2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: 30th September, 2021

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Executive Summary: Air Quality in Our Area

Air Quality in North Warwickshire Borough 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[1,2].

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The World Health Organization released new guidelines for several pollutants on 22 September 2021. PM10 target has been reduced to 15 µg/m³ and PM2.5 to 5 µg/m³ (annual average limit). The health implications of both $PM_{2.5}$ and PM_{10} which both can penetrate deep into the lungs and in the cast of PM2.5 into the bloodstream. Research from WHO suggest air pollution kills at least 7 million people a year worldwide[5]. These new lower targets and research will mean policymakers will need to consider the next step. The UK Government are aiming to introduce The Environment Bill before the end of 2021 and the draft bill includes new legally binding targets for these pollutants.

An additional ten diffusion tubes were distributed around the borough in 2020 bringing the total number to 29. Nitrogen dioxide levels were found to be below the national objective for all tubes except for one in 2019. An exceedance of the air quality objective for nitrogen dioxide was identified in the 2019 data for Tube 8 A5 Watling Street, Dordon (11). The levels in 2020 were below the objective for all diffusion tubes but this location will be

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[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

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

[5] World Health Organization: New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution 2021

closely monitored. The location appears to represent a localised hotspot as nearby tubes have not exceeded the objective.

The Borough Council is continuing to work in partnership through the Coventry and Warwickshire Air Quality Alliance, which is made up of the Borough, Districts County Council and City Council as well as and Public Health England.

The Council have adopted a new Local Plan on 29 September 2021 which includes:

LP31 Development Considerations

avoid and address unacceptable impacts upon neighbouring amenities through air quality.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[6] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[7] sets out 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.

The Council have adopted a new Local Plan on 29 September 2021 which includes:

LP31 Development Considerations

Avoid and address unacceptable impacts upon neighbouring amenities through air quality. As part of the Local Transport Plan, Warwickshire County Council has produced an Air Quality Strategy which details several measures that have been employed to improve air quality across the County. The Air Quality Strategy is contained in the Local Transport[8]

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[6] Defra. Clean Air Strategy, 2019

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

[8] Warwick County Council. Warwickshire Local Transport Plan 2011 – 2026, September 2021

Plan and can be seen in full at http://apps.warwickshire.gov.uk/api/documents/WCCC-630-116.

Conclusions and Priorities

North Warwickshire Borough Council is continuing to work in partnership through the Coventry and Warwickshire Air Quality Alliance, which is made up of the Borough, Districts County Council and City Council as well as and Public Health England.

The monitoring over this past 12 months has shown reduced levels of nitrogen dioxide with all monitoring sites below the national objective. The major trend of overall reduction likely to be due to the effects of reduced travel during the pandemic. For this reason the Council have decided to continue monitoring these sites during 2021. If exceedances are found in the next report, the Council will consider the options which include declaring an AQMA.

A priority for the coming year will be to evaluate and reduce complaints about burning.

Local Engagement and How to get Involved

If further information is required a copy of the previous Annual Status Report for North Warwickshire can be seen at Air Quality Annual Status Report ASR downloads | North Warwickshire (northwarks.gov.uk)[9]. Also, if you have any questions relating to air quality please contact the Environmental Health Department at North Warwickshire Borough Council on 01827 715341 or via e-mail at environmentalhealth@northwarks.gov.uk.

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[9] North Warwickshire Borough Council. Air Quality Annual Status Report ASR downloads, September 2020

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1 Local Air Quality Management

This report provides an overview of air quality in North Warwickshire Borough Council during 2020. 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 North Warwickshire Borough 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.

https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

2 Actions to Improve Air Quality

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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

North Warwickshire Borough Council currently does not have any declared AQMAs.

Progress and Impact of Measures to address Air Quality in North Warwickshire Borough Council

North Warwickshire Borough Council have taken direct measure to gather a better understanding of air quality issues in the area. An additional 10 diffusion tubes were distributed around the borough. These additional tubes have proven to be a worthwhile exercise as new hotspots/exceedances have been identified. An exceedance of the air quality objective for nitrogen dioxide was identified in the 2019 data for Tube 8 A5 Watling Street, Dordon (11). The level in 2020 was below the objective but this location will be closely monitored.

An Air Quality Supplementary Planning Document was also approved by the Council in September 2019 in a bid to help reduce air pollution issues at the planning stage[10]. This has helped to ensure the council are considering air quality with every development that needs planning consent.

The Borough Council is continuing to work in partnership through the Coventry and Warwickshire Air Quality Alliance, which is made up of the Borough, Districts County Council and City Council as well as and Public Health England.

The Council have adopted a new Local Plan on 29 September 2021 which includes:

LP31 Development Considerations

avoid and address unacceptable impacts upon neighbouring amenities through air quality

As part of the Local Transport Plan, Warwickshire County Council has produced an Air Quality Strategy which details several measures that have been employed to improve air quality across the County. The Air Quality Strategy is contained in the Local Transport Plan and can be seen in full at http://apps.warwickshire.gov.uk/api/documents/WCCC-630-116.

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

1. The council should include Public Health Outcomes Framework and the fraction of mortality, when discussing $PM_{2.5}$. The Council are encouraged to draw links to the framework (and specifically the $PM_{2.5}$ indicator) in future reports, in addition to a

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[10] North Warwickshire Borough Council. Supplementary Planning Documents, September 2019

discussion of historical trends, a comparison between North Warwickshire and England as a whole, and a comparison to neighbouring authorities.

2. Council should also include specific actions/measures to tackle $PM_{2.5}$ emissions.

The above points are addressed in section 2.3.

PM$_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16[11] (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 (see Public Health Outcomes Framework - Data - PHE[12] includes an indicator relating to the impact of particulate pollution on human health. Indicator D01 – Fraction of mortality attributable to particulate air pollution provides an estimation of the mortality burden associated with long-term exposure to PM2.5 as a percentage of the annual deaths from all causes in those aged 30+. The D01 indicator value for North Warwickshire is 5.4% in 2019. This is comparable to the regional average for the West Midlands (5.3%) and the national English average (5.1%).

The modelled background level provided by Defra for North Warwickshire are modelled to be between 7.8μg/m3 and 10.5μg/m3 for 2019, with the annual mean for 2019 being 8.7μg/m3.

The Air Quality Objective (AQO) for PM2.5 is an annual mean of 25μg/m3. However, the World Health Organisation (WHO) guideline value are more stringent for PM2.5. WHO updated their Global Air Quality Guidelines on 22 September 2021. The new update includes interim targets intended to guide reduction, as well as revised guideline levels, including (as annual mean concentrations):

- PM2.5 Interim targets of 35 / 25 / 15 / 10, and a guideline level of 5 μg/m

Modelling results show that all of the Borough is exceeding WHO guideline but is meeting the AQO.

North Warwickshire Borough Council is taking the following measures to address PM$_{2.5}$:

- Quantify and aim to reduce the number of complaints about smoke.

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[11] Local Air Quality Management Policy Guidance LAQM.PG16, May 2016.

[12] Public Health England. Public Health Outcomes Framework, September 2021

- Increase awareness on Air pollution issues. the council are arranging to bid for additional funding from the Defra Air Quality Grant. It will include a bid for an educational campaign on idling vehicles and burning.
- Link air quality to any new transport and climate change strategies.
- The Council will continue to inspect processes with environmental permits as per DEFRA guidance.

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

This section sets out the monitoring undertaken within 2019 by North Warwickshire Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

North Warwickshire Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 29 sites during 2019. Table A.1 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.

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.

3.1.2 Nitrogen Dioxide (NO_2)

Error! Reference source not found. Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 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.

The number of diffusion tube sites were increased from 11 to 19 in 2019 and from 19 to 29 in 2020. Therefore, we do not have five years of data for the majority of locations. The data has been displayed as a line graph of annual mean nitrogen dioxide levels and a bar chart of annual mean nitrogen dioxide levels for 19 sites from 2019 – 2020 in Figure A1

The annual mean level of nitrogen dioxide was found to be 46.8 μg/m3 for Tube 8 in 2019 which is greater than the objective level of 40 μg/m3. This location is not within an Air Quality Management Area (AQMA) and there are no current AQMAs in North Warwickshire. The level of nitrogen dioxide for Tube 8 was found to be below 40 μg/m3 in 2020 which is likely to be due to reduced travel during the coronavirus pandemic.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	Rowlands Way, Atherstone	Roadside	430762	298747	NO2	No	5.0	2.0	No	2.0
2	Penmire Close, Grendon	Roadside	427374	299431	NO2	No	2.0	2.0	No	2.0
3	Spon Lane, Grendon	Roadside	427835	299652	NO2	No	3.0	1.0	No	2.0
4	Bridge Street, Polesworth	Roadside	426183	302564	NO2	No	1.0	1.0	No	2.0
5	Long Street, Dordon Top	Roadside	426195	300310	NO2	No	1.0	1.0	No	2.0
6	Long Street, Dordon Bottom	Roadside	426178	300108	NO2	No	4.0	0.0	No	2.0
7	New Street, Dordon	Roadside	426055	300164	NO2	No	2.0	7.0	No	2.0
8	A5 Watling Street, Dordon (11)	Roadside	426136	300075	NO2	No	3.0	2.0	No	2.0
9	A5 Watling Street, Dordon (55)	Roadside	426025	300133	NO2	No	3.0	2.0	No	2.0
10	A5 Watling Street, Dordon (65)	Roadside	425943	300172	NO2	No	2.0	3.0	No	2.0
11	Old Ambulance Station, Dordon (A5)	Roadside	425811	300263	NO2	No	22.0	14.0	No	2.0
12	Kingsbury Water Park	Rural	420380	295902	NO2	No	N/A	N/A	No	2.0
13	Farthing Lane, Curdworth	Kerbside	418186	292959	NO2	No	10.0	0.0	No	2.0
14	Maud Road, Water Orton	Kerbside	418060	290943	NO2	No	10.0	0.0	No	2.0
15	Coleshill Heath Road, Coleshill	Other	419854	287041	NO2	No	N/A	N/A	No	2.0
16	Coventry Road, Coleshill	Roadside	420027	287360	NO2	No	5.0	1.0	No	2.0
17	Parkfield Road, Coleshill	Roadside	420120	288627	NO2	No	9.0	2.0	No	2.0
18	Church Hill, Coleshill	Roadside	420042	289079	NO2	No	0.0	1.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
19	High Street, Coleshill	Roadside	419983	289095	NO2	No	0.0	3.0	No	2.0
20	55 High Street, Coleshill	Roadside	419969	289197	NO2	No	4.0	0.0	No	2.0
21	Blythe Road A, Coleshill	Roadside	420024	289176	NO2	No	5.0	1.0	No	2.0
22	Blythe Road B, Coleshill	Roadside	420040	289199	NO2	No	16.0	2.0	No	2.0
23	Coleshill Road, Furnace End	Roadside	424876	291320	NO2	No	2.0	1.0	No	2.0
24	Coventry Road, Fillongley	Roadside	428051	287239	NO2	No	5.0	1.0	No	2.0
25	Victoria Road, Hartshill	Roadside	432733	293402	NO2	No	2.0	1.0	No	2.0
26	Church Road, Hartshill	Roadside	432560	293767	NO2	No	2.0	1.0	No	2.0
27	Coleshill Road, Atherstone	Roadside	430940	297759	NO2	No	1.0	1.0	No	2.0
28	Taxi Rank, Atherstone	Roadside	430717	297825	NO2	No	2.0	1.0	No	2.0
29	Long Street, Atherstone	Kerbside	430912	297773	NO2	No	3.0	3.0	No	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.2 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	NO2 Annual Mean Concentration (µg/m3)				
						2016	2017	2018	2019	2020
1	430762	298747	Roadside	91.7	95.9				19.8	14.0
2	427374	299431	Roadside	83.3	86.5	25.9	18.8	22.6	17.3	13.8
3	427835	299652	Roadside	91.7	95.9				18.0	13.6
4	426183	302564	Roadside	91.7	95.9				24.9	20.6
5	426195	300310	Roadside	91.7	95.9				29.4	22.5
6	426178	300108	Roadside	91.7	95.9					25.2
7	426145	300504	Roadside	91.7	95.9	23.8	32.1	29.9	28.6	20.6
8	426026	300135	Roadside	91.7	95.9				**46.8**	35
9	426025	300133	Roadside	91.7	95.9					35.1
10	425943	300172	Roadside	83.3	80.7					35.4
11	425811	300263	Roadside	91.7	95.9					23.7
12	420380	295902	Rural	91.7	95.9	22.9	22.9	21.7	20.1	14.1
13	418186	292959	Kerbside	91.7	95.9	21.7	22.8	22.1	18.6	15.4
14	418060	290943	Kerbside	91.7	95.9	23.2	27.5	32.5	26.8	20.9
15	419854	287041	Other	91.7	95.9				34.1	27.8
16	420027	287360	Roadside	83.3	88.1	29.6	30.2	28.4	28.2	19.7
17	420120	288627	Roadside	83.3	88.4					19.1
18	420042	289079	Roadside	83.3	87.6					18.5
19	419983	289095	Roadside	91.7	95.9					26.5
20	419969	289197	Roadside	91.7	95.9					24.7
21	420024	289176	Roadside	91.7	95.9				39.5	29.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	NO2 Annual Mean Concentration (µg/m3)				
						2016	2017	2018	2019	2020
22	420040	289199	Roadside	91.7	95.9					35.8
23	424876	291320	Roadside	91.7	95.9				28.5	21.0
24	428051	287239	Roadside	91.7	95.9				22.8	15.7
25	432733	293402	Roadside	91.7	95.9				26.1	20.4
26	432560	293767	Roadside	58.3	57.2				20.2	17.4
27	430940	297759	Roadside	75	79.8				26.0	19.0
28	430717	297825	Roadside	91.7	95.9					13.3
29	430912	297773	Kerbside	91.7	95.9	31.3	31.3	31.6	30.7	22.6

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

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

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

Notes:

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

Exceedances of the NO$_2$ annual mean objective of 40µg/m^3 are shown in **bold**.

NO$_2$ annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO$_2$ 1-hour mean objective are shown in **bold and underlined**.

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

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

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

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

Figure A.1 – Trends in Annual Mean NO$_2$ Concentrations
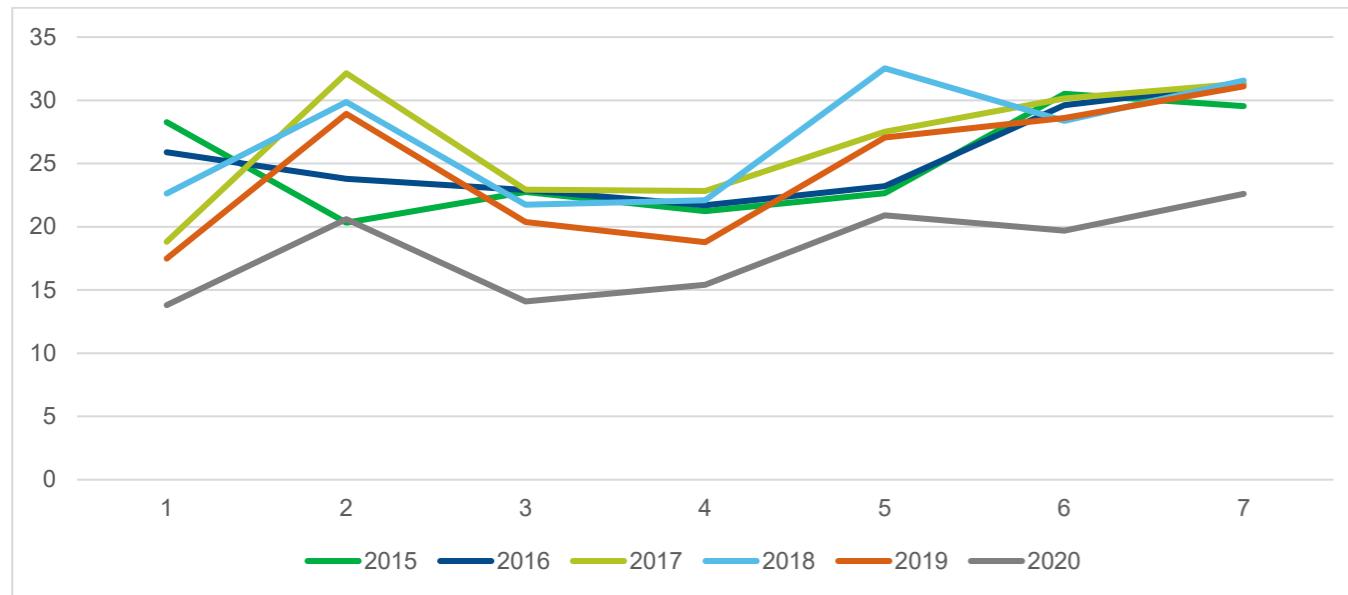
This graph shows the trend for annual mean nitrogen dioxide levels (µg/m3) from 2015 – 2020.
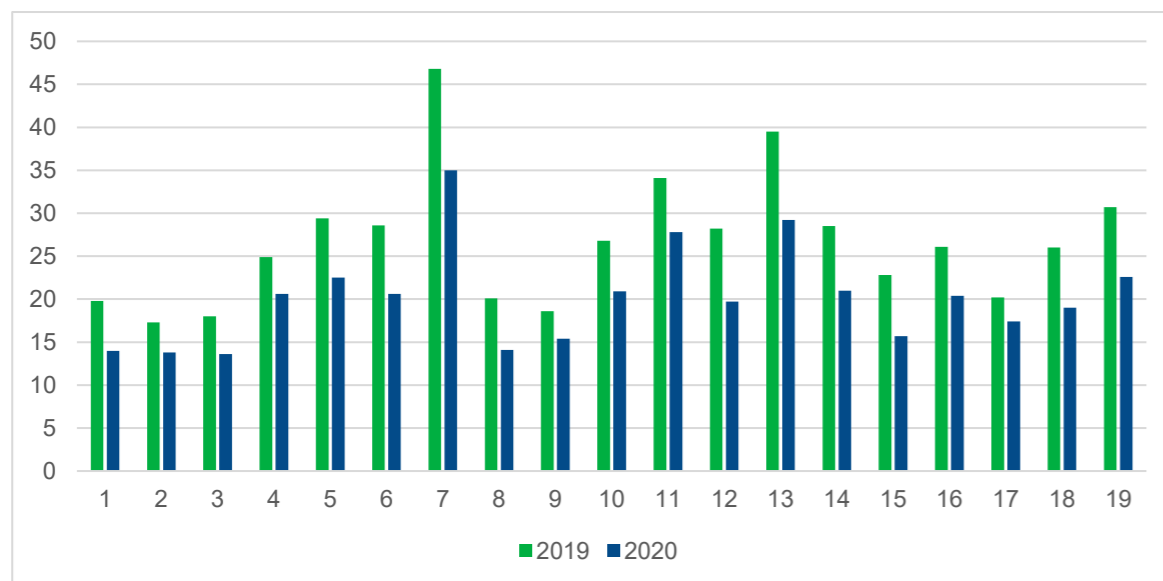
This graph shows the trend for annual mean nitrogen dioxide levels (µg/m3) for 19 sites from 2019 – 2020.

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO₂ 2020 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	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
1	430762	298747	28.6	18.4	13.2		13.5	14.8	12.1	14.0	18.0	19.3	20.3	23.7	17.3	14.0		
2	427374	299431	21.3	13.9	16.2			18.7	10.8	14.6	16.8	18.8	18.3	21.7	17.0	13.8		
3	427835	299652	27.3	17.1	15.0		11.8	14.2	11.3	12.7	16.9	18.3	20.1	23.1	16.8	13.6		
4	426183	302564	37.9	30.5	20.2		18.3	21.8	19.2	22.0	27.0	29.3	29.8	31.2	25.5	20.6		
5	426195	300310	35.7	30.0	23.4		21.0	25.4	20.8	26.7	28.3	31.2	32.6	36.5	27.8	22.5		
6	426178	300108	42.7	36.1	23.8		25.1	26.2	25.9	28.4	32.1	32.3	36.9	41.9	31.1	25.2		
7	426145	300504	39.0	28.8	20.0		17.5	20.6	21.5	21.2	27.2	28.5	30.7	31.6	25.4	20.6		
8	426026	300135	63.6	57.8	43.4		44.0	48.2	53.2	53.9	51.2	58.6	54.5	47.7	51.5	41.7	35.0	
9	426025	300133	56.8	47.7	40.9		34.8	45.7	36.6	40.9	51.5	40.1	36.2	47.7	43.3	35.1		
10	425943	300172			40.5		38.5	45.1	41.8	41.4	48.4	49.1	44.9	46.9	43.7	35.4		
11	425811	300263	39.7	34.4	20.9		19.1	23.9	20.1	24.0	30.9	36.6	40.8	43.0	29.3	23.7		
12	420380	295902	31.1	22.2	13.5		11.0	12.6	11.6	13.0	17.6	19.0	23.5	22.7	17.4	14.1		
13	418186	292959	28.8	22.4	16.6		13.1	14.5	12.0	15.1	20.1	21.0	21.6	27.6	19.0	15.4		
14	418060	290943	36.0	27.1	21.8		18.8	22.3	15.6	23.4	26.4	30.6	29.2	38.3	25.8	20.9		
15	419854	287041	51.8	48.0	24.1		22.5	25.0	27.6	29.8	38.9	40.2	38.2	43.7	34.3	27.8		
16	420027	287360	40.2	32.0	17.9		15.0	15.5	21.3	17.6	27.4		32.1	33.2	24.3	19.7		
17	420120	288627		27.0	18.7		15.3	18.9	18.7	20.5	28.7	29.9	29.5	34.0	23.5	19.1		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	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
18	420042	289079	32.1	22.9	15.5		14.3		18.0	18.6	23.5	30.6	28.9	33.9	22.9	18.5		
19	419983	289095	47.1	40.3	27.6		23.1	25.5	29.0	25.2	36.0	34.1	37.0	42.4	32.7	26.5		
20	419969	289197	42.8	34.0	26.3		18.7	25.4	20.5	26.1	32.9	35.8	37.6	42.6	30.5	24.7		
21	420024	289176	45.5	37.6	28.5		26.8	32.0	27.8	33.1	42.9	41.2	45.3	44.0	36.1	29.2		
22	420040	289199	59.3	49.4	35.5		32.6	42.7	32.8	50.8	45.4	44.7	51.2	53.6	44.2	35.8		
23	424876	291320	34.0	27.4	20.8		21.1	25.0	19.6	25.6	27.9	29.7	27.1	32.5	25.9	21.0		
24	428051	287239	27.4	19.7	15.8		13.9	20.6	12.7	18.3	20.9	23.1	19.3	26.6	19.4	15.7		
25	432733	293402	33.5	28.2	18.9		17.6	22.6	22.9	23.7	27.9	29.5	28.7	31.8	25.2	20.4		
26	432560	293767	25.0				15.5	18.0	17.0		21.1	24.6		35.2	21.9	17.4		
27	430940	297759	30.1		19.6		19.1		21.4	21.6	25.1	27.7	23.3	28.0	23.5	19.0		
28	430717	297825	23.5	16.5	13.2		11.2	13.8	11.6	14.1	18.0	18.3	20.7	24.2	16.4	13.3		
29	430912	297773	34.1	29.6	23.6		22.0	25.7	21.6	25.4	29.3	30.8	30.1	40.0	27.8	22.6		

☒ **All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **North Warwickshire Borough Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 North Warwickshire Borough Council During 2019

North Warwickshire Borough Council has not identified any new sources relating to air quality within the reporting year of 2019.

Additional Air Quality Works Undertaken by North Warwickshire Borough Council During 2019

The number of diffusion tube monitoring sites were increased from 19 to 29 in 2020.

QA/QC of Diffusion Tube Monitoring

Within this section provide details relating to the following aspects of non-automatic (i.e. passive) monitoring using diffusion tubes:

Gradko International Ltd were the supplier used for diffusion tubes within 2020 and the method of preparation was 20% TEA in water[13].

Gradko International Ltd is UKAS accredited (ISO: 17025) and participates in the AIR NO2 PT scheme15. This scheme forms an integral part of the UK NO2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). In the most recent AIR NO2 PT rounds AR042 and AR040 Gradko International Ltd achieved 25% and 75% satisfactory scores respectively.

Monitoring was not completed in adherence with the 2020 Diffusion Tube Monitoring Calendar. The tubes were left for a period longer than the recommended 5 weeks (+4 days) during March and April. The supplier of the tubes Gradko International Ltd was contacted and they advised that the data should be treated with caution. The Diffusion

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[13] LGC. Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme

(January 2019 – March 2021), March 2021

Tube Data Processing Tool was used both with and without this data and it was decided to keep it in as it not appear to significantly affect the annual averages.

The additional subsections should be used to provide QA/QC details of the data processing methodologies applied to diffusion tube monitoring data, specifically in relation to annualisation, bias adjustment and fall-off-with-distance calculations.

If you do not undertake diffusion tube monitoring, please delete this section.

Diffusion Tube Annualisation

If annualisation was required for any non-automatic monitoring sites, the sites requiring annualisation should be clearly defined along with details of the calculation method undertaken provided in Table C.2. Annualisation is required for any site with data capture less than 75% but greater than 25%.

Tube 26 required annualisation as the data capture was less than 75% but greater than 25%.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 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.TG16[14] provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

North Warwickshire Borough Council have applied a national bias adjustment factor of 0.81 to the 2020 monitoring data. A summary of bias adjustment factors used by North Warwickshire Borough Council over the past five years is presented in

Table C.1.

Provide discussion in relation to the bias adjustment factor chosen; a national factor or a local factor.

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[14] Local Air Quality Management Technical Guidance LAQM.TG16. April 2021.

A national bias adjustment factor has been used.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	06/21	0.81
2019	National	03/19	0.92
2018	National	- (1)	0.93
2017	National	- (1)	0.89
2016	National	- (1)	0.94

(1) Version of the spreadsheet not recorded

19

NO$_2$ Fall-off with Distance from the Road

Fall-off-with distance calculations were required for Tube 8 A5 Watling Street, Dordon (11)

non-automatic annual mean NO$_2$ concentrations corrected for distance are presented in Table B.1 and Table C.4.

Table C.2 – Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor Coventry Allesley	Annualisation Factor Telford Hollinswood	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
26	0.9645	0.9873			0.9759	21.9	21.4	

Table C.3 – NO₂ Fall off With Distance Calculations (concentrations presented in µg/m³)

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
8	2.0	5.0	41.7	10.4	35.0	

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

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

Tube 1

Tube 2

Tube 2

Tube 3

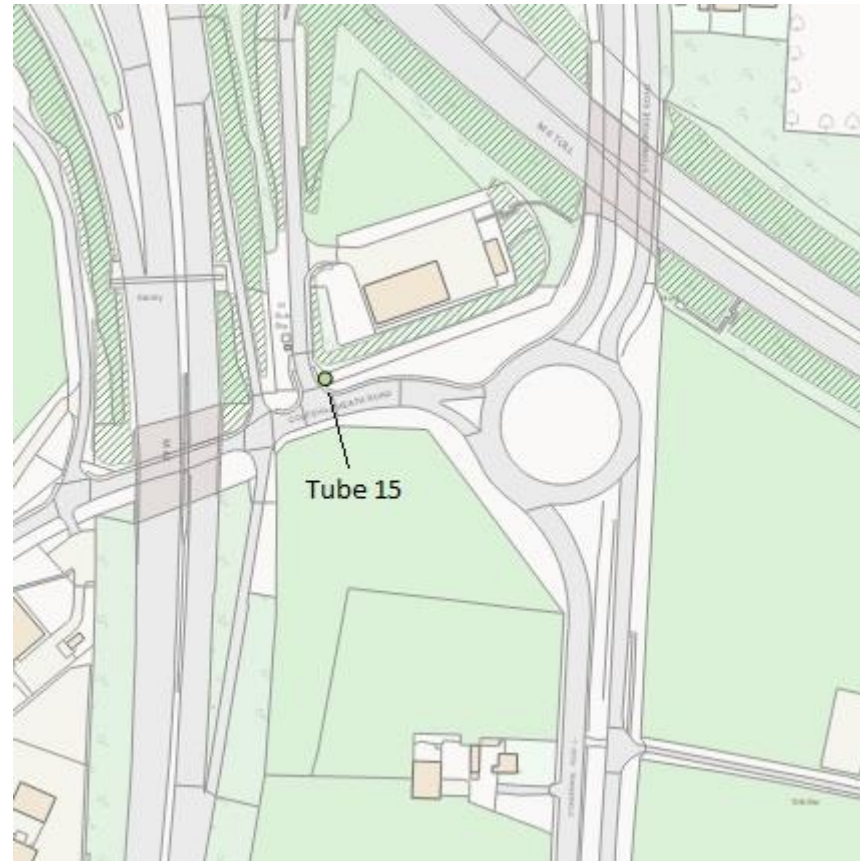Tube 3

Grendon

Tube 4

Tubes 5 to 11

Tube 12

Tube 13

Tube 13

Tube 14
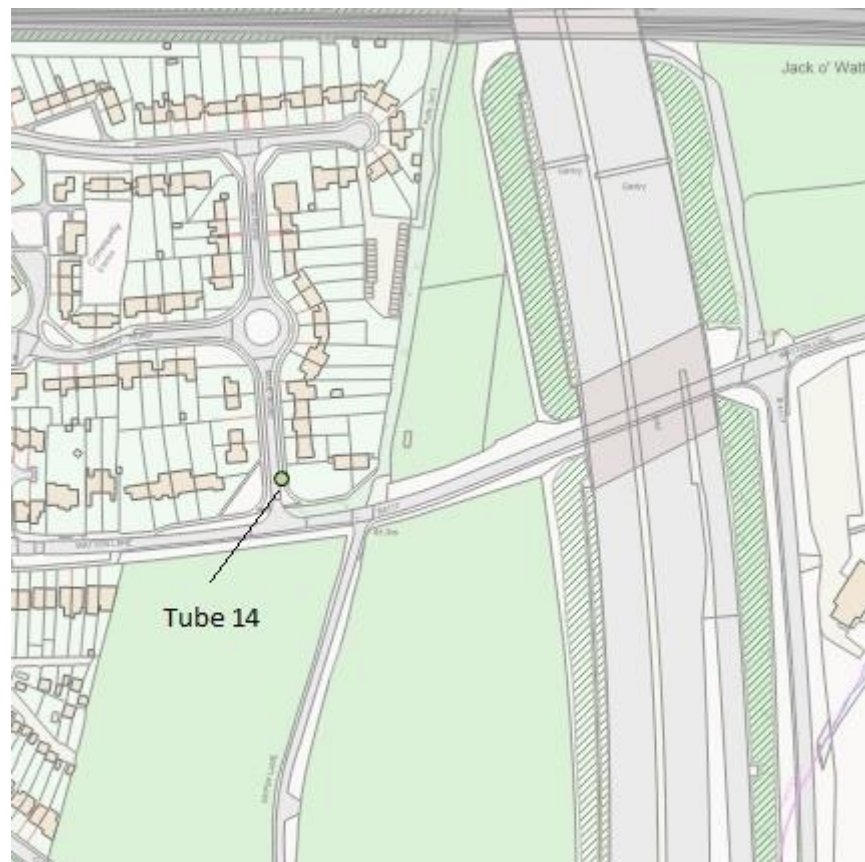
Tube 14
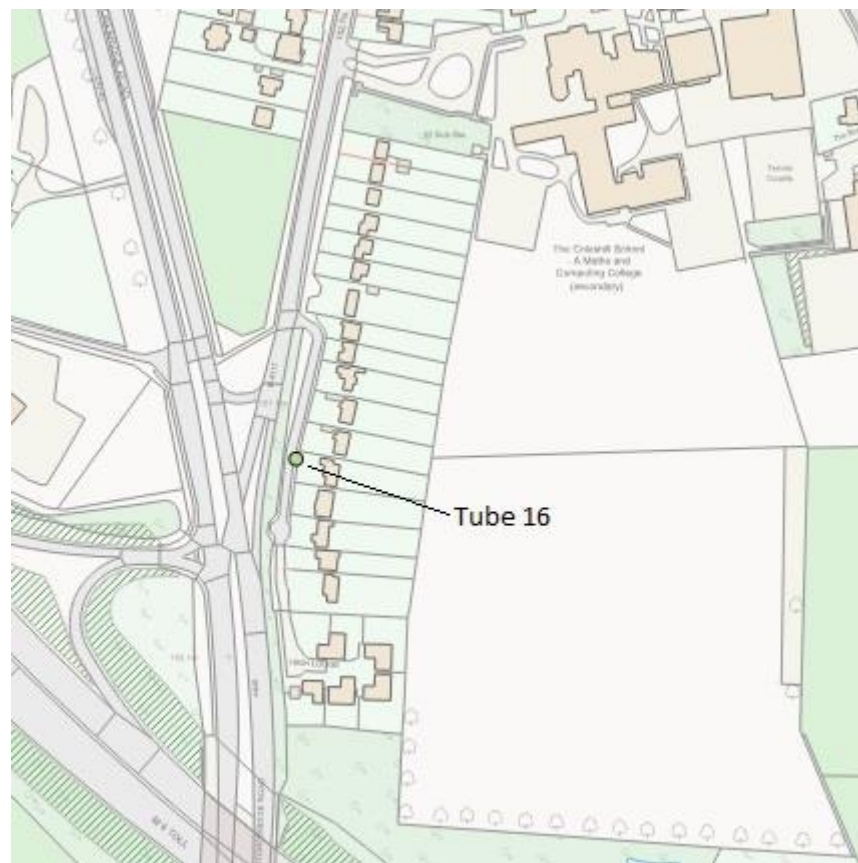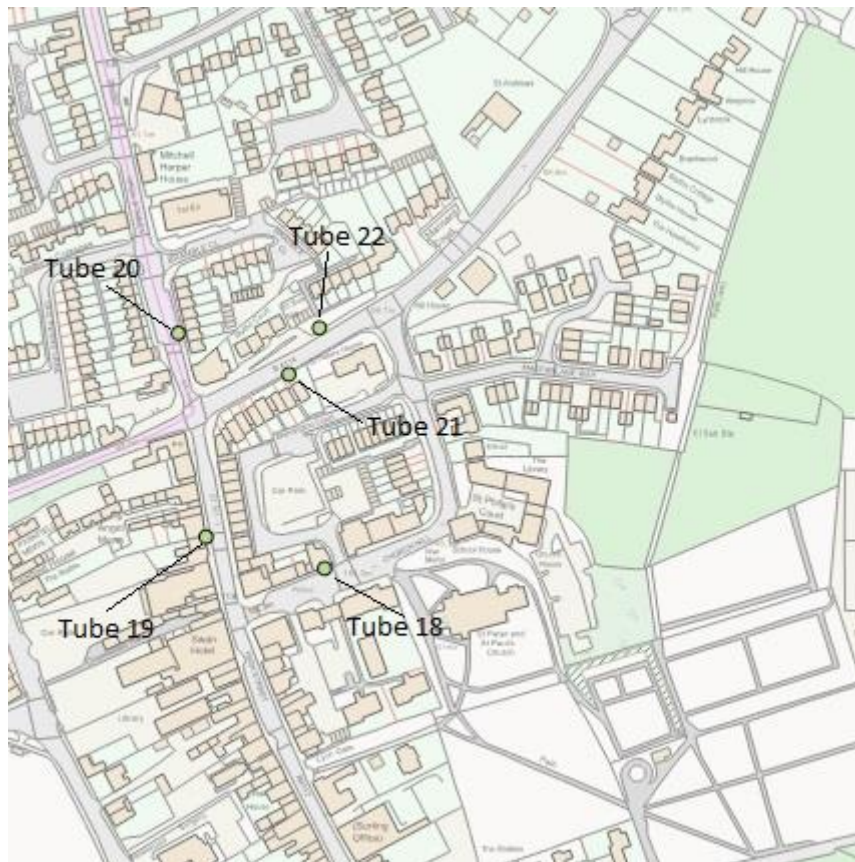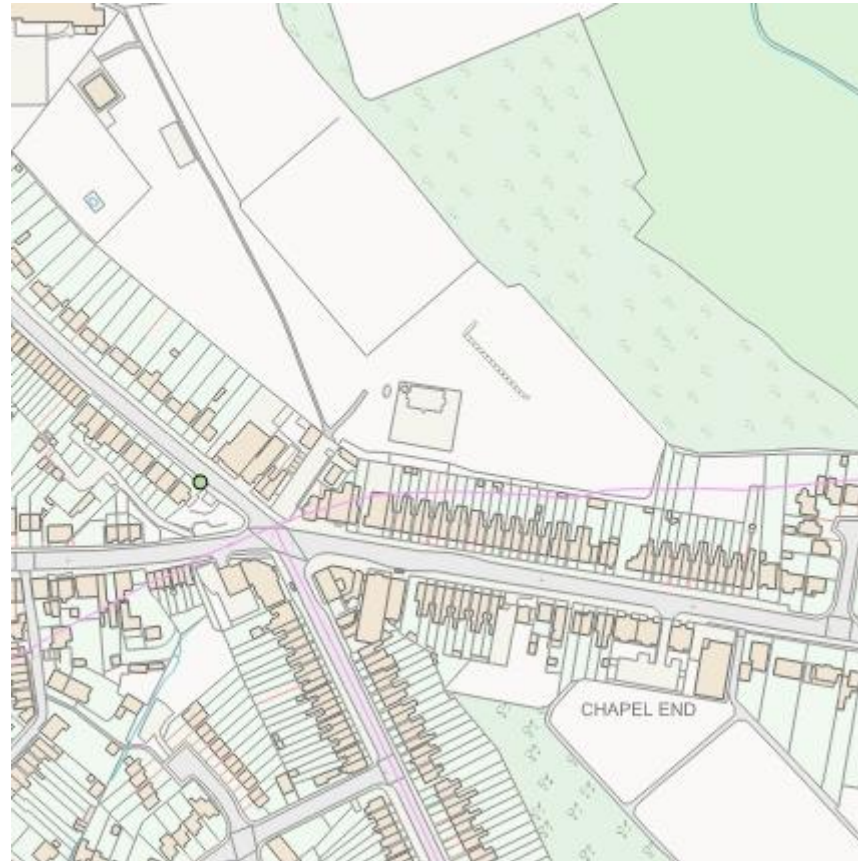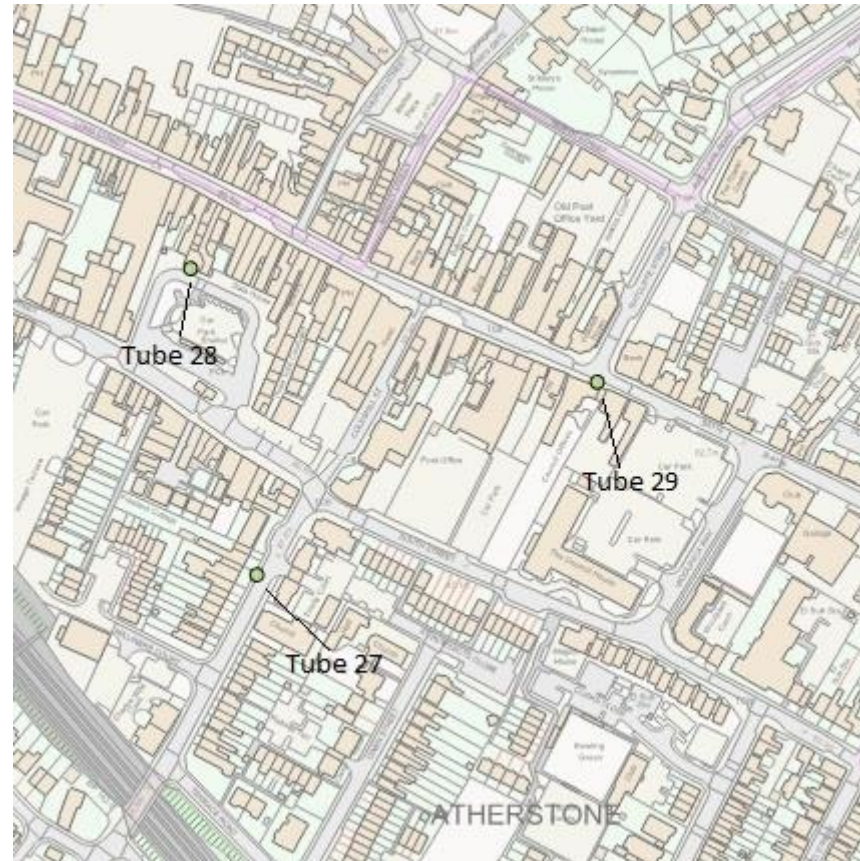
Tube 15

Tube 15

Tube 16

Tube 17

Tube 18 to 22

Tube 23

Tube 24

Tube 25

Tube 26

Tube 26

Tube 27 to 29

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[15]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO$_2$)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO$_2$)	40µg/m^3	Annual mean
Particulate Matter (PM$_{10}$)	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM$_{10}$)	40µg/m^3	Annual mean
Sulphur Dioxide (SO$_2$)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO$_2$)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO$_2$)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[16] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[17] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

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[16] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[17] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in PM$_{2.5}$ concentrations were less marked than those of NO$_2$. PM$_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that PM$_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within North Warwickshire Borough Council

Figure A1 includes a graph showing the trend for annual mean nitrogen dioxide levels (µg/m3) for 19 sites from 2019 to 2020. The number of sites was increased from 7 in 2018 to 19 in 2019 and 29 in 2020 so there is little data for many locations. Figure A1 shows that there was a reduction in nitrogen dioxide measured at 19 sites during 2020 when compared with 2019. Traffic numbers are not available.

Opportunities Presented by COVID-19 upon LAQM within North Warwickshire Borough Council

No LAQM related opportunities have arisen as a consequence of COVID-19 within North Warwickshire Borough Council.

Challenges and Constraints Imposed by COVID-19 upon LAQM within North Warwickshire Borough Council

Challenges and constraints relating to LAQM have arisen during 2020 as a consequence of COVID-19. These challenges are outlined below, with their impacts assessed in line with guidance presented within the LAQM Impact Matrix provided within Table F 1.

1. Passive Monitoring – Adherence to Changeover Dates. Tubes left out for two exposure periods.   Impact Rating: Small.
2. Passive Monitoring – Storage of Tubes. Tubes stored for longer than normal but adhering to laboratory guidance. Impact Rating: Small.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

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 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 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

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12. Public Health England. Public Health Outcomes Framework, September 2021

13. LGC. Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (January 2019 – March 2021), March 2021

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