DISTRICT OF HARBOROUGH

2024 Air Quality Annual Status Report (ASR)

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

Date: June, 2024

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Executive Summary: Air Quality in Our Area

Air Quality in Harborough District Council

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

The main air quality issues in Harborough District are related to traffic sourced nitrogen dioxide

The Council has two Air Quality Management Areas ('AQMA'):

- One AQMA in Lutterworth declared for exceedances of the annual mean Air Quality Objective (AQO) for Nitrogen Dioxide (NO_2). Copies of the Air Quality Management Orders and a map showing the area covered is available from the Council website. https://www.harborough.gov.uk/info/20025/environmental_health/101/air_quality/3
- One AQMA in the Kibworths declared for exceedances of the annual mean Air Quality Objective (AQO) for Nitrogen Dioxide (NO_2). Copies of the Air Quality Management Orders and a map showing the area covered is available from the Council website. https://www.harborough.gov.uk/info/20025/environmental_health/101/air_quality/2

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[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

During 2023 the council has:

- worked with development control and Leicestershire County Council Highways to determine what funding is available to implement the junction improvements modelled in 2019;
- worked in partnership with North West Leicestershire District Council and Air Quality Consultants to implement an air quality grant project to monitor the impact of $PM_{2.5}$ from solid fuel burning and to encourage behaviour change to improve local air quality;
- taken part in clean air day to promote the issue of air quality.
- Ongoing work in collaboration with public health staff at Leicestershire County Council on the impacts of poor air quality on health

Conclusions and Priorities

The ASR concludes that:

- there are no new areas likely to be exceeding air quality objectives.
- The Lutterworth AQMA has been compliant with the annual mean air quality standard for an extended period of time and can be revoked.

In 2024 the council plans to:

- Continue to monitor in Lutterworth to show that the Air Quality Standard (AQS) for NO_2 continues to be met.
- Publish the findings of the DEFRA grant project on impacts of solid fuel burning.
- Participate in Clean Air Day 2024
- Continue to work in collaboration with public health colleagues at Leicestershire County Council on key recommendations from the Leicestershire Air Quality and Health Partnership Steering Group to tackle poor air quality and related health issues.

Local Engagement and How to get Involved

The main contributions that our community can make to improving air quality are around minimising emissions from traffic and other sources and limiting exposure at times of poor

air quality. Specifically, that means avoiding unnecessary car use for short journeys, utilising public transport where possible, buying and maintaining low emissions vehicles and being linked into the national alert system for predicted episodes of poor air quality.

The public can get further information on Air Quality from the following websites :-

- Harborough District Council Air Quality website
  http://www.harborough.gov.uk/info/20025/environmental_health/101/air_pollution
- DEFRAs UK-AIR: Air Information Resource website
  https://uk-air.defra.gov.uk/
- DEFRAs Local Air Quality Management (LAQM) Support website
  http://laqm.defra.gov.uk/
- Environmental Protection UK Air Pollution website
  http://www.environmental-protection.org.uk/policy-areas/air-quality/about-air-pollution/
- Choose How You Move
  https://www.choosehowyoumove.co.uk/

Local Responsibilities and Commitment

This ASR was prepared by the Regulatory Services department of Harborough District Council with the support and agreement of the following officers and departments:

- Gareth Rees
  Environmental Protection officer (air quality and contaminated land)
- Ian Bartlett
  Environmental Protection Team Leader

This ASR has been approved by Harborough District Council Cabinet committee

- Committee: Cabinet
  Date/Time: 10 Jun 2024 - 18:30 to 22:00
  Venue: Harborough Innovation Centre
  https://cmis.harborough.gov.uk/cmis5/Meetings/tabid/73/ctl/ViewMeetingPublic/mid/410/Meeting/5834/Committee/862/SelectedTab/Documents/Default.aspx

This ASR has been signed off by a Director of Public Health.

Mike Sandys, Director of Public Health, Leicestershire County Council

If you have any comments on this ASR please send them to Regulatory Services at:

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1 Local Air Quality Management

This report provides an overview of air quality in Harborough District during 2024. 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 requirement showing the strategies employed by Harborough 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 Harborough District Council can be found in Table 2.1. The table presents a description of the 2 AQMAs that are currently designated within Harborough District. Map(s) 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

We propose to revoke Lutterworth AQMA as monitoring within the AQMA has shown compliance for the last 6 years.

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
Lutterworth	Declared 18/07/2001, Amended 04/04/2011, Amended 16/04/2013	NO2 Annual Mean	An area encompassing dwellings adjacent to Rugby Road, High Street and Market Street.	NO	51	31.9	4	Apr-13	http://www.harborough.gov.uk/download/downloads/id/145/lutterworth_air_quality_action_plan.pdf
Kibworth	Declared 28/11/2017	NO2 Annual Mean	Area encompassing dwelling with close proximity to the kerb line along the A6 between the roundabout with Wistow Road south to the junction with Church Road	NO	55	38	0	Feb-19	http://www.harborough.gov.uk/download/downloads/id/5104/2019_kibworth_air_quality_action_plan.pdf

☒ **Harborough District Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Harborough District Council confirm that all current AQAPs have been submitted to Defra (confirm by selecting in box).**

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

Defra's appraisal of last year's ASR concluded

1. The laboratory and preparation method are required in the QA/QC section of the 2023 ASR. Include this information in your QA/QC section.
    - This has been included
2. QA/QC of the reference monitor has been undertaken as per the HDC's supplier, however, the data output is ratified and validated to TG 2016 guidance. Since TG 2023 is now being used, the data is required to be validated to the new LAQM guidance.
    - This was a typographical error by the supplier QA/QC was undertaken inline with the most recent guidance.
3. Update Table 2.2 so that it is clear to see which KPI belongs to which AQAP measure. If there are multiple KPI's for one measure, ensure that they remain in the same cell.
    - This is/was the case
4. Correct the grammatical and formatting errors in the report prior to publication on the council's website. ASRs are public facing documents that serve to keep local communities informed of the steps being taken by their local authority to improve air quality, and as such it is important that they are accessible and easy to read.
    - The council endeavours to keep grammatical error to a minimum by ensure proof reading of reports by several officers. Any formatting errors are caused by the design of your report template and are outside of the control of the council.

Following a second refusal

1. It has been noted that all data for October is missing from the previous report. It is critical to clarify this absence in the current report as it could significantly affect the calculation of annual average concentrations, potentially impacting compliance outcomes.
    - Though no comment was made on this. The tubes were lost in transit on return to the laboratory. This has no substantive impact on the findings of the report.

The following comments are designed to help inform future reports:

2. Tube 1n in the Lutterworth AQMA was non-compliant in 2019 which impacts the number of years of compliance for potential revocation of the AQMA. In line with the LAQM guidance, as compliance began in 2020, the years of 2020 and 2021 should not be considered when outlining if compliance has been achieved. HDC should continue to monitor annual NO_2 concentrations within the Lutterworth AQMA and upon receipt of the 2023 and 2024, consider if revocation is possible.

    - Though the location 1n was above 36 $\mu g.m^{-3}$ it was only marginally above 36 $\mu g.m^{-3}$ in 2019 and was below the standard of 40$\mu g.m^{-3}$. It was lower than 36$\mu g.m^{-3}$ in 2018 and in 2020 through 2023. The COVID-19: Supplementary Guidance Local Air Quality Management Reporting in 2021 Date: April 2021 states that “Authorities need to simply make clear how monitoring was impacted and, if appropriate, highlight that the data should be treated with caution.” not that it cannot be used. The data collected in 2020 and 2021 is consistent with the data collected in 2022 and 2023. Therefore, given the data collected in 2018 and 2019, the authority is confident that the site is compliant which is the requirement of the policy guidance LAQM.TG22

3. HDC have Zephyr analysers at 2 locations, which monitored NO_2, PM_{10}, and $PM_{2.5}$. It's important to note that Zephyr monitors cannot be used for compliance reporting due to their specifications. Therefore, whilst we encourage the Council to use additional monitoring methods, any data collected from Zephyr analysers should be reported separately in an appendix to ensure clarity and compliance with regulatory standards.

    - The authority does not treat the zephyr data as reference data however hiding the data in an appendix does not communicate the findings with the public who are unlikely to look at lengthy appendices.

4. Comments from last year’s ASR have been mentioned and addressed.

    - noted

5. Additional appendices have been uploaded to the LAQM portal which is welcomed, however these should be collated into one final document for publication to the public.

    - noted

6. The Kibworth AQAP will be due for update this year. The Lutterworth AQAP is over 5 years old and requires to be updated.
    - noted
7. According to Table A1, passive monitoring was conducted at 34 sites, not 33 as stated on page 11.
    - This is a typographical error in page 11, 34 sites were monitored.
8. Minor formatting issues are present throughout the ASR document such as number of decimal places, grammar, and not removing templated text. The ASR should be reviewed and formatting/grammar errors addressed prior to submission.
    - The authority took its best steps to address grammatical and formatting issues, without further clarification on the issue no further action can be taken. All reports go through multiple stages of proof reading and review before submission.
9. All graphs and maps are well presented and are clear to read. The Council have also provided a detailed discussion of the trends.
    - Thank you
10. A national bias adjustment factor has been applied. It would be beneficial to include a screenshot of the tool so the factor can be verified. Whilst a national bias adjustment factor was selected, justification should be given as to if this is the most appropriate factor.
    - The inclusion of a screenshot of a technical, difficult to read spreadsheet which is publicly available to all on the LAQM website serves no purpose especially when the content of the screenshot is already present in a readable format within the report. i.e. Table C2 of appendix C.

Harborough District Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 7 measures are included within Table 2.2, with the type of measure and the progress Harborough District Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action

Harborough District Council worked to implement these measures in partnership with the following stakeholders during 2023:

- Leicestershire County Council Highways Department
- Leicestershire County Council Public Health

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Harborough District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Kibworth AQMA .

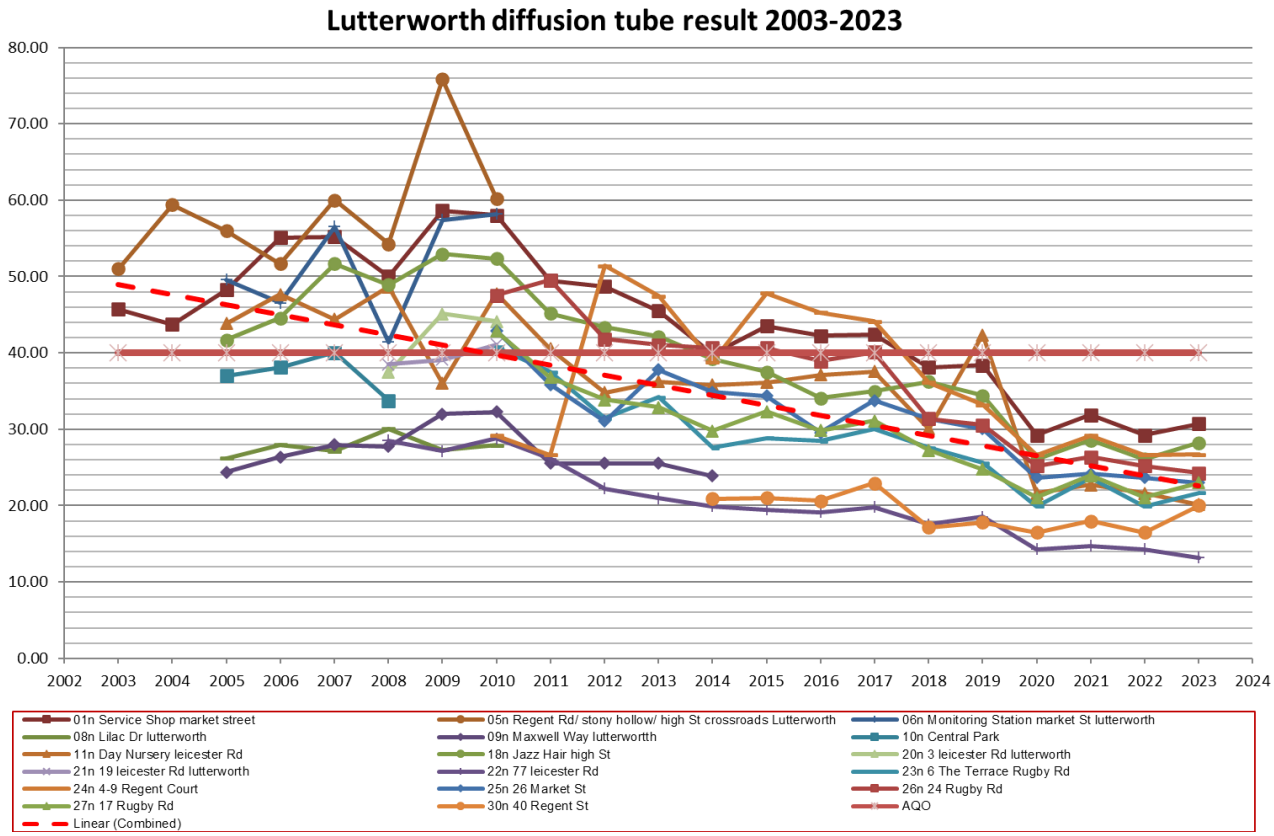
2.2.1 Lutterworth AQMA

Nitrogen Dioxide levels have seen significant improvement over the last 20 years as show in figure 2-1.

Concentrations of NO_2 have been below the Annual Mean air quality Objective for the 5th year running since the HGV gating system has been implemented. No specific actions beyond monitoring have been undertaken in Lutterworth.

As such it is the intention of the council to revoke the Lutterworth AQMA

Figure 2.1. Lutterworth diffusion tube results 2003-2023



2.2.2 Kibworth AQMA

Progress on the implementation of junction improvements in Kibworth has been slower than expected due to negotiations with Leicestershire County Council Highways.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Harborough District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Kibworth AQMA.

The council has started engaging with Leicestershire county council highways of a new Kibworth Air Quality Action Plan as all actions within he plan have now been completed.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	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
Lutterworth 1	20mph zone	Traffic Management	Reduction of speed limits, 20mph zones	Apr-18	Apr-18	Harborough District Council, Leicestershire County Council Highways	LA, Funding: Defra AQ grant	NO	Funded		Completed		Determine reduction in traffic emissions	Complete	Lengthy Timescale
													Determine impact on air quality	Complete	
													Determine exact area of the speed reduction (likely required to be larger than AQMA by Highway authority) and costs of implementation and undertake cost benefit analysis	none	LCC Highways determined this did not fit within current policy in 2017 . evidence gathered was used to implement a gating system in 2018
Kibworth 1	Impact assessment of local traffic management options.	Transport Planning and Infrastructure	Other	2018	2018	Harborough District Council, Leicestershire County Council Highways	Harborough District Council	NO	Partially Funded		Completed	Cannot be quantified as work is to identify works and the potential benefit	To publish findings	Complete	The modelling has been completed and found that implementing the proposed junction improvements will improve air quality within the AQMA by approximately 4 µg.m-3
	1. Detailed traffic surveys.										Completed				
	2. Undertake traffic simulation of proposed junction improvements.										Completed				
	3. Undertake air quality impact assessment of junction improvements.										Completed				
Kibworth 2	Continue consultation between Regulatory Services and Development Management. Establish mechanism for consultation between the two parties to ensure Regulatory Services are consulted on all relevant planning applications and policy documents	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018		Harborough District Council,	Harborough District Council,	NO	Funded		Implementation	Unlikely to provide improvements to air quality but will limit potential negative impacts		ongoing	

Measure No.	Measure Title	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
Kibworth 3	Provide Guidance and Training to members. Provide guidance and training to the members on assessing air quality impacts and their significance when considering planning applications.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018		Harborough District Council,	Harborough District Council,	NO	Funded		Implementation			ongoing	Local plan adopted April 2019
Kibworth 4	Ensure air quality policies in Local Plan documents and evidence base. Provide information on air quality to residents in an accessible format.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018		Harborough District Council,	Harborough District Council,	NO	Funded		Implementation			ongoing	Local plan adopted April 2019
Kibworth 5	Provide information about the AQMA to local residents. Provide information on air quality to residents in an accessible format.	Public Information	Via the Internet	2018		Harborough District Council,	Harborough District Council,	NO	Funded		Implementation			ongoing	
Kibworth 6	Development of local air quality monitoring. Retain monitoring at relevant locations within and adjacent to the AQMA and to install real time monitoring within the AQMA.	Public Information	Via the Internet	2017		Harborough District Council,	Harborough District Council,	NO	Funded		Implementation			ongoing	

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Public Health Outcomes Framework (PHOF) (https://www.gov.uk/government/collections/public-health-outcomes-framework) is a Office of Health Improvement and Disparities data tool for England, intended to focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between communities. The tool uses indicators to assess improvements. Recognising the significant impact that poor air quality can have on health, the PHOF includes an indicator relating to fine particulate matter ($PM_{2.5}$).

The indicator in the PHOF reports the estimates fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution (measured as fine particulate matter).

Based on the latest available figures the position in Harborough District has the 2nd lowest fraction of attributable deaths to particulate air pollution in Leicestershire. (https://fingertips.phe.org.uk/profile/wider-determinants/data#page/0/gid/1938133043/pat/502/par/E10000018/ati/501/are/E07000131/iid/93867/age/-1/sex/-1/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/tre-ao-1_tre-so-1)

Harborough District Council is taking the following measures to address $PM_{2.5}$:

- Ongoing work in collaboration with public health staff at Leicestershire County Council is delivered through the Joint Strategic Needs Assessment (JSNA) and associated action plan. Within the JSNA there is a chapter on air quality and health. The chapter recognises that by its nature, air quality cannot be controlled by geographical boundaries or by a single individual alone. Instead, collective, systematic efforts are required to reduce air pollution and its harmful effects on health. The key recommendation was that the Leicestershire Air

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

Quality and Health Partnership Steering Group should agree a plan to deliver joint actions to tackle poor air quality and related health issues. The first plan has been completed and the group are currently drafting the Air Quality and Health Partnership 2023-26 document he Council controls dust and combustion emissions from permitted processes within the district

- Promoting the use of green waste collection and Leicestershire County Council run waste bring sites over bonfires to dispose of garden waste
- Robust planning process

- Concluded the DEFRA Grant funded project with North West Leicestershire District Council to increase the level of knowledge of $PM_{2.5}$ and ultimately reduce $PM_{2.5}$ emissions by changing behavioural attitudes to solid fuel burning.

2.3.1 Findings of the joint grant project with North West Leicestershire

A 12-month PM10 and PM2.5 monitoring programme was carried out in three villages (Donisthorpe, Oakthorpe and North Kilworth) in NWL and Harborough. The monitoring was funded through a grant funded project awarded to NWL and Harborough District Councils, to support work to increase public awareness of the air quality impacts of solid-fuel burning. This report provides an overview of the monitoring results, to try to identify any quantified evidence of domestic solid fuel burning in the three villages.

Detailed statistical analysis of the monitoring results has not identified any clear influences from solid fuel burning in the vicinity of the any of the monitors. The plots produced seem to show periods of higher concentrations, at times, during colder temperatures, during the evening and over the weekend, which could be interpreted as times when residents are more likely to be burning solid fuel, however variations in PM2.5 can occur for multiple reasons, due to source, meteorology, chemistry or measurement method; in the absence of a clear signal from the monitoring data and its subsequent analysis, it is concluded that data are not clear enough to draw a conclusion as to what is driving these elevated concentrations.

The full report is attached as

- Appendix C1 Domestic Fuel Burning.

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

This section sets out the monitoring undertaken within 2023 by Harborough District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Harborough District Council undertook automatic (continuous) monitoring at 1 site using a reference monitor and 2 sites using a low-cost zephyr monitor during 2023. Table A 1 – Details of Automatic Monitoring Sites in Appendix A shows the details of the automatic monitoring sites.

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

Harborough District Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 34 sites during 2023. Table A 2– Details of Non-Automatic Monitoring Sites in Appendix A presents the details of the non-automatic sites.

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

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 – Annual Mean NO2 Monitoring Results: Automatic Monitoring (µg/m3) and Table A 4 – Annual Mean NO2 Monitoring Results: Non-Automatic Monitoring (µg/m3) 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 (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2023 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 – 1-Hour Mean NO2 Monitoring Results, Number of 1-Hour Means > 200µg/m3 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.

3.2.1.1Lutterworth

There are 10 long term diffusion tube monitoring locations in and around the Lutterworth AQMA. All locations were significantly below the annual mean air quality standard for NO_2. Trends for the monitoring locations in and around the AQMA are shown in Figure A. 1 – Trends in Annual Mean NO2 Concentrations in Lutterworth. This is the 6th year that the air quality standard has been achieved however,

- results were substantially lower in 2020 and 2021 than in previous years this is likely still a result of the COVID19.
- Results in 2021 were slightly higher than in 2020 but still generally lower than 2018/19
- Results for 5 location in 2023 where slightly higher than in 2022 but were still substantially lower than in 2018.

Where AQMA have shown compliance for several years and the local authority is confident that the AQMA is compliant the AQMA should be revoked inline with the LAQM policy and technical guidance.

3.2.1.2The Kibworths

There are 10 long term diffusion tube monitoring locations within the Kibworths. During 2023 all locations were below the Annual mean Air quality Standard for NO_2, however location 34n did exceed 36µg.m^{-3}.

Trends for the monitoring locations in and around the AQMA are shown in Figure A. 2 – Trends in Annual Mean NO2 Concentrations in The Kibworths

The automatic monitor and the Zephyr low cost monitor did not detect any exceedances of either the hourly or annual mean air quality objectives for NO_2.

3.2.1.3Market Harborough

There are 5 long term diffusion tube monitoring locations within Market Harborough, all locations were below the annual mean air quality standard for NO_2. Trends for the monitoring locations are shown in Figure A. 3 – Trends in Annual Mean NO2 Concentrations in Market Harborough

3.2.1.4A5

There are 2 long term diffusion tube monitoring locations along the A5, both were below the annual mean air quality standard for NO_2. Trends for the monitoring locations are shown in Figure A. 4 – Trends in Annual Mean NO2 Concentrations in A5

3.2.1.5Broughton Astley

There are 2 long term diffusion tube monitoring locations within Broughton Astley, both locations were below the annual mean air quality standard for NO_2. Trends for the monitoring locations are shown in Figure A. 5 – Trends in Annual Mean NO2 Concentrations in Broughton Astley

3.2.1.6Theddingworth

There are 2 long term diffusion tube monitoring locations in Theddingworth both were below the annual mean air quality standard for NO_2. Trends for the monitoring locations are shown in Figure A. 6 – Trends in Annual Mean NO2 Concentrations in Theddingworth

3.2.1.7Bushby, Fleckney & Walcote

3 other locations have been monitored Walcote (45n) Fleckney (50n) and Bushby (51n) all locations recorded concentrations below the Annual mean air quality objective for NO_2. Trends for the monitoring locations are shown in Figure A. 7 – Trends in Annual Mean NO2 Concentrations in other locations

The zephyr (Z3) located in North Kilworth did not detect an exceedence of the annual mean air quality standard for NO_2.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in 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.

3.2.2.1The Kibworths

The zephyr low cost analyser has been located in Kibworth did not detect an exceedance of the Annual mean air quality objective for PM_{10} and no exceedances of the daily mean air quality objective for PM_{10} were detected.

3.2.2.2North Kilworth

A zephyr low cost analyser has been located in North Kilworth did not detect an exceedance of the Annual mean air quality objective for PM_{10} and no exceedances of the daily mean air quality objective for PM_{10} were detected.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

3.2.3.1The Kibworths

The zephyr low cost analyser has been located in Kibworth did not detect an exceedance of the Annual mean air quality objective for $PM_{2.5}$

3.2.3.2North Kilworth

A zephyr low cost analyser has been located in North Kilworth did not detect an exceedance of the Annual mean air quality objective for $PM_{2.5}$

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)
A1	Kibworth	Roadside	468114	294353	NO_2	yes Kibworth	chemiluminesence	9	2.5	1.8
Z2	Kibworth	Roadside	468309	294352	NO_2 $PM_{2.5}$ PM_{10}	yes Kibworth	Zephyr	0	1.4	2.5
Z3	North Kilworth	Rural	461675	283303	NO_2 $PM_{2.5}$ PM_{10}	No	Zephyr			2

Notes:

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

(2) N/A if not applicable

Table A 2– Details of Non-Automatic Monitoring Sites

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)
NA S02	Lut. Service Shop	Roadside	454475	284560	NO2	Lutterworth	0.0	4.2		2.0
NA S10	Day Nursery	Roadside	454539	284932	NO2		9.0	1.3		2.0
NA S11	A6 Kibworth	Roadside	468425	294314	NO2	Kibworth	10.7	1.3		2.0
NA S17	Jazz Hair	Roadside	454443	284348	NO2	Lutterworth	0.0	3.0		2.0
NA S09	77 leicester road	Roadside	454533	284872	NO2		0.0	13.5		2.0
NA S01	6 The Terrace Rugby Road	Roadside	454428	284274	NO2	Lutterworth	0.0	2.5		2.0
NA S04	regent court	Roadside	454410	284326	NO2	Lutterworth	2.0	1.0		2.0
NA S05	26 Market Street Lutterworth	Roadside	454497	284618	NO2	Lutterworth	1.6	4.8		2.0
NA S13	24 Rugby Road Lutterworth	Roadside	454432	284229	NO2		0.0	2.0		2.0
NA S07	17 Rugby road Lutterworth	Roadside	454476	284178	NO2		3.7	5.2		2.0
NA S18	Spencerdene main street theddingworth	Roadside	466535	285545	NO2		1.2	0.2		2.0
NA S06	Homeside main street Theddingworth	Roadside	466651	285607	NO2		0.2	1.4		2.0

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)
NA S03	40 regent street lutterworth	Roadside	466651	285607	NO2		0.2	1.4		2.0
NA S08	69 leicester road Kibworth	Roadside	467933	294660	NO2	Kibworth	3.5	4.0		2.0
NA S19	Alma House, Watling Street Claybrooke Parva	Roadside	448065	287719	NO2		0.0	7.0		2.0
NA S20	sign post outside White House Farm Watling street	Roadside	448948	286554	NO2		14.0	1.0		2.0
NA S14	sign outside 64 Leicester Road Kibworth	Roadside	468143	294351	NO2	Kibworth	0.5	2.3		2.0
NA S12	lamppost outside 78 leicester road kibworth	Roadside	468022	294450	NO2	Kibworth	3.1	6.4		2.0
NA S15	signpost just north of 11 Leicester road Kibworth	Roadside	468309	294352	NO2	Kibworth	0.0	1.4		2.0
NA S16	pizza Express st marys road	Roadside	473749	287214	NO2		0.0	1.4		2.0
NA S21	coach and horse kibworth	Roadside	468403	294298	NO2	Kibworth	2.2	2.5		2.0
NA S22	lamppost 29 church road kibworth	Roadside	468412	294218	NO2		10.2	2.0		2.0
NA S23	106 main street kibworth	Roadside	468027	294570	NO2		0.0	1.7		2.0

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)
NA S24	lampost outside 52 Leicester Road	Roadside	468982	293824	NO2	Kibworth	9.0	2.2		2.0
NA S25	road sign on leicester road, rear of 9 Milestone Close	Roadside	469037	293796	NO2		12.0	2.0		2.0
NA S26	3 dunton road BA	Roadside	453583	292002	NO2		2.9	1.5		2.0
NA S27	16 Main Street, BA (on wooden pole outside the shop)	Roadside	453625	291935	NO2		2.0	0.2		2.0
NA S28	lampost est of 5 Lutterworth road Walcote	Roadside	456575	283605	NO2		3.0	0.2		2.0
NA S29	sw junction welland park road and northamton road MH	Roadside	473596	286821	NO2		14.0	2.3		2.0
NA S30	53 northamton road MH	Roadside	473598	286851	NO2		9.0	1.0		2.0
NA S31	7 leicester road MH	Roadside	473172	287534	NO2		2.6	2.9		2.0
NA S32	lamppost outside 12 Springfield Street MH	Roadside	473678	286931	NO2		2.1	1.9		2.0
NA S33	lamppost carpark adj Fleckney Fish bar, High street	Roadside	464971	293501	NO2		0.1	2.0		2.0

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)
NA S34	lamppost outside thurnby memorial hall, main street, bushby	Roadside	464773	303914	NO2		1.6	3.8		2.0

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
A1	468114	294353	Roadside	99.9	99.9	**43.97**	30.64	32.22	31	29
Z2	468309	294352	Roadside	99.2	99.2		34.47	35.01	17.5	16.1
Z3	461675	283303	Rural	95.7	95.7				4.2	3.23

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

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

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023**

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

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
NA S02	454475	284560	Roadside		98.1	37.9	29.2	31.7	31.9	30.7
NA S10	454539	284932	Roadside		64.6	**41.8**	21.6	22.9	17.9	17.2
NA S11	468425	294314	Roadside		98.1	29.4	20.7	22.7	22.7	21.2
NA S17	454443	284348	Roadside		98.1	34.0	26.1	28.4	29.8	28.2
NA S09	454533	284872	Roadside		98.1	18.3	14.3	14.6	13.8	13.2
NA S01	454428	284274	Roadside		89.6	25.3	19.9	23.3	22.8	21.7
NA S04	454410	284326	Roadside		98.1	32.8	26.7	28.8	27.5	26.7
NA S05	454497	284618	Roadside		98.1	29.7	23.6	24.3	24.5	23.0
NA S13	454432	284229	Roadside		98.1	30.2	25.2	26.2	24.4	24.3
NA S07	454476	284178	Roadside		90.9	24.4	21.0	23.8	22.9	23.0
NA S18	466535	285545	Roadside		98.1	17.5	14.5	12.2	12.8	13.0
NA S06	466651	285607	Roadside		98.1	21.6	14.6	17.7	17.3	15.5
NA S03	466651	285607	Roadside		89.6	17.6	12.7	14.1	16.7	15.4

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 2023 (%) [2]	2019	2020	2021	2022	2023
NA S08	467933	294660	Roadside		87.9	28.6	23.6	25.2	23.1	23.9
NA S19	448065	287719	Roadside		72.0	23.9	18.8	20.6	17.3	19.1
NA S20	448948	286554	Roadside		98.1	21.9	16.4	17.8	18.0	17.1
NA S14	468143	294351	Roadside		98.1	**52.0**	37.6	38.0	39.6	37.0
NA S12	468022	294450	Roadside		98.1	38.5	26.2	30.7	29.6	28.3
NA S15	468309	294352	Roadside		98.1	34.5	24.8	26.8	27.9	27.7
NA S16	473749	287214	Roadside		98.1	27.7	20.3	20.7	20.9	20.1
NA S21	468403	294298	Roadside		98.1	19.8	15.0	15.3	16.7	14.3
NA S22	468412	294218	Roadside		98.1	17.7	13.9	14.9	14.3	13.9
NA S23	468027	294570	Roadside		98.1	21.1	16.1	16.3	15.8	16.4
NA S24	468982	293824	Roadside		98.1	19.3	13.4	14.9	15.4	13.8
NA S25	469037	293796	Roadside		82.1	21.6	15.3	16.8	16.1	17.4
NA S26	453583	292002	Roadside		89.8	19.1	15.4	18.4	18.0	17.5
NA S27	453625	291935	Roadside		71.7	18.1	13.0	13.3	12.5	16.3

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 2023 (%) (2)	2019	2020	2021	2022	2023
NA S28	456575	283605	Roadside		98.1	31.4	22.0	24.1	26.5	12.6
NA S29	473596	286821	Roadside		87.9	27.0	21.9	25.9	24.6	25.1
NA S30	473598	286851	Roadside		98.1	26.1	18.5	22.4	21.3	23.0
NA S31	473172	287534	Roadside		98.1	26.0	17.9	22.8	20.9	20.9
NA S32	473678	286931	Roadside		67.6		12.8	14.9	13.8	18.8
NA S33	464971	293501	Roadside		64.8		10.3	11.8	13.1	12.8
NA S34	464773	303914	Roadside		82.7			17.7	15.2	12.2

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

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

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

Notes:

The annual mean concentrations are presented as 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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A. 1 – Trends in Annual Mean NO2 Concentrations in Lutterworth

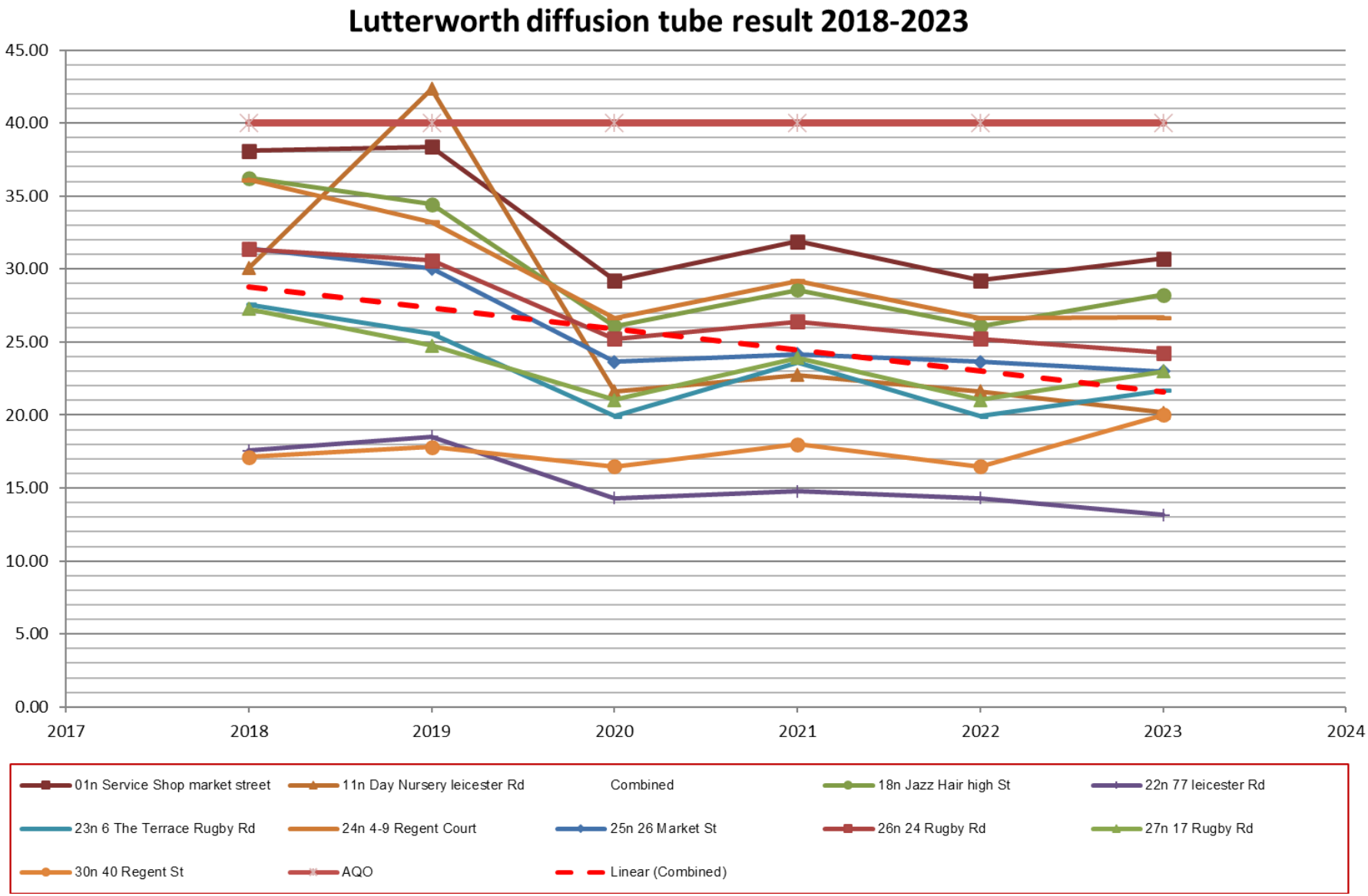


Figure A. 2 – Trends in Annual Mean NO2 Concentrations in The Kibworths

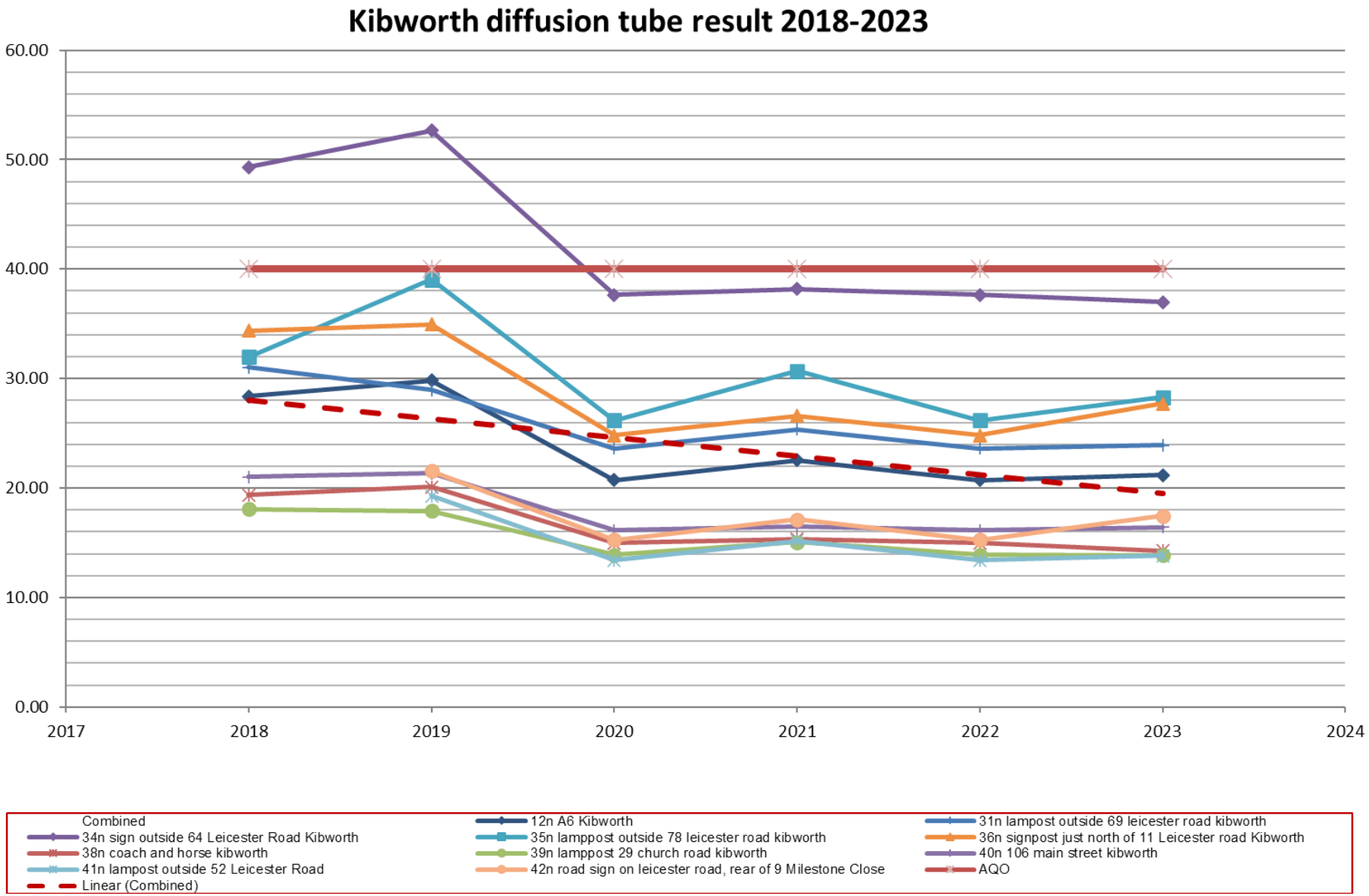


Figure A. 3 – Trends in Annual Mean NO2 Concentrations in Market Harborough

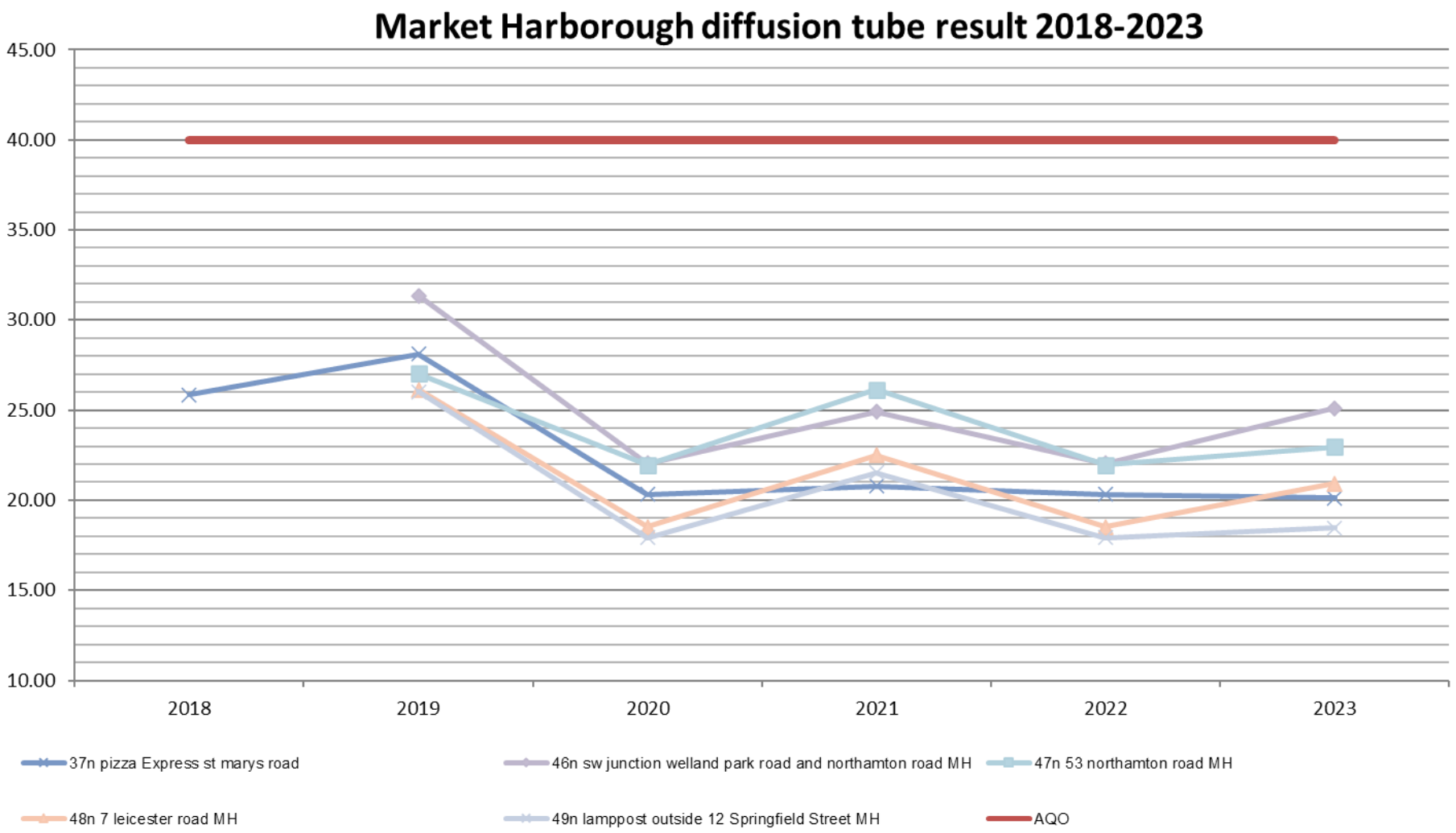


Figure A. 4 – Trends in Annual Mean NO2 Concentrations in A5

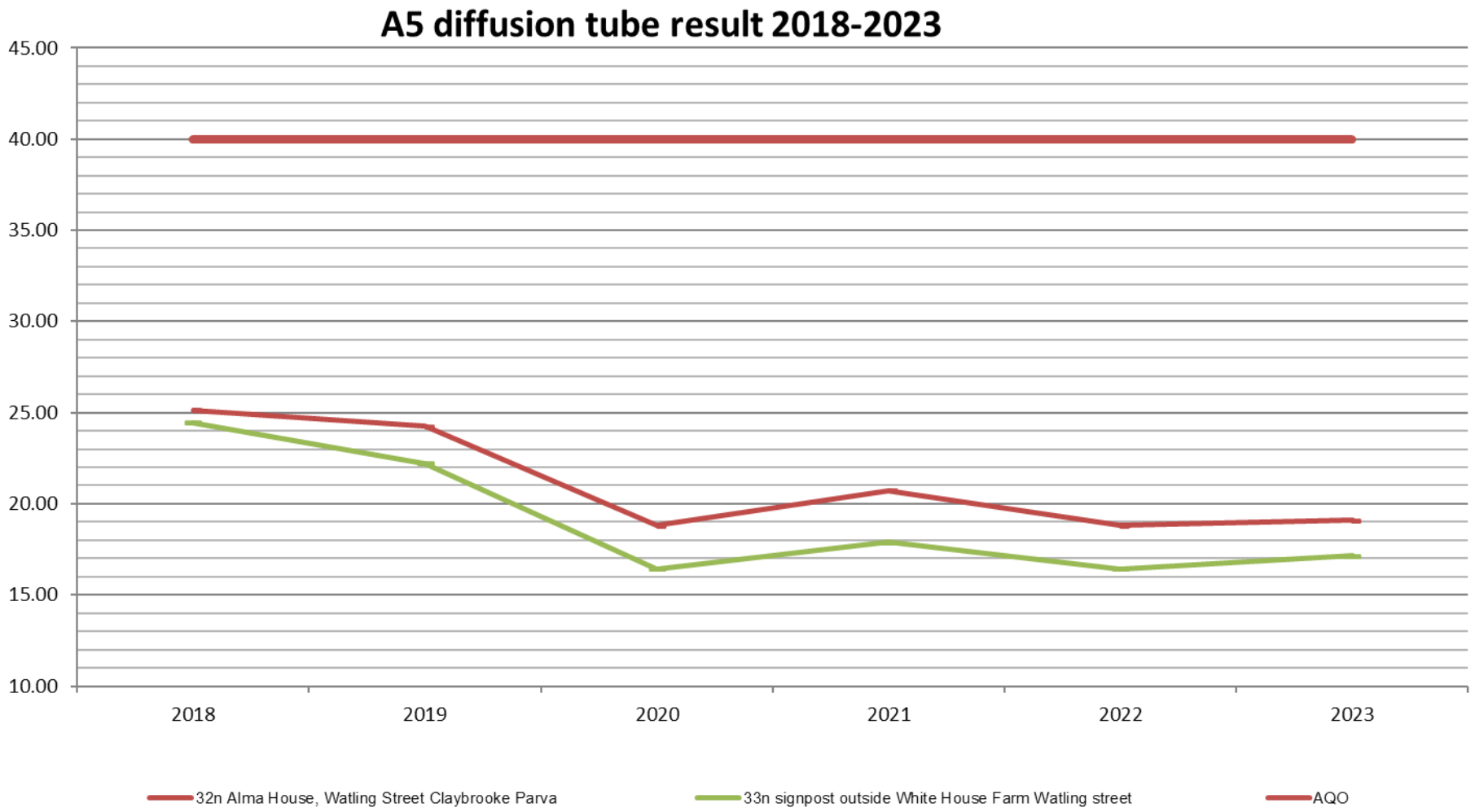


Figure A. 5 – Trends in Annual Mean NO2 Concentrations in Broughton Astley

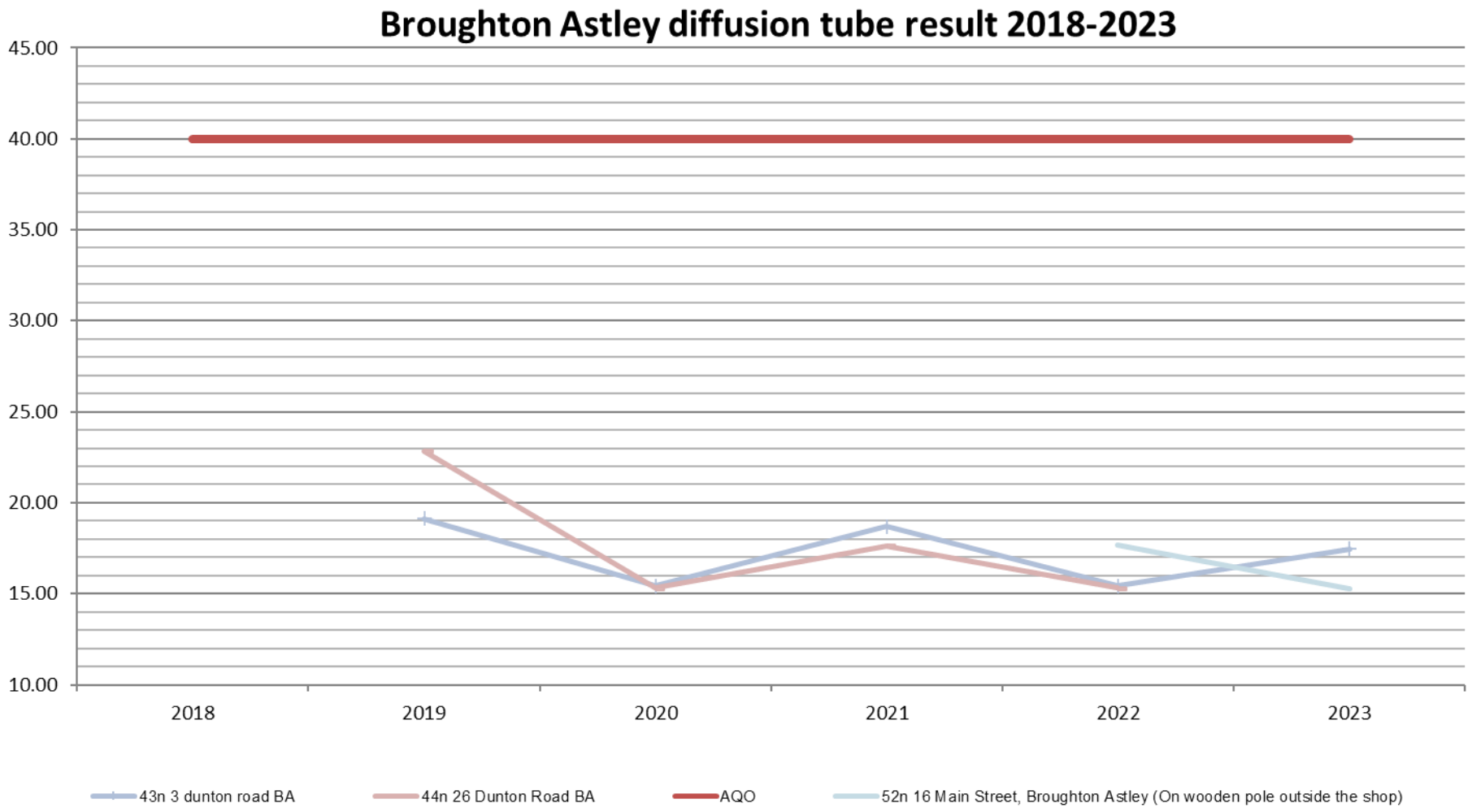


Figure A. 6 – Trends in Annual Mean NO2 Concentrations in Theddingworth

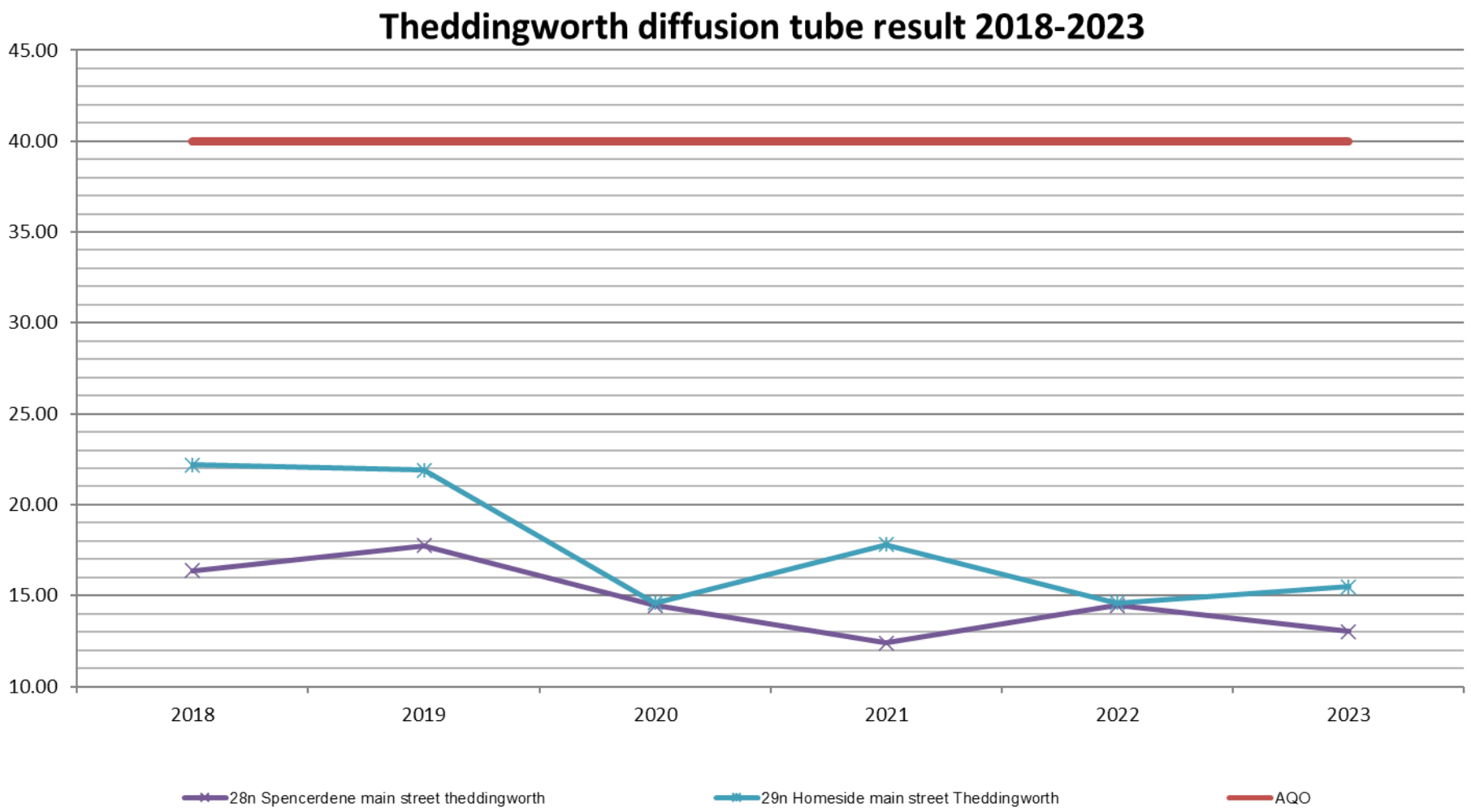


Figure A. 7 – Trends in Annual Mean NO2 Concentrations in other locations

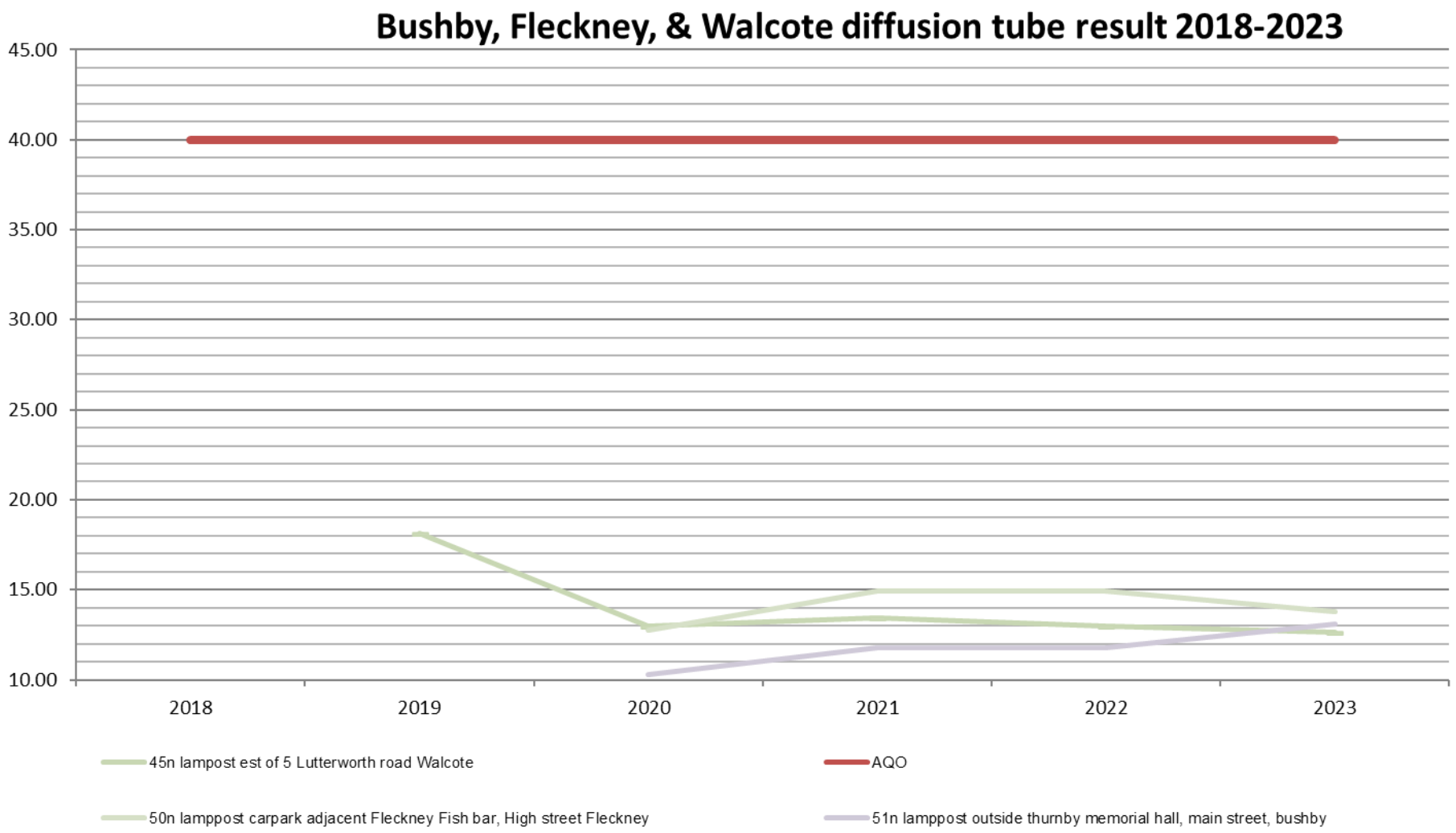


Table A 5 – 1-Hour Mean NO2 Monitoring Results, Number of 1-Hour Means > 200µg/m3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
A1	468114	294353	Roadside	99.9	99.9	0	0	0	0	0
Z2	468309	294352	Roadside	99.2	99.2		**3 (153)**	0	0	0
Z3	461675	283303	Rural	95.7	95.7				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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

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 2023 (%) (2)	2019	2020	2021	2022	2023
Z2	468309	294352	Roadside	99.03	99.03		**16.2**	**9.18**	**12.4**	**11.36**
Z3	461675	283303	Rural	95.65	95.65				11.7	10.26

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (confirm by selecting in box).**

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

Figure A. 8 – Trends in Annual Mean PM10 Concentrations

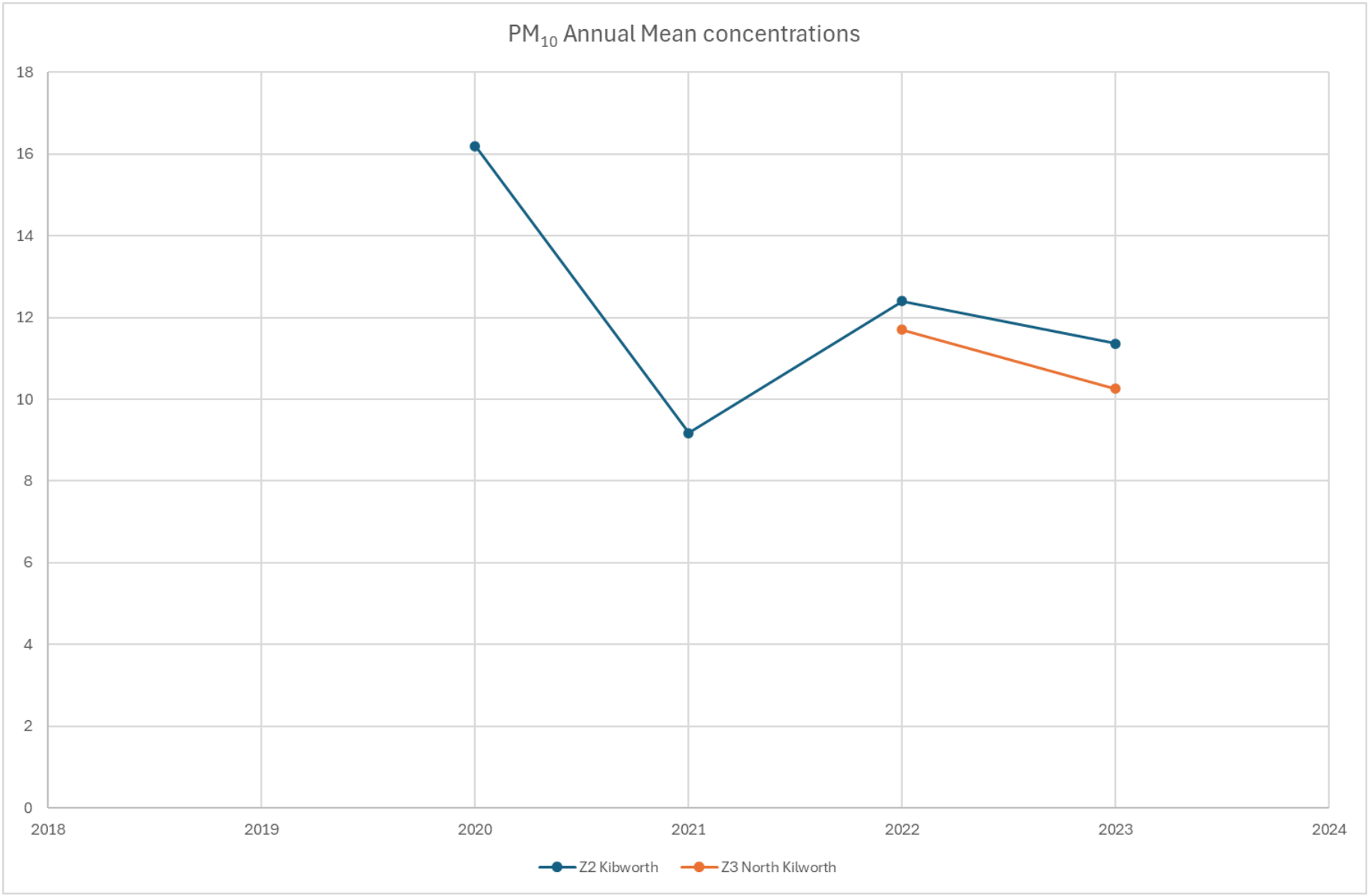


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
Z2	468309	294352	Roadside	99.03	99.03		**0 (20.63)**	0	**0 (20.5)**	0
Z3	461675	283303	Rural	95.65	95.65				**0 (23.2)**	0

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

Table A.8 – Annual Mean $PM_{2.5}$ 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 2023 (%) (2)	2019	2020	2021	2022	2023
Z2	468309	294352	Roadside	99.03%	99.03%		9.21	6.82	11.5	10.36
Z3	461675	283303	Rural	95.65%	95.65%				10.07	9.35

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

Notes:

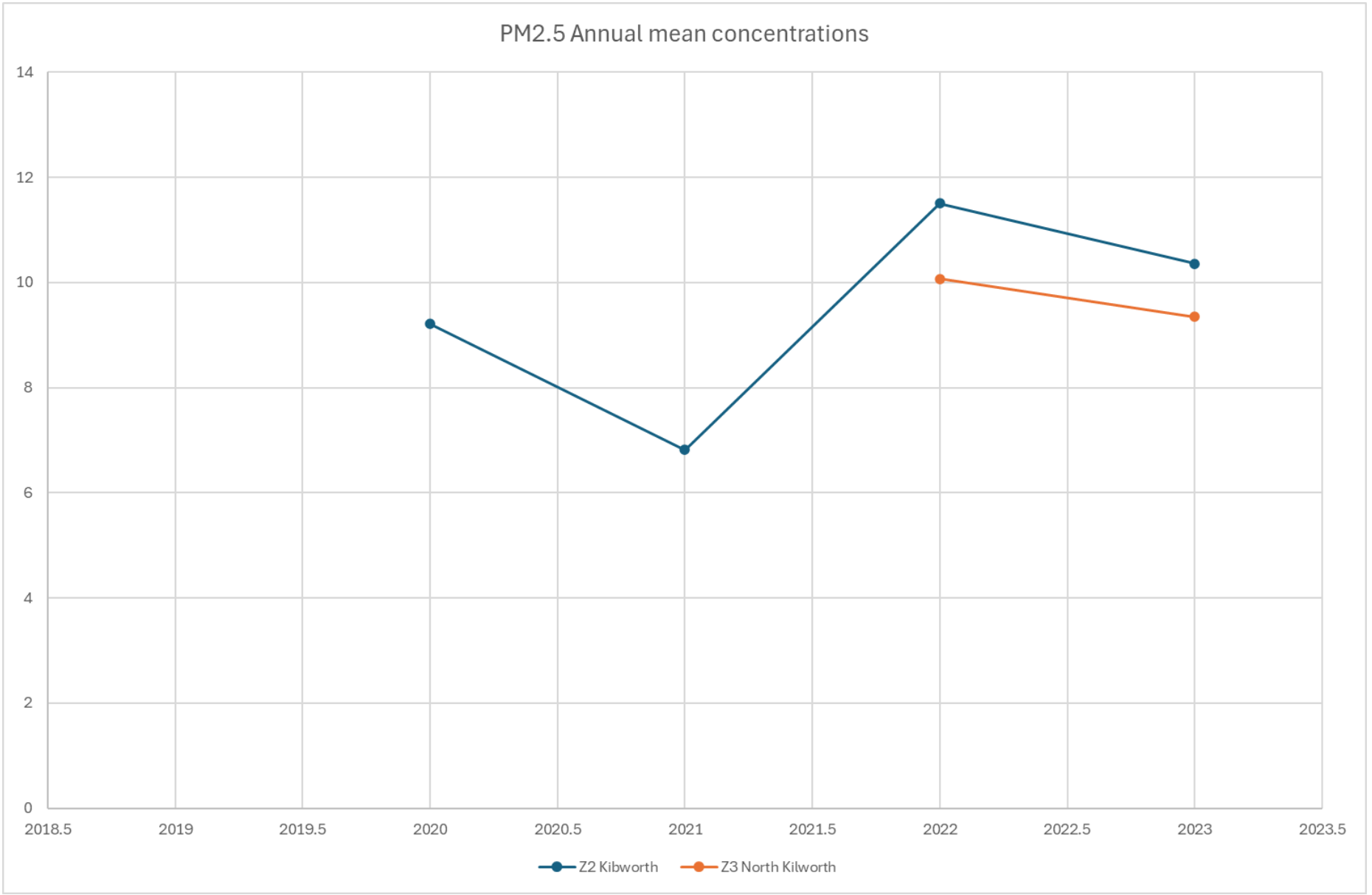
The annual mean concentrations are presented as $\mu g/m^3$.

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

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

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

Figure A. 9 – Trends in Annual Mean PM2.5 Concentrations



Appendix B. Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
01n	454475	284560	52.4	39.4	39.6	37.1	37.9	42.7	41.7	38.6	37.6	35.6	42.2	33.7	39.9	30.7	-	
11n	454539	284932	32.6	21.9	33.3	25.0					26.3	25.6	26.7	18.0	26.2	17.2	-	
12n	468425	294314	34.7	30.0	26.6	22.9	25.0	25.6	26.8	23.6	23.4	28.8	36.9	25.7	27.5	21.2	-	
18n	454443	284348	48.9	30.7	50.7	40.3	26.6	33.5	35.8	43.0	33.5	35.1	38.8	23.1	36.7	28.2	-	
22n	454533	284872	18.5	18.8	19.6	16.1	14.8	14.7	16.0	16.5	16.3	18.3	21.7	13.9	17.1	13.2	-	
23n	454428	284274	32.3	24.6	33.8	35.6		24.2	20.7	32.3	26.4	27.1	29.1	23.7	28.2	21.7	-	
24n	454410	284326	50.6	25.6	42.2	29.2	29.4	32.6	33.4	41.4	31.7	30.3	40.7	28.7	34.7	26.7	-	
25n	454497	284618	41.0	30.6	38.8	33.5	16.3	27.4	27.1	34.6	29.7	27.9	28.7	22.5	29.8	23.0	-	
26n	454432	284229	46.8	40.6	37.5	17.5	30.4	33.1	31.1	26.2	27.2	28.2	32.2	27.3	31.5	24.3	-	
27n	454476	284178	37.1	27.9	36.5	28.8	24.0		26.3	29.7	30.2	27.4	34.0	26.5	29.9	23.0	-	
28n	466535	285545	23.1	15.5	18.2	13.8	14.8	14.2	14.1	14.5	19.9	23.1	14.9	16.8	16.9	13.0	-	
29n	466651	285607	34.5	23.8	22.5	21.0	17.2	16.5	18.3	22.2	16.3	16.4	21.3	11.4	20.1	15.5	-	
30n	466651	285607	28.7	18.6	27.6	31.3		14.5	12.5	16.2	16.8	18.7	17.2	18.0	20.0	15.4	-	
31n	467933	294660	49.8	25.3	32.9	32.0	24.3	23.4	26.7		29.6	34.8	37.8	25.0	31.1	23.9	-	
32n	448065	287719	34.5	21.0	30.3	24.0	22.1	18.9			21.6		34.0	16.8	24.8	19.1	-	
33n	448948	286554	33.7	21.7	26.3	18.8	18.3	19.0	21.7	19.7	19.1	22.4	24.9	21.6	22.3	17.1	-	
34n	468143	294351	62.3	56.4	50.5	44.6	47.9	52.3	49.6	49.7	52.0	51.9	41.2	18.1	48.0	37.0	35.6	
35n	468022	294450	55.5	39.7	43.2	36.6	37.6	40.7	40.3	14.7	36.4	32.6	35.8	28.0	36.8	28.3	-	
36n	468309	294352	43.6	32.6	43.9	33.5	31.9	34.8	32.9	32.8	36.9	37.5	41.5	30.3	36.0	27.7	-	
37n	473749	287214	38.0	27.1	33.5	23.0	22.2	23.4	24.1	20.6	24.3	25.0	28.4	24.1	26.1	20.1	-	
38n	468403	294298	33.2	19.1	26.5	18.6	14.9	22.5	17.1	19.1	15.1	20.9	1.8	13.4	18.5	14.3	-	
39n	468412	294218	28.7	19.9	20.3	17.3	13.5	16.7	14.3	13.1	15.7	19.5	22.1	15.2	18.0	13.9	-	
40n	468027	294570	18.4	23.6	19.0	15.8	17.6	17.3	16.6	37.2	20.4	22.7	26.3	21.1	21.3	16.4	-	
41n	468982	293824	28.9	21.9	27.0	15.6	13.7	13.9	14.7	17.4	18.3	17.7	13.7	12.8	18.0	13.8	-	
42n	469037	293796	32.2		32.2	20.3		17.8	18.4	22.8	17.6	21.5	27.1	16.6	22.7	17.4	-	
43n	453583	292002	35.1	25.7	30.1	21.5	18.4	15.9	17.4	20.8	18.6		28.8	17.1	22.7	17.5	-	
44n	453625	291935	31.4	20.0	27.2	15.6		26.0			15.0	19.2	20.3	15.6	21.1	16.3	-	

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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
45n	456575	283605	20.0	18.0	19.9	10.2	14.9	14.1	15.0	12.9	16.7	17.9	19.2	18.1	16.4	12.6	-	
46n	473596	286821	48.6	34.6	36.8	28.0	29.5	32.3	33.4		31.4	32.4	24.7	27.0	32.6	25.1	-	
47n	473598	286851	40.3	29.7	43.1	33.1	27.6	26.1	28.8	33.1	24.8	24.2	27.7	19.3	29.8	23.0	-	
48n	473172	287534	38.4	22.6	37.7	29.8	23.6	15.8	23.8	25.8	24.3	28.6	37.1	18.7	27.2	20.9	-	
49n	473678	286931		25.5	29.5		21.4	20.7	23.5	29.6			20.8	20.7	24.0	18.8	-	
50n	464971	293501		17.1	24.6	15.4	13.0	12.9	14.2				20.6	15.6	16.7	12.8	-	
51n	464773	303914	36.3	20.1	16.6	12.6	10.7	9.3	11.2	10.5			14.8	16.0	15.8	12.2	-	

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

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **Harborough District Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry Syste.**

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 Harborough District During 2023

Harborough District Council has not identified any new sources relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by Harborough District Council During 2023

The council in partnership with North West Leicestershire District Council undertook a DEFAR funded regarding the impacts of solid fuel burning on PM2.5 . the full report is attached as

- appendix C1 Domestic Solid-fuel burning

QA/QC of Diffusion Tube Monitoring

The supplier used for diffusion tubes within 2023 was Socotec (Didcote) and the method of preparation was 50% TEA in acetone.

Socotecs QA/QC data is attached as appendix C2 NO2 Diffusion Tube Information 2023

Monitoring has been completed in adherence with the 2023 Diffusion Tube Monitoring Calendar

The Full Diffusion tube Data processing tool v4.0 is attached at appendix C3

Diffusion Tube Annualisation

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

Site ID	Annualisation Factor Leamington Spa	Annualisation Factor Leicester University	Annualisation Factor Northampton Spring Park	Annualisation Factor Nottingham Centre	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
11n	0.8229	0.8773	0.8385	0.8806	0.8548	26.2	22.4
32n	0.9022	0.9258	0.9393	0.9442	0.9279	24.8	-
44n	0.8635	0.9048	0.8764	0.9171	0.8904	21.1	-
49n	1.0430	1.0053	1.0364	0.9963	1.0202	24.0	24.4
50n	0.9955	0.9931	1.0281	0.9722	0.9972	16.7	16.6

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 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.

Harborough District Council have applied a national bias adjustment factor 0.77 to the 2023 monitoring data. A summary of bias adjustment factors used by Harborough District Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.77
2022	National	03/23	0.76
2021	National	03/22-	0.78
2020	National	03/21-	0.77
2019	National	03/20	0.75

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.

Table C.3 – Non-Automatic NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
34n	2.3	2.8	37.0	7.8	35.6	

QA/QC of Automatic Monitoring

Please see the following attachments for QA/QC of automatic monitoring data

- Appendix C5a Kibworth A6 Air Quality Data Ratification for 2023 and the LAQM Statistics
- Appendix C5b Kibworth A6 2023
- Appendix C5c AQDM QAQC Procedures

Zephyr Monitoring data QA/QC is handled by the equipment manufacturer EarthSense. Zephyr data is attached as

- appendix C6

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

The type of PM10/PM2.5 monitor(s) utilised within Harborough District Council do not required the application of a correction factor

Automatic Monitoring Annualisation

All automatic monitoring locations within Harborough District recorded data capture of greater than 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.

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, automatic annual mean NO_2 concentrations corrected for distance are presented in Table A.3.

No automatic NO_2 monitoring locations within Harborough District required distance correction during 2023.

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

Figure D.1 – Map of Non-Automatic Monitoring Site

See attached

Appendix E. Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/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
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
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
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
SO_2	Sulphur Dioxide

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.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.