



# DISTRICT OF HARBOROUGH

## 2023 Air Quality Annual Status Report (ASR)

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

Date: June, 2023

Information	Harborough District Council Details
<b>Local Authority Officer</b>	Gareth Rees
<b>Department</b>	Regulatory Services
<b>Address</b>	Council Offices The Symington Building Adam and Eve Street Market Harborough Leicestershire LE16 7AG
<b>Telephone</b>	01858 828282
<b>E-mail</b>	airquality@harborough.gov.uk
<b>Report Reference Number</b>	ASR_HDC_2023v1.4
<b>Date</b>	June 2023 amended December 2023

## Executive Summary: Air Quality in Our Area

### Air Quality in Harborough District Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas<sup>1,2</sup>.

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

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<sub>2</sub>). 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](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<sub>2</sub>). 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](https://www.harborough.gov.uk/info/20025/environmental_health/101/air_quality/2)

---

<sup>1</sup> Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, January 2023

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

## 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 Department for Environment, Food and Rural Affairs ('DEFRA') has produced an Environmental Improvement Plan<sup>5</sup> which sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM<sub>2.5</sub> 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<sub>2.5</sub> in their areas. The Road to Zero<sup>6</sup> details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

During 2022 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<sub>2.5</sub> 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.

## Conclusions and Priorities

The ASR concludes that:

- there are no new areas likely to be exceeding air quality objectives.

---

<sup>5</sup> Defra. Environmental Improvement Plan 2023, January 2023

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

In 2023 the council plans to:

- Continue to monitor in Lutterworth to show that the Air Quality Standard (AQS) for NO<sub>2</sub> continues to be met.
- Complete and monitoring and evaluation of the DEFRA grant project on impacts of solid fuel burning.
- Participate in Clean Air Day 2023

## 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](http://www.harborough.gov.uk/info/20025/environmental_health/101/air_pollution)
- DEFRA's UK-AIR: Air Information Resource website  
<https://uk-air.defra.gov.uk/>
- DEFRA's 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:

- List officers/departments involved in the preparation of the ASR

This ASR has been approved by:

Clare Pattinson, Director Of Law And Governance (Interim)



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:

Address	Council Offices The Symington Building Adam and Eve Street Market Harborough Leicestershire LE16 7AG
Telephone	01858 828282
E-mail	<a href="mailto:airquality@harborough.gov.uk">airquality@harborough.gov.uk</a>

## Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
Air Quality in Harborough District Council .....	i
Actions to Improve Air Quality .....	ii
Conclusions and Priorities.....	ii
Local Engagement and How to get Involved .....	iii
Local Responsibilities and Commitment.....	iii
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
2.1 Air Quality Management Areas .....	2
2.2 Progress and Impact of Measures to address Air Quality in Harborough District Council .....	4
2.2.1 Lutterworth AQMA .....	5
2.2.2 Kibworth AQMA .....	5
2.3 PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations .....	9
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>11</b>
3.1 Summary of Monitoring Undertaken.....	11
3.1.1 Automatic Monitoring Sites .....	11
3.1.2 Non-Automatic Monitoring Sites .....	11
3.2 Individual Pollutants .....	11
3.2.1 Nitrogen Dioxide (NO <sub>2</sub> ) .....	12
3.2.2 Particulate Matter (PM <sub>10</sub> ) .....	13
3.2.3 Particulate Matter (PM <sub>2.5</sub> ).....	14
<b>Appendix A: Monitoring Results</b> .....	<b>15</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2022</b> .....	<b>36</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> .....	<b>39</b>
New or Changed Sources Identified Within Harborough District Council During 2022.....	39
Additional Air Quality Works Undertaken by Harborough District Council During 2022 .....	39
QA/QC of Diffusion Tube Monitoring.....	39
Diffusion Tube Annualisation .....	39
Diffusion Tube Bias Adjustment Factors.....	40
NO <sub>2</sub> Fall-off with Distance from the Road .....	41
QA/QC of Automatic Monitoring .....	41
PM <sub>10</sub> and PM <sub>2.5</sub> Monitoring Adjustment .....	41
Automatic Monitoring Annualisation.....	41
NO <sub>2</sub> Fall-off with Distance from the Road .....	42
<b>Appendix D: Map(s) of Monitoring Locations and AQMAs</b> .....	<b>43</b>

<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>44</b>
<b>Glossary of Terms</b> .....	<b>45</b>
<b>References</b> .....	<b>46</b>



## Figures

Figure A.1 – The Kibworth Trends in Annual Mean NO <sub>2</sub> Concentrations.....	25
Figure A.2 – Lutterworth Trends in Annual Mean NO <sub>2</sub> Concentrations.....	26
Figure A.3 – Theddingworth Trends in Annual Mean NO <sub>2</sub> Concentrations.....	27
Figure A.4 – A5 Trends in Annual Mean NO <sub>2</sub> Concentrations.....	28
Figure A.5 – Market Harborough Trends in Annual Mean NO <sub>2</sub> Concentrations.....	29
Figure A.6 – Broughton Astley Trends in Annual Mean NO <sub>2</sub> Concentrations.....	30
Figure A.7 – Other Trends in Annual Mean NO <sub>2</sub> Concentrations.....	31
Figure D.1 – Map of Non-Automatic Monitoring Site.....	43

## Tables

Table 2.1 – Declared Air Quality Management Areas.....	3
Table 2.2 – Progress on Measures to Improve Air Quality.....	7
Table A.1 – Details of Automatic Monitoring Sites.....	15
Table A.2 – Details of Non-Automatic Monitoring Sites.....	16
Table A.3 – Annual Mean NO <sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m <sup>3</sup> ).....	20
Table A.4 – Annual Mean NO <sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m <sup>3</sup> )....	21
Table A.5 – 1-Hour Mean NO <sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m <sup>3</sup> .....	32
Table A.6 – Annual Mean PM <sub>10</sub> Monitoring Results (µg/m <sup>3</sup> ).....	33
Table A.7 – 24-Hour Mean PM <sub>10</sub> Monitoring Results, Number of PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> .....	34
Table A.8 – Annual Mean PM <sub>2.5</sub> Monitoring Results (µg/m <sup>3</sup> ).....	35
Table B.1 – NO <sub>2</sub> 2022 Diffusion Tube Results (µg/m <sup>3</sup> ).....	36
Table C.1 – Annualisation Summary (concentrations presented in µg/m <sup>3</sup> ).....	40
Table C.2 – Bias Adjustment Factor.....	40
Table C.3 – NO <sub>2</sub> Fall off With Distance Calculations (concentrations presented in µg/m <sup>3</sup> )	41
Table E.1 – Air Quality Objectives in England.....	44

# 1 Local Air Quality Management

This report provides an overview of air quality in Harborough 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 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. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of the 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<sub>2</sub> 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
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	<a href="http://www.harborough.gov.uk/download/downloads/id/145/lutterworth_air_quality_action_plan.pdf">http://www.harborough.gov.uk/download/downloads/id/145/lutterworth_air_quality_action_plan.pdf</a>
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	<a href="http://www.harborough.gov.uk/download/downloads/id/5104/2019_kibworth_air_quality_action_plan.pdf">http://www.harborough.gov.uk/download/downloads/id/5104/2019_kibworth_air_quality_action_plan.pdf</a>

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.

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

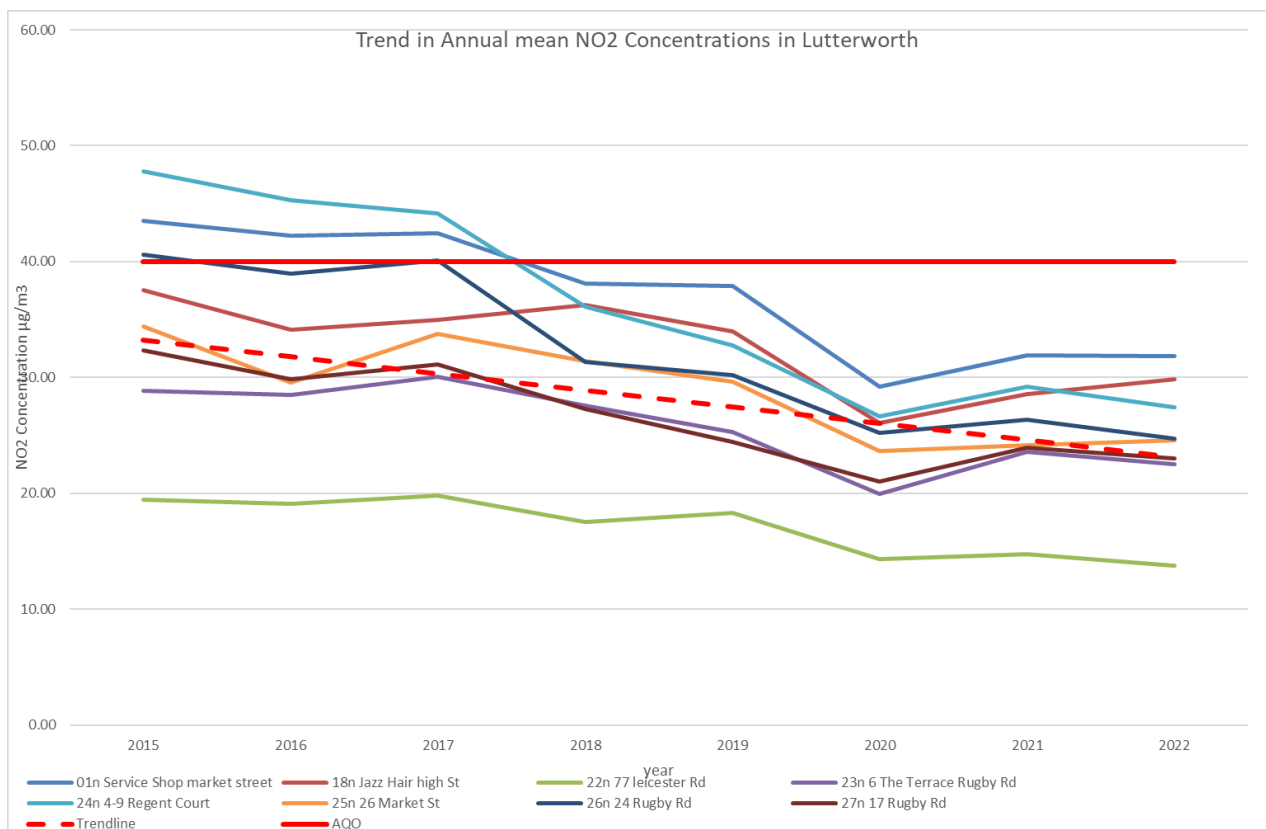
Defra's appraisal of last year's ASR concluded:

1. Figure D shows the map of all of the monitoring locations and the declared AQMA's. This is encouraged for future reports as it allows the reader to see the whole of the monitoring network within the local authority area.
2. Figures A.1 to A.7 clearly shows the results of the monitoring in different locations throughout the local authority area. This is encouraged for future reports as it allows the reader to make comparisons to their area to see if there are any exceedances of the air quality objective.
3. Make sure that all of the AQMA details match the details that are in the portal. In Table 2.1, the data of declaration for AQMA Kibworth is different to that captured on the portal.
4. There are quite a few blank boxes within Table 2.2 which should be avoided where possible in future reports so that there is less wasted space. If a box cannot be filled, the box should have a dash in it.
5. For future reports, the choice of chosen bias adjustment factor should be clearly explained so that the reader can be satisfied that the correct bias adjustment factor is being used.
6. The excel file containing the tables filled out as according to the latest ASR report template needs to be provided so that the appraiser can more easily see if the tables have been filled out as according to the latest ASR report template.
7. Please make sure that sections of the report such as who has approved the ASR has been filled out with the correct information and not been left with the template text on how to fill these sections. This will enable the report to be more completed, and make it look more professional.
8. For future reports, it is encouraged to produce figures similarly to Figures A.1 to A.7 that show the results of the monitoring sites in each AQMA area so that the reader can easily see if there are any exceedances of the air quality objective in these areas and if these AQMA areas need to be amended in any way.
9. Future reports should be submitted in a PDF format instead of a Word document format so that it is easier for the reader to read the report.

Harborough District Council 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. 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 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

### 2.2.1 Lutterworth AQMA

Concentrations of NO<sub>2</sub> have been below the Annual Mean air quality Objective for the 5<sup>th</sup> year running since the HGV gating system has been implemented. No specific actions beyond monitoring have been undertaken in Lutterworth.



### 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 .

**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
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	First phase successful, second phase complete. LCC Highways require further evidence of likely reduction before they would be willing to consider implementation
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		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	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<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> 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<sub>2.5</sub>).

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 2<sup>nd</sup> lowest fraction of attributable deaths to particulate air pollution in Leicestershire. (

[https://fingertips.phe.org.uk/search/particulate#page/3/gid/1/pat/502/ati/501/are/E07000131/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/tre-ao-0\\_tre-do-1\\_car-do-0](https://fingertips.phe.org.uk/search/particulate#page/3/gid/1/pat/502/ati/501/are/E07000131/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/tre-ao-0_tre-do-1_car-do-0))

Harborough District Council is not currently taking any specific measures to address PM<sub>2.5</sub>. However the following measures and activities undertaken by Harborough District Council will improve PM<sub>2.5</sub> concentrations:

- Successfully secured grant funding with Harborough District Council to increase the level of knowledge of PM<sub>2.5</sub> and ultimately reduce PM<sub>2.5</sub> emissions by changing behavioural attitudes to solid fuel burning. This project is ongoing and will be concluded the end of 2023. All data will be feedback to DEFRA through the grant evaluation process.
- 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 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

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

This section sets out the monitoring undertaken within 2022 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 2018 and 2022 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 during 2022 and at 2 locations using low cost Zephyr Monitors at 2 locations during 2022. Table A.1 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<sub>2</sub> at 33 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

### 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<sub>2</sub>)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

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

Table A.5 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

#### 3.2.1.1 The Kibworths

There are 10 long term diffusion tube monitoring locations within the Kibworths. During 2022 all locations were below the Annual mean Air quality Standard for NO<sub>2</sub>, however location 34n did exceed 36µg.m<sup>-3</sup>.

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<sub>2</sub>.

#### 3.2.1.2 Lutterworth

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<sub>2</sub>. This is the 5th 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
- 4 locations in 2022 (11n, 18n, 25n and 30n) were higher than in 2021

### 3.2.1.3 Theddingworth

There are 2 long term diffusion tube monitoring locations in Theddingworth both were below the annual mean air quality standard for NO<sub>2</sub>.

### 3.2.1.4 A5

There are 2 long term diffusion tube monitoring locations along the A5, both were below the annual mean air quality standard for NO<sub>2</sub>.

### 3.2.1.5 Market 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<sub>2</sub>.

### 3.2.1.6 Broughton 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<sub>2</sub>.

### 3.2.1.7 Other Locations

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<sub>2</sub>.

The zephyr (Z3) located in North Kilworth did not detect an exceedance of the annual mean air quality standard for NO<sub>2</sub>.

## 3.2.2 Particulate Matter (PM<sub>10</sub>)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>.

Table A.7 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than 35 times per year.

### 3.2.2.1 The 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<sub>10</sub> and no exceedances of the daily mean air quality objective for PM<sub>10</sub> were detected.

### **3.2.2.2 North 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<sub>10</sub> and no exceedances of the daily mean air quality objective for PM<sub>10</sub> were detected.

## **3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

Table A.8 in Appendix A presents the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past five years.

### **3.2.3.1 The 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<sub>2.5</sub>

### **3.2.3.2 North 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<sub>2.5</sub>

## 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
A1	Kibworth	Roadside	468114	294353	NO2	yes Kibworth	chemiluminescence	9	2.5	1.8
Z2	Kibworth	Roadside	468309	294352	NO2 PM2.5 PM10	yes Kibworth	Zephyr	0	1.4	2.5
Z3	North Kilworth	Rural	461675	283303	NO2 PM2.5 PM10	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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
01n	Lut. Service Shop	Roadside	454475	284560	NO2	yes Lutterworth	0.0	4.2		2.0
11n	Day Nursery	Roadside	454539	284932	NO2		9.0	1.3		2.0
12n	A6 Kibworth	Roadside	468425	294314	NO2	yes kibworth	10.7	1.3		2.0
18n	Jazz Hair	Roadside	454443	284348	NO2	yes Lutterworth	0.0	3.0		2.0
22n	77 leicester road	Roadside	454533	284872	NO2		0.0	13.5		2.0
23n	6 The Terrace Rugby Road	Roadside	454428	284274	NO2	yes Lutterworth	0.0	2.5		2.0
24n	regent court	Roadside	454410	284326	NO2	yes Lutterworth	2.0	1.0		2.0
25n	26 Market Street Lutterworth	Roadside	454497	284618	NO2	yes Lutterworth	1.6	4.8		2.0
26n	24 Rugby Road Lutterworth	Roadside	454432	284229	NO2	yes Lutterworth	0.0	2.0		2.0
27n	17 Rugby road Lutterworth	Roadside	454476	284178	NO2	yes Lutterworth	3.7	5.2		2.0
28n	Spencerdene main street theddingworth	Roadside	466535	285545	NO2		1.2	0.2		2.0
29n	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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
30n	40 regent street lutterworth	Roadside	466651	285607	NO2		0.2	1.4		2.0
31n	69 leicester road Kibworth	Roadside	467933	294660	NO2	yes Lutterworth	3.5	4.0		2.0
32n	Alma House, Watling Street Claybrooke Parva	Roadside	448065	287719	NO2		0.0	7.0		2.0
33n	sign post outside White House Farm Watling street	Roadside	448948	286554	NO2		14.0	1.0		2.0
34n	sign outside 64 Leicester Road Kibworth	Roadside	468143	294351	NO2	yes kibworth	0.5	2.3		2.0
35n	lamppost outside 78 leicester road kibworth	Roadside	468022	294450	NO2	yes kibworth	3.1	6.4		2.0
36n	signpost just north of 11 Leicester road Kibworth	Roadside	468309	294352	NO2	yes kibworth	0.0	1.4		2.0
37n	pizza Express st marys road	Roadside	473749	287214	NO2		0.0	1.4		2.0
38n	coach and horse kibworth	Roadside	468403	294298	NO2	yes kibworth	2.2	2.5		2.0
39n	lamppost 29 church road kibworth	Roadside	468412	294218	NO2		10.2	2.0		2.0
40n	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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
41n	lamppost outside 52 Leicester Road	Roadside	468982	293824	NO2	yes kibworth	9.0	2.2		2.0
42n	road sign on leicester road, rear of 9 Milestone Close	Roadside	469037	293796	NO2		12.0	2.0		2.0
43n	3 dunton road BA	Roadside	453583	292002	NO2		2.9	1.5		2.0
45n	lamppost est of 5 Lutterworth road Walcote	Roadside	456575	283605	NO2		3.0	0.2		2.0
46n	sw junction welland park road and northampton road MH	Roadside	473596	286821	NO2		14.0	2.3		2.0
47n	53 northampton road MH	Roadside	473598	286851	NO2		9.0	1.0		2.0
48n	7 leicester road MH	Roadside	473172	287534	NO2		2.6	2.9		2.0
49n	lamppost outside 12 Springfield Street MH	Roadside	473678	286931	NO2		2.1	1.9		2.0
50n	lamppost carpark adj Fleckney Fish bar, High street	Roadside	464971	293501	NO2		0.1	2.0		2.0
51n	lamppost outside thurnby memorial hall, main street, bushby	Roadside	464773	303914	NO2		1.6	3.8		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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
52n	16 Main Street, Broughton Astley (On wooden pole outside the shop)	Roadside	452483	292966	NO2		0.0	3.0		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 NO<sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
A1	468114	294353	Roadside	99.8	99.8		<b>43.97</b>	30.64	32.22	31
Z2	468309	294352	Roadside	98.5	62.8			34.47	35.01	17.5
Z3	461675	283303	Rural	92.7	23.5					4.2

<CLICK HERE THEN PASTE COMPLETED DATA ROWS FROM ASR EXCEL TEMPLATE>

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

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

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> 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 NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)**

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
01n	454475	284560	Roadside	94.26229508	94.3	38.1	37.9	29.2	31.7	31.9
11n	454539	284932	Roadside	50.81967213	50.8	30.1	<b>41.8</b>	21.6	22.9	17.9
12n	468425	294314	Roadside	94.26229508	94.3	28.4	29.4	20.7	22.7	22.7
18n	454443	284348	Roadside	94.26229508	94.3	36.2	34.0	26.1	28.4	29.8
22n	454533	284872	Roadside	94.26229508	94.3	17.6	18.3	14.3	14.6	13.8
23n	454428	284274	Roadside	84.9726776	85.0	27.6	25.3	19.9	23.3	22.8
24n	454410	284326	Roadside	83.33333333	83.3	36.1	32.8	26.7	28.8	27.5
25n	454497	284618	Roadside	94.26229508	94.3	31.4	29.7	23.6	24.3	24.5
26n	454432	284229	Roadside	94.26229508	94.3	31.4	30.2	25.2	26.2	24.4
27n	454476	284178	Roadside	76.50273224	76.5	27.3	24.4	21.0	23.8	22.9
28n	466535	285545	Roadside	94.26229508	94.3	16.4	17.5	14.5	12.2	12.8
29n	466651	285607	Roadside	94.26229508	94.3	22.2	21.6	14.6	17.7	17.3
30n	466651	285607	Roadside	84.9726776	85.0	17.1	17.6	12.7	14.1	16.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
31n	467933	294660	Roadside	86.06557377	86.1	31.0	28.6	23.6	25.2	23.1
32n	448065	287719	Roadside	68.03278689	68.0	25.1	23.9	18.8	20.6	17.3
33n	448948	286554	Roadside	94.26229508	94.3	24.4	21.9	16.4	17.8	18.0
34n	468143	294351	Roadside	94.26229508	94.3	<b>49.3</b>	<b>52.0</b>	37.6	38.0	39.6
35n	468022	294450	Roadside	83.33333333	83.3	32.0	38.5	26.2	30.7	29.6
36n	468309	294352	Roadside	94.26229508	94.3	34.4	34.5	24.8	26.8	27.9
37n	473749	287214	Roadside	94.26229508	94.3	25.9	27.7	20.3	20.7	20.9
38n	468403	294298	Roadside	94.26229508	94.3	19.4	19.8	15.0	15.3	16.7
39n	468412	294218	Roadside	94.26229508	94.3	18.1	17.7	13.9	14.9	14.3
40n	468027	294570	Roadside	94.26229508	94.3	21.0	21.1	16.1	16.3	15.8
41n	468982	293824	Roadside	94.26229508	94.3		19.3	13.4	14.9	15.4
42n	469037	293796	Roadside	66.93989071	66.9		21.6	15.3	16.8	16.1
43n	453583	292002	Roadside	94.26229508	94.3		19.1	15.4	18.4	18.0
45n	456575	283605	Roadside	94.26229508	94.3		18.1	13.0	13.3	12.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
46n	473596	286821	Roadside	75.13661202	75.1		31.4	22.0	24.1	26.5
47n	473598	286851	Roadside	94.26229508	94.3		27.0	21.9	25.9	24.6
48n	473172	287534	Roadside	86.33879781	86.3		26.1	18.5	22.4	21.3
49n	473678	286931	Roadside	65.30054645	65.3		26.0	17.9	22.8	20.9
50n	464971	293501	Roadside	66.93989071	66.9			12.8	14.9	13.8
51n	464773	303914	Roadside	83.33333333	83.3			10.3	11.8	13.1
52n	452483	292966	Roadside	83.33333333	50.8				17.68	15.2

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  $\mu\text{g}/\text{m}^3$ .

Exceedances of the NO<sub>2</sub> annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

NO<sub>2</sub> annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

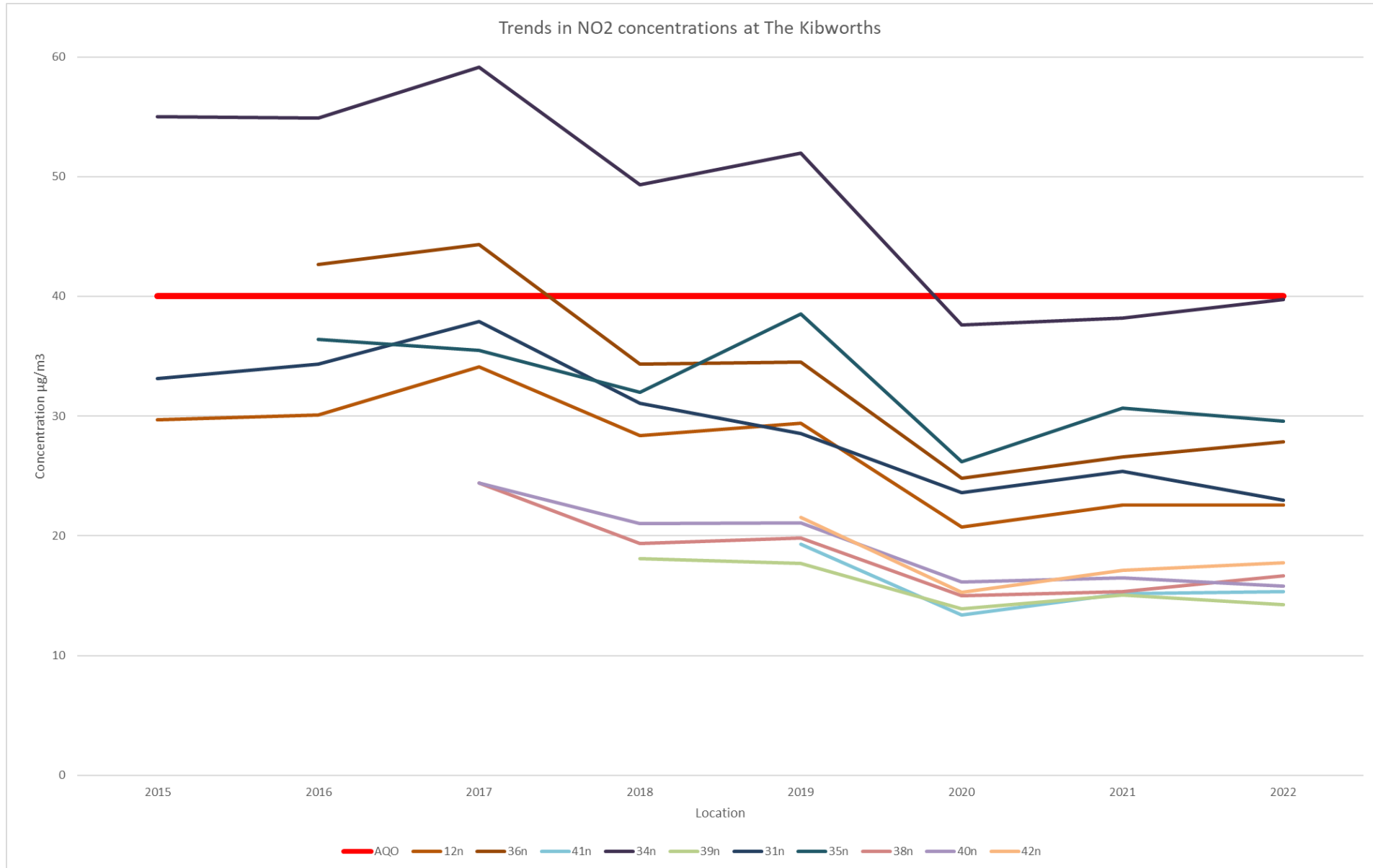
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

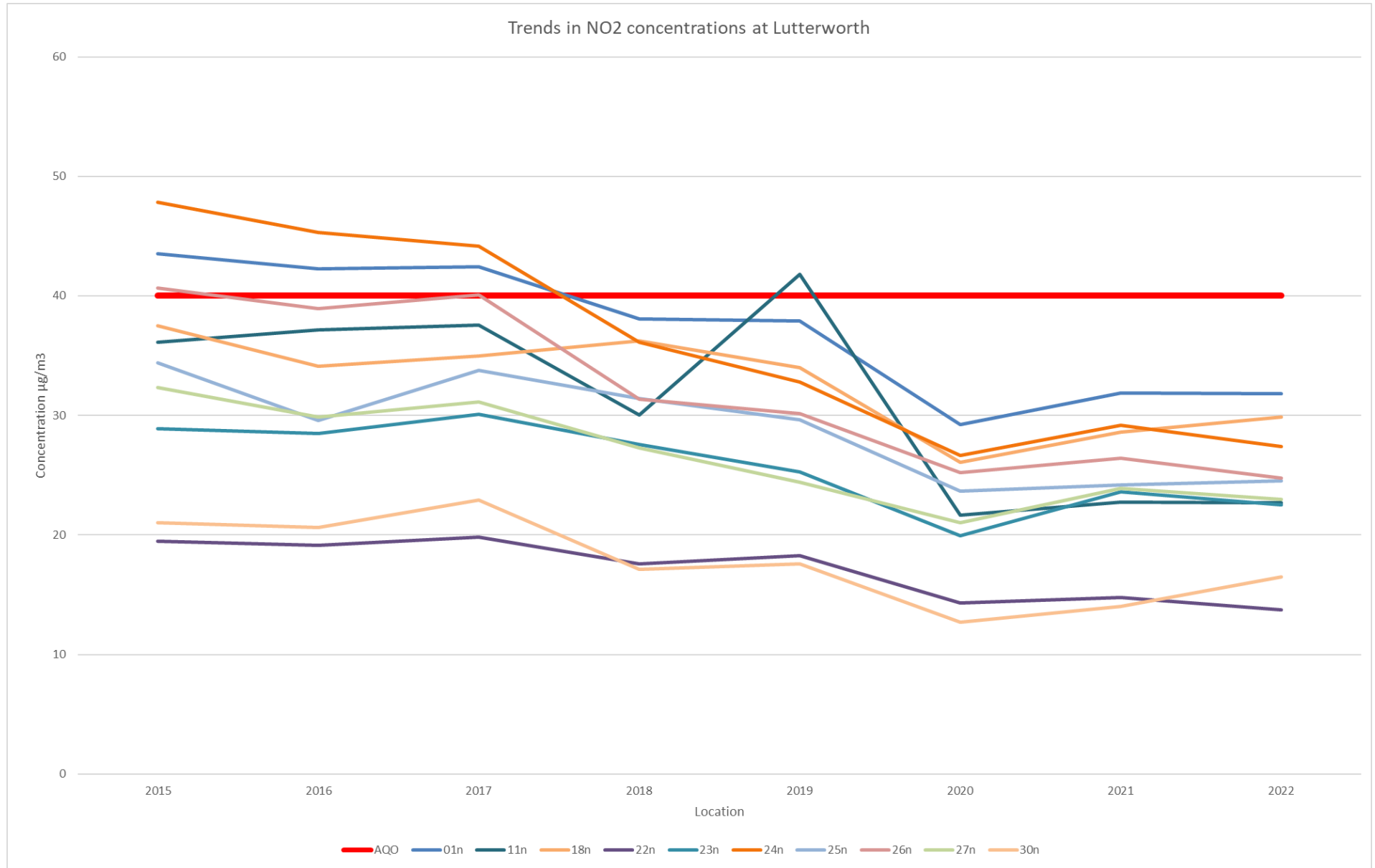


- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Figure A.1 – The Kibworth Trends in Annual Mean NO<sub>2</sub> Concentrations**



**Figure A.2 – Lutterworth Trends in Annual Mean NO<sub>2</sub> Concentrations**



**Figure A.3 – Theddingworth Trends in Annual Mean NO<sub>2</sub> Concentrations**

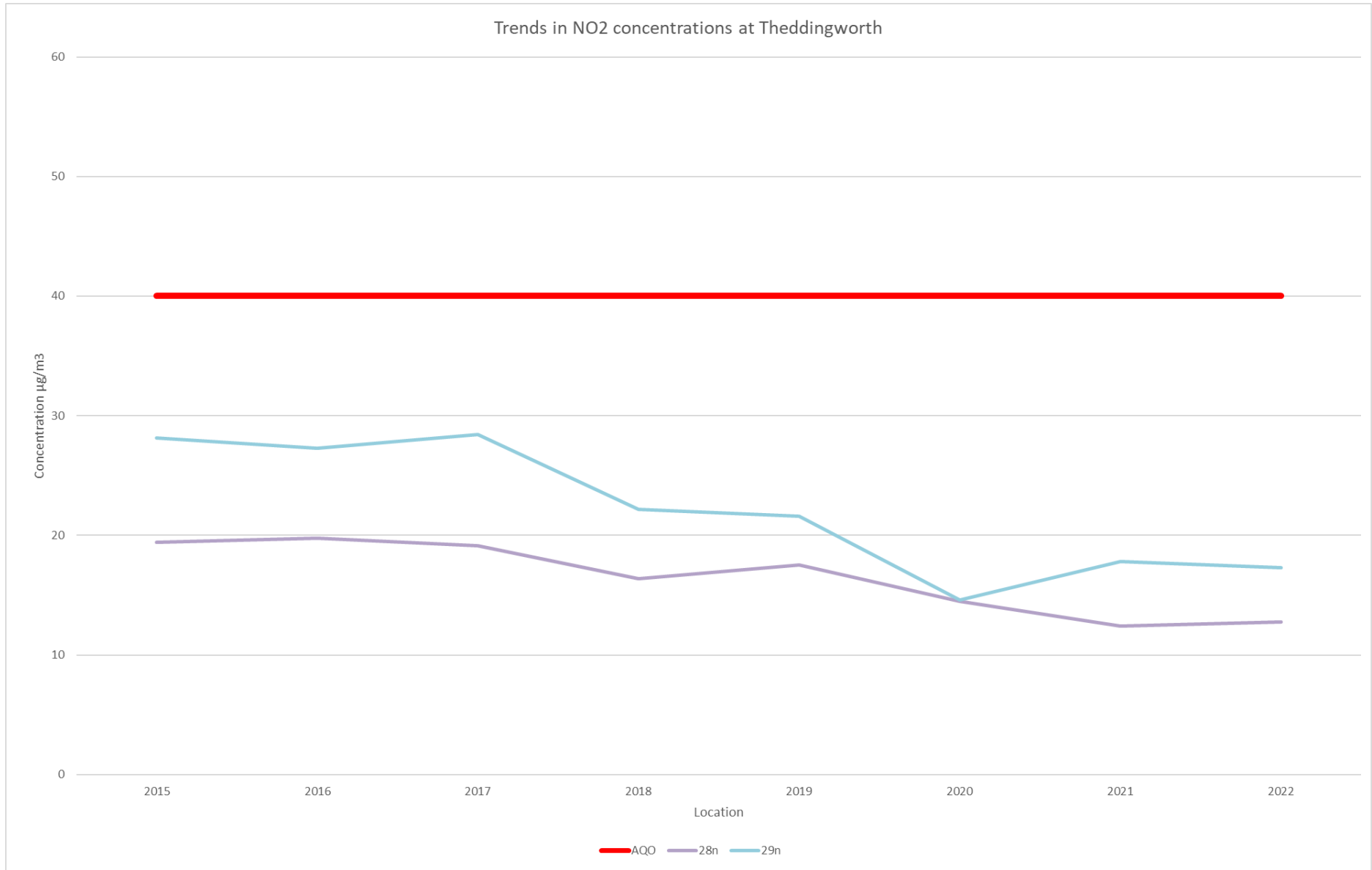
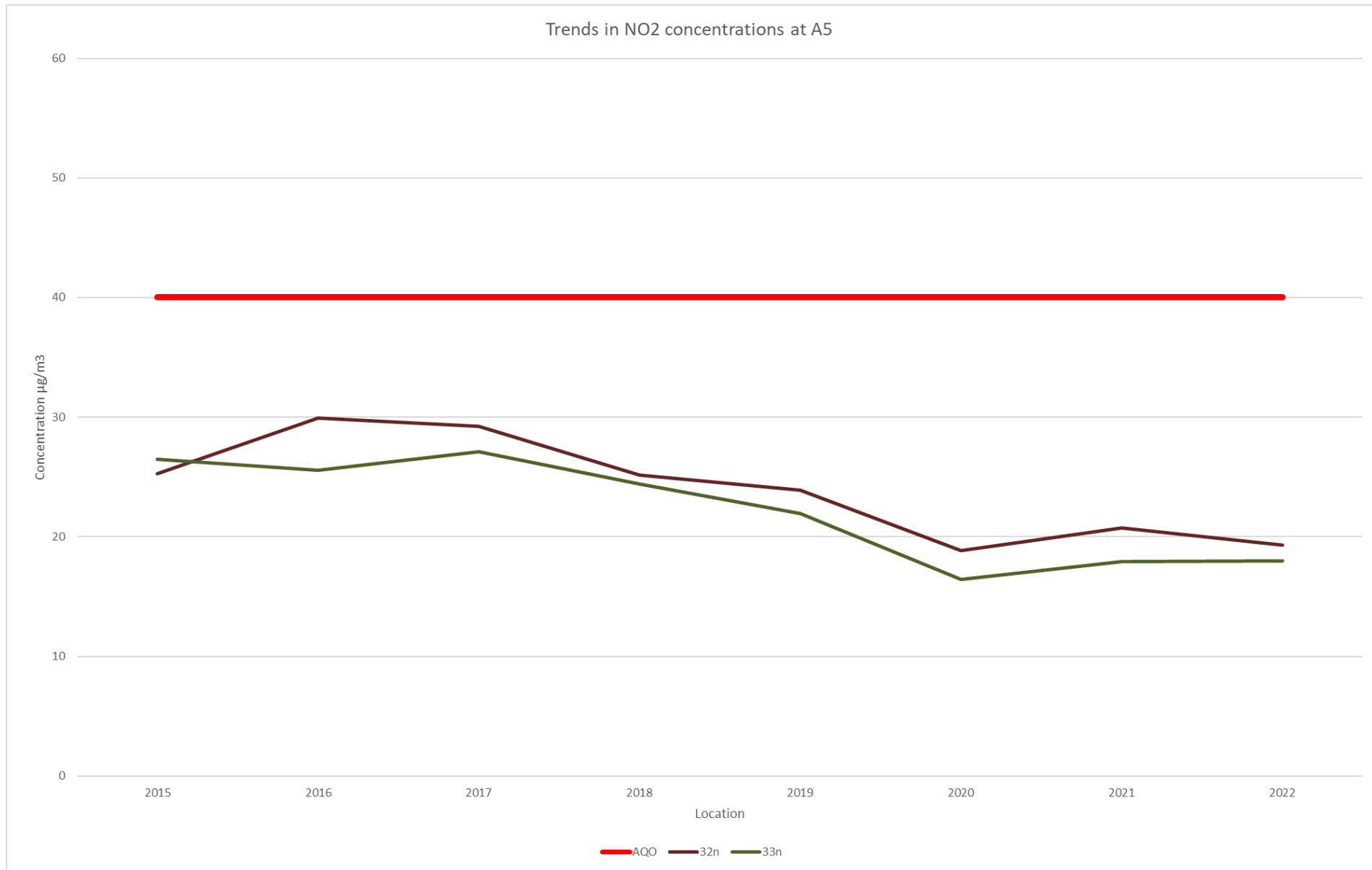
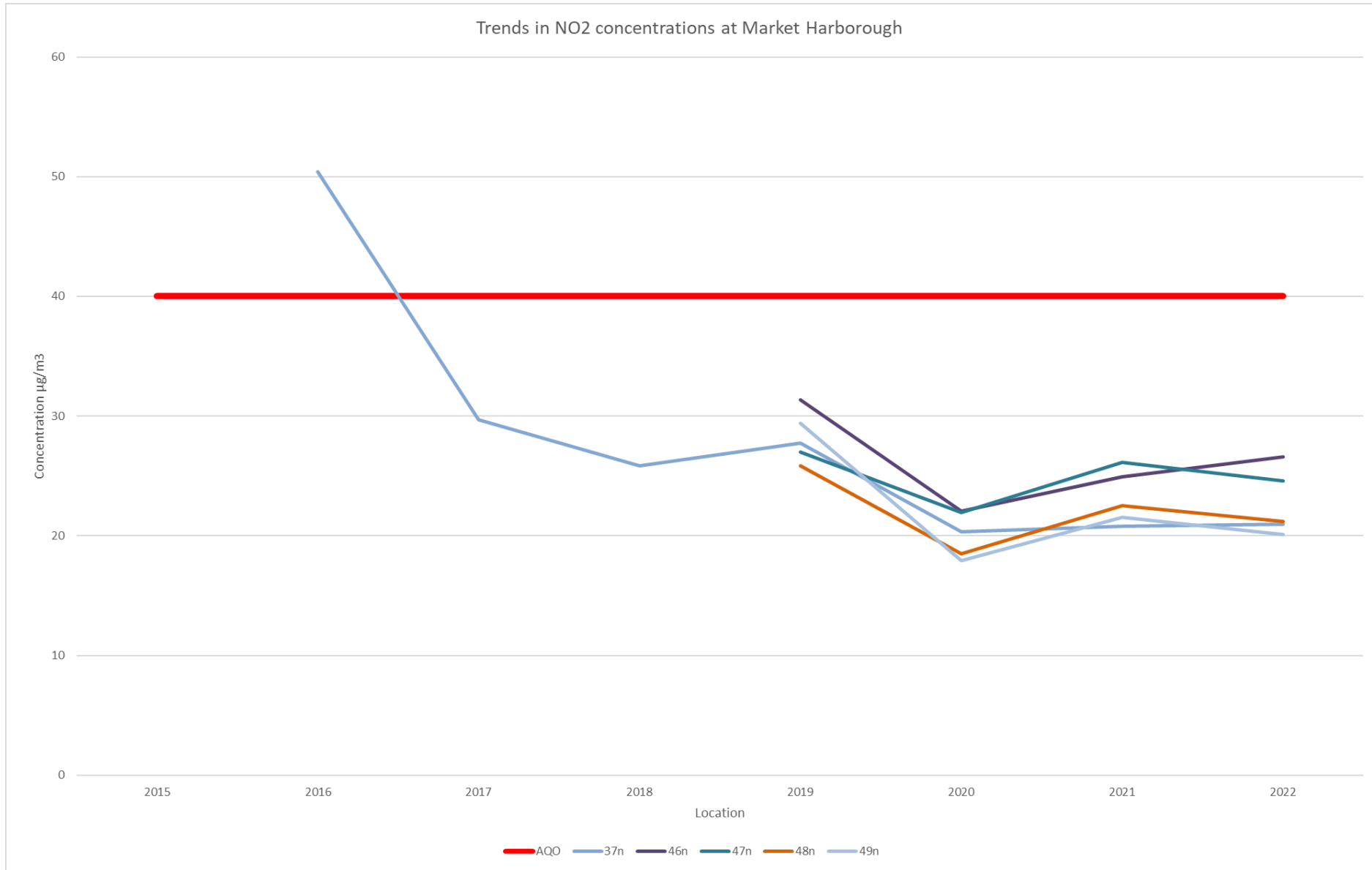


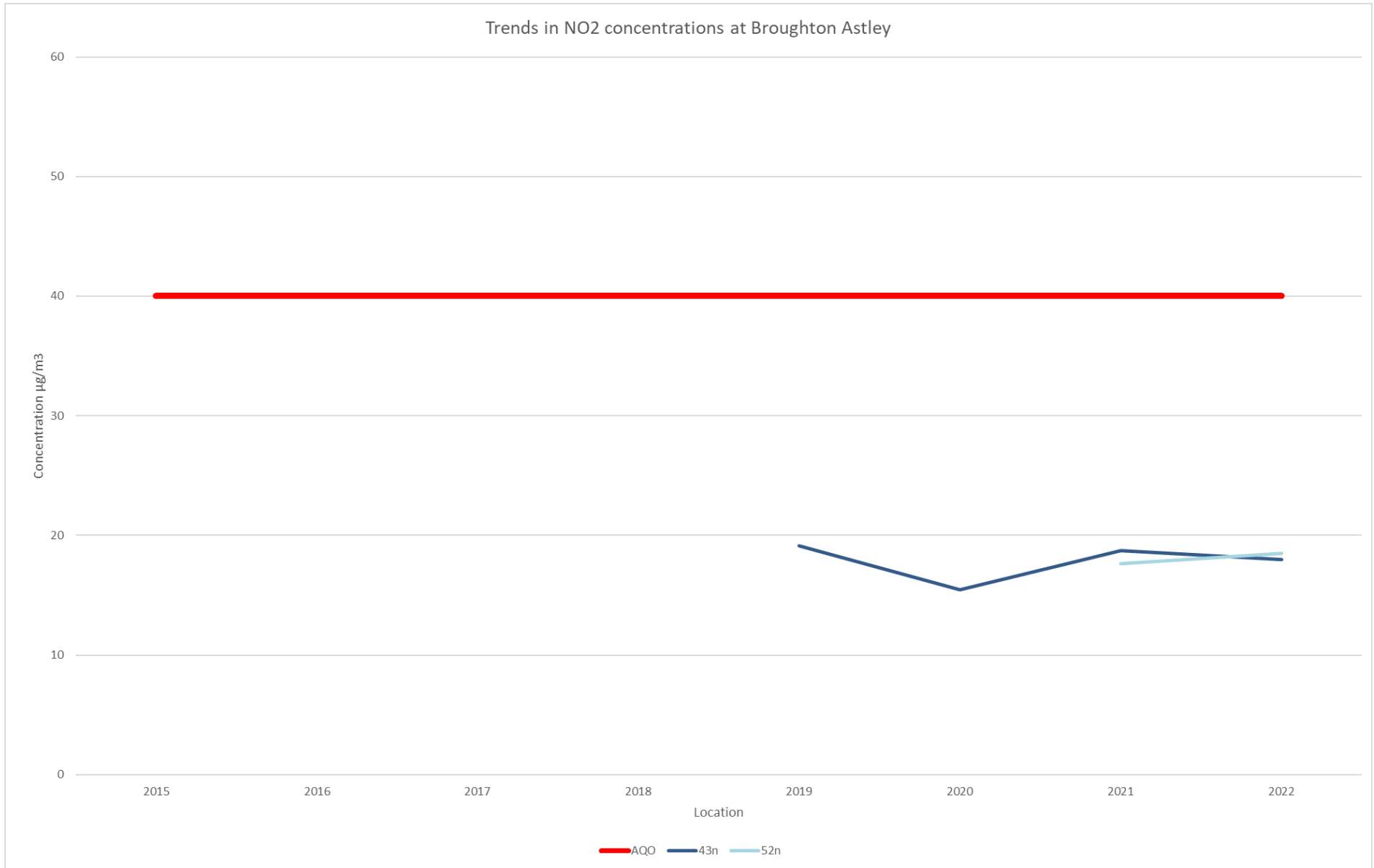
Figure A.4 – A5 Trends in Annual Mean NO<sub>2</sub> Concentrations



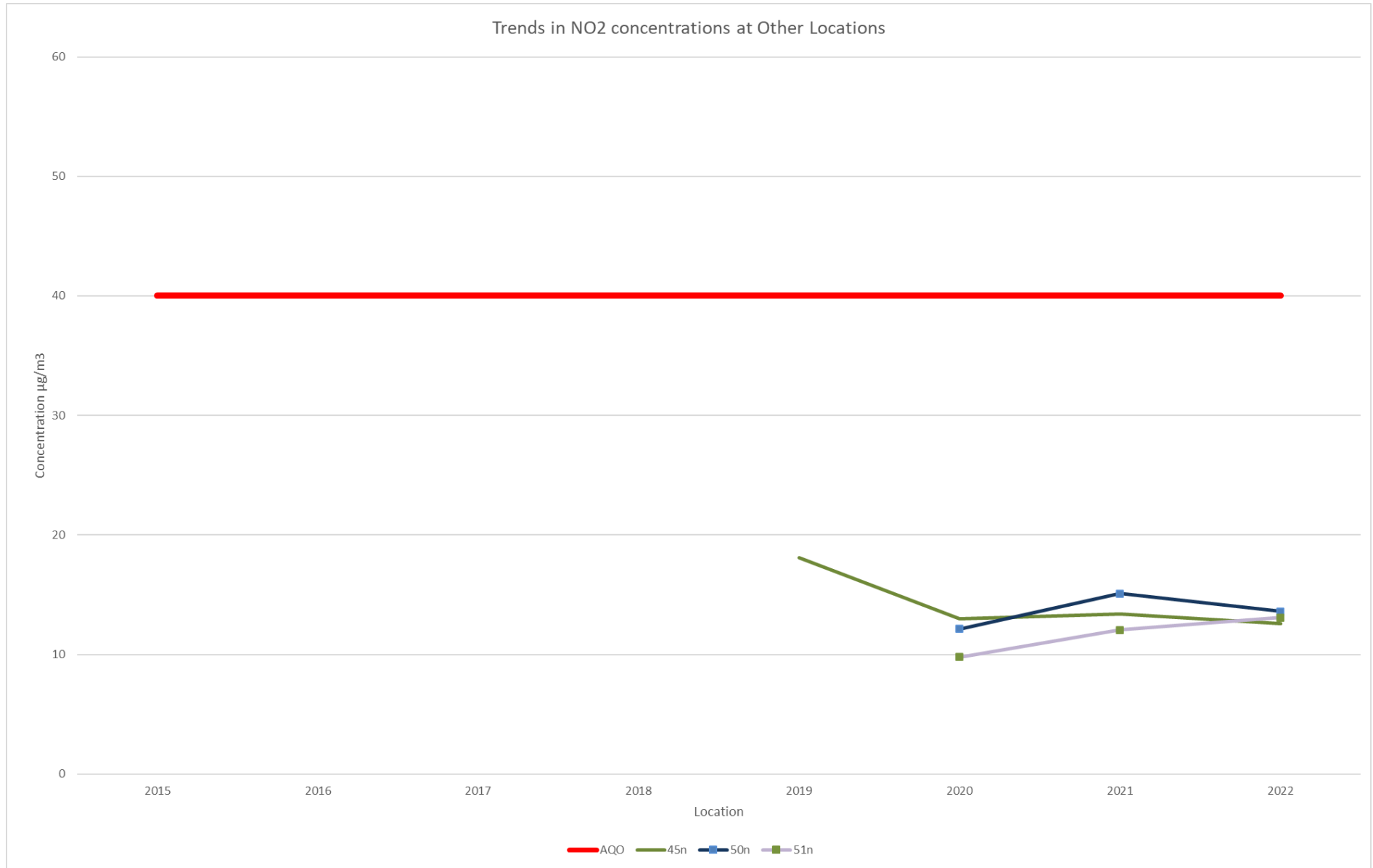
**Figure A.5 – Market Harborough Trends in Annual Mean NO<sub>2</sub> Concentrations**



**Figure A.6 – Broughton Astley Trends in Annual Mean NO<sub>2</sub> Concentrations**



**Figure A.7 – Other Trends in Annual Mean NO<sub>2</sub> Concentrations**





**Table A.5 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
A1	468114	294353	Roadside	99.8	99.8		0	0	0	0
Z2	468309	294352	Roadside	98.5	62.8			<b>3 (153)</b>	0	0
Z3	461675	283303	Rural	92.7	23.5					0

**Notes:**

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

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> 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<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
Z2	468309	294352	Roadside	98.5	62.8			16.2	9.18	12.4
Z3	461675	283303	Rural	92.7	23.5					11.7

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

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> 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%).

**Table A.7 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
Z2	468309	294352	Roadside	98.5	62.8			<b>0 (20.63)</b>	0	<b>0 (20.5)</b>
Z3	461675	283303	Rural	92.7	23.5					<b>0 (23.2)</b>

**Notes:**

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

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> 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<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
Z2	468309	294352	Roadside	98.5	62.8			9.21	6.82	11.5
Z3	461675	283303	Rural	92.7	23.5					10.07

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

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

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%).

## Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO<sub>2</sub> 2022 Diffusion Tube Results (µg/m<sup>3</sup>)

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 <(x.x)>	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	46.5		42.3	42.4	41.9	31.9	-	
11n	454539	284932	32.6	21.9	33.3	25.0							30.6	35.8	30.1	17.9	-	
12n	468425	294314	34.7	30.0	26.6	22.9	25.0	25.6	26.8	23.6	36.0		35.9	39.7	29.9	22.7	-	
18n	454443	284348	48.9	30.7	50.7	40.3	26.6	33.5	35.8	43.0	37.7		41.7	43.0	39.3	29.8	-	
22n	454533	284872	18.5	18.8	19.6	16.1	14.8	14.7	16.0	16.5	19.8		20.9	23.2	18.2	13.8	-	
23n	454428	284274	32.3	24.6	33.8	35.6		24.2	20.7	32.3	29.7		31.7	31.4	30.0	22.8	-	
24n	454410	284326	50.6	25.6	42.2	29.2	29.4	32.6	33.4	41.4			33.7	42.6	36.1	27.5	-	
25n	454497	284618	41.0	30.6	38.8	33.5	16.3	27.4	27.1	34.6	31.1		35.0	39.9	32.3	24.5	-	
26n	454432	284229	46.8	40.6	37.5	17.5	30.4	33.1	31.1	26.2	33.3		31.7	30.0	32.2	24.4	-	
27n	454476	284178	37.1	27.9	36.5	28.8	24.0		26.3	29.7	30.1		31.9		30.2	22.9	-	
28n	466535	285545	23.1	15.5	18.2	13.8	14.8	14.2	14.1	14.5	19.9		16.2	20.1	16.9	12.8	-	
29n	466651	285607	34.5	23.8	22.5	21.0	17.2	16.5	18.3	22.2	24.0		27.5	22.9	22.8	17.3	-	
30n	466651	285607	28.7	18.6	27.6	31.3		14.5	12.5	16.2	18.3		24.4	25.0	22.0	16.7	-	
31n	467933	294660	49.8	25.3	32.9	32.0	24.3	23.4	26.7		32.6		23.6	31.4	30.4	23.1	-	
32n	448065	287719	34.5	21.0	30.3	24.0	22.1	18.9					22.4	30.0	25.5	17.3	-	
33n	448948	286554	33.7	21.7	26.3	18.8	18.3	19.0	21.7	19.7	26.3		27.0	27.4	23.7	18.0	-	
34n	468143	294351	62.3	56.4	50.5	44.6	47.9	52.3	49.6	49.7	48.2		52.8	60.9	52.1	39.6	38.1	

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 <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
35n	468022	294450	55.5	39.7	43.2	36.6	37.6	40.7	40.3	14.7			37.8	43.0	38.9	29.6	-	
36n	468309	294352	43.6	32.6	43.9	33.5	31.9	34.8	32.9	32.8	40.3		37.7	39.2	36.8	27.9	-	
37n	473749	287214	38.0	27.1	33.5	23.0	22.2	23.4	24.1	20.6	27.1		33.3	31.3	27.5	20.9	-	
38n	468403	294298	33.2	19.1	26.5	18.6	14.9	22.5	17.1	19.1	23.3		22.6	24.4	22.0	16.7	-	
39n	468412	294218	28.7	19.9	20.3	17.3	13.5	16.7	14.3	13.1	18.5		19.3	24.4	18.8	14.3	-	
40n	468027	294570	18.4	23.6	19.0	15.8	17.6	17.3	16.6	37.2	19.8		16.3	26.8	20.8	15.8	-	
41n	468982	293824	28.9	21.9	27.0	15.6	13.7	13.9	14.7	17.4	20.5		21.5	27.1	20.2	15.4	-	
42n	469037	293796	32.2		32.2	20.3		17.8	18.4	22.8			15.8	27.1	23.4	16.1	-	
43n	453583	292002	35.1	25.7	30.1	21.5	18.4	15.9	17.4	20.8	22.1		22.5	30.8	23.7	18.0	-	
45n	456575	283605	20.0	18.0	19.9	10.2	14.9	14.1	15.0	12.9	14.9		19.7	22.3	16.4	12.5	-	
46n	473596	286821	48.6	34.6	36.8	28.0	29.5	32.3	33.4				32.5	39.0	34.9	26.5	-	
47n	473598	286851	40.3	29.7	43.1	33.1	27.6	26.1	28.8	33.1	29.8		28.6	35.3	32.3	24.6	-	
48n	473172	287534	38.4	22.6	37.7	29.8	23.6	15.8	23.8	25.8	28.2			32.9	28.1	21.3	-	
49n	473678	286931		25.5	29.5		21.4	20.7	23.5	29.6			28.4	32.9	26.6	20.9	-	
50n	464971	293501		17.1	24.6	15.4	13.0	12.9	14.2				21.7	24.3	18.0	13.8	-	
51n	464773	303914	36.3	20.1	16.6	12.6	10.7	9.3	11.2	10.5			20.4	24.4	17.2	13.1	-	
52n	452483	292966	31.4	20.0	27.2	15.6		26.0						26.0	24.2	15.2	-	

- All erroneous data has been removed from the NO<sub>2</sub> 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 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 Council During 2022**

Harborough District Council has not identified any new sources relating to air quality within the reporting year of 2022

### **Additional Air Quality Works Undertaken by Harborough District Council During 2022**

Harborough District Council has not completed any additional works within the reporting year of 2022.

### **QA/QC of Diffusion Tube Monitoring**

2022 diffusion tubes were supplied by Socotec (Didcote) using 50% TEA in acetone.

### **Diffusion Tube Annualisation**

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<sub>x</sub>/NO<sub>2</sub> 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 0.76 to the 2022 monitoring data. A summary of bias adjustment factors used by Harborough District Council over the past five years is presented in Table C.2.

The Diffusion Tube Data Processing tool is attached as Appendix C2



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

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	0.7200	0.8238	0.7628	0.8368	0.7858	30.1	23.6
32n	0.8350	0.9167	0.8755	0.9330	0.8901	25.5	22.7
42n	0.8502	0.9241	0.8975	0.9443	0.9040	23.4	21.2
49n	1.0011	1.0677	1.0285	1.0457	1.0357	26.6	27.5
50n	0.9685	1.0290	1.0071	1.0278	1.0081	18.0	18.1
52n	0.7651	0.8473	0.8245	0.8774	0.8286	24.2	20.1

## 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  $\text{NO}_x/\text{NO}_2$  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 of 0.76 to the 2022 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
<b>2022</b>	National	03/23	0.76
<b>2021</b>	National	03/22-	0.78
<b>2020</b>	National	03/21-	0.77

<b>2019</b>	National	03/20	0.75
<b>2018</b>	National	03/19	0.76
<b>2017</b>	National	03/18	0.77
<b>2016</b>	National	03/17	0.77

## NO<sub>2</sub> Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

**Table C.3 – NO<sub>2</sub> Fall off With Distance Calculations (concentrations presented in µg/m<sup>3</sup>)**

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	39.6	8.0	38.1	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>

## QA/QC of Automatic Monitoring

Please see attachment Appendix C 5 AQDM QAQC Procedures

## PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment

The type of PM<sub>10</sub>/PM<sub>2.5</sub> monitor(s) utilised within Harborough District Council do not required the application of a correction factor.

## Automatic Monitoring Annualisation

Please see attachment Appendix C6 for annualization of Zephyr data

## **NO<sub>2</sub> Fall-off with Distance from the Road**

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No automatic NO<sub>2</sub> monitoring locations within Harborough District required distance correction during 2022.

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

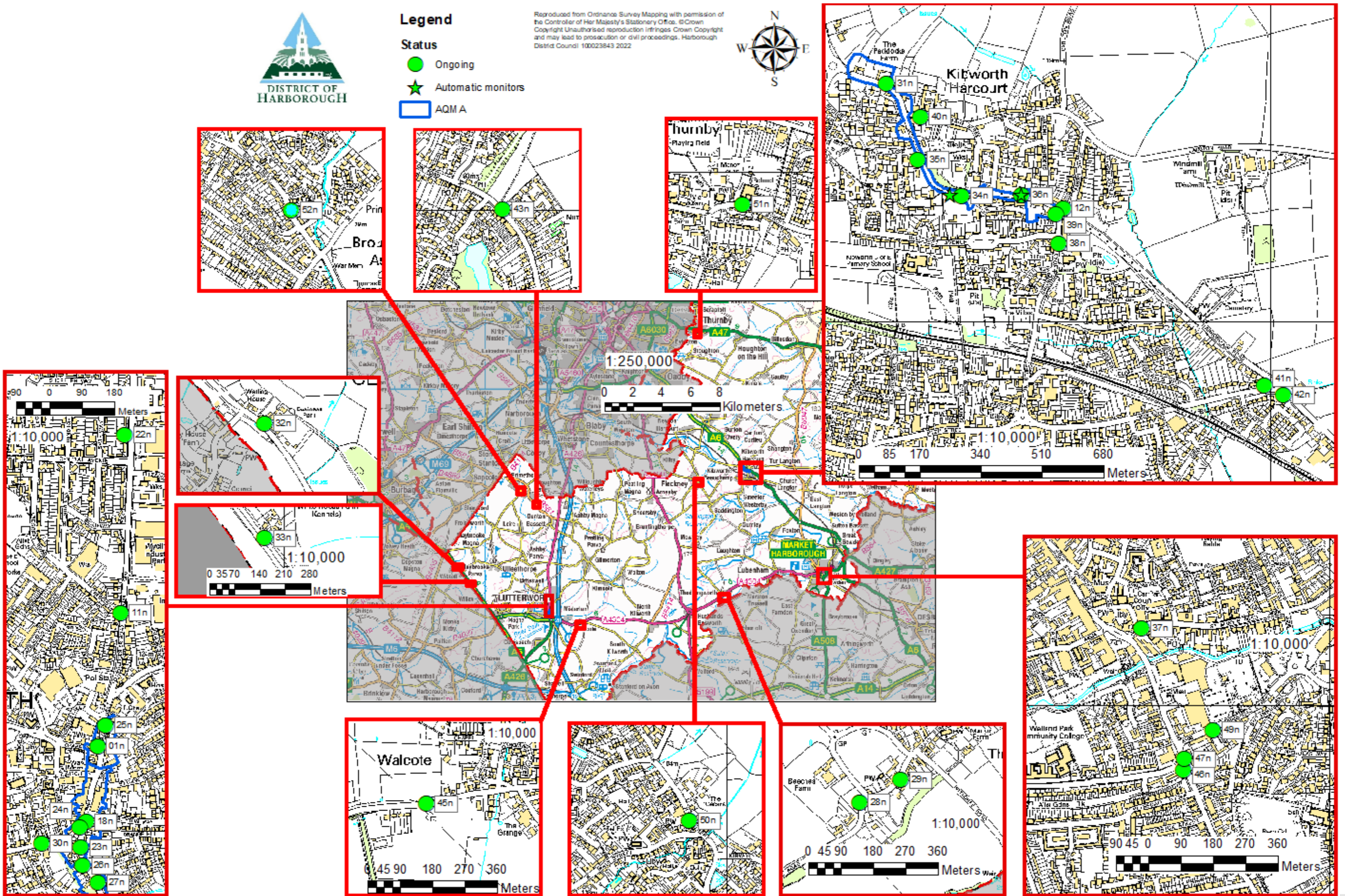
Fi



### Legend

- Ongoing
- ★ Automatic monitors
- AQM A

Reproduced from Ordnance Survey Mapping with permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Harborough District Council 100023843 2022



## Appendix E: Summary of Air Quality Objectives in England

**Table E.1 – Air Quality Objectives in England<sup>7</sup>**

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

<sup>7</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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 <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	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.