Bath & North East Somerset Council

Improving People's Lives

Appendix 4

2024 and 2025 Air Quality Monitoring Report, Liveable Neighbourhoods – New Sydney Place and Sydney Road

Monitoring Dates:

- **January 2023 to March 2024 (Baseline monitoring)**
- **April 2024-September 2025 (In-trial monitoring, including the ETRO consultation period)**
- **October 2024 – June 2025 (additional in-trial monitoring post-ETRO consultation)**

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Background information

This report provides a comparison of baseline air quality data collected during 2023, with provisional data from 2024 and 2025 for the New Sydney Place and Sydney Road Liveable Neighbourhoods (LN) scheme. The purpose is to assess the potential impact of a through-traffic restriction trial on Sydney Road installed on 1 April 2024.

An earlier Air Quality Monitoring Report (January to September 2024) was prepared and published to inform a decision on the Experimental TRO consultation, and in March 2024 a decision was made to make the scheme permanent subject to a formal TRO process which is now in progress.

Please note that the area referred to as New Sydney Place is Sydney Place between its junctions with Darlington Street and Sydney Mews. The monitor referred to as DT312 Sydney Place 2 is on New Sydney Place.

Please also note that both the 2024 and 2025 data is provisional until a peer review is performed and published. The 2024 data is due to be confirmed and published in Summer 2025.

Air pollution

Air pollution is the leading environmental health risk to the UK public, with an estimated 29,000 to 43,000 deaths annually attributed to it in the UK alone[1].

Long-term exposure to air pollution is linked to premature death associated with lung, heart and circulatory conditions, while short-term exposure exacerbates asthma and increases hospital admissions.

There is evidence to suggest that despite strengthening environmental policies, the poorest in our society are being unfairly exposed to worse air pollution without seeing improvements[2]. Clean air is important for everyone and will alleviate stress on our health system, improve people's lives and make our society more equitable.

Types and causes of air pollution

There are different causes and sources of air pollution. Historically, combustion of fossil fuels for energy, such as coal, produced smoke and sulphur dioxide (SO_2).

Now road traffic is chiefly responsible for the poor air quality in the UK contributing to nitrogen dioxide (NO_2) pollution and particulate matter (PM) pollution.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.
[2] Air Quality Management Resource Centre, UWE. Emissions vs exposure: Increasing injustice from road traffic-related air pollution in the United Kingdom, 2019
https://www.sciencedirect.com/science/article/pii/S1361920919300392

Particulate matter pollution, referred to as PM_{10} (particulate matter less than 10 µm in diameter) or $PM_{2.5}$ (particulate matter less than 2.5 µm in diameter), is made up of tiny bits of material from all sorts of places including smoke from fires, exhaust fumes, smoking or the dust from brake pads on vehicles. These particles are too small to see, and we breathe them in without noticing.

Nitrogen dioxide (NO_2) comes from burning fuels or other materials, so levels are especially high around roads. But they are also produced from home gas boilers, bonfires, and other sources as well. You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies. Vehicle exhaust emissions contribute 35 per cent of all UK nitrogen oxide emissions (NOx) making them the single greatest source[3].

How does air pollution affect our health?

Air pollution particles and gases enter our bodies and can damage our cells in different ways. They usually travel into our lungs first, then from there can then move into our blood and vital organs such as our heart and brain.

Any amount of pollution can be damaging to our health, but the more that you are exposed to, the bigger the risk and the larger the effect on you and your family. Some people are more vulnerable to the impacts of air pollution than others. Those more at risk from air pollution include children, pregnant and older people; and people with lung conditions such as asthma, chronic obstructive pulmonary disease (COPD) and lung cancer, and people with heart conditions such as coronary artery disease, heart failure and high blood pressure.

Air pollution in Bath

Historically, nitrogen dioxide (NO_2) levels in Bath have been unacceptably high. Since introducing Bath's clean air zone and through the natural replacement of polluting vehicles with cleaner ones over time, air quality is gradually improving and, in 2023, annual average NO_2 levels were below the legal limit of 40 µg/m^3 within the city. However, there are still areas of concern and two sites in Bath had annual average levels of between 36-40 µg/m^3 which is mainly caused by vehicle emissions.[4] Both of these sites are located at Walcot Parade and are therefore not within the vicinity of Sydney Place.

The problem is exacerbated by Bath's topography. The city sits in the bottom of a valley surrounded by hills, and its central roads are flanked by tall buildings, which

[3] DEFRA. Air quality: explaining air pollution – at a glance, 2019. https://www.gov.uk/government/publications/air-quality-explaining-air-pollution/air-quality-explainingair-pollution-at-a-glance

[4] B&NES Air Quality Annual Status Report 2024 https://www.bathnes.gov.uk/sites/default/files/2024%20Annual%20Air%20Quality%20Report.pdf

means that in certain conditions, vehicle emissions can get trapped in the atmosphere causing high levels of NO_2 in certain locations.

Particulate matter in Bath was not found to exceed legal limits for either PM_{10} or $PM_{2.5}$, except at times when there were meteorological or other events that caused spikes in these pollutants, nationally[4].

How we monitor air quality

We have measured air quality in Bath and North East Somerset since the mid-1990s. Currently we measure NO_2, $PM_{2.5}$ and PM_{10} concentrations in two ways: automatic analysers and diffusion tubes.

Automatic analysers measure NO_2 and PM in three permanent roadside locations in Bath. They take hourly readings of air pollution concentrations and provide more accurate readings than diffusion tubes. One of these monitoring stations is linked to the UK Automatic Urban and Rural Network (AURN) which provides national coverage of a range of pollutants.

Diffusion tubes are light, mobile and can be placed in many locations around the area (typically using street furniture), usually 1 to 15 metres from the road or at the kerbside (less than 1 metre from the road) and around 2-3 metres above ground level. The ambient air reacts with a chemical reagent in the tube so that NO_2 concentrations can be measured. The tubes are exposed to the air for one month before they are collected and sent to a laboratory for analysis. There are currently over 150 diffusion tube locations across Bath & North East Somerset including 22 key sites with higher levels of pollution where three diffusion tubes are located at each location to improve data confidence.

To find out more information about air quality across B&NES go to: https://www.bathnes.gov.uk/air-quality

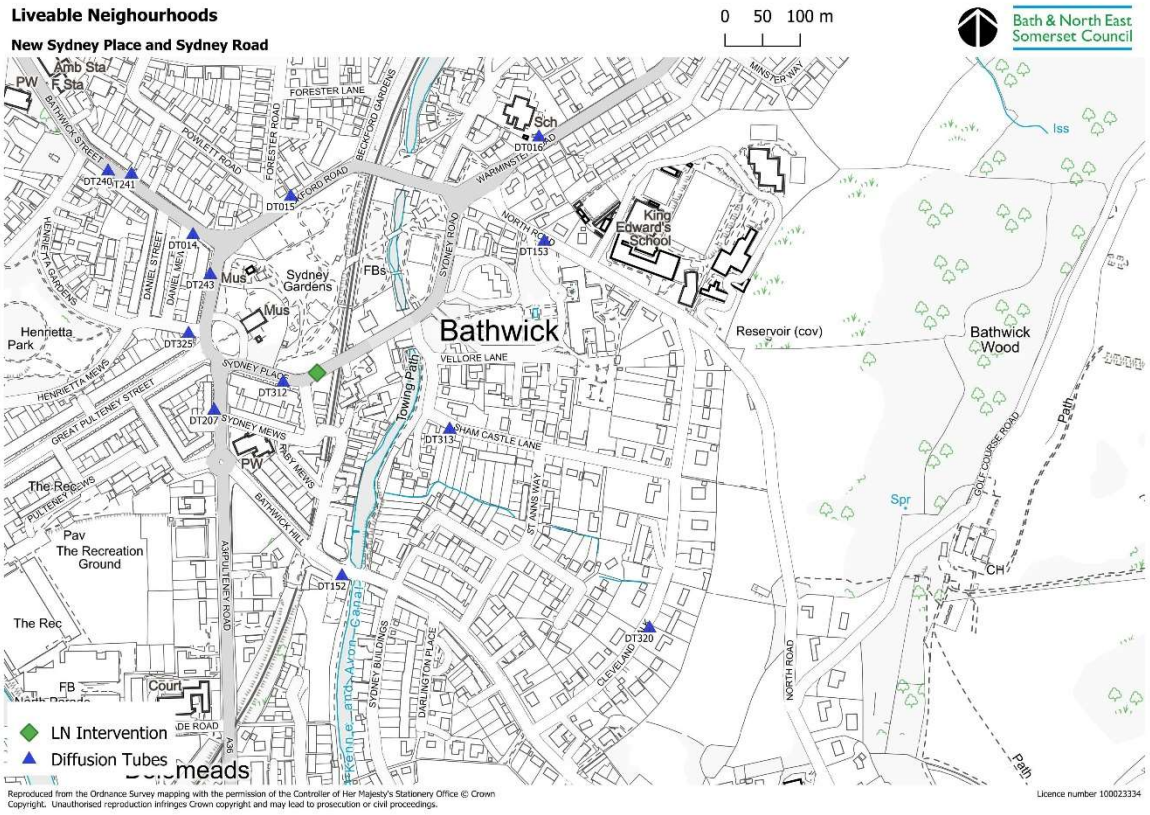
As part of our obligations under the Local Air Quality Management (LAQM) legislation (part IV of Environment Act 1995 as amended by the Environment Act 2021) we have issued an Annual Status Reports (ASR) alongside this report. These set out and comment on air quality data from across the wider authority. These are found at: https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports.

You can also view an interactive map of historical NO_2 data collected from monitoring locations around the area, here: https://www.bathnes.gov.uk/nitrogen-dioxide-monitoring-data

How we monitor air quality (specifically NO_2 concentrations) for the Liveable Neighbourhoods programme

As part of the Liveable Neighbourhoods (LN) project additional monitoring has been carried out at around the New Sydney Place/Sydney Road Experimental Traffic Regulation Order (ETRO) trial. Additional monitoring sites were placed on New Sydney Place (DT312 - Sydney Place 2) and Sham Castle Lane (DT313) in October 2023 and on Cleveland Walk (DT320) in April 2024 to supplement the existing monitoring in the area (Figure 1). Full details of site locations can be found in the Air Quality Annual Status Report (https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports).

Figure 1: Air quality monitor locations near New Sydney Place and Sydney Road LN



Blue triangles are monitoring locations, and the green diamond represents the through traffic restriction location.

Data Analysis – Provisional Data

The 2024 and 2025 data shown below is provisional. Final 2024 results will be available when the Annual Status Report has been peer reviewed.

To determine how air quality may have changed with the introduction of the trial, we compare the latest data collected since the start of the trial (1st April) with baseline data from similar periods before its launch.

Because we need to consider seasonal effects on air quality, we compare like-for-like data from previous years, breaking the year into quarters:

- Quarter 1 (Q1) – January, February, March
- Quarter 2 (Q2) – April, May, June
- Quarter 3 (Q3) – July, August, September
- Quarter 4 (Q4) – October, November, December

The focus of this report is to review and present all the data collected from diffusion tubes located in the trial area (as presented in Figure 1).

When reading the report please note the following:

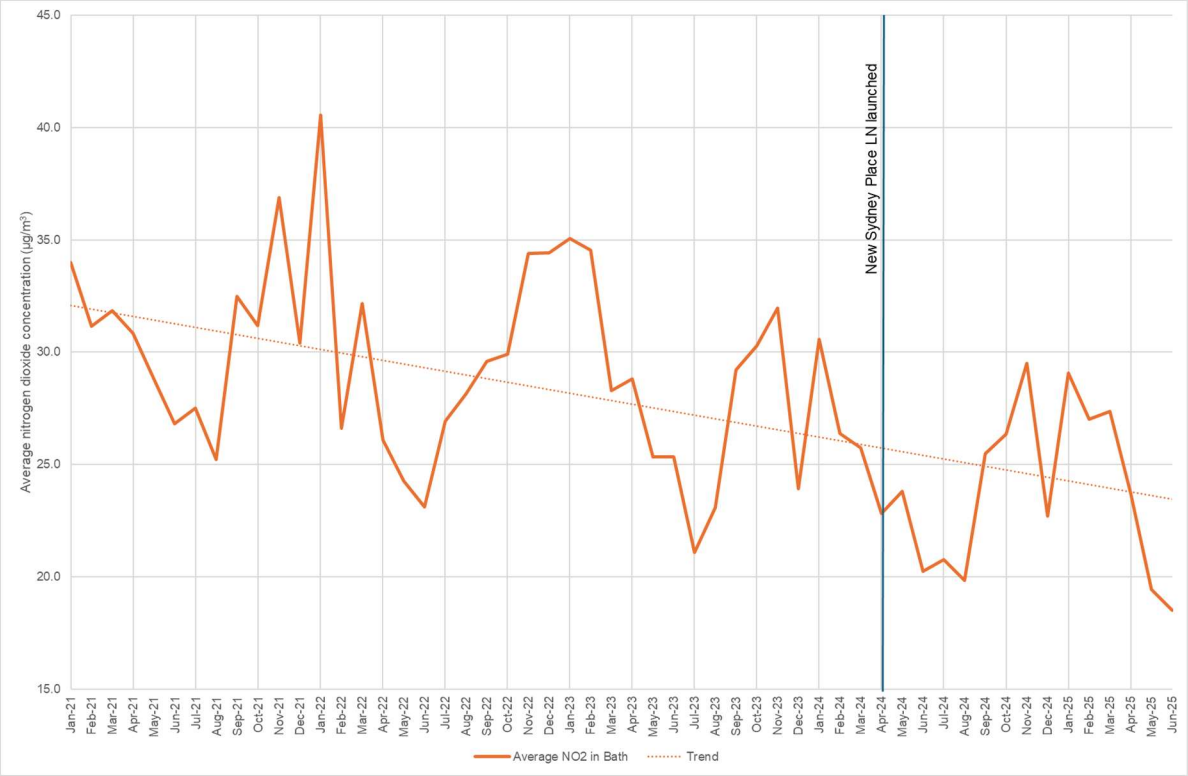
- 2024 and 2025 air quality data is provisional.
- We compare baseline data (pre-trial) collected during 2023 with 2024/5 air quality monitoring results to inform how the trial may have impacted air quality.
- Air pollution is affected by the seasons.
- Quarterly results are not comparable to annual air quality objectives.
- The **quarterly data has not been corrected for bias** as this is always and only carried out at the end of each calendar year. This formal process is detailed in the Annual Status Report (https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports).

It should be noted that there are several factors which can affect nitrogen dioxide concentrations. These include but are not limited to weather, local pollution sources and seasonality. Further information is needed to see the ongoing trends in this area. Monitoring will continue in the scheme area to ensure there are no ongoing adverse effects on air quality.

To compare the results in the trial area to the wider area, Figure 2 shows the monthly average readings that were taken from 136 long-term monitoring diffusion tube sites in B&NES between 2021 and 2025. Sites were only included if they were active for the whole period. The results (for the whole of B&NES) are showing a

downward trend, however, the average of the results for February and March 2025 are slightly higher (by c.3 µg/m$^{3)}$ compared with the same months in 2024. This is likely due to differences in weather conditions between the two years.

Figure 2: Trend in monthly average diffusion tube NO_2 concentrations in Bath from 2021 to 2025 (µg/m^3)



Quarterly Monitoring Results

The monitoring data from diffusion tubes in the trial area (as presented in Figure 1) is compared with baseline monitoring data from 2023 in **Figure 3** and **Tables 1, 2 and 3 respectively.**

Bias correction (the correction made after comparison to monitoring at an automatic monitoring site) has not been applied to the quarterly data in both 2024 and 2025. This formal process is only carried out at the end of each calendar year with a full 12-months of data. However, all the quarterly results show that the NO_2 concentrations at all locations within the trial area are below the national government objective of 40 µg/m^3.

Figure 3: Quarterly Provisional NO_2 Diffusion Tube Monitoring Results (µg/m^3)

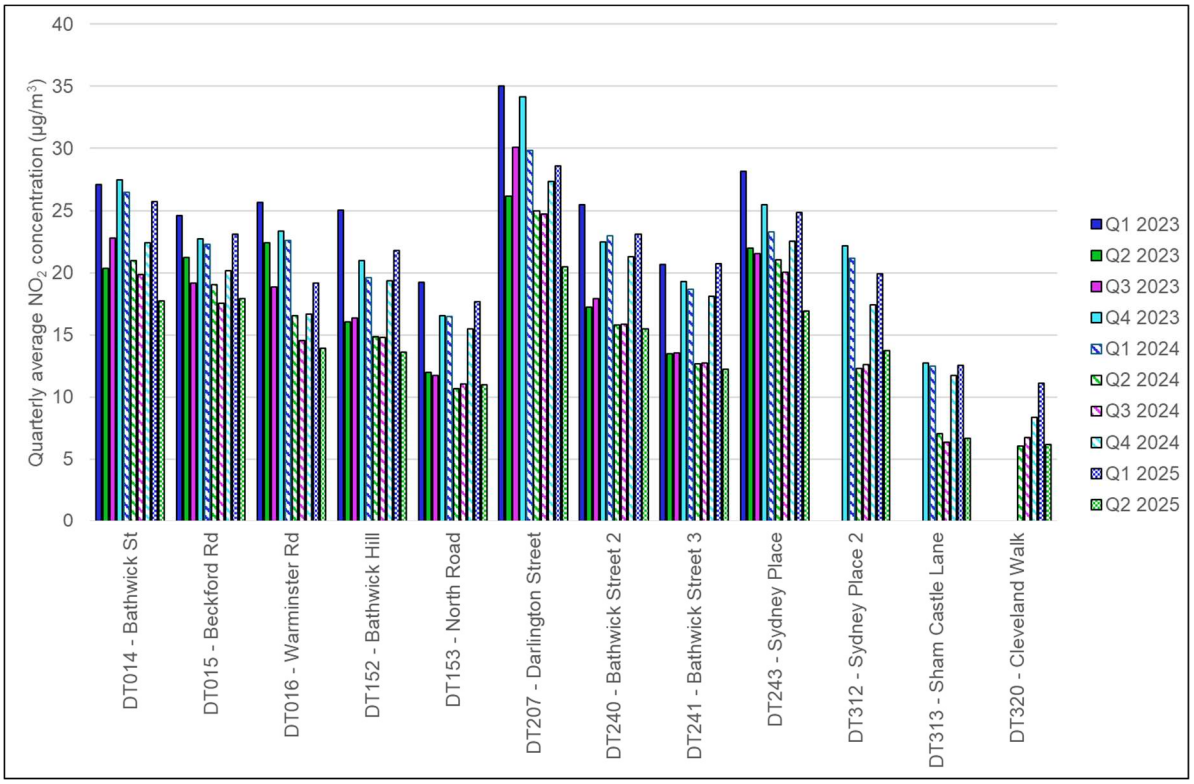


Figure 3 shows monitoring data (in a bar chart) from all the sites in the trial area per quarter from Q1 2023 to Q2 2025 inclusive.

Table 1 – Comparison of Quarter 4 (2023 and 2024) Provisional NO_2 Diffusion Tube Monitoring Results: New Sydney Place and Sydney Road LN (µg/m^3)

Site ID	Site Name	Q4 2023	Q4 2024	Change (%)
DT014	Bathwick Street	27.5	22.4	-18.3
DT015	Beckford Road	22.7	20.1	-11.4
DT016	Warminster Road	23.4	16.7	-28.6
DT152	Bathwick Hill	21.0	19.3	-7.8
DT153	North Road	16.6	15.4	-6.8
DT207	Darlington Street	34.2	27.3	-20.0
DT240	Bathwick Street 2	22.5	21.3	-5.3
DT241	Bathwick Street 3	19.3	18.1	-6.1
DT243	Sydney Place	25.5	22.6	-11.5
DT312	Sydney Place 2*	22.2	17.4	-21.4
DT313	Sham Castle Lane*	12.7	11.7	-8.1
DT320	Cleveland Walk**	-	8.4	-

*Data not available – sites added in October 2023
**Data not available – site added in April 2024

Table 1 presents a comparison of monitoring data from all the sites collected during Q4 of the years 2023 (baseline) and 2024 (in-trial) and the percentage change.

The results illustrated in Table 1 show that when comparing **Q4 in 2024** (in-trial) with Q4 in 2023 (baseline), there has been a decrease at all sites in the trial area.

Table 2 – Comparison of Quarter 1 (2023, 2024, and 2025) Provisional NO_2 Diffusion Tube Monitoring Results: New Sydney Place and Sydney Road LN (µg/m^3)

Site ID	Site Name	Q1 2023	Q1 2024	Q1 2025	Change (%) 2023-2025	Change (%) 2024-2025
DT014	Bathwick Street	27.1	26.5	25.7	-5.0	-2.7
DT015	Beckford Road	24.6	22.3	23.1	-6.2	3.7
DT016	Warminster Road	25.6	22.6	19.2	-25.2	-15.1
DT152	Bathwick Hill	25.1	19.6	21.8	-13.1	11.2
DT153	North Road	19.2	16.5	17.6	-8.4	7.0
DT207	Darlington Street	35.0	29.9	28.6	-18.4	-4.2
DT240	Bathwick Street 2	25.5	23.0	23.1	-9.2	0.6
DT241	Bathwick Street 3	20.7	18.7	20.7	0.3	11.2
DT243	Sydney Place	28.1	23.3	24.9	-11.6	6.8
DT312	Sydney Place 2*	-	21.1	19.9	-	-5.8
DT313	Sham Castle Lane*	-	12.5	12.5	-	0.4
DT320	Cleveland Walk**	-	-	11.1	-	-

*Data not available – sites added in October 2023
**Data not available – site added in April 2024

Table 2 presents a comparison of monitoring data from all the sites collected during Quarter 1 2023 (baseline), 2024 (in-trial) and 2025 (in-trial) and the percentage change between baseline and 2024, and between 2024 and 2025.

The results illustrated in Table 2 show that in **Q1 2025** there was a small increase in concentrations at five of the 12 sites in the trial area when compared to baseline, **Q1 2024** (pre-trial). However, further investigation showed similar increases in other areas of the district and wider region in the same period, indicating that the trial is not likely to be responsible for the change.

When we compare **Q1 2025** (in-trial) to **Q1 2023** (pre-trial), air quality at all trial sites improved except at one (DT241 Bathwick Street North) which remained the same. However, the other two sites on Bathwick Street showed improved air quality

Table 3 – Comparison of Quarter 2 (2023, 2024, and 2025) Provisional NO_2 Diffusion Tube Monitoring Results: New Sydney Place and Sydney Road LN (µg/m^3)

Site ID	Site Name	Q2 2023	Q2 2024	Q2 2025	Change (%) 2023-2025	Change (%) 2024-2025
DT014	Bathwick Street	20.4	21.0	17.7	-12.9	-15.4
DT015	Beckford Road	21.2	19.0	17.9	-15.8	-6.0
DT016	Warminster Road	22.4	16.5	13.9	-37.9	-15.9
DT152	Bathwick Hill	16.1	14.9	13.6	-15.4	-8.5
DT153	North Road	12.0	10.7	11.0	-8.1	3.1
DT207	Darlington Street	26.1	24.9	20.5	-21.7	-17.9
DT240	Bathwick Street 2	17.3	15.8	15.5	-10.2	-2.0
DT241	Bathwick Street 3	13.5	12.6	12.2	-9.4	-3.6
DT243	Sydney Place	22.0	21.0	16.9	-23.2	-19.6
DT312	Sydney Place 2*	-	12.3	13.7	-	11.6
DT313	Sham Castle Lane*	-	7.0	6.7	-	-5.6
DT320	Cleveland Walk**	-	6.1	6.2	-	1.7

*Data not available – sites added in October 2023
**Data not available – site added in April 2024

Table 3 presents a comparison of monitoring data from all the sites collected during Q2 2023 (baseline), Q2 2024 (in-trial) and **Q2 2025** (in-trial) and the percentage change between baseline and 2024, and between 2024 and 2025. Full quarterly data is available in Appendix 1.

The results illustrated in Table 3 show that in **Q2 2025 (in-trial)**, three out 12 sites in the trial area show a small increase in concentration (up to 2 µg/m^3) when compared to **Q2 2024** in-trial results. One month's missing data in **Q2 2024** at two of these three sites (DT153 North Road and DT313 Sham Castle Lane) is likely to be responsible for this difference. The presence of cobwebs can lead to data loss particularly if the blockage is severe or if the chemical interference is significant enough to render the data unusable. The tubes can also be knocked out of holders by vegetation.

A small increase (1.4 µg/m^3) at site DT312 (Sydney Place 2) in **Q2 2025** when compared to **Q2 2024** was due to a higher reading in April 2025 which was not following the trends of nearby locations. This monitoring location is close to the modal filter where there is significantly reduced traffic and the levels of NO_2 concentrations are low at 13.7 (which is a third of the government's annual objective

level of 40 µg/m^3). When comparing **Q2 2025** against baseline **Q2 2023** all sites show improved air quality.

Annual Monitoring Results

The data shown below for 2024 is provisional and is currently being finalised. Final results will be available when the Annual Status Report (ASR) has been peer reviewed. The data for 2023 is confirmed.

Table 4 – Annual Average NO_2 Diffusion Tube Monitoring Results: Sydney Road LN (µg/m^3)

Site ID	Site Name	2023	2024	Change (%)
DT014	Bathwick Street	19.8	18.4	-7.1
DT015	Beckford Road	17.8	16.2	-9.0
DT016	Warminster Road	18.3	14.4	-21.3
DT152	Bathwick Hill	15.9	14.1	-11.3
DT153	North Road	12.1	11.2	-7.4
DT207	Darlington Street	25.2	22.0	-12.7
DT240	Bathwick Street 2	16.8	15.2	-9.5
DT241	Bathwick Street 3	13.6	12.9	-5.1
DT243	Sydney Place	19.7	17.8	-9.6
DT312	Sydney Place 2*	16.2	13.0	-19.8
DT313	Sham Castle Lane*	9.3	8.5	-8.6
DT320	Cleveland Walk**	-	5.8	-

*Data not available – sites added in October 2023
**Data not available – site added in April 2024

Table 4 compares monitoring data from **2024** with that collected in **2023** (pre-trial baseline monitoring). Where monitoring sites were already in existence, 2023 data was collected from January to December 2023. New monitors were added for the trial in October 2024 ready for the potential start of the trial in the new year, and 2023 data was collected between October and December 2023 at these additional sites. All monitors in the trial area were in place from January to December 2024 except DT320 (Cleveland Walk) which was added in April 2024. The 2024 results include the first 9 months of the trial's operation. All data has been bias-corrected using the local bias of 0.82 in 2024 and 0.81 in 2023 and annualised where there are less than 9 months data. This process is detailed in the ASR https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports).

The results of the monitoring show lower concentrations of NO_2 in the trial area in 2024 when compared with 2023. It also shows that all readings are well below 40 µg/m^3 (by less than half, except for at one site Darlington Street at 22 µg/m^3) and that the annual average air quality objective has not been exceeded.

The results are comparable with data from across Bath where the average change between the 2023 and 2024 was a reduction of 9%. Monitoring will continue to assess what impact, if any, the through traffic restriction trial is having on air quality.

Conclusion

- Baseline NO_2 monitoring has been carried out in the New Sydney Place and Sydney Road Liveable Neighbourhood and surrounding streets to help establish the impact on air quality of the through-traffic restriction trial.

- The results of the baseline monitoring show that the NO_2 concentrations at all locations in the trial area are below 40 µg/m^3 and that the annual average air quality objective had not been exceeded.

- All sites in 2025 Q2 are showing a decrease in NO_2 concentrations when compared to the 2023 Q4 baseline results (when monitoring at all the trial sites were in place).

- A few sites in the trial area during Q1 and Q2 2025 show an increase in concentrations compared to baseline Q1 2024 data. Further investigation showed similar increases in other areas of the district and wider region, indicating that it is unlikely that the small increase is linked to the trial.

- Some sites in Q2 2025 (in-trial) show an increase in concentration compared to Q2 2024 (in-trial) data. However, where this was the case, the concentrations were low (not concerning) and there was some missing data which led to slightly higher averages.

- All annual average monitored concentrations for 2024 were below the annual average objective of 40 µg/m^3 and showed lower concentrations at all sites when compared with 2023 baseline data. Annual averages are not yet available for 2025. Concentration levels are well below 40 µg/m^3 (by less than half except for at one site, Darlington Street, where the reading was 22 µg/m^3)

- The results show similar trends to other locations across Bath indicating that fluctuations may not be specifically attributed to the trial.

Monitoring will continue until a decision is made to either make the scheme permanent or remove it.

Further information

- As part of our obligations under the Local Air Quality Management (LAQM) legislation (part IV of Environment Act 1995 as amended by the Environment Act 2021) we have issued an Annual Status Reports (ASR) alongside this report. These set out and comment on air quality data from across the wider authority. These are found at https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports
- You can also view an interactive map of historical NO_2 data collected from monitoring locations around the area, here: https://www.bathnes.gov.uk/nitrogen-dioxide-monitoring-data

Appendix 1

Table 3 – Quarterly NO_2 Monitoring Results: Diffusion Tube – Sydney Road LN (µg/m^3)

Site ID	Site Name	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025	Q2 2025
DT014	Bathwick Street	27.1	20.4	22.8	27.5	26.5	21.0	19.8	22.4	25.7	17.7
DT015	Beckford Road	24.6	21.2	19.1	22.7	22.3	19.0	17.5	20.1	23.1	17.9
DT016	Warminster Road	25.6	22.4	18.9	23.4	22.6	16.5	14.6	16.7	19.2	13.9
DT152	Bathwick Hill	25.1	16.1	16.3	21.0	19.6	14.9	14.8	19.3	21.8	13.6
DT153	North Road	19.2	12.0	11.8	16.6	16.5	10.7	11.0	15.4	17.6	11.0
DT207	Darlington Street	35.0	26.1	30.1	34.2	29.9	24.9	24.7	27.3	28.6	20.5
DT240	Bathwick Street 2	25.5	17.3	17.9	22.5	23.0	15.8	15.8	21.3	23.1	15.5
DT241	Bathwick Street 3	20.7	13.5	13.5	19.3	18.7	12.6	12.7	18.1	20.7	12.2
DT243	Sydney Place	28.1	22.0	21.5	25.5	23.3	21.0	20.0	22.6	24.9	16.9
DT312	Sydney Place 2	-	-	-	22.2	21.1	12.3	12.6	17.4	19.9	13.7
DT313	Sham Castle Lane	-	-	-	12.7	12.5	7.0	6.3	11.7	12.5	6.7
DT320	Cleveland Walk	-	-	-	-	-	6.1	6.7	8.4	11.1	6.2

The results are averaged across 3 months data and have not been bias adjusted. The 2024 & 2025 results are also provisional and may be subject change following end of year QA/QC checks. As such the quarterly results should not be compared to annual average objectives. Shaded squares have one or two months missing data.