2020 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

Date (June 2020)

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Executive Summary: Air Quality in Our Area

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedances are considered likely, the local authority must then 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 pursuit of the objectives.

This report covers the period 1 January 2019 to 31st December 2019.

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

The Council has two AQMAs:

- 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.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

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

During 2019 the council completed the microsimulation and diffusion modelling of the proposed junction improvements in the Kibworths. The microsimulation modelling found that if all 3 junction improvements are implemented:

- they will have a negligible impact on traffic flow.
- within the AQMA the junction alterations will provide a 12% increase in emissions during the AM rush hour and a -19% reduction during the PM rush hour.
- The alterations are predicted to lead to large improvements at all locations within the AQMA even at the worst-case location. The consultant has concluded that based on the modelled results this option would improve air quality conditions to the greatest degree in The Kibworths.
- one property in the AQMA will remain above the national objective level in the short term, however air quality conditions generally are expected to improve in the future as the uptake of newer vehicles continues.

Conclusions and Priorities

The ASR has found that

- there was no exceedance of the Annual mean Air quality for NO2 in the Lutterworth AQMA for the second year running.

- The Kibworth AQMA is still exceeding the Annual mean Air quality for NO2 in the Lutterworth AQMA.
- The junction improvement proposed for the A6 in the Kibworths will have a beneficial impact on air quality within the AQMA.

Given that Lutterworth has met the air quality objectives for 2 years running Harborough District Council proposes to continue monitoring to determine if the objective will be met over the longer term.

For Kibworth, Harborough District Council proposes to try and identify and secure funding for the junction improvements.

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/

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1 Local Air Quality Management

This report provides an overview of air quality in Harborough District Council during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 pursuit of the objectives. 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 can be found in Table E.1 in Appendix E.

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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Harborough District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=118 or on the Council's website at: https://www.harborough.gov.uk/info/20025/environmental_health/101/air_quality

For reference, a map of Harborough District Council's monitoring locations is available in Appendix D.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plana		
						At Declaration		Now		Name	Date of Publication	Link
Lutterworth	Declared 18/07/2001, Amended 04/04/2011, Amended 16/04/2013	NO2 Annual Mean	Lutterworth	An area encompassing dwellings adjacent to Rugby Road, High street and Market Street.	NO			36 to 38	µg/m3	2013 Lutterworth Air Quality Management Area Action Plan Framework for Harborough District Council	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	Kibworth	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	µg/m3	49	µg/m3	Kibworth Air Quality Management Area Action Plan for Harborough District Council In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management Date (February 2019)	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

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

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

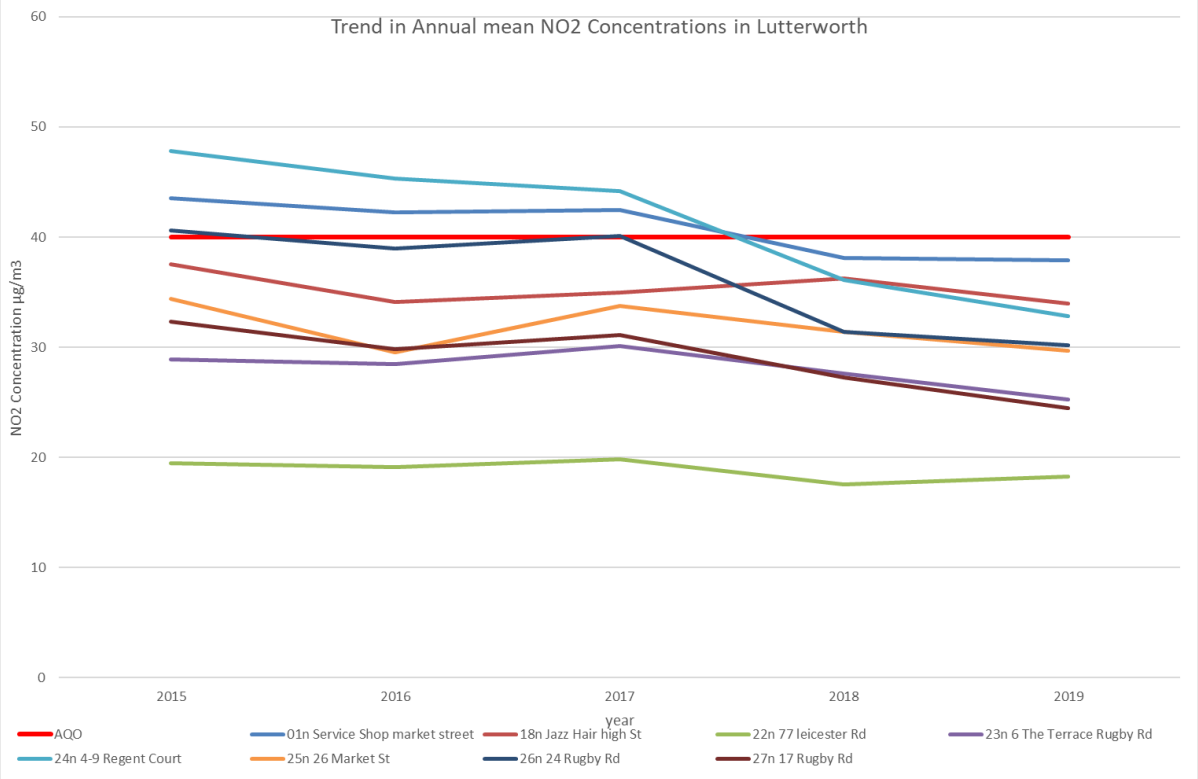
- . The Council have not provided within their report any discussion of bias adjustment factor derivation, nor any supporting evidence to justify the value used to adjust their results.
    - Discussion of the Bias adjustment has been included in this report.
- Moreover, results appear to have been distance corrected however there is an absence of discussion and example calculations.
    - Discussions of distance correction, where used have been included.

Harborough District Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key completed measures are:

2.2.1 Lutterworth AQMA

Concentrations of NO_2 have been below the Annual Mean air quality Objective for the 2nd 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

Modelling of the junction improvements proposed in Cumulative Development Traffic Impact Study - Fleckney, Great Glen and the Kibworths_Jan_2017 (Appendix C6) has been completed. The project involved:

- A detailed traffic survey and an ANPR survey to gather details of local fleet makeup i.e. how many vehicles are Euro6, Euro5, etc; engine size; fuel type; vehicle size;
- Microsimulation modelling of the entire Kibworth area using the proposed junction improvements and the data collected, modelling was undertaken to determine how the improvements would impact traffic flow and emissions.
- Dispersion modelling of the microsimulation outputs to determine how this would impact NO_2 concentrations.

The reports are attached as Appendices C3 to C5.

The principal challenges and barriers to implementation that Harborough District Council anticipates facing are securing funding for implementing the junction improvements.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Lutterworth 1	20mph zone	Traffic Management	Reduction of speed limits, 20mph zones	Apr-18	Harborough District Council, Leicestershire County Council Highways	LA, Funding: Defra AQ grant	Determine reduction in traffic emissions		Complete	Complete	Lengthy Timescale
							Determine impact on air quality		Complete	Nov-16	
							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	Apr-18	First phase successful, second phase compete. LCC Highways require further evidence of likely reduction before they would be willing to consider implementation

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Lutterworth 2	HGV gating system.	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Jul-17	Harborough District Council, Leicestershire County Council Highways	LCC highway maintenance	implement gating system		ongoing	Apr-18	system has been implemented

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Kibworth 1	Impact assessment of local traffic management options.	Transport Planning and Infrastructure	Other	01/01/2018	Harborough District Council, Leicestershire County Council Highways	Harborough District Council	To publish findings	Cannot be quantified as work is to identify works and the potential benefit	completed	Dec-19	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.								complete	Jun-18	
	2. Undertake traffic simulation of proposed junction improvements.								completed	Dec-19	
	3. Undertake air quality impact assessment of junction improvements.								completed	Dec-19	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
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	N/A	Harborough District Council,	Harborough District Council	N/A	Unlikely to provide improvements to air quality but will limit potential negative impacts	Close links with Development Management are already in place	Ongoing	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion 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	Quarter 4 2018/19	Harborough District Council,	Harborough District Council	To have published a guidance note to councillors and undertaken training of planning committee members	Unlikely to provide improvements to air quality but will limit potential negative impacts		On going	Local plan adopted April 2019
Kibworth 4	Ensure air quality policies in Local Plan documents and evidence base.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	01/01/2017	Harborough District Council,	Harborough District Council	N/A	N/A		N/A	Local plan adopted April 2019

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
	Provide information on air quality to residents in an accessible format.										
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	01/06/2017	Harborough District Council,	Harborough District Council	N/A	N/A	All of the Council's air quality data and reports produced to date are available on the council website	Ongoing	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
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	01/01/2018	Harborough District Council,	Harborough District Council	N/A	N/A	complete	Mar-19	

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Public Health Outcomes Framework (PHOF) (http://www.phoutcomes.info/) is a Department of Health 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 joint second lowest fraction of attributable deaths to particulate air pollution in Leicestershire. (https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/102/par/E10000018/ati/101/are/E07000135/iid/30101/age/230/sex/4)

Harborough District Council is not currently taking any specific measures to address $PM_{2.5}$. However the following measures and activities undertaken by Harborough District Council will improve $PM_{2.5}$ concentrations:

- The 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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Harborough District Council undertook automatic (continuous) monitoring at 1 site during 2019. Table A.1 in Appendix A shows the details of the 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 (passive) monitoring of NO_2 at 32 sites during 2019. Table A.2 in Appendix A shows the details of the 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.

Results have been Bias adjusted using a value of 0.75. This is taken from the National Bias adjustment spreadsheet for Socotec Didcot 2019 50% TEA in acetone. This is the most appropriate value for the district.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4], "annualisation" (where the data capture falls below 75%), and distance correction[5]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in Table A.3 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 2019 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.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The Kibworths

There are 8 long term monitoring locations in the Kibworths. Two new locations were commissioned to the south of the Kibworths in order to confirm the modelling outputs for the New Road | A6 junction.

The automatic monitor recorded an exceedance of the annual mean air quality objective for NO_2.

[4] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html

[5] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Only diffusion tube location 34n within the AQMA exceeded the annual mean air quality standard for NO_2. When façade corrected the concentration at the nearest receptor was 50µg/m^3.

Lutterworth

All locations in the Lutterworth AQMA were below the annual mean air quality objective for NO_2.

One location north of the AQMA (11n) exceeded the air quality objective for NO2 however when façade corrected to the nearest receptor the concentration was 29µg/m^3.

Theddingworth

There are 2 monitoring locations in Theddingworth both were below the air quality objective for NO_2.

A5

There are 2 monitoring locations along the A5 both were below the air quality objective for NO_2.

Market Harborough

There is 1 long term monitoring site in Market Harborough, it was below the Annual mean air quality objective for NO_2.

Four new monitoring location were commissioned within Market Harborough, following annualization, all locations were below the Annual mean air quality objective for NO_2.

Broughton Astley

Two monitoring locations were commissioned in Broughton Astley, following annualization, all locations were below the Annual mean air quality objective for NO_2.

Walcote

One monitoring location was commissioned in Walcote, following annualization, all locations were below the Annual mean air quality objective for NO_2.

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?	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	chemiluminesence	9	2.5	1.8

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
01n	former Service Shop - Lutterworth	Roadside	454475	284560	NO_2	Y	0	4.2	NO	2
11n	Day Nursery Lutterworth	Roadside	454539	284932	NO_2	N	9	1.3	NO	2
12n	A6 Kibworth	Roadside	468425	294314	NO_2	N	10.7	1.3	NO	2
18n	Jazz Hair Lutterworth	Roadside	454443	284348	NO_2	Y	0	3	NO	2
22n	77 Leicester Road Lutterworth	Roadside	454533	284872	NO_2	N	0	13.5	NO	2
23n	6 The Terrace Rugby Road	Roadside	454428	284274	NO_2	Y	0	2.5	NO	2
24n	Regent Court Lutterworth	Roadside	454410	284326	NO_2	Y	2	1	NO	2
25n	26 Market Street Lutterworth	Roadside	454497	284618	NO_2	Y	1.6	4.8	NO	2
26n	24 Rugby Road Lutterworth	Roadside	454432	284229	NO_2	Y	0	2	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
27n	17 Rugby Road Lutterworth	Roadside	454476	284178	NO_2	Y	3.7	5.2	NO	2
28n	Spencerdene Main Street Theddingworth	Roadside	466535	285545	NO_2	N	1.2	0.2	NO	2
29n	Homeside Main Street Theddingworth	Roadside	466651	285607	NO_2	N	0.2	1.4	NO	2
30n	40 Regent Street Lutterworth	Roadside	466651	285607	NO_2	N	0.2	1.4	NO	2
31n	69 Leicester Road Kibworth	Roadside	467933	294660	NO_2	N	3.5	4	NO	2
32n	Alma House, Watling Street Claybrooke Parva, A5	Roadside	448065	287719	NO_2	N	0	7	NO	2
33n	sign post outside White House Farm Watling Street , A5	Roadside	448948	286554	NO_2	N	14	1	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
34n	sign outside 64 Leicester Road Kibworth	Roadside	468143	294351	NO_2	N	0.5	2.3	NO	2
35n	lamppost outside 78 Leicester Road Kibworth	Roadside	468022	294450	NO_2	N	3.1	6.4	NO	2
36n	signpost just north of 11 Leicester Road Kibworth	Roadside	468309	294352	NO_2	N	0	1.4	NO	2
37n	Pizza Express St Marys Road	Roadside	473749	287214	NO_2	N	0	1.4	NO	2
38n	Coach and Horses Kibworth	Roadside	468403	294298	NO_2	N	2.2	2.5	NO	2
39n	lamppost 29 Church Road Kibworth	Roadside	468412	294218	NO_2	N	10.2	2	NO	2
40n	106 Main Street Kibworth	Roadside	468027	294570	NO_2	N	0	1.7	NO	2
41n	lampost outside 52	Roadside	468982	293824	NO_2	N	9	2.2	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Leicester Road Kibworth									
42n	road sign on Leicester Road, rear of 9 Milestone Close, Kibworth	Roadside	469037	293796	NO_2	N	12	2	NO	2
43n	3 Dunton Road BA	Roadside	453583	292002	NO_2	N	2.9	1.5	NO	2
44n	26 Dunton Road BA	Roadside	453625	291935	NO_2	N	2	0.2	NO	2
45n	lampost West of 5 Lutterworth Road Walcote	Roadside	456575	283605	NO_2	N	3	0.2	NO	2
46n	SW junction Welland Park Road and Northampton Road MH	Roadside	473596	286821	NO_2	N	14	2.3	NO	2
47n	53 Northampton Road MH	Roadside	473598	286851	NO_2	N	9	1	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
48n	7 Leicester Road MH	Roadside	473172	287534	NO_2	N	2.6	2.9	NO	2
49n	lamppost outside 12 Springfield Street MH	Roadside	473678	286931	NO_2	N	2.1	1.9	NO	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.3 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
A1	468114	294353	Roadside	Automatic	99.76%	79.93%					**43.97**
01n	454475	284560	Roadside	Diffusion Tube	100.00%	100.00%	**43.52**	**42.27**	**42.44**	**38.09**	**37.88**
11n	454539	284932	Roadside	Diffusion Tube	75.00%	75.00%	**36.11**	**26.59**	**26.65**	**30.05**	**41.80**
12n	468425	294314	Roadside	Diffusion Tube	100.00%	100.00%	**29.72**	**21.74**	**23.82**	**28.37**	**29.43**
18n	454443	284348	Roadside	Diffusion Tube	100.00%	100.00%	**37.52**	**34.10**	**34.99**	**36.25**	**33.98**
22n	454533	284872	Roadside	Diffusion Tube	91.67%	91.67%	**19.45**	**19.12**	**19.80**	**17.56**	**18.29**
23n	454428	284274	Roadside	Diffusion Tube	100.00%	100.00%	**28.87**	**28.49**	**30.08**	**27.58**	**25.27**
24n	454410	284326	Roadside	Diffusion Tube	100.00%	100.00%	**47.8**	**38.06**	**37.08**	**36.12**	**32.79**
25n	454497	284618	Roadside	Diffusion Tube	100.00%	100.00%	**34.38**	**28.18**	**31.98**	**31.39**	**29.65**
26n	454432	284229	Roadside	Diffusion Tube	91.67%	91.67%	**40.63**	**38.96**	**40.09**	**31.38**	**30.18**
27n	454476	284178	Roadside	Diffusion Tube	100.00%	100.00%	**32.32**	**27.05**	**28.04**	**27.26**	**24.43**

28n	466535	285545	Roadside	Diffusion Tube	100.00%	100.00%	**19.43**	**16.89**	**16.45**	**16.38**	**17.52**
29n	466651	285607	Roadside	Diffusion Tube	100.00%	100.00%	**28.15**	**26.77**	**27.90**	**22.17**	**21.61**
30n	466651	285607	Roadside	Diffusion Tube	100.00%	100.00%	**21**	**20.30**	**22.56**	**17.14**	**17.56**
31n	467933	294660	Roadside	Diffusion Tube	100.00%	100.00%	**33.12**	**30.48**	**33.57**	**31.05**	**28.57**
32n	448065	287719	Roadside	Diffusion Tube	91.67%	91.67%	**25.27**	**29.93**	**29.23**	**25.14**	**23.92**
33n	448948	286554	Roadside	Diffusion Tube	100.00%	100.00%	**26.5**	**18.13**	**18.84**	**24.43**	**21.93**
34n	468143	294351	Roadside	Diffusion Tube	100.00%	100.00%	**55**	**52.87**	**56.91**	**49.31**	**51.98**
35n	468022	294450	Roadside	Diffusion Tube	100.00%	100.00%	-	**33.36**	**32.53**	**31.97**	**38.54**
36n	468309	294352	Roadside	Diffusion Tube	100.00%	100.00%	-	**42.67**	**44.31**	**34.36**	**34.51**
37n	473749	287214	Roadside	Diffusion Tube	100.00%	100.00%	-	**50.44**	**29.70**	**25.86**	**27.74**
38n	468403	294298	Roadside	Diffusion Tube	100.00%	100.00%	-		**22.53**	**19.35**	**19.83**
39n	468412	294218	Roadside	Diffusion Tube	100.00%	100.00%	-			**18.07**	**17.68**
40n	468027	294570	Roadside	Diffusion Tube	91.67%	91.67%	-		**24.41**	**21.00**	**21.07**
41n	468982	293824	Roadside	Diffusion Tube	100.00%	50.00%	-				**19.29**
42n	469037	293796	Roadside	Diffusion Tube	100.00%	50.00%	-				**21.55**

43n	453583	292002	Roadside	Diffusion Tube	75.00%	25.00%	-	**19.12**
44n	453625	291935	Roadside	Diffusion Tube	100.00%	33.33%	-	**22.84**
45n	456575	283605	Roadside	Diffusion Tube	100.00%	33.33%	-	**18.11**
46n	473596	286821	Roadside	Diffusion Tube	100.00%	33.33%	-	**31.36**
47n	473598	286851	Roadside	Diffusion Tube	100.00%	33.33%	-	**27.01**
48n	473172	287534	Roadside	Diffusion Tube	100.00%	33.33%	-	**26.15**
49n	473678	286931	Roadside	Diffusion Tube	100.00%	16.67%	-	**26.03**

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

☒ **Annualisation has been conducted where data capture is <75%**

☒ **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 adjustment**

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.**

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

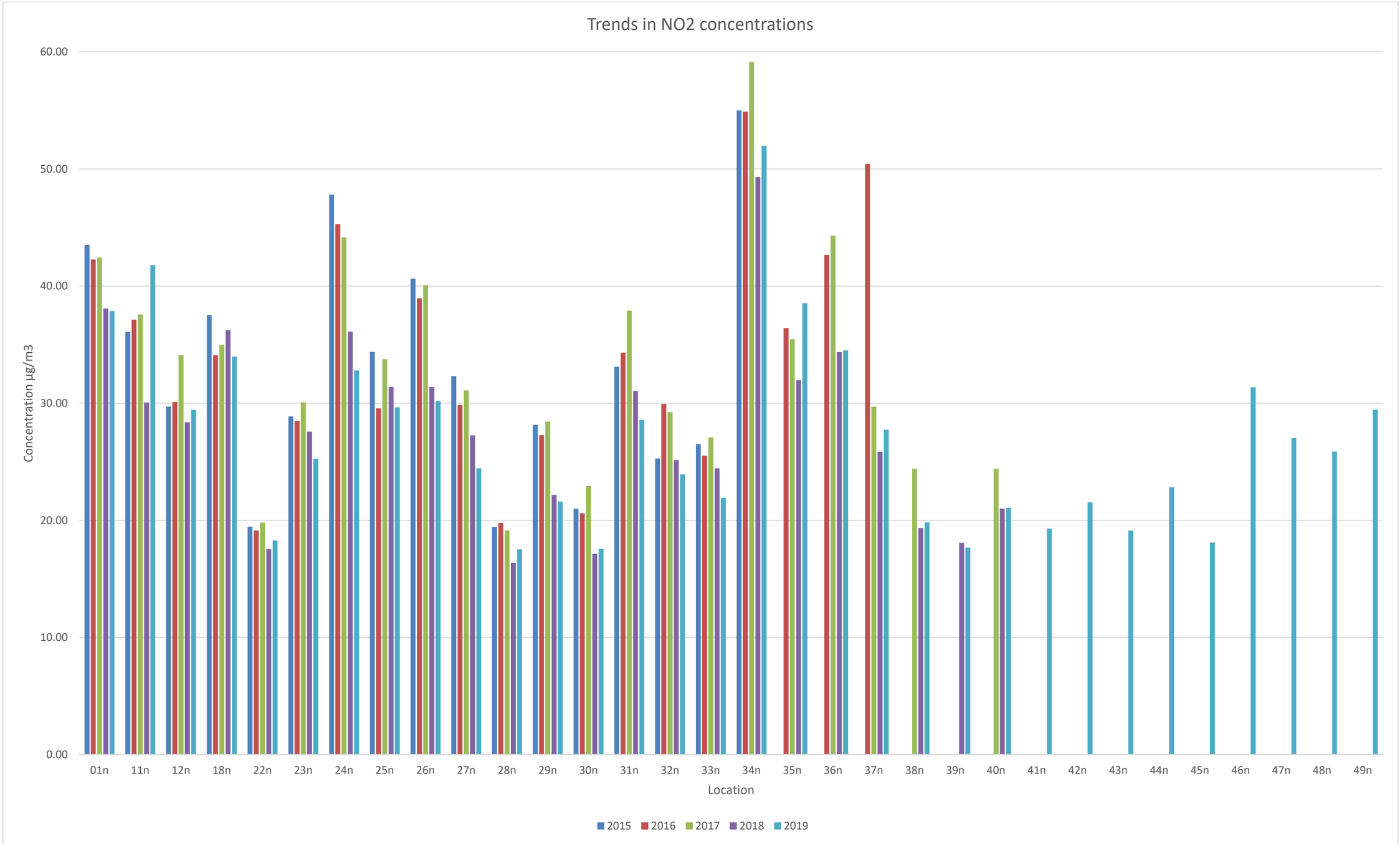


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
A1	468114	294353	Roadside	Automatic	99.8	79.9					**0**

Notes:

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.**

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)													
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
															Raw Data	Bias Adjusted (0.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
01n	454475	284560	59.1	64.0	51.0	39.0	48.7	45.9	46.9	47.4	52.1	51.8	53.5	46.6	50.5	37.875	
11n	454539	284932	162.9	42.3	45.6	40.5	32.5		50.7			40.8	51.4	34.9	55.7	41.8	28.29
12n	468425	294314	51.6	58.4	50.5	47.5	29.4	29.6	31.7	31.3	37.1	32.3	38.5	32.9	39.2	29.4	
18n	454443	284348	58.1	51.1	44.4	55.1	41.7	44.5	33.8	34.5	42.9	45.2	54.4	37.9	45.3	34.0	
22n	454533	284872	30	26.2	22.1	20.9	19.3	19	17.9		23	26.8	32.8	30.2	24.4	18.3	
23n	454428	284274	41.5	35.8	30.1	43.8	28.1	29.5	24.8	24.9	31.4	40.2	41.8	32.4	33.7	25.3	
24n	454410	284326	56	50.4	46.2	43.3	38.7	38.5	35.8	37.2	45.4	45.1	49.4	38.7	43.7	32.8	
25n	454497	284618	45.4	49	39.9	38	33.4	37.3	28.8	32.4	37.2	43.7	49.6	39.7	39.5	29.7	
26n	454432	284229	52.9	49.6	48.6	35.8	37.4	37.6	35.4	39.6		41.8	19.6	44.3	40.2	30.2	
27n	454476	284178	42.4	40.9	31.8	36.3	4.2	31.1	27.9	28.7	32.1	40.6	41.4	33.5	32.6	24.4	
28n	466535	285545	24.3	27	18.4	16.6	19	21.6	18.9	20.1	23.5	27	40.4	23.5	23.4	17.5	
29n	466651	285607	40.4	38.2	26.3	26	25.3	25.4	21.3	24.6	28.7	32.8	31.4	25.3	28.8	21.6	
30n	466651	285607	32.1	28.4	23.6	22.6	16	17.7	14.3	18.7	22.9	26.5	31.1	27.1	23.4	17.6	
31n	467933	294660	46.6	38.5	39.5	32	39.5	35.2	35.5	31.2	36.4	41.7	46.9	34.1	38.1	28.6	
32n	448065	287719	43.9	28.2	31	32.4	31.4	29.3	26.2	25	31.2		41.5	30.7	31.9	23.9	
33n	448948	286554	48.8	36.8	35	17.4	21.1	19.5	19.9	19.8	22.4	34.4	44.9	30.8	29.2	21.9	
34n	468143	294351	74.6	89.2	70.9	56.3	60.5	65.8	58.7	65.3	68.9	68.7	80.9	71.8	69.3	52.0	50.0
35n	468022	294450	62.4	64.5	52.9	48.3	47.1	47.8	44.1	45.2	48.5	51.3	52.2	52.4	51.4	38.5	34.9
36n	468309	294352	56.1	38.9	43.7	22.2	47.1	46.7	47.8	49.8	55.4	46.7	58.6	39.2	46.0	34.5	
37n	473749	287214	46.7	47.3	35.3	32.5	31.1	33	28.9	29.1	34.1	40.4	48	37.5	37.0	27.7	
38n	468403	294298	39.6	28.3	28.6	26	22.8	22.5	19.9	19.3	21.7	28.1	34.3	26.2	26.4	19.8	
39n	468412	294218	35.3	29.1	21.6	21.8	18.6	19	17	19.6	21.7	26.4	28	24.7	23.6	17.7	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)													
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (**0.75**) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
40n	468027	294570	39.4	34.4	29.7	19.5	20.6	22.5	22.6	27.4	31.1	33.4		28.4	28.1	21.1	
41n	468982	293824							16.3	15.3	25.3	28.3	35.8	26.5	24.6	19.3	
42n	469037	293796							22.6	18.1	28	29.9	38.6	27.6	27.5	21.6	
43n	453583	292002										27.9	32.4	28.6	29.6	19.1	
44n	453625	291935									29.4	31.9	37.3	33.7	33.1	22.8	
45n	456575	283605									20.1	27	33	24.8	26.2	18.1	
46n	473596	286821									36.9	44.6	44.3	55.9	45.4	31.4	
47n	473598	286851									36.2	40.3	39	41	39.1	27.0	
48n	473172	287534									32.5	37.4	44.4	37.2	37.9	26.1	
49n	473678	286931											50.8	37.1	44.0	26.0	

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

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

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.**

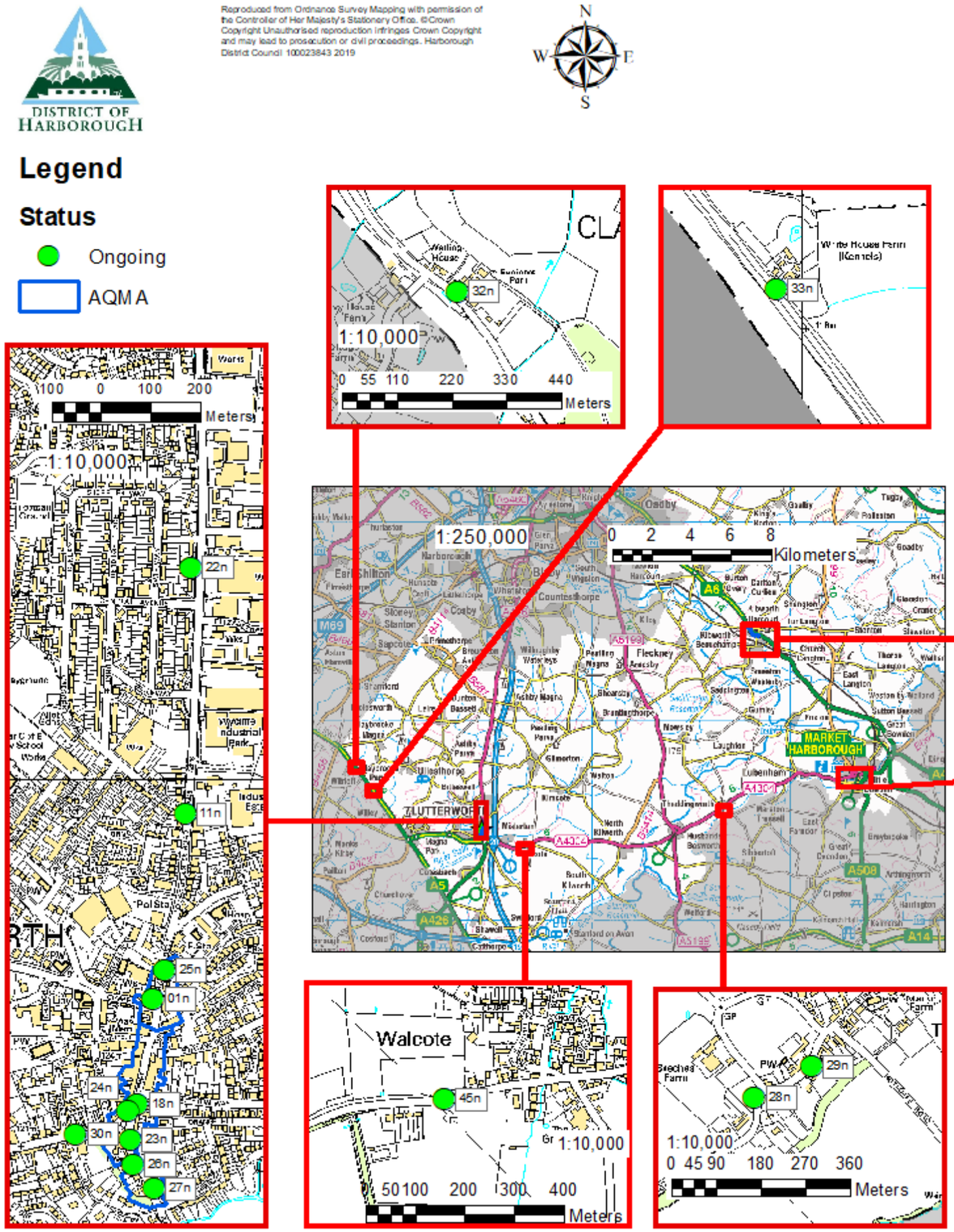
(1) See Appendix C for details on bias adjustment and annualisation.
(2) Distance corrected to nearest relevant public exposure.

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

Attachments

- Appendix C1 – Socotec Didcot Qa/Qc report
- Appendix C2 – Details and annualization calculations
- Appendix C3 – Façade correction calculations and data
- Appendix C4 – Microsimulation modelling
- Appendix C5 – Dispersion modelling of microsimulation modelling
- Appendix C6 - Cumulative Development Traffic Impact Study - Fleckney, Great Glen and the Kibworths_Jan_2017

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



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[6] 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	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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 (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References