation		No. of users of WSCC car share database for PO19 area	Covid 19 has altered travel patterns in 2021 with employees working from home for part of year and many staff not attending workplaces on full time basis.	Data for 2022 awaited
11	Cycle route information	Promoting Travel Alternatives	Promotion of cycling	2012	2030	CDC	CDC	NO	Not Funded		Implementation		No. of maps sold through Tourist Information or other outlets.	5 route leaflets have been produced and over 1480 copies have been sold to date.	20 maps sold in 2022
12	Cycle journey planning	Public Information	Via the Internet	2012	2030	WSCC	WSCC	NO	Not Funded		Implementation		No. of journeys	Web link available on	3152 journeys planned 2022-23

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													planned on website (note this covers whole of West Sussex area)	WSCC and CDC websites	(decrease from 2021/22 but data awaited for three months of the year).
13	Public transport infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2012	2030	WSCC	WSCC	NO	Funded	£50k - £100k	Implementation		Increase in use of public transport	RTPI displays installed at key locations across City	No new RTPI displays installed during 2022 however order is being submitted for additional displays in 2023.
14	Cleaner buses	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2012	2030	WSCC	WSCC	NO			Planning		% of Euro 5 buses	Two Euro 6 double deckers added to fleet in 2019. Emissions retrofitting project ongoing for 2020 for five Euro 4 and three Euro 3 buses	Following the publishing of Bus Back Better – an Enhanced Partnership has been formally made by West Sussex County Council and local bus operators. The Partnership is responsible for the delivery of the West Sussex Bus Service Improvement Plan (BSIP). Funding has been awarded of £18.5m towards the BSIP ambitions including a new high frequency bus service between Chichester and Littlehampton, new demand responsive services are to be introduced covering various zones in the district north of the city as well as an enhanced 99 Flex service between Petworth and Chichester. Finally, it is intended to explore lower fares

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
															for young people, notably 16-21 year olds to improve access further education opportunities as well as work and leisure. The partnership will be considering its approach to assist operators increase their fleets of zero emission vehicles through applications to the Zero Emission Bus Regional Area (ZEBRA). This opportunity is primarily focused where zero emission buses will make a notable positive impact on air quality.
15	Licensing requirement for taxis	Promoting Low Emission Transport	Taxi Licensing conditions	2012	2030	CDC	CDC	NO	Not Funded		Implementation		No. of Euro 4 vehicles	For vehicles 5 years and over, MOT and fitness test required every 6 months.	Action within revised AQAP to work to provide infrastructure to allow the introduction of EV taxis to fleet Over 30% of fleet either hybrid or electric vehicles. Sussex-air is currently carrying out a public survey with all taxi fleet managers and taxi drivers (inc private hire) to understand their requirements for going electric.
16	Forecasting, monitoring and public information	Public Information	Via other mechanisms	2012	2030	SAQP	SAQP	NO	Partially Funded		Implementation		No. of people registered to receive alerts	Previously 1182 subscribers registered across Sussex	Contract has been re-tendered, currently 590 subscribers
17	AQ monitoring and traffic monitoring	Traffic Management	UTC, Congestion management, traffic reduction	2012	2030	CDC/WSCC	CDC/WSCC	NO	Not Funded		Implementation		Reduction in traffic volumes	Traffic data for 2022 is not available due to a fault in the	Traffic flows across the district between 2021 – 2022 have

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
														counter. This was repaired in April 2023.	continued to increase but are likely to be below pre-covid volumes.
18	A27 by-pass improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2017	2030	National Highways	National Highways	NO	Not Funded		Planning		Reduction in congestion	NH consulted during 2017 on options for improving A27 around Chichester however no option chosen	No funds allocated for A27 improvements at the present time.
19	Variable message signing (VMS) on A27	Traffic Management	UTC, Congestion management, traffic reduction			National Highways	National Highways	NO	Not Funded				No. of warnings made per year	NH decision awaited	Awaiting outcome of A27 improvements decision
20	Park and ride schemes in and around City	Alternatives to private vehicle use	Bus based Park & Ride			CDC/WSCC	CDC/WSCC	NO	Not Funded				Reduce traffic in City centre by 3%	Previously linked to A27 improvements that have not yet been brought forward	Not currently part of the area transport strategy for Chichester within the West Sussex Transport Plan 2022 – 2036 due to lack of possible sites.
21	Speed limit changes - 20 mph as part of school safety zone	Traffic Management	Reduction of speed limits, 20mph zones	2012	2015	WSCC	WSCC	NO	Funded		Completed		Reduction in traffic queues within Orchard St AQMA area	Signs installed around schools and on nearby residential streets	Reductions in NO_2 within AQMA should be achieved through smoothing of traffic flow
22	Blanket 20mph scheme on residential streets	Traffic Management	Reduction of speed limits, 20mph zones	2014	2016	WSCC	WSCC	NO	Funded		Completed		Reduced speed on residential streets	WSCC contracted officer to promote 20mph and work with schools and community and CDC hosted officer and provided support	Roads monitored before and after implementation and speed reductions achieved on some roads
23	MOVA traffic signal optimisation	Traffic Management	UTC, Congestion management, traffic reduction	2012	2015	WSCC	WSCC	NO	Not Funded		Completed		Reduction in traffic queues within AQMAs	2 new Puffins to replace existing crossings implemented	Improves emissions by eliminating ghost users and reducing red time

2.3 $PM_{2.5}$ – 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, respiratory and cardiovascular diseases.

Data from the Public Health Outcomes Framework (Public Health Outcomes Framework - Data - OHID (phe.org.uk) indicates that Chichester District has a lower fraction of mortality (5.0% in 2021) attributable to particulate air pollution than the England average of 5.5%. This is similar to other nearby authorities.

CDC and partners are taking the following measures to address $PM_{2.5}$:

- Measure 2 – cleaner vehicles – we have installed electric vehicle charging points across the district and have a procurement policy to encourage the use of electric vehicles where the business case is favourable. We have implemented a pilot pool car fleet for CDC employees comprising ZEZ vehicles. We plan to roll out further EV charge points in 2023-24 and onwards in partnership with WSCC and their provider Connected Kerb.
- Measure 4 and 5 – two electric pool bikes have been installed to enhance the current pool bike fleet. We continue to promote cycling opportunities and the use of the Car Club in responses to planning applications for large scale developments in order to help reduce private vehicle mileage and increase the use of alternative modes of transport.
- Measure 14 – cleaner buses – Following the publishing of Bus Back Better – an Enhanced Partnership has been formally made by West Sussex County Council and local bus operators. The Partnership is responsible for the delivery of the West Sussex Bus Service Improvement Plan (BSIP). Funding has been awarded of £18.5m towards the BSIP ambitions including a new high frequency bus service between Chichester and Littlehampton via Tangmere using low emission vehicles operating seven days a week from early morning to late at night. This will offer a viable sustainable alternative to car travel to key destinations such as St Richard's Hospital, the University and city centre. In addition, new demand responsive services are to be introduced covering various zones in the district north of the city as well as an enhanced 99 Flex service between Petworth and the city centre. These can be planned, booked and paid for via an App and will be branded as Book-a-Bus. Finally, it is intended to explore lower fares for young people, notably 16-21 year olds to improve access further education opportunities as well as work and leisure. The partnership will be considering its approach to assist operators increase their fleets of zero emission vehicles through applications to the Zero Emission Bus Regional Area (ZEBRA). This opportunity is primarily focused where zero emission buses will make a notable positive impact on air quality.
- Measure 15 – taxi licensing conditions – air quality considerations have been included with CDC's taxi licensing policy. There are currently 27.8% of the taxi fleet comprised of hybrid vehicles and 3.2% of the fleet are electric.

Within the revised AQAP 2021, we have included the following measures:

- Consider declaring Smoke Control Areas which would allow for regulatory oversight of firewood and stoves being sold.
- Include in the Communications Plan for Air Quality a specific thread on domestic burning, bonfires, fire-pits, open fires and wood burners.

Where considered appropriate we have recommended that construction environmental management plans (CEMP) are put in place during the construction of new developments which include dust control strategies.

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

This section sets out the monitoring undertaken within 2022 by CDC and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

CDC undertook automatic (continuous) monitoring at two sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem and so this ASR includes no data or analysis of those pollutants. The http://www.sussex-air.net page presents automatic monitoring results for CDC, with automatic monitoring results also available through the UK-Air website .

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

CDC undertook non- automatic (ie passive by the diffusion tube method) monitoring of NO_2 at 20 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 (eg annualisation and/or distance correction), are included in Appendix C.

3.2 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.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of

40µg/m^3. 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 (ie 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 NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Economic activity across the district appeared to increase during 2022 following the downturn during the pandemic however many businesses have moved to 'hybrid' working arrangements resulting in reduced vehicle trips for commuting.

Data in Table A.3 indicates that there has been a decrease in the NO_2 annual mean concentration at the Stockbridge monitoring station (from 24 to 22.4 µg/m^3) and the air quality objective was not exceeded. The results at this location have been decreasing for the past five years (from 29 to 22.4 µg/m^3). The monitoring station is not within the AQMA and does not represent a location of relevant exposure however it is the only real-time monitoring location available near the former Stockbridge AQMA. There are three co-located diffusion tubes at the monitoring station and the 2022 annual mean for these tubes was 22.1 µg/m^3. As noted for the air quality monitoring station, the air quality objective was not exceeded. Measured concentrations for the Claremont Court diffusion tube location (which is in the former Stockbridge AQMA) have also reduced from 29.2 to 27.1 µg/m^3 (and over the last five years the results have decreased from 33 to 27.1 µg/m^3). As reported last year, the Stockbridge Roundabout AQMA was revoked on 9 May 2022 based on air quality monitoring data showing compliance with the air quality standard for three years and the results of air quality modelling (presented within the AQAP).

At the Westhampnett Road monitoring station the NO_2 annual mean concentration was 23.5 µg/m^3. This monitoring station was commissioned in February 2019 so we do not have a five year trend at this location (but the results are showing a decreasing trend from 27 to 23.5 µg/m^3). There is a diffusion tube located to the east of the monitoring station. The annual mean for the diffusion tube has been decreasing over the last five years (from 29 to 22.3 µg/m^3). Neither the monitoring station nor the diffusion tube are located within an AQMA.

At the former Orchard Street AQMA there are still a number of diffusion tubes being deployed. The annual mean for the diffusion tube at the former Orchard Street monitoring station was 16.4 µg/m^3 (over the last five years the results have decreased from 22 to 16.4 µg/m^3). At the nearby co-located diffusion tube location at 174 Orchard Street, the annual mean was 25 µg/m^3 (and over the last five years the results have decreased from 33 to 25 µg/m^3). As reported last year the Orchard Street AQMA was revoked on 9 May 2022 based on the long term trend in the results. The monitoring station was decommissioned in January 2022.

At the diffusion tube locations within the St Pancras AQMA, there were no exceedences of the air quality objective of 40 µg/m^3 and the concentrations measured were :

- St Pancras co-located diffusion tube annual mean 36.4 µg/m^3 (down from 38 µg/m^3 last year)
- Nag's Head diffusion tube annual mean 28.4 µg/m^3 (down from 33 µg/m^3 last year).

At the diffusion tube locations within the Rumbolds Hill AQMA in Midhurst, there were no exceedances of the air quality objective of 40 µg/m^3 and the concentrations were:

- Rumbolds Hill co-located diffusion tube annual mean 31.6 µg/m^3 (down from 36 µg/m^3 last year)
- Midhurst Stationery diffusion tube annual mean 21.3 µg/m^3 (down from 24.2 µg/m^3 last year)
- Nat West Bank diffusion tube annual mean 29.5 µg/m^3 (down from 33.3 µg/m^3 last year)
- Nationwide diffusion tube annual mean 27.2 µg/m^3 (down from 29.8 µg/m^3 last year).

At all other diffusion tube sites within Chichester and Midhurst, the NO_2 concentration has decreased. All sites were compliant with the air quality objective. It is not intended that the locations of any of the diffusion tubes will be changed in the coming year given that some businesses are continuing to struggle after the pandemic and traffic volumes may not have fully stabilised. There are a number of vacant business premises which may become occupied during the year, generating increased traffic and subsequent pollutants. It is intended to add an additional diffusion tube site near the Tangmere Westbound A27 carriageway as a result of air quality information made available to the Council by National Highways recently.

From Table A.5 there have been no exceedances of the NO_2 1-hour mean concentration at the Stockbridge or Westhampnett Road monitoring stations for the last five years. The DEFRA guidance suggests the 1-hour mean objective is unlikely to be breached unless the annual mean concentration is 60 µg/m^3 or above.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.
From Table A.6, the annual mean concentration (23.6 µg/m^3 in 2022) has fluctuated over the last five years between 18 and 23.6 µg/m^3 and is fully compliant with the air quality objective of 40 µg/m^3. In addition, the number of PM_{10} daily mean concentrations exceeding the Objective has been zero for the last four years with two exceedances this year (note as the analyser developed a fault during the year, the data are not considered by BV to be representative values). The air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year has therefore been met for the last five years. The Council intends to replace the TEOM monitor at this location during 2023 and will undertake monitoring of both PM_{10} and $PM_{2.5}$ in the future.

3.2.3 Particulate Matter ($PM_{2.5}$)

An estimate of $PM_{2.5}$ has been derived using the methodology in Technical Guidance LAQM.TG22 (box 7.7).

Note the CDC value for PM_{10} had to be annualised as the data capture rate for the year was below 75%. In addition, the analyser had intermittent faults throughout the year so the estimated $PM_{2.5}$ value is not considered to be a realistic estimate.

Step 1: multiply the annual mean PM_{10} concentration by the nationally derived correction factor: 23.61 x 0.7 = 16.53

Step 2: Estimated annual mean $PM_{2.5}$ = 16.53

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)
CI1	Stockbridge	Suburban	485881	103791	NO_2, PM_{10}	No	Chemiluminescent; TEOM	25	26	3
CI5	Westhampnett Road	Roadside	487212	105372	NO_2	No	Chemiluminescent	11.8	4.2	1.9

Notes:

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

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	Kings Ave/SouthbankJct	Roadside	485776	103961	NO2	No	11.0	2.3	No	3.0
2a, 2b	Claremont Court	Roadside	485772	103847	NO2	No	0.0	7.5	No	3.0
3, 4, 5	Cabin	Suburban	485880	103791	NO2	No	25.0	26.0	Yes	2.7
6	Stockbridge Road South	Roadside	485696	103731	NO2	No	14.0	2.0	No	2.9
7	Cleveland Rd	Roadside	486953	104414	NO2	No	18.0	1.8	No	2.8
8	Westhampnett Road	Roadside	487341	105474	NO2	No	3.0	1.7	No	2.9
9a, 9b	Hornet	Roadside	486502	104795	NO2	No	0.0	1.8	No	3.1
10a, 10b	St Pancras	Roadside	486533	104860	NO2	Yes, St Pancras AQMA	0.0	2.0	No	3.0
11	Arthur Purchase	Urban Background	486082	105026	NO2	No	0.0	6.0	No	2.7
12a, 12b	174 Orchard St	Roadside	485914	105185	NO2	No	0.0	2.0	No	2.7
13a, 13b	Rumbolds Hill	Roadside	488561	121479	NO2	Yes Rumbolds Hill AQMA	0.5	1.5	No	3.4
14	Sussex Cleaners	Roadside	486575	104799	NO2	No	0.0	1.8	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
15	Nag's Head	Roadside	486495	104845	NO2	Yes St Pancras AQMA	0.0	2.4	No	3.2
16	Orchard St Cabin	Roadside	485982	105221	NO2	No	9.8	3.8	No	2.0
17	Midhurst Stationery	Roadside	488545	121434	NO2	Yes Rumbolds Hill AQMA	1.8	0.6	No	2.8
18	Nat West Bank	Roadside	488583	121512	NO2	Yes Rumbolds Hill AQMA	9.9	1.1	No	3.0
19	Nationwide	Roadside	488605	121538	NO2	Yes Rumbolds Hill AQMA	0.5	2.2	No	2.7
20	British Heart Foundation	Roadside	488636	121613	NO2	No	0.0	3.8	No	2.8
21	Whyke Road	Roadside	486899	103720	NO2	No	20.0	1.7	No	2.4
22	St Pauls Road	Roadside	485957	105334	NO2	No	0.0	2.1	No	2.1

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

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
CI1	485881	103791	Suburban		96.5	29	28	23	24	22.4
CI5	487212	105372	Roadside		98.9		27	19	23	23.5

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

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^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
1	485776	103961	Roadside	100	100.0	27.0	25.0	20.8	22.9	21.0
2a, 2b	485772	103847	Roadside	100	100.0	33.0	33.0	27.2	29.2	27.1
3, 4, 5	485880	103791	Suburban	100	100.0	29.0	28.0	24.4	24.1	22.1
6	485696	103731	Roadside	100	100.0	34.0	33.0	27.9	31.6	30.0
7	486953	104414	Roadside	100	100.0	15.0	14.0	11.7	12.8	10.5
8	487341	105474	Roadside	100	100.0	29.0	27.0	21.6	23.4	22.3
9a, 9b	486502	104795	Roadside	100	100.0	36.0	34.0	26.9	30.4	28.2
10a, 10b	486533	104860	Roadside	100	100.0	**45.0**	**42.0**	33.3	37.5	36.4
11	486082	105026	Urban Background	100	100.0	17.0	17.0	13.1	14.5	12.7
12a, 12b	485914	105185	Roadside	100	100.0	33.0	30.0	21.5	25.1	25.0
13a, 13b	488561	121479	Roadside	100	100.0	**42.0**	**40.0**	33.5	36.0	31.6
14	486575	104799	Roadside	100	100.0	32.0	31.0	25.6	25.1	24.2
15	486495	104845	Roadside	100	100.0	38.0	37.0	28.3	33.0	28.4

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
16	485982	105221	Roadside	100	100.0	22.0	20.0	15.5	17.2	16.4
17	488545	121434	Roadside	90.4	90.4	28.0	26.0	22.0	24.2	21.3
18	488583	121512	Roadside	100	100.0	37.0	37.0	30.2	33.3	29.5
19	488605	121538	Roadside	100	100.0	38.0	33.0	29.0	29.8	27.2
20	488636	121613	Roadside	82.7	82.7	27.0	24.0	18.7	20.3	19.6
21	486899	103720	Roadside	100	100.0			25.1	28.0	26.7
22	485957	105334	Roadside	100	100.0			17.0	20.8	18.9

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

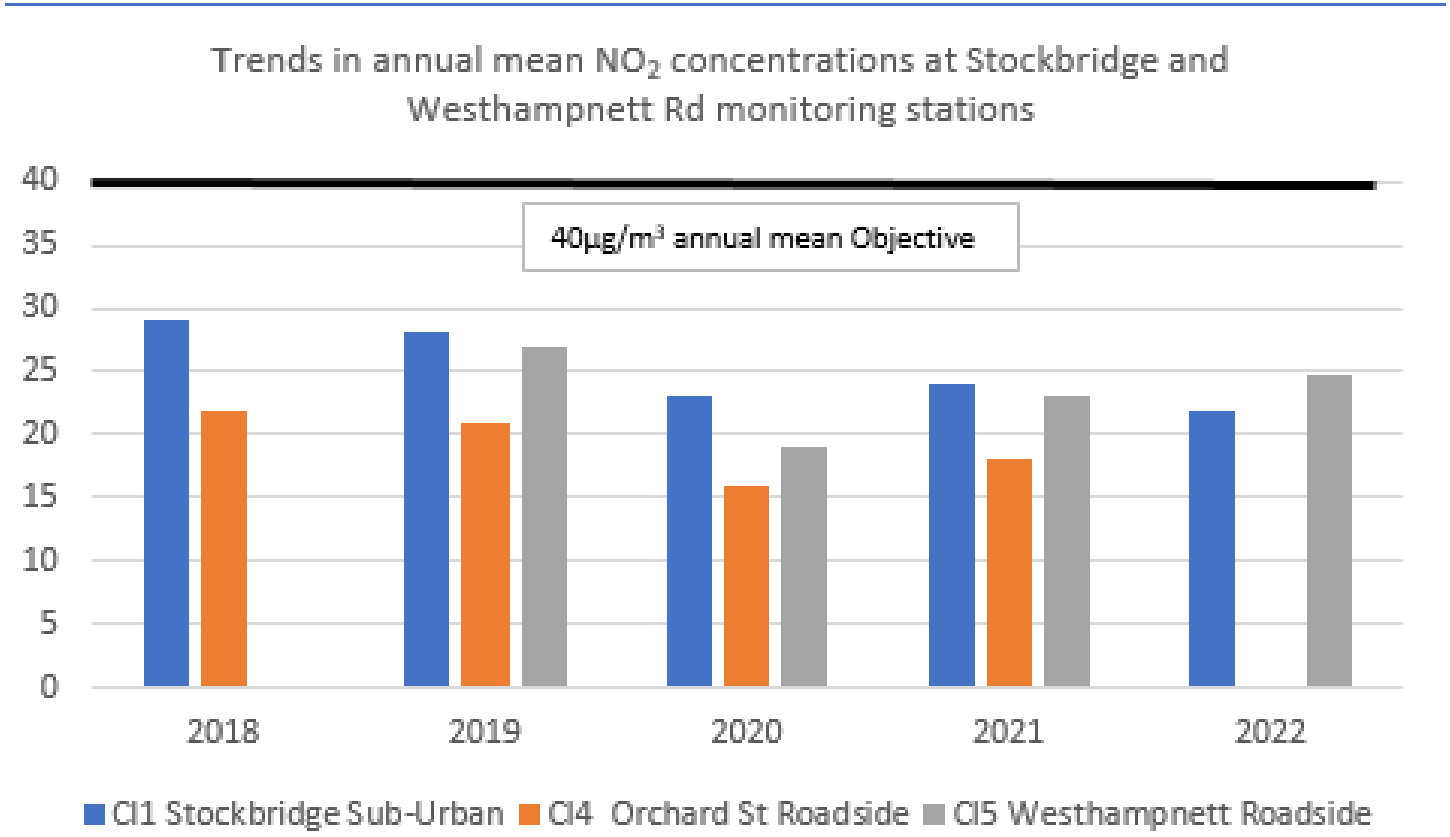
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

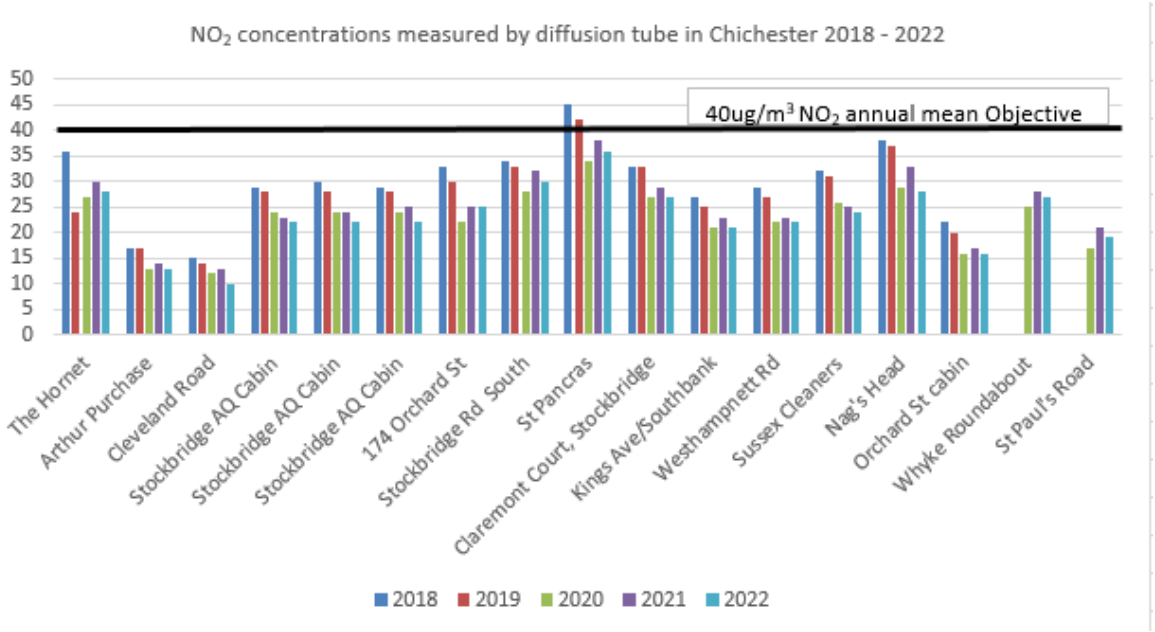
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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 (eg 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 NO_2 Concentrations (monitoring stations and diffusion tube sites)




NO2 concentrations measured by diffusion tube in Chichester 2018 - 2022
40ug/m3 NO2 annual mean Objective
50
45
40
35
30
25
20
15
10
5
0
The Hornet
Arthur Purchase
Cleveland Road
Stockbridge AQ Cabin
Stockbridge AQ Cabin
Stockbridge AQ Cabin
174 Orchard St
Stockbridge Rd South
St Pancras
Claremont Court, Stockbridge
Kings Ave/Southbank
Westhampnett Rd
Sussex Cleaners
Nag's Head
Orchard St cabin
Whyke Roundabout
St Paul's Road
2018
2019
2020
2021
2022

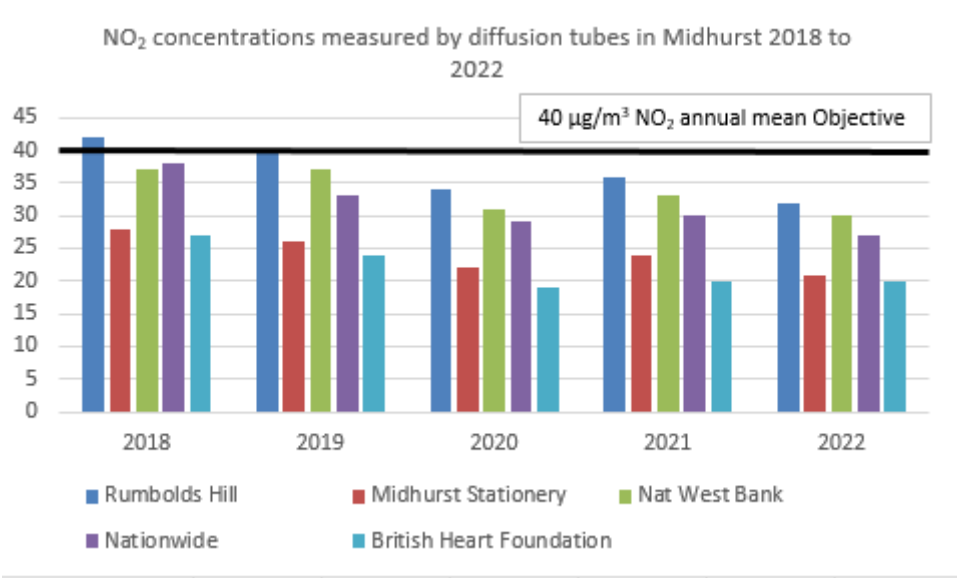

NO2 concentrations measured by diffusion tubes in Midhurst 2018 to 2022
40 µg/m3 NO2 annual mean Objective
45
40
35
30
25
20
15
10
5
0
2018
2019
2020
2021
2022
Rumbolds Hill
Midhurst Stationery
Nat West Bank
Nationwide
British Heart Foundation

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

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
CI1	485881	103791	Suburban		96.5	0	0	0	0	0
CI5	487212	105372	Roadside		98.9		0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

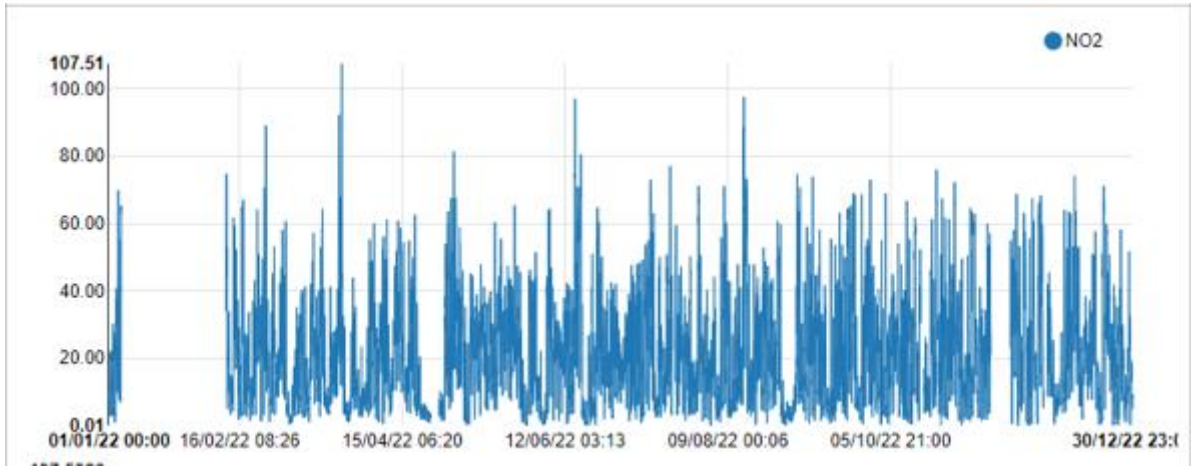
If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

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

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3 (no exceedance of 200µg/m^3)

NO_2 1-hour means at Stockbridge Monitoring Station units µg/m^3 during 2022



NO_2 1-hour means at Westhampnett Road Monitoring Station units µg/m^3 during 2022

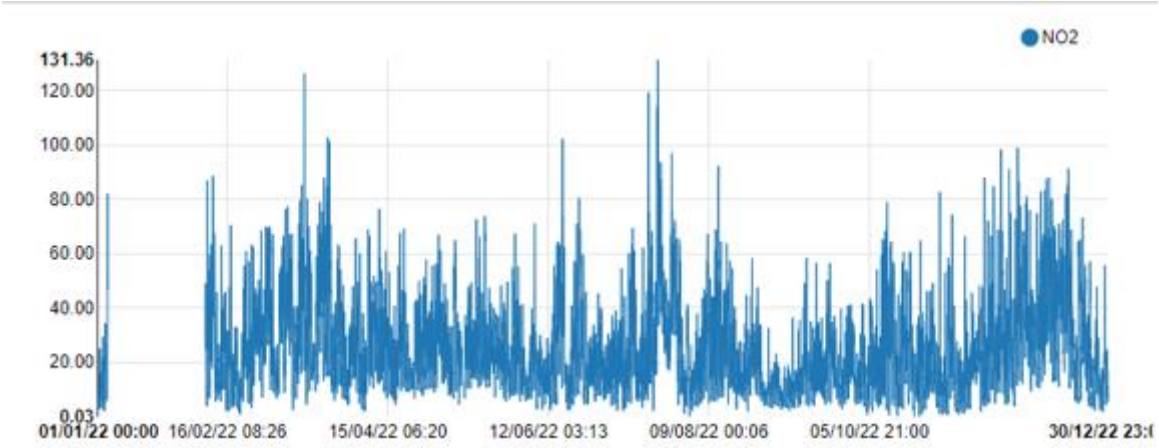


Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

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
CI1	485881	103791	Suburban		71.7	18	19	18	20	23.61

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

Notes:

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

Exceedances of the PM_{10} annual mean objective of $40\mu g/m^3$ are shown in **bold**.

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

Figure A.3 – Trends in Annual Mean PM_{10} Concentrations – annual mean Objective not exceeded

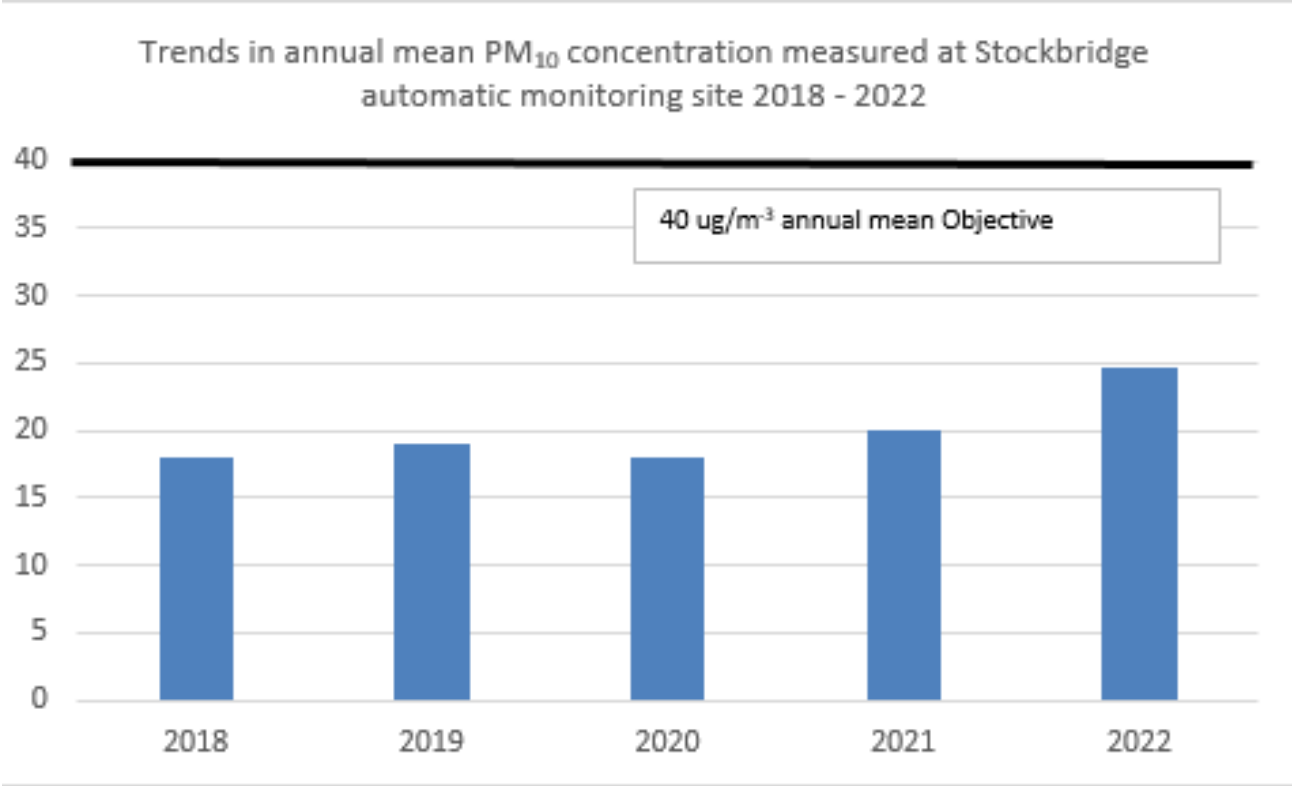


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

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
CI1	485881	103791	Suburban		71.7	0	0	0	0	(2)

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

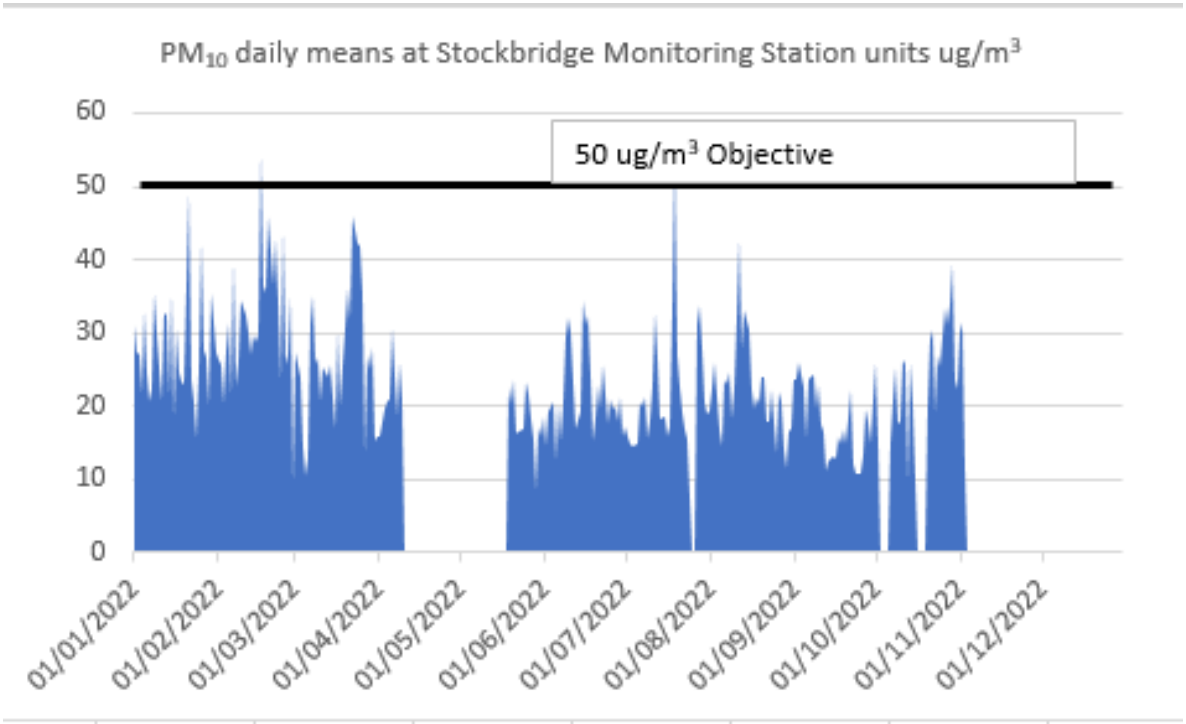
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-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 (eg if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.76)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	485776	103961	31.2	28.2	25.7	23.6	27.3	25.3	28.0	25.1	27.4	29.3	28.8	31.8	27.6	21.0	-	
2a	485772	103847	42.3	31.4	37.8	28.1	37.0	36.9	35.9	35.7	34.0	34.8	34.3	34.2	-	-	-	Duplicate Site with 2a and 2b - Annual data provided for 2b only
2b	485772	103847	41.0	36.4	37.5	29.8	36.3	37.3	36.3	37.8	36.4	36.5	35.5	33.8	35.7	27.1	-	Duplicate Site with 2a and 2b - Annual data provided for 2b only
3	485880	103791	31.9	34.7	22.0	22.6	29.3	32.2	29.3	28.5	26.2	31.9	30.9	25.9	-	-	-	Triplicate Site with 3, 4 and 5 - Annual data provided for 5 only
4	485880	103791	33.9	34.2	23.7	22.6	29.8	33.8	29.8	27.9	24.6	31.3	31.4	27.4	-	-	-	Triplicate Site with 3, 4 and 5 - Annual data provided for 5 only
5	485880	103791	31.8	35.5	21.5	23.2	30.9	30.5	29.2	28.8	26.9	31.5	31.1	28.2	29.0	22.1	-	Triplicate Site with 3, 4 and 5 - Annual data provided for 5 only
6	485696	103731	53.0	32.6	34.8	40.3	35.0	36.2	41.0	45.3	41.3	37.7	34.2	42.6	39.5	30.0	-	
7	486953	104414	16.4	15.5	18.2	14.1	11.2	10.1	11.0	12.1	12.7	13.2	14.4	17.4	13.8	10.5	-	
8	487341	105474	35.6	28.0	33.8	26.7	28.1	26.5	28.4	29.8	28.4	23.7	28.1	35.0	29.3	22.3	-	
9a	486502	104795	46.0	35.2	40.5	36.6	36.6	30.0	35.8	37.2	40.9	33.7	36.3	41.4	-	-	-	Duplicate Site with 9a and 9b - Annual data provided for 9b only
9b	486502	104795	45.8	30.1	39.9	36.4	36.3	30.6	35.8	38.1	40.2	33.0	34.2	39.1	37.1	28.2	-	Duplicate Site with 9a and 9b - Annual data provided for 9b only
10a	486533	104860	46.8	45.9	52.0	39.2	45.4	50.4	52.6	53.8	50.4	43.4	44.7	43.5	-	-	-	Duplicate Site with 10a and 10b - Annual data provided for 10b only
10b	486533	104860	55.6	40.8	46.7	44.3	47.1	49.6	55.5	56.2	49.6	45.9	45.4	45.7	47.9	36.4	-	Duplicate Site with 10a and 10b - Annual data provided for 10b only
11	486082	105026	24.0	17.7	18.1	14.6	13.9	12.7	12.8	13.5	15.3	17.1	17.6	23.9	16.8	12.7	-	
12a	485914	105185	42.4	30.0	41.0	25.8	29.9	27.6	31.2	31.5	29.7	33.4	35.3	35.5	-	-	-	Duplicate Site with 12a and 12b - Annual data provided for 12b only
12b	485914	105185	41.1	28.6	42.3	28.7	30.1	28.3	31.2	30.7	29.8	33.2	35.2	37.3	32.9	25.0	-	Duplicate Site with 12a and 12b - Annual data provided for 12b only
13a	488561	121479	50.7	43.1	38.3	40.5	41.2	40.3	42.1	45.0	42.5	35.4	39.2	45.7	-	-	-	Duplicate Site with 13a and 13b - Annual data provided for 13b only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.76)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
13b	488561	121479	50.0	40.9	37.2	40.1	38.5	39.1	41.4	43.3	42.4	35.4	40.4	46.3	41.6	31.6	-	Duplicate Site with 13a and 13b - Annual data provided for 13b only
14	486575	104799	38.4	32.9	32.3	26.0	31.7	30.4	32.7	33.1	27.8	31.3	33.2	31.5	31.8	24.2	-	
15	486495	104845	44.7	34.4	37.1	36.8	39.6	34.8	37.4	35.7	39.9	31.7	37.9	38.7	37.4	28.4	-	
16	485982	105221	33.5	21.4	27.8	20.0	17.8	16.4	16.8	17.4	14.8	20.1	23.9	28.4	21.5	16.4	-	
17	488545	121434	34.8	23.5	27.7		25.3	23.6	26.9	30.6	29.3	25.3	29.6	31.7	28.0	21.3	-	
18	488583	121512	48.6	37.5	34.3	34.9	40.1	38.3	43.2	39.4	39.8	32.9	39.5	36.9	38.8	29.5	-	
19	488605	121538	40.2	29.5	40.6	37.1	32.0	33.6	35.3	37.4	36.2	33.6	37.4	37.1	35.8	27.2	-	
20	488636	121613	24.2		30.4		21.7	23.5	23.5	26.5	23.9	22.7	24.1	36.9	25.7	19.6	-	
21	486899	103720	42.6	32.8	40.2	30.3	33.2	34.5	39.3	36.1	33.7	32.3	35.8	31.4	35.2	26.7	-	
22	485957	105334	33.5	21.1	28.8	21.8	19.9	19.4	21.7	24.8	26.5	25.2	25.0	31.4	24.9	18.9	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**.

☒ **Local bias adjustment factor used.**

☒ **CDC confirms that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 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 or Changed Sources Identified within Chichester District During 2022

CDC has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Chichester District Council During 2022

CDC revoked the AQMAs at Orchard Street and Stockbridge Roundabout in May 2022.

CDC published its revised AQAP 2021 – 2026 on the website in 2022 see link below:

Air quality - Chichester District Council

QA/QC of Diffusion Tube Monitoring

CDC uses Gradko Environmental for supplying and analysing the diffusion tubes. The tube preparation method is 50% TEA/Acetone and ANA UKAS Method GLM7 and GLM9. CDC uses a local bias adjustment factor. The monitoring was completed in adherence to the 2022 Diffusion Tube Monitoring Calendar.

Gradko Environmental uses the AIR NO_2 Proficiency Testing scheme for quality control. The result for 2022 was Satisfactory (Z score +/- 2) for 100% of results submitted.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Chichester District recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

The data capture rate for the TEOM was 71.7% therefore annualisation of the PM_{10} data was undertaken in accordance with the methodology in TG22, see Table C.1.

Site ID	Annualisation Factor <Site 1 Name>	Annualisation Factor <Site 2 Name>	Annualisation Factor <Site 3 Name>	Annualisation Factor <Site 4 Name>	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
Ci1	1.0002	0.999			1.0005	23.6	23.61

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 with regard to 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.

CDC has applied a local bias adjustment factor of 0.76 to the 2022 monitoring data. A summary of bias adjustment factors used by CDC over the past five years is presented in Table C.2. CDC has checked the National Bias Adjustment Factor for the tube preparation method in use – this is reported as 0.76 based on 26 studies which is the same as the CDC local bias adjustment factor. Bias adjustment factors used by neighbouring authorities range between 0.69 – 0.87. It has been decided to continue to use a local bias adjustment factor.

There are three diffusion tubes co-located with the Stockbridge (CI1) continuous analyser which are used to derive the local bias adjustment factor.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.76
2021	Local	-	0.83
2020	Local	-	0.79
2019	Local	-	0.84
2018	Local	-	0.85

Table C.2 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12				
Bias Factor A	0.76 (0.71 - 0.82)				
Bias Factor B	31% (22% - 41%)				
Diffusion Tube Mean (µg/m^3)	29.0				
Mean CV (Precision)	2.8%				
Automatic Mean (µg/m^3)	22.1				
Data Capture	99%				
Adjusted Tube Mean (µg/m^3)	**0.76**				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Chichester District required distance correction during 2022.

QA/QC of Automatic Monitoring

All sites are visited by a CDC officer for calibration and filter changes on a bi-monthly basis. CDC has a service agreement with a third party who provides site maintenance, auditing, regular inspections and 48 hour call out response if problems are encountered. Data is downloaded from all sites twice daily by BV[7] and is available to download online[8]. CDC has a contract with BV to calibrate and ratify all real time data collected. Data presented in the report has been ratified.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The PM_{10} data has had a factor of 1.3 applied to it to provide a gravimetric equivalent value (as there are no regional TEOM FDMS units available to calculate a valid VCM factor).

Automatic Monitoring Annualisation

The data capture rate for the TEOM was 71% therefore annualisation of the PM_{10} data was undertaken in accordance with the methodology in TG22, see Table C.1 above.

Background site	Annual Mean (Am)	Period Mean (Pm)	Ratio (R)
A – Eastbourne Holly Place	14.6	14.566	1.002
B – Devonshire Park	19.3	19.306	0.999
		Average R	1.0005
CDC PM10 annualised mean 1.005 x 23.6 = 23.61			

[7] Bureau Veritas

[8] www.sussex-air.net

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within Chichester District required distance correction during 2022.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Sites in Chichester

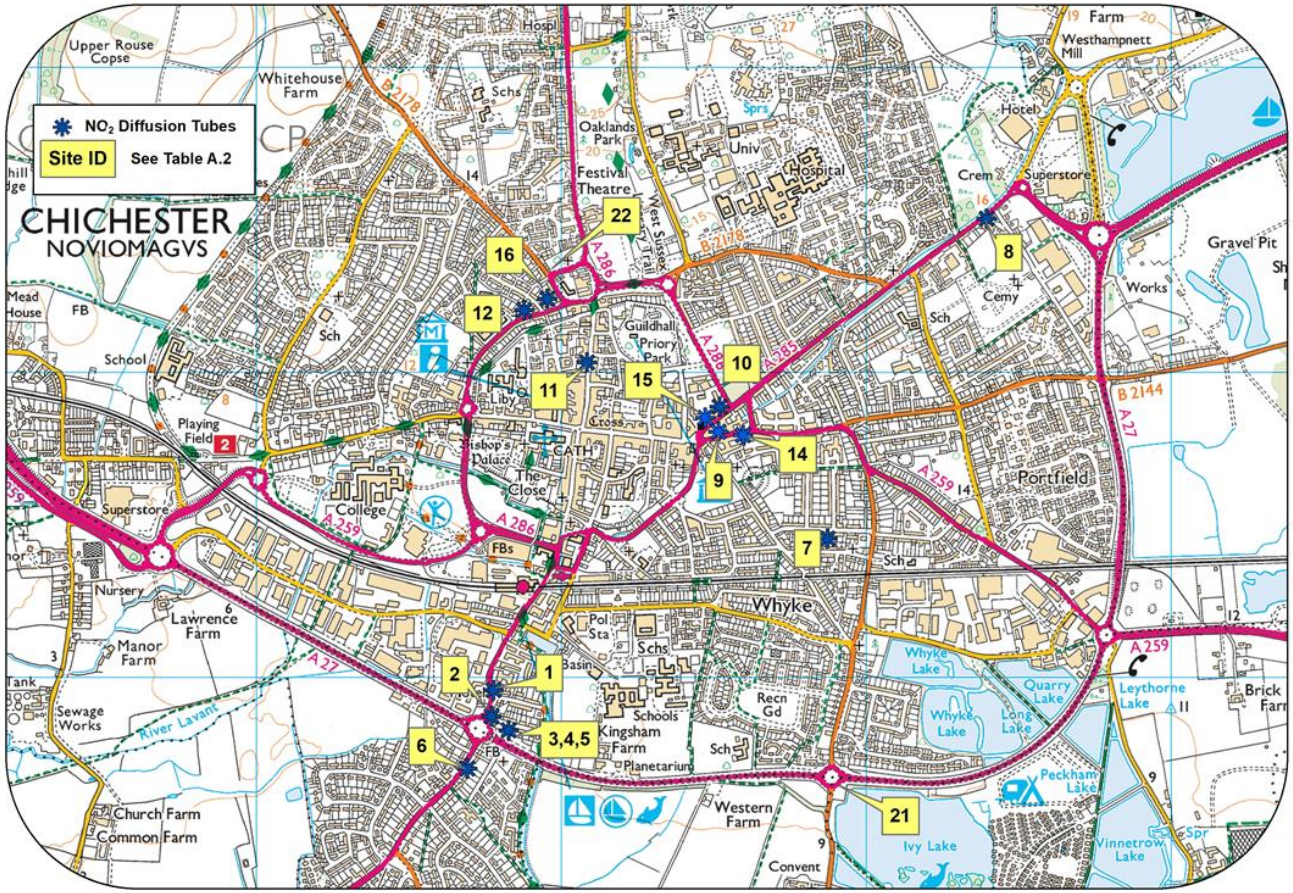


Figure D.2 – Map of Automatic and Non-Automatic Monitoring Sites at Stockbridge Roundabout site, Chichester (CI1)

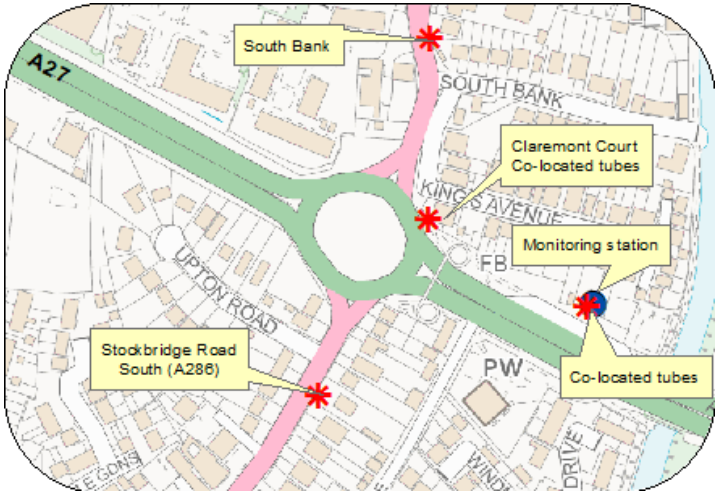


Figure D.3 – Map of Non-Automatic Monitoring Sites at St Pancras AQMA, Chichester

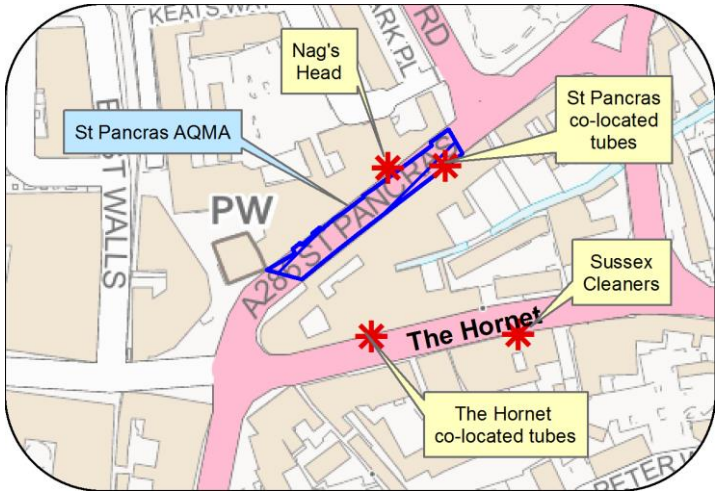


Figure D.4 – Map of Non-Automatic Monitoring Sites at Orchard St, Chichester

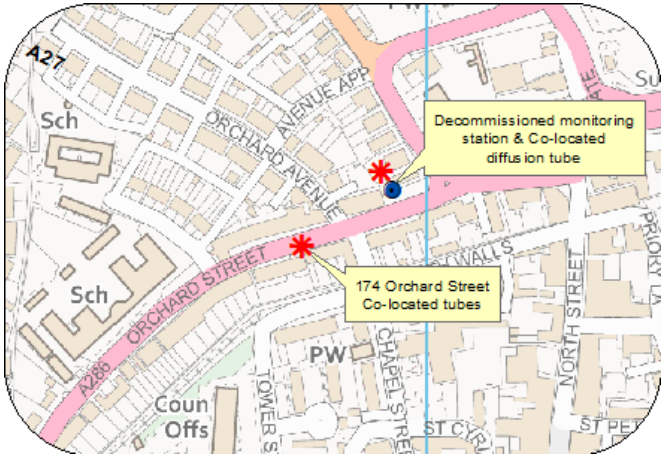
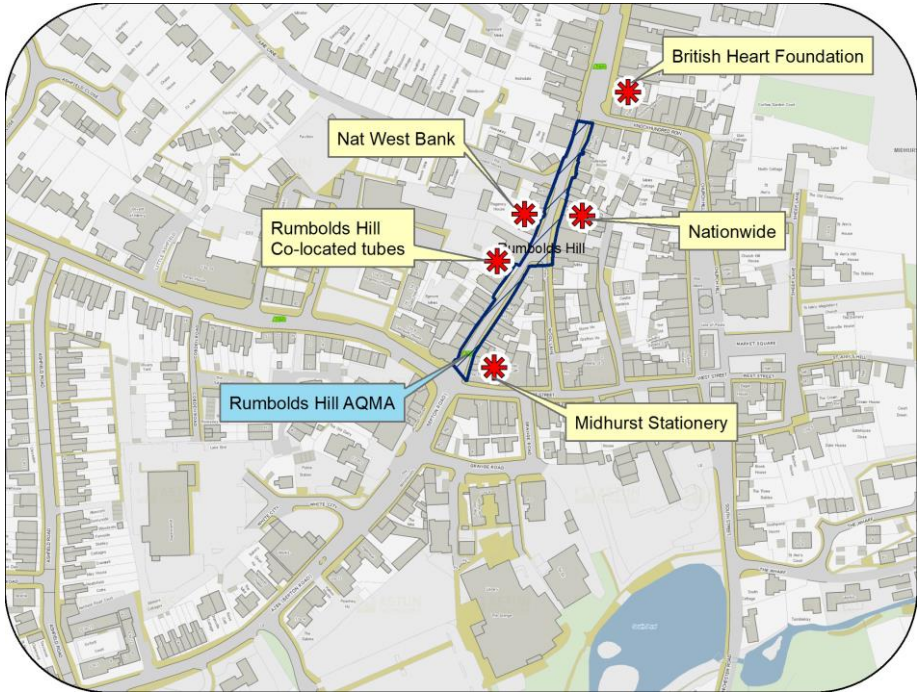


Figure D.5 – Map of Automatic and Non-Automatic Monitoring Sites at Westhampnett Road, Chichester

Figure D.6 – Map of Non-Automatic Monitoring Sites at Rumbolds Hill AQMA, Midhurst



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[9]

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

[9] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
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	Annual Status Report
CCTV	Closed circuit television
CDC	Chichester District Council
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
EV	Electric vehicle
FDMS	Filter Dynamics Measurement System
IAAQG	Inter Authority Air Quality Group
LAQM	Local Air Quality Management
LES	Low Emissions Strategy
MOVA	Microprocessor Optimised Vehicle Actuation
NH	National Highways
NHS	National Health Service
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office of Low Emission Vehicles
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RTPI	Real Time Passenger Information
SAQP	Sussex Air Quality Partnership

Abbreviation	Description
SO_2	Sulphur Dioxide
STIP	Strategic Transport Investment Programme
UTC	Urban Transport Controls
VMS	Variable message signing
WSCC	West Sussex County Council

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- West Sussex Walking and Cycling Strategy 2016 – 2026 produced by WSCC (currently being updated).
- Chichester City Local Cycling and Walking Infrastructure Plan 2021 produced by Transport Initiatives and PJA for CDC.
- Revised CDC Air Quality Action Plan 2021 – 2026 produced by CDC February 2021.
- Public Health Outcomes Framework - Data - OHID (phe.org.uk)