



2022 Air Quality Annual Status Report (ASR)

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

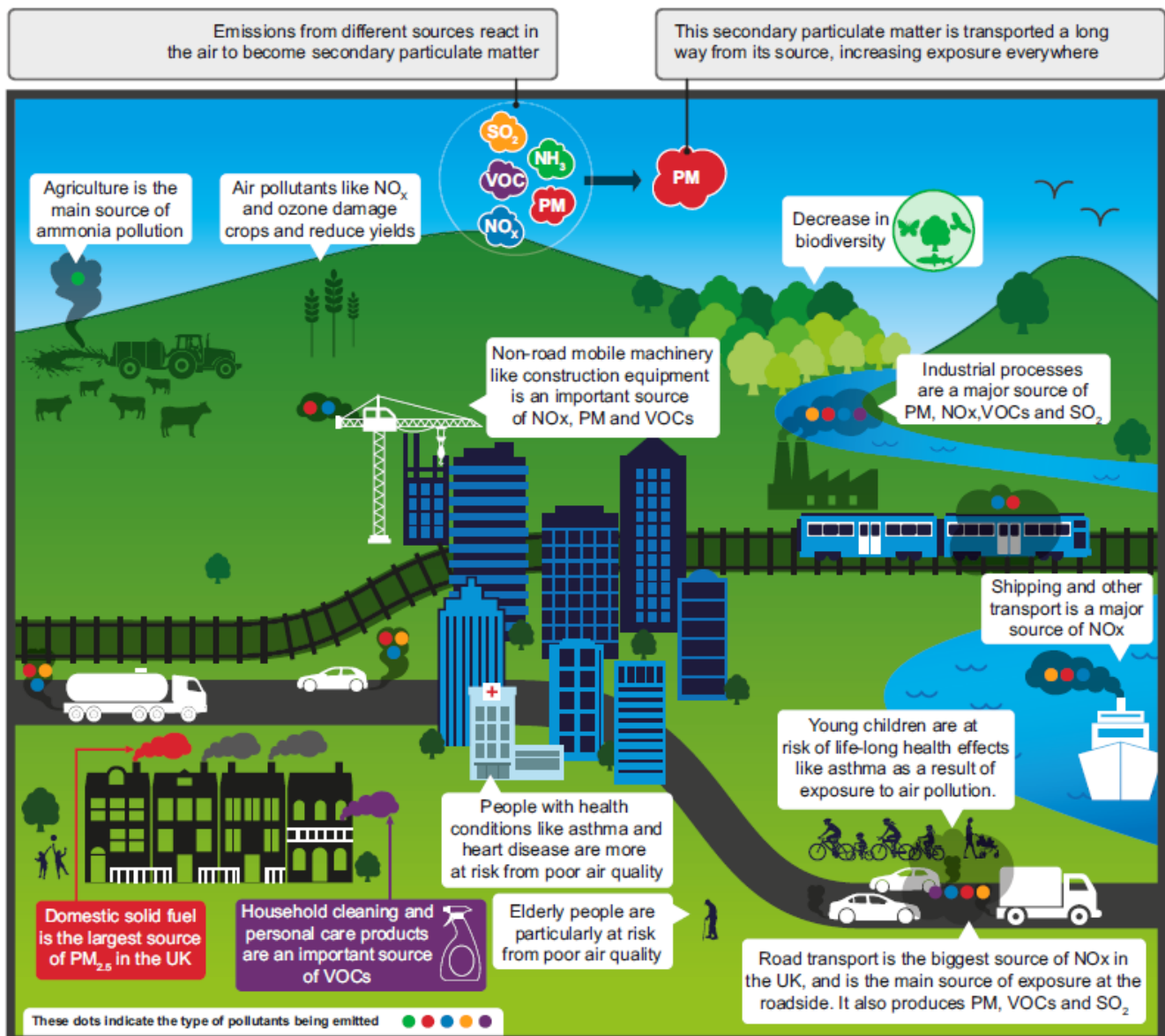
Date: July, 2022

Information	Gedling Borough Council Details
Local Authority Officer	Brendan Cox
Department	Public Protection
Address	Civic Centre, Arnot Hill Park, Arnold, Nottinghamshire, NG5 6LU
Telephone	0115 9013901
E-mail	environmental.health@gedling.gov.uk
Report Reference Number	GBC/ASR-2022
Date	08/07/2022

Executive Summary: Air Quality in Our Area

What is Air Pollution?

Air pollution is defined as a mixture of gases and particles that have been emitted into the atmosphere by man-made processes. The combustion of fuels such as: Coal, Oil, Gas, Petrol or Diesel and Wood Burning; are the most significant sources of the key pollutants of concern to Local Authorities.



Types of pollution	Ammonia (NH₃)	Primary Particulate Matter (PM_{2.5})
Nitrogen oxides (NO_x)	Sulphur dioxide (SO₂)	Volatile organic compounds (NMVOCs)

Source – Defra 2017

What are Particles?

Particle pollution (also called particulate matter or PM) is the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.

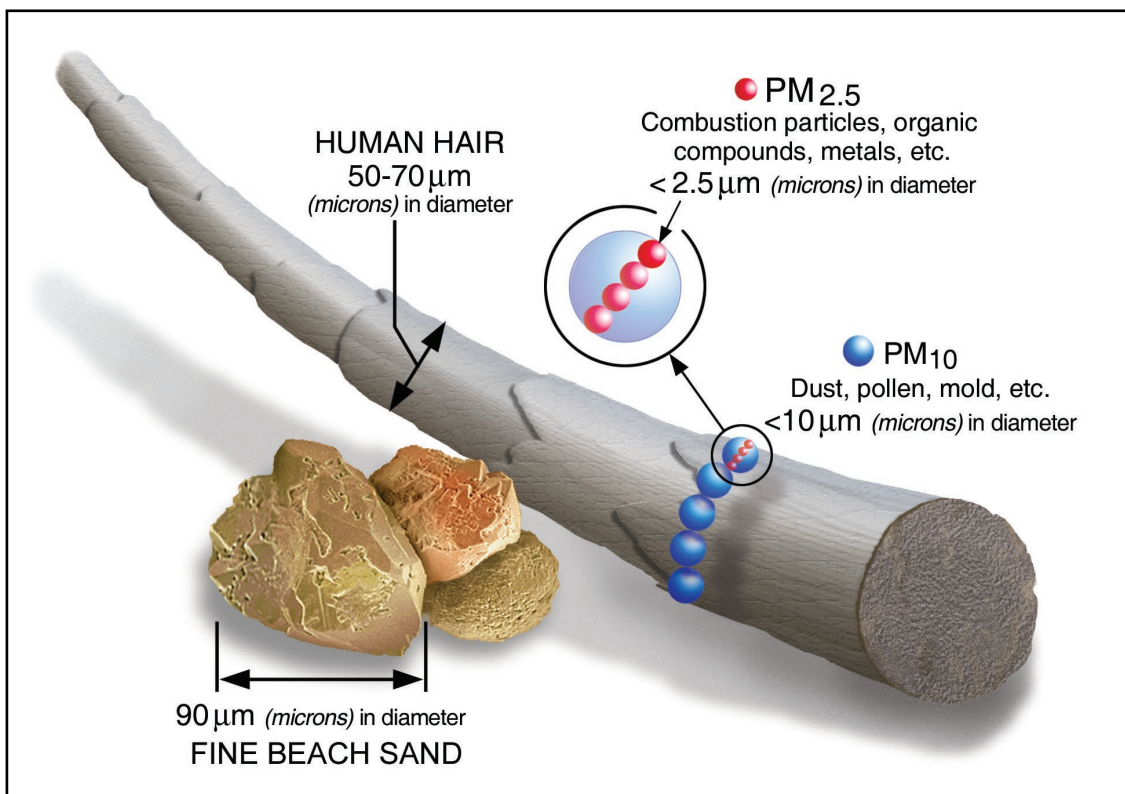
Particulate matter is made of lots of different sorts of things including: vehicle exhausts; poorly combusted fuel; particles of metal from engine chambers; bits worn from brake pads; bitumen asphalt or concrete dust work from the road; biological and other waste ground up on the road; and it's formed by reactions between other pollution in the air too.

How big is Particle Pollution?

Particle pollution includes "inhalable coarse particles," with diameters larger than 2.5 micron (μm) and smaller than $10\mu\text{m}$ and "fine particles," with diameters that are $2.5\mu\text{m}$ and smaller.

How small is $2.5\mu\text{m}$? Think about a single hair from your head. The average human hair is about $70\mu\text{m}$ in diameter; making it 30 times larger than the largest fine particle.

(See diagram below)



Source: [US EPA Particle Matter Basics](#)

These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles, known as **primary particles** are emitted directly from vehicles and road surfaces, chimney stacks, dust from storage areas, spoil heaps, emissions from buildings (ventilation, boilers and solid fuel combustion), materials handling and construction sites.

Particles may form when substances react in the atmosphere. These are often from the oxidation of sulphur and nitrogen oxides, which form nitrates and ammonium salts. These are usually less than 10µm diameter, and originate from combustion and natural sources; these particles, known as **secondary particles**.

What is Nitrogen Dioxide?

Nitrogen dioxide is a brown gas, with the chemical formula NO₂. It is chemically related to nitric oxide, a colourless gas with the chemical formula NO. These abbreviations are often used instead of writing the names of the chemicals in full.

Together, NO and NO₂ are known as Nitrogen Oxides or NO_x. NO_x is released into the atmosphere when fuels are burned (for example, petrol or diesel in a car engine or natural gas in a domestic central heating boiler).

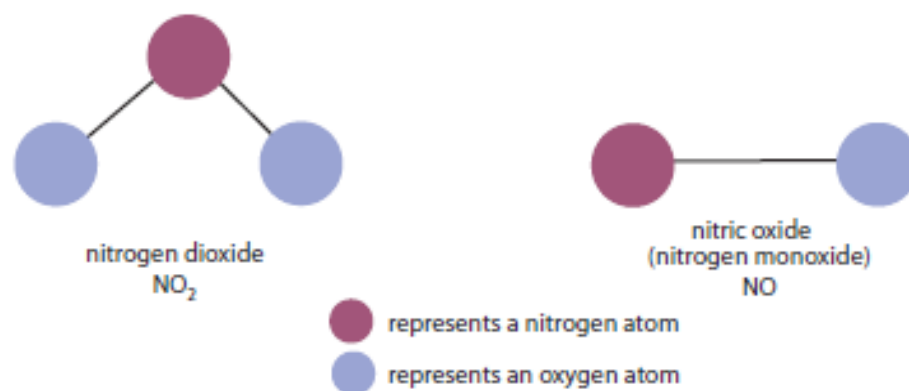


Diagram of the structures of NO₂ and NO

NO_x emissions from burning fossil fuels are mainly as NO, but some sources can release a lot of NO_x as NO₂. These **primary** NO₂ emissions are particularly important from diesel vehicles (especially when moving slowly), and can make up as much as 25% of the total NO_x emissions from this source.

One reason for this is as a side-effect of measures that have been developed to reduce emissions of particulate matter (PM) from diesel vehicles by treating the exhaust using diesel particulate filters.

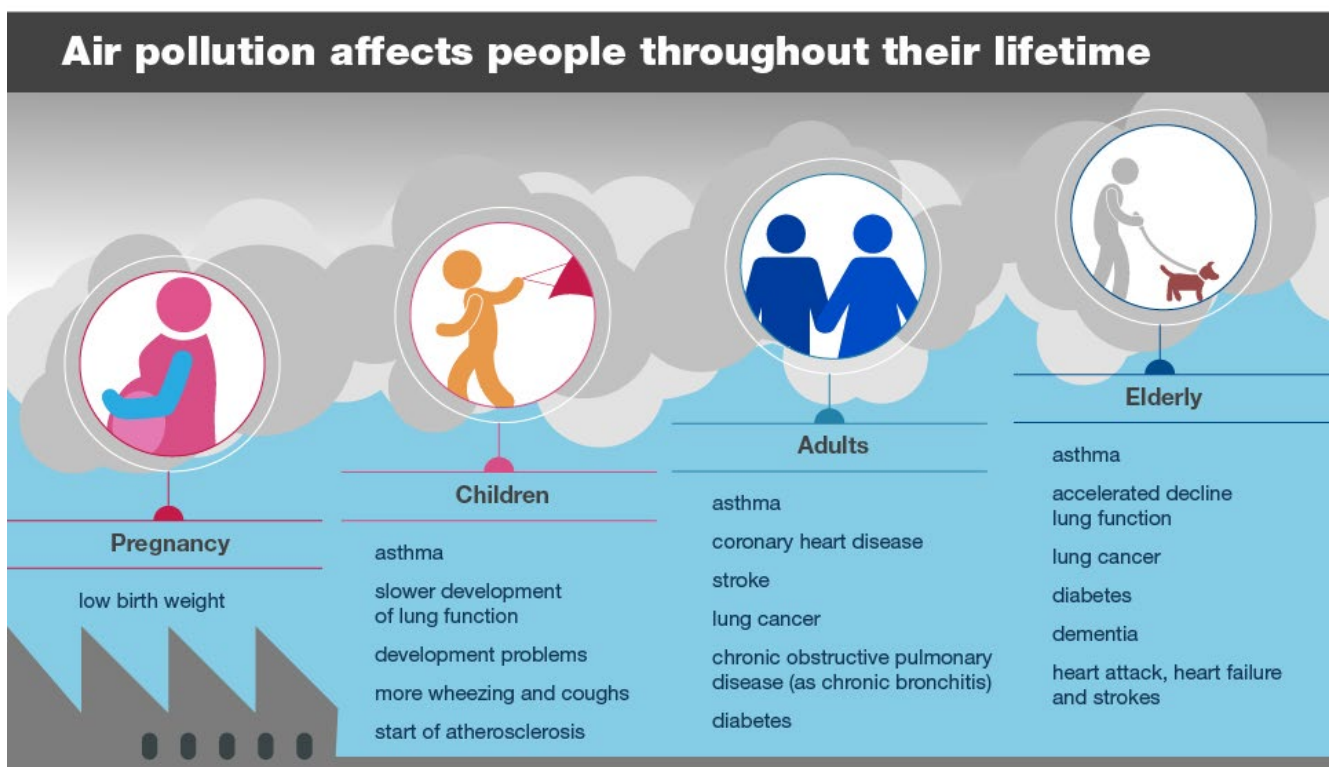
These primary NO₂ emissions can lead to high concentrations of NO₂ at the roadside, especially where there are many diesel vehicles.

NO₂ is also formed in the atmosphere in a chemical reaction between NO and ozone (O₃). Because this NO₂ is not released straight into the atmosphere, but is formed there by a chemical reaction, it is known as **secondary** NO₂.

Sometimes this reaction cannot take place because there is not enough O₃ for the NO to react with. This is most common close to where NO is released, for example, nearby busy roads.

Why Should I Be Concerned?

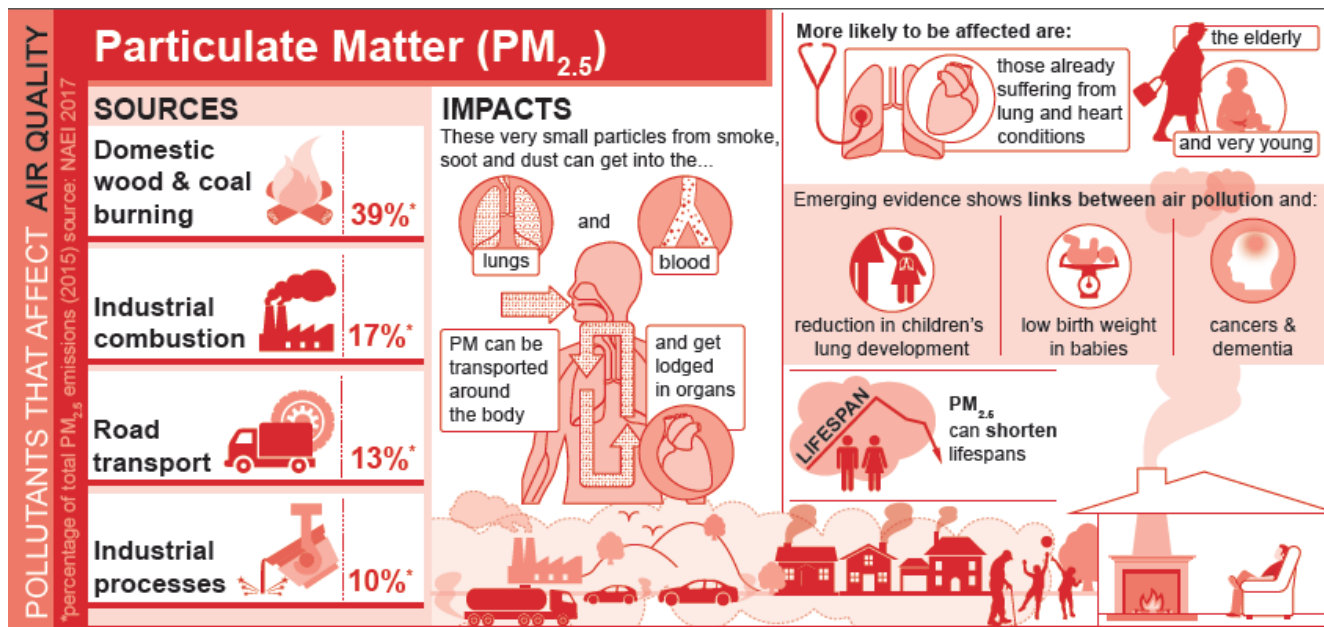
Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer.



Source – Public Health England 'Health Matters' 2018

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 health inequalities 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 ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.



Source: DEFRA 2017

Fine (PM_{2.5}) and ultrafine (PM_{0.1})⁵ particulates can cause these problems because they are so small that they can be drawn into the lungs and can pass into the bloodstream. Once there it is transported around the body and can be deposited in body issues and interfere and affect the body's metabolic processes. As particulate matter is made up of a range of different chemical compounds and materials it can affect the body's processes in different ways.

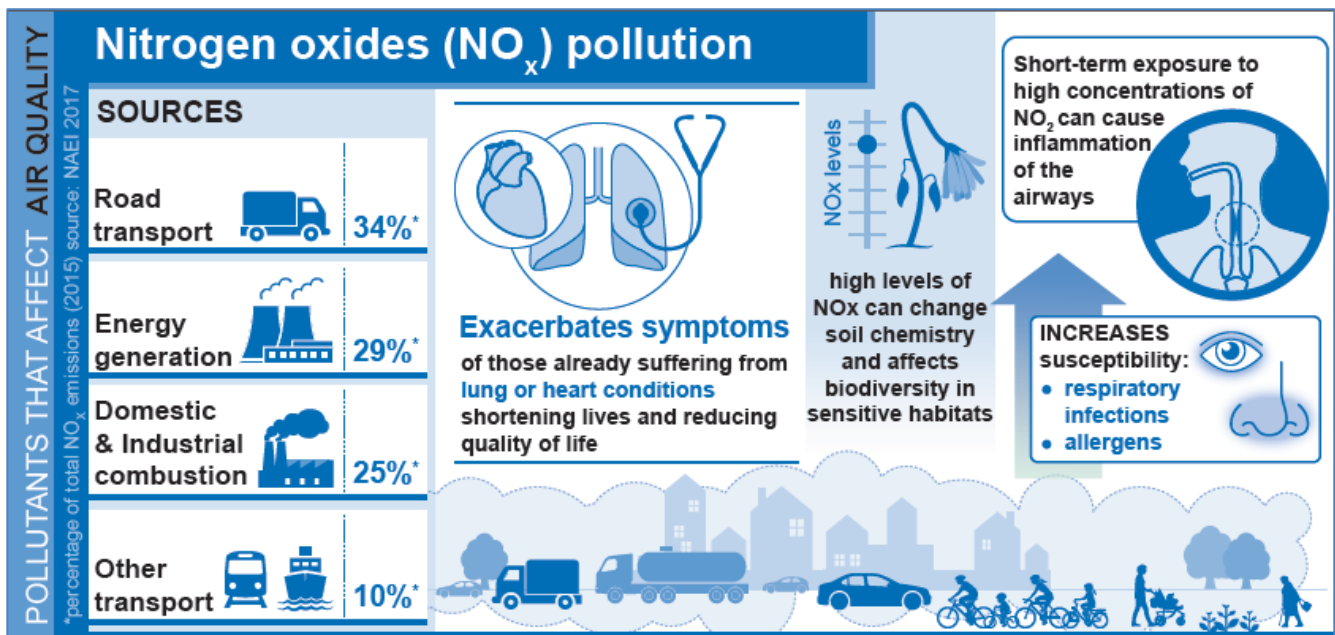
¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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 PM_{0.1}; particles that are less than 0.1 µm in diameter



Source: DEFRA 2017

Studies have shown associations of nitrogen dioxide (NO₂) in outdoor air with adverse effects on health, including reduced life expectancy. It has been unclear whether these effects are caused by NO₂ itself or by other pollutants emitted by the same sources (such as traffic). Evidence associating NO₂ with health effects has strengthened substantially in recent years and we now think that, on the balance of probability, NO₂ itself is responsible for some of the health impact found to be associated with it in epidemiological studies.⁶

Estimating the Impacts of Air Pollution to your Health

The UK Committee on the Medical Effects of Air Pollutants (COMEAP) examined existing papers compiled in a number of countries, including the UK, looking at the effect that long-term exposure to NO₂ may have on mortality.

However, after several years of analysis and deliberation over the available data, Committee members concluded that uncertainty in assessing the impact of NO₂ individually compared to other pollutants, such as PM_{2.5}, made it difficult to arrive at an individual figure wholly attributable to NO₂.

One reason for this is that both pollutants can often be emitted from a single source, for example from road transport, meaning that it can be difficult to differentiate between the individual effects of each pollutant.

⁶ GOV.UK Webpage [Statement on the evidence for the effects of nitrogen dioxide on health](#)

The report⁷ does include exploratory calculations based on both PM_{2.5} and NO₂, using information from studies in which the overlap of effects associated with the two pollutants has been accounted for; although there was disagreement within the committee a majority view was published:

“the range of estimates of the annual mortality burden of human-made air pollution in the UK is estimated as an effect equivalent to 28,000 to 36,000 deaths.”

These figures are thought to be the closest overall estimate to the mortality impact of air pollution in the UK – however as more research on the impacts of nitrogen dioxide is carried out, this could yet be further refined.

Public Health England (PHE) publishes an annual indicator in the Public Health Outcome Framework relating to air quality⁸. The indicator is a summary measure of the impact on death rates of long term exposure to man-made particulate air pollution.

PHE have also estimated the mortality burden are based on modelled annual average concentrations of fine particulate matter (PM_{2.5}) in each local authority area originating from human activities, based on the attributable mortality in 2010.

Using this information and the COMEAP lower level of confidence figure for both particles and NO₂ (28,000 deaths) local Environment Health Teams working with County Council Public Health have calculated the following local estimates for particles and NO₂: **Table i.**

⁷ Committee On The Medical Effects Of Air Pollutants: [Associations of long-term average concentrations of nitrogen dioxide with mortality](#),

⁸ Public Health Profiles, [PHE Online](#)

Table i: Estimated effects on annual mortality in 2019 of human-made PM_{2.5} and NO₂ air pollution.

Area	Attributable Fraction	Attributable* deaths aged 25+	Associated Life-years Lost
EAST MIDLANDS	5.3	3,052	30,878
Nottingham City	5.7	171	2,004
Gedling Borough	5.4	78	807

Sources: local secondary analysis combining:

- PHE Public Health Outcomes Framework (Indicator 3.01) (last accessed May 2021)
- ONS Mortality 2019 (last accessed via NOMIS May 2021)
- COMEAP "Mortality Effects of Long-Term Exposures to Particulate Air Pollution in the United Kingdom" (2010)

* in reality, air pollution is likely to contribute a small amount to the deaths of a larger number of exposed individuals rather than being solely responsible for the number of deaths equivalent to the calculated figure of attributable deaths.

Air Quality in Gedling Borough

The main pollutants of concern in the Borough relate to the tail pipe emissions from motor vehicles. As such the main commuter routes into Nottingham, through the Borough, are the main areas of concern: the A60 Mansfield Road, A612 Colwick Loop Road and B684 Mapperley Plains/Woodborough Road. Ambient background levels are affected by emissions from domestic heating: NO_x from domestic gas boilers and PM from wood/coal burners.

Nitrogen Dioxide is the primary pollutant of concern in the Borough; Gedling Borough has an Air Quality Management Area (AQMA) along the A60 Mansfield Road. Nitrogen Dioxide monitoring results for the last year (2021) show no exceedances within the AQMA, but continue to be of concern in the AQMA and along the Colwick Loop Road.

Background levels of PM_{2.5} across the Borough are modelled to be over the World Health Organisation guideline level, which was revised down in late 2021 to 5 µg/m³ (micrograms per cubic metre). Currently there is no Air Quality Objective for PM_{2.5}; the Environment Act 2021 is due to set this.

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 Strategy⁹ sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero¹⁰ 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.

Due to the traffic related issues of our AQMA and more widely across the Borough the Council works with colleagues from the County Council Highway Department to implement actions to help:

- Ease congestion thereby maintaining a flow of traffic (reducing the stop/start)
- Promote Public Transport use.
- Promote cycling/walking as an alternative.

More generally the Public Protection Service works with colleagues in the Planning Service to ensure air quality issues are considered in the forward planning process and during consultation for new developments.

Below is a brief summary of core actions to target sources of pollution in Gedling over the past year.

⁹ Defra. Clean Air Strategy, 2019

¹⁰ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Local Planning Document - Guidance on Air Quality Mitigation

Informal guidance on Air Quality has been prepared to set out the measures, which will be taken to help reduce vehicle emissions that occur as a result of development proposals. ([Link to Guidance on Air Quality Mitigation](#)) The guidance applies across the whole Borough in order to improve air quality and avoid other areas having to be designated as AQMAs. At the present time the guidance carries some weight as a material consideration in determining planning applications; the Council seeks agreement with developers to include many of the mitigation measures on a voluntary basis.

The Council's Local Planning Document was published and adopted in the summer of 2018. The Plan includes **Policy LPD11: Air Quality** which states:

Planning permission will not be granted for development proposals that have the potential to adversely impact on air quality, unless measures to mitigate or offset their emissions and impacts have been incorporated, in accordance with the Council's Air Quality and Emissions Mitigation guidance and other associated guidance documents.

In areas where air quality is a matter of concern, development proposals will be required to deliver a positive impact on air quality.

Development proposals must not exacerbate air quality beyond acceptable levels, either through poor design or as a consequence of site selection.

This will bring the requirements of the guidance into the statutory development plan giving it more weight.

Marketing and promotion of sustainable transport alternatives

Both the County Council and Gedling Borough Council continue to develop and deliver programmes to encourage more sustainable travel. These include infrastructure improvements such as the County Council's integrated transport programme delivering improvements for pedestrians, cyclists and bus users; as well as marketing materials and campaigns developed in partnership with stakeholders such as passenger transport operators

Car Club partnership

Work has been undertaken to investigate the feasibility of a partnership with a Car Club operator in the county, for both residents and internal use (i.e. staff travel), which will feed into a wider review of fleet and staff business travel.

Electric Vehicle Cable Channels

The County Council continues to work on developing the EV charging infrastructure network within the county. A report on 'On-street Electric Vehicle Charging Infrastructure' was considered at the Transport & Environment Committee in February 2022, and approval was granted for the introduction of an Electric Vehicle Cable Channel pilot scheme. Work is currently underway to finalise the details of the pilot scheme.

Bus Service Improvement Plans (BSIP)

NCC have developed two Bus Service Improvement Plans (BSIP) for Nottinghamshire; the BSIP for the Greater Nottinghamshire (Robin Hood) area, which was developed in partnership with Nottingham City Council, and the BSIP for Nottinghamshire. The plans, which were approved at the Transport & Environment Committee in November 2021, outline the Council's ambitions for improving bus services within the county.

Effective network management

The County Council continues to work with stakeholders to effectively manage its highway network. This includes the co-ordination of works, contingency planning, and effective event and incident planning.

Workplace Travel Plans

Gedling Borough Council and Nottinghamshire County Council have completed a council travel plan to help promote sustainable travel amongst staff as part of both their journeys to work and whilst undertaking Council business. Travel Plans are also developed with businesses through the development control process

Conclusions and Priorities

Conclusions from the following report include:

- The results of diffusion tube monitoring for 2021 (Table A3) show no exceedances inside the AQMA; all other monitoring results tend to indicate levels below the objective.
- Trends of monitoring carried out the Nitrogen Dioxide indicate a declining level of this pollutant.
- All monitoring results within existing AQMA were below the air quality objective; generally monitoring results have returned to pre-pandemic levels but still below the objective. Results in the AQMA appear to be following a declining trend and continue to be below the objective; at this time we continue to hold a watching brief with regard to revocation, with a view to being able to potentially remove the AQMA in 2023/2024; if results continue to be favourable.

Priorities for the coming year are predominantly through measures to make the best use of the transport networks and through smarter travel measures that will encourage people to travel more sustainably. Measures will include:

- Ongoing effective land use planning and securing of appropriate levels of developer contributions for mitigation (including travel planning) and sustainable transport improvements
- Measures to encourage the take-up of low emission vehicles, including charging infrastructure and promotion events; and through the Bus Quality Partnerships, including the purchase of new vehicles and the retrofitting of buses
- Ongoing management of on-street parking to help keep traffic moving
- Traffic control and information provision to minimise disruption and delay on County Council managed roads (including the A60) such as contingency planning, the effective co-ordination of works and the provision of real-time travel information
- Travel planning such as the development of new travel plans at businesses across the county through planning conditions
- The encouragement of smarter travel behaviour such as the marketing and promotion of passenger transport, walking and cycling, provision of cycling and walking route maps, cycle training programmes, and web-based journey planners
- Enhancements to the local cycling and walking networks

- The facilitation of smarter travel behaviour such as the provision of a car sharing scheme and integrated and concessionary passenger transport ticketing schemes
- Measures to reduce the need to travel at peak times such as the provision and encouragement of flexible working arrangements
- Undertake feasibility work on a number of significant projects for delivery in future years, including:
 - Cycling improvements, including along the A612 corridor
 - Bus priority measures, including along the A60 corridor

Local Responsibilities and Commitment

This ASR was prepared by the Public Protect Service of Gedling Borough Council with the support and agreement of the following officers and departments:

- Ellie Jaycock and Sean Parks - Transport Planning and Programme Development Place Department, Nottinghamshire County Council
- John Wilcox - Public Health, Nottinghamshire County Council

This ASR has been approved by:

Eugene Minogue
Corporate Director



This ASR has been reviewed and commented by Senior Public Health & Commissioning Manager on behalf of the Director of Public Health.

If you have any comments on this ASR please send them to Public Protection Service at:
Gedling Borough Council, Civic Centre, Arnot Hill Park, Arnold, Nottinghamshire, NG5 6LU
0115 9013901

environmental.health@gedling.gov.uk

How to Get Involved

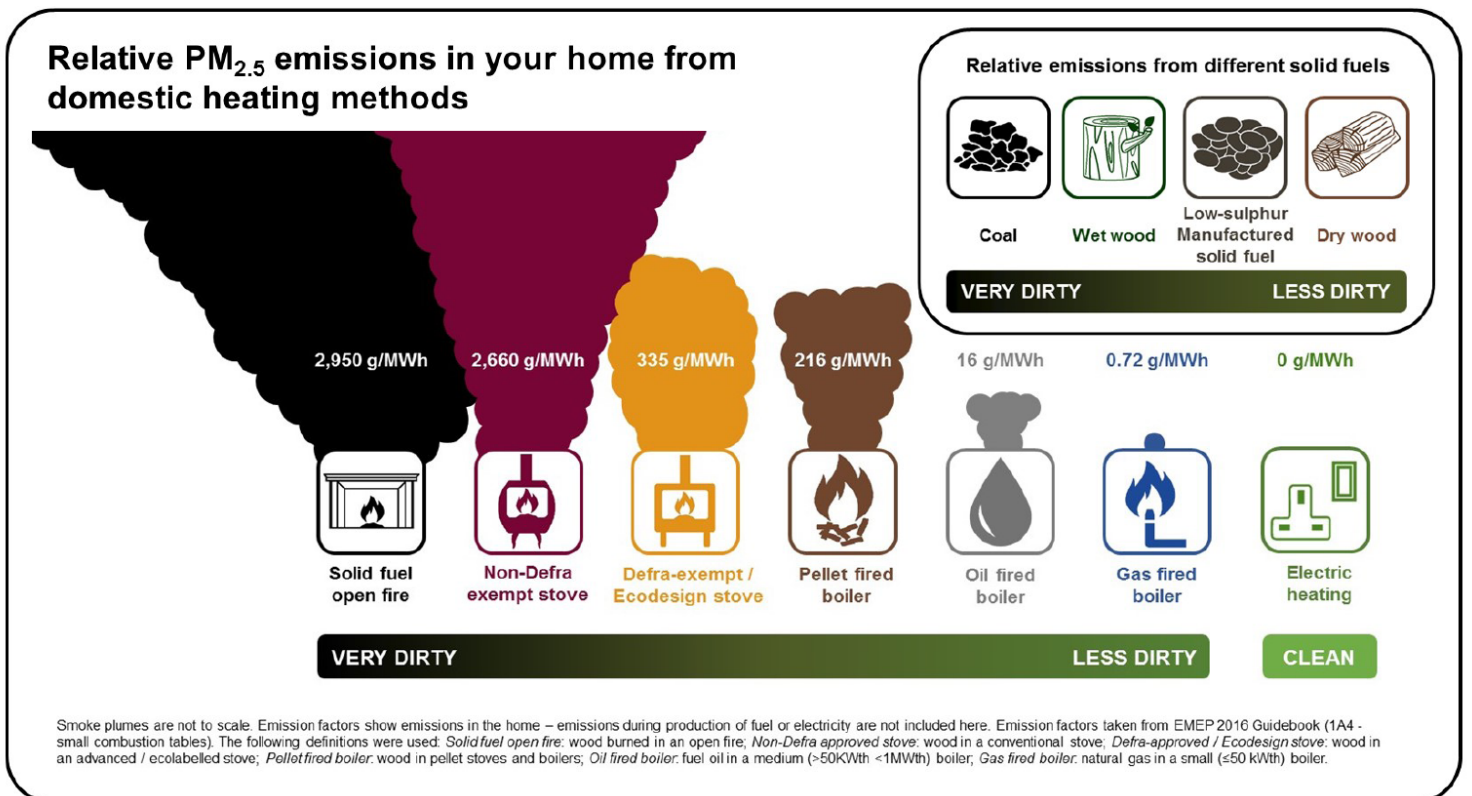
As a resident of Gedling Borough you can help to make a difference

Transport Choices

- trying alternatives to car travel or preferably taking the active option - bus, train, walking and cycling.
- when buying a new or used car consider the alternatives to diesel – electric/hybrid/petrol.

Heating your Home

- when buying a new boiler for your home consider the NOx emissions – go for a low NOx model.
- if you are thinking of installing a solid fuel burner make sure you are not in a smoke control area. If you are, make sure the appliance is certified for use in a smoke control area; buy a **SIA Ecodesign Ready** model, where available, and if possible one certified as **ClearSkies Level 4-5**.



Defra, 2018

- keeping gas appliances and solid fuel burners in good repair and make sure any chimney/flue is cleaned regularly.



- If you are using wood burning appliance make sure the wood is



Changing your behaviour can reduce your exposure to pollution

Pollution levels vary over very short distances: in general, the closer you are to the sources, the more you breathe in.

- If you're walking or cycling, you can easily avoid the worst pollution by travelling along quieter streets. Even walking on the side of the pavement furthest from the road can help.
- One of the worst places for pollution is inside vehicles on busy roads where levels inside the car are typically as high as just outside.
- The health benefits of physical activity (walking or cycling) outweigh the risks from air pollution. If you're in a vehicle, you just get the risks with none of the benefits.

Air pollution is a local problem. It comes from local sources, it has local health impacts, and it can be tackled by local action.

The collective effect of actions by individuals, together with action by local councils and governments, can make a significant difference to pollutant exposure.

Royal College of Physicians. Every breath we take: the lifelong impact of air pollution. Report of a working party. London: RCP, 2016

Table of Contents

Executive Summary: Air Quality in Our Area	i
What is Air Pollution?	i
What are Particles?	ii
What is Nitrogen Dioxide?	iii
Why Should I Be Concerned?	iv
Estimating the Impacts of Air Pollution to your Health	vi
Air Quality in Gedling Borough	viii
Actions to Improve Air Quality	ix
Conclusions and Priorities	xii
Local Responsibilities and Commitment	xiii
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
Air Quality Management Areas	2
Progress and Impact of Measures to address Air Quality in Gedling Borough	4
PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations	18
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	20
Summary of Monitoring Undertaken	20
3.1.1 Automatic Monitoring Sites	20
3.1.2 Non-Automatic Monitoring Sites	20
Individual Pollutants	21
3.1.3 Nitrogen Dioxide (NO ₂)	21
3.1.4 Particulate Matter (PM ₁₀)	22
3.1.5 Particulate Matter (PM _{2.5})	22
3.1.6 Sulphur Dioxide (SO ₂)	22
Appendix A: Monitoring Results	23
Appendix B: Full Monthly Diffusion Tube Results for 2021	36
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	38
New or Changed Sources Identified Within Gedling Borough During 2021	38
Additional Air Quality Works Undertaken by Gedling Borough During 2021	39
QA/QC of Diffusion Tube Monitoring	39
QA/QC Procedures	40
Diffusion Tube Annualisation	40
Diffusion Tube Bias Adjustment Factors	41
NO ₂ Fall-off with Distance from the Road	43
QA/QC of Automatic Monitoring	43
QA/QC Procedures	44

Data Validation and Ratification	44
Automatic Monitoring Annualisation	45
NO ₂ Fall-off with Distance from the Road.....	45
Appendix D: Map(s) of Monitoring Locations and AQMAs	47
Appendix E: Summary of Air Quality Objectives in England.....	52
Glossary of Terms	53
References	54

Figures

Figure A.1 – Trends in Annual Mean NO ₂ Concentrations.....	30
Figure D.1 – Map of Air Quality Management Area	47
Figure D.2 - Map of Overall Sheet Locations	48
Figure D.3 – Sheet 1 - Map of Central and Southern Diffusion Tubes.....	49
Figure D.4 – Sheet 2 - Map of Air Quality Management Area Diffusion Tubes	50
Figure D.5 – Sheet 3 - Map of Rural Background Diffusion Tubes	51

Tables

Table i: Estimated effects on annual mortality in 2018 of human-made PM _{2.5} and NO ₂ air pollution.	viii
Table 2.1 – Declared Air Quality Management Areas.....	3
Table 2.2 – Progress on Measures to Improve Air Quality.....	8
Table A.1 – Details of Automatic Monitoring Sites	23
Table A.2 – Details of Non-Automatic Monitoring Sites	24
Table A.3 – Annual Mean NO ₂ Monitoring Results: Automatic Monitoring (µg/m ³).....	27
Table A.4 – Annual Mean NO ₂ Monitoring Results: Non-Automatic Monitoring (µg/m ³)	28
Table A.5 – 1-Hour Mean NO ₂ Monitoring Results, Number of 1-Hour Means > 200µg/m ³	35
Table B.1 – NO ₂ 2021 Diffusion Tube Results (µg/m ³)	36
Table C.1 – Bias Adjustment Factor	43
Table C.2 – Annualisation Summary (concentrations presented in µg/m ³).....	46
Table C.3 – Local Bias Adjustment Calculation	46
Table E.1 – Air Quality Objectives in England	52

1 Local Air Quality Management

This report provides an overview of air quality in Gedling Borough during 2021. 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 Gedling Borough 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

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.

A summary of AQMAs declared by Gedling Borough can be found in Table 2.1. The table presents a description of the one AQMA that is currently designated within Gedling Borough. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO₂ 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	Name and Date of AQAP Publication	Web Link to AQAP
AQMA Gedling No.2	Declared 16/03/2011	NO2 Annual Mean	A60 Manfield Road (Oxclose Lane to Egerton Road)	NO	45µg/m ³	32.4µg/m ³	Air Quality Action Plan for Gedling Borough Council 2019	Action Plan 2019

- Gedling Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Gedling Borough Council confirm that all current AQAPs have been submitted to Defra.

Progress and Impact of Measures to address Air Quality in Gedling Borough

Defra's appraisal of last year's ASR concluded: *'On the basis of the evidence provided by the local authority the conclusions reached are **accepted** for all sources and pollutants, and the report is considered an example of good practice. The next step is for Gedling Borough Council to submit an Annual Status Report in 2022.'*

Gedling Borough has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 44 measures are included within Table 2.2, with the type of measure and the progress Gedling Borough have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in the Action Plan. Key completed measures are:

- Nottinghamshire Air Quality Strategy
- Marketing and promotion of sustainable transport alternatives
- Go-Ultra Low programme
- Retrofitting of buses
- Effective network management
- Workplace Travel Plans
- Personal travel planning with residents
- Environment Strategy
- School Travel Toolkit.
- ECOStars Fleet Recognition Scheme
- Installation of 16 EV points covering 32 bays under OZEV On-Street Residential Charging Scheme.

Gedling Borough working in partnership with Nottinghamshire County Council expects the following measures to be completed over the course of the next reporting year:

- Construction of improved cycle routes in Gedling – Funding has been secured to deliver further cycling improvements in the borough along the A612 corridor. Further feasibility work on the proposals is underway and it is hoped construction will start in 2020, subject to feasibility, design, consultation and County Council approvals.
- Local Cycling & Walking Infrastructure Plan (LCWIP) – the County Council (in partnership with Derby City, Derbyshire County, and Nottingham City councils) have developed a D2N2 wide LCWIP. Further public engagement on the D2N2 LCWIP is due to be undertaken in the summer of 2022. Cycling and walking improvements priorities identified through technical analysis undertaken as part of the LCWIP development will be subject to feasibility, consultation, and County Council Cabinet approval.
- Bus priority – Development of potential bus priority improvement measures including traffic light priority (TLP), along the A60 Corridor and at various other location in the district, subject to necessary feasibility, design, consultation, and approvals.
- Bus and Ultra Low Emission Vehicles (ULEV) lane – Development of potential Bus and ULEV lane on the A612 Colwick Loop Road between Private Road No.1 and Victoria Park Way subject to necessary feasibility, design, consultation, and approvals.

Priorities for the coming year are predominantly through measures to make the best use of the transport networks and through smarter travel measures that will encourage people to travel more sustainably. Measures will include:

- Ongoing effective land use planning and securing of appropriate levels of developer contributions for mitigation (including travel planning) and sustainable transport improvements
- Measures to encourage the take-up of low emission vehicles, including charging infrastructure and promotion events; and through the Bus Quality Partnerships, including the purchase of new vehicles and the retrofitting of buses
- Ongoing management of on-street parking to help keep traffic moving

- Traffic control and information provision to minimise disruption and delay on County Council managed roads (including the A60) such as contingency planning, the effective co-ordination of works and the provision of real-time travel information
- Travel planning such as the development of new travel plans at businesses across the county through planning conditions
- The encouragement of smarter travel behaviour such as the marketing and promotion of passenger transport, walking and cycling, provision of cycling and walking route maps, cycle training programmes, and web-based journey planners
- Enhancements to the local cycling and walking networks
- The facilitation of smarter travel behaviour such as the provision of a car sharing scheme and integrated and concessionary passenger transport ticketing schemes
- Measures to reduce the need to travel at peak times such as the provision and encouragement of flexible working arrangements
- Undertake feasibility work on a number of significant projects for delivery in future years, including:
 - Cycling improvements, including along the A612 corridor
 - Bus priority measures, including along the A60 corridor

Gedling Borough anticipates that the measures stated above and in Table 2.2 will achieve compliance in A60 Mansfield Rd AQMA.

Quantification of emissions and/or concentrations reduction can be difficult for most of the action plan measures. There are often various confounding factors that make it difficult to directly attribute concentration changes, as a result of intervention measure implementation. Quantification of the emissions reduction will often be easier to calculate than an estimate of the concentration reduction; which would otherwise require the application of detailed dispersion models to make suitable predictions.

Where direct quantification of emissions reduction cannot be achieved, LAs are asked to apply best judgement in a qualitative manner; such as a matrix based approach whereby each measure is assigned an indicative reduction of NO₂ with associated timescales.

Air Quality Impacts		Timescale	
Score	<u>Indicative</u> Reduction in NO ₂ Concentration		Years
7	>5 µg/m ³	Short (S)	<2
6	2 - 5 µg/m ³	↓	↓
5	1 - 2 µg/m ³	↓	↓
4	0.5 - 1 µg/m ³	Medium (M)	2.5
3	0.2 - 0.5 µg/m ³	↓	↓
2	0 - 0.2 µg/m ³	↓	↓
1	0 µg/m ³	Long (L)	>5

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
1	Traffic control and management - Consideration and installation of SCOOT/MOVA and other traffic signal efficiency improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2010	2024	NCC/Via EM	integrated transport block funding	NO	Funded		Completed	5(L)	Restrain average journey times in the morning peak to a 1% increase per year	All signals within AQMA equipped with SCOOT and MOVA but require periodic review. Signal improvements at A60/Sir John Robinson Way delivered during 2019/20	
2	Traffic control and management - traffic control centre that monitors traffic movement and provides real time traffic control over many traffic signal installations	Traffic Management	UTC, Congestion management, traffic reduction	2019	2024	Nottinghamshire County Council (NCC)/Via EM Ltd/Nottingham City Council (NCiC)	NCC and NCiC revenue funding	NO	Funded	£100k - £500k	Implementation	4(S)	Restrain average journey times in the morning peak to a 1% increase per year	Traffic control centre monitors traffic movement on the local highway network (not the trunk road/motorways) and provides real time traffic control over many traffic signal installations, including on A60 Daybrook	The UTCC is a shared facility between Nottinghamshire County Council and the City Council. Estimated cost shown is the County Council's annual contribution.
3	Traffic control and management - co-ordination of street works to minimise traffic disruption and unnecessary congestion	Traffic Management	UTC, Congestion management, traffic reduction	2019	2024	NCC/Via EM/NCiC	NCC and NCiC revenue funding	NO	Funded	£100k - £500k	Implementation	3(S)	Restrain average journey times in the morning peak to a 1% increase per year	Regular coordination meetings held between all works promoters and regional partners in addition to regular meetings between HE and regional partners to create a framework programme of planned works affecting strategic and local routes. The County Council introduced a streetworks permit scheme on 1 April 2020 to help plan/coordinate roadworks on its managed highway network. Detailed journey time monitoring undertaken annually since 2005/06	
4	Traffic control and management - management of incidents to minimise traffic disruption and unnecessary congestion	Traffic Management	UTC, Congestion management, traffic reduction	2019	2024	NCC/Via EM/NCiC/Highways England (HE)	NCC, NCiC, HE revenue funding	NO	Funded	£100k - £500k	Implementation	2(S)	Restrain average journey times in the morning peak to a 1% increase per year	Traffic control centre that monitors traffic movement on the local highway network (not the trunk road/motorways) and provides real time traffic control over many traffic signal installations. See also item 5 below	Lack of future revenue funding

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
5	Traffic control and management - Effective contingency planning to minimise traffic disruption and unnecessary congestion	Traffic Management	UTC, Congestion management, traffic reduction	2019	2024	NCC/Via EM Ltd	NCC revenue funding	NO	Funded	£100k - £500k	Completed	2(S)	Restrain average journey times in the morning peak to a 1% increase per year	The local operating agreement between NCC and HE has been comprehensively reviewed to identify the relevant parts of the network which have interaction on each authority and to put in place appropriate communication channels for management of incidents and dissemination of information Key locations on the local network have been identified and associated diversion routes investigated in line with the developing network hierarchy Incidents dealt with through agreed procedures and regular partnership meetings held. Working in close collaboration with the City and HE, tactical diversion routes have been developed for the emergency diversion of traffic from any part of the strategic road network, to reduce the delay in rerouting traffic to ease congestion at the time of incidents Detailed journey time monitoring undertaken annually since 2005/06.	Information conveyed by all forms of media (press, radio, website, social media etc.). Implementation ongoing
6	Parking management and control - Bus stop clearways	Traffic Management	UTC, Congestion management, traffic reduction	2019	2024	NCC/Via EM Ltd	NCC capital funding	NO	Funded		Completed	3(S)		Bus stop clearways introduced at bus stops within the AQMA where parked vehicles were identified as impeding traffic flows	Additional bus stop clearways will be considered in the future should vehicles parking in bus stops be identified as impeding traffic flows at additional locations
7	Parking management and control - Ensure that car parking in and around the AQMA is managed and reviewed	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2010	2024	NCC	NCC revenue funding	NO	Funded		Completed	2(S)	Manage parking to improve journey time reliability	Parking restrictions already in place along the A60. No additional side-road/off-line locations currently identified as requiring restrictions to aid traffic flow.	Improvements will be considered should vehicles parking be identified as impeding traffic flows.No additional side-road/off-line locations currently identified as requiring restrictions to aid traffic flow.
8	Improving links with local transport strategy	Transport Planning and Infrastructure	Other	2019	2024	NCC/GBC	N/A	NO			Implementation	N/A(S)	N/A		Ensuring existing strategies complement and enable actions to improve air quality
9	Analyse journeys through AQMA	Other	Other			NCC/GBC	NONE	NO	Not Funded		Aborted	N/A(M)	survey	None	Project would require acquiring origin/destination journey data over a massive geographic area and therefore would be very expensive to deliver. GBC therefore need to determine and secure funding before such surveys could be undertaken

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
10	Consider walking infrastructure and facility enhancements	Transport Planning and Infrastructure	Other policy	2010	2024	NCC/GBC	Various funding sources, including S38 and S106	NO			Implementation	3(S)	Increased walking trips	Walking infrastructure improvements (including pedestrian crossings, dropped kerbs, new footways etc.) are delivered as part of NCC's annual integrated transport programme. GBC secure s38, s106 and capital funding for improvements as part of new development. Funding status to be determine based on any improvements identified.	Schemes identified are subject to feasibility and availability of funding.
11	Consider cycling infrastructure and facility enhancements	Transport Planning and Infrastructure	Other policy	2010	2024	NCC/GBC	Various funding sources	NO	Partially Funded	> £10 million	Implementation	3(S)	Increased cycling trips	NCC secured LGF and NCC funding to deliver cycle network improvements in the Arnold area during 2018/19 and 2019/20 (2.7km of new off-road facilities and 14.5km of signed routes). Funding has also been secured to deliver further improvements along the A612 corridor (subject to feasibility, cost, consultation and member approval - construction to be completed by 2023 in line with funding requirements)	Cycling infrastructure improvements delivered as part of annual integrated transport programme. GBC secure s38 and s106 funding for improvements as part of new development. The D2N2 LCWIP will be used to help identify and prioritise future improvements should DfT funding be made available for their delivery
12	Improve links with local planning and Local Development Framework - Ensure sustainable development on vacant sites within and in the vicinity of the AQMA	Policy Guidance and Development Control	Other policy	2019	2024	GBC	N/A	NO			Implementation	3(S)	No. of AQ impact assessments related to AQMA	none in reporting year	
13	Improve links with local planning and Local Development Framework - Co-ordination of land-use planning and transport infrastructure	Policy Guidance and Development Control	Other policy	2019	2024	GBC/NCC	N/A	NO			Implementation	4(S)	N/A		
14	Improve links with local planning and Local Development Framework - Secure appropriate levels of developer contributions (Section 106 and/or CIL) for use on air quality improvement projects	Policy Guidance and Development Control	Other policy	2019	2024	GBC/NCC	N/A	NO			Implementation	4(S)	Sums collected for air quality projects	None in reporting year	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
15	Improve links with local planning and Local Development Framework - Use of planning conditions for mitigation; inc. travel plans etc. enforcement to ensure compliance	Policy Guidance and Development Control	Other policy	2019	2024	GBC	N/A	NO			Implementation	4(M)	N/A	AQ mitigation Conditions requested on 111 planning applications throughout the Borough	
16	Encourage the uptake of alternative fuels - wider network of charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2024	GBC	ORCS	NO	Partially Funded	£100k - £500k	Completed	4(M)	N/A	£130k funding secured (ORCS) for 2019-2020 - 16 7Kw charge points installed covering 32 parking bays at 4 sites in the Borough	Installed
17	Communication and education - awareness raising of local air quality issues - Tackling the school run – communication with school children and parents	Public Information	Via other mechanisms	2019	2024	GBC/NCC/Public Health	GBC/NCC	NO			Planning	3(M)		Following the trial with four pilot schools in 2019/20, the Nottinghamshire School Travel Planning Toolkit was rolled out to all County schools during the 2020/21 academic year. This provides information and advice to school leaders, teachers, parents/carers and children, on ways in which travel to and from schools can be improved and sustainable modes of travel encouraged.	GBC and Public Health looking to KS2 education performance programme put on hold during Covid 19
18	Communication and education - awareness raising of local air quality issues - the link with poor health	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2019	2024	GBC/NCC Public Health	N/A	NO			Implementation	1(M)	Publication of relevant promotional material		Air Quality Strategy for Nottingham and Nottinghamshire published linked to wider work carried out at County Level
19	Travel plans - Work with local businesses/ organisations to encourage the development and implementation of travel plans	Promoting Travel Alternatives	Workplace Travel Planning	2010	2024	GBC planning/NCC	Developer contributions	NO			Implementation	3(S)	Restrain average journey times in the morning peak to a 1% increase per year	Developed with businesses as part of planning conditions. Targeted travel planning (funded by the County Council) was held at workplaces within the AQMA during 2014/15	Funding status costs dependent on the businesses receiving travel planning support and GBC securing developer contributions.
20	Promoting travel choices - Undertake personalised travel planning in Commuter Areas	Promoting Travel Alternatives	Personalised Travel Planning	2010	2019	NCC	DfT Access Fund	NO	Funded	£50k - £100k	Completed	3(M)	Restrain average journey times in the morning peak to a 1% increase per year	The 2019 DfT Access Fund funded PTP project targeted 4,976 households in Daybrook; with 1,188 households opting to take part in the project and receiving travel advice.	Funding relates only to travel planning already complete and not what may be undertaken in the future

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
21 i	Promotion of EV Charging Network - Nottingham Go-Ultra Low programme - installation of off-street public EV chargepoint network	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging	2016	2020	NCiC/NCC/GBC	OZEV funding	No	Funded	£1 Million-£10Million	Implemented	Reduction in pollutants and emissions due to increased use of low emission vehicles.	On-going take-up of cleaner vehicles	£6.1m funding secured for 2016-2020 through the Go Ultra Low programme 123 locations in the county have been investigated for the potential provision of EV charge points as part of GUL project. 19 sites investigated in Gedling; of which three were feasible, resulting in the delivery of 8 public chargepoints in three off-street car parks across three areas (Carlton, Mapperley and Netherfield). A total of 68 chargers across 22 sites in Nottinghamshire were installed during 2019-20 as part of the GUL programme. This includes 8 chargers in Gedling. Funding ended in 2020	Complete
21ii	Promotion of EV Charging Network - Nottingham Go-Ultra Low programme - promoting uptake of LEVs	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging	2016	2020	NCiC/NCC	OZEV funding	No	Funded	£1 Million-£10Million	Implemented	Reduction in pollutants and emissions due to increased use of low emission vehicles.	On-going take-up of cleaner vehicles	£6.1m funding secured for 2016-2020 through the Go Ultra Low programme Promotion events held for public, businesses and fleet operators including loans of LEVs for trial use in 2018 and 2019 Funding ended in 2021	Complete
21iii	Promotion of EV Charging Network - Nottinghamshire on-street EV charging pilot scheme - electric vehicle cable channels (EVCC)	Promoting Low Emission Transport	On-street EV charging infrastructure	2022	2023	NCC	Privately funded by resident and OZEV LEVI pilot funding (if the bid's successful)	No	Privately funded by resident	Costs to be determined	Pending	Reduction in pollutants and emissions due to increased use of low emission vehicles.	Number of EVCC installed and back-office data from EV chargepoint	NCC approved the trialling of on-street EV charging cable channels at the February 2022 Transport & Environment Committee. All delivery processes, design specifications, and internal approvals are being finalised. Nottinghamshire County Council intend to submit a bid for OZEV's Local Electric Vehicle Infrastructure (LEVI) pilot funding in June 2022. If successful, the LEVI pilot funding will help extend the pilot scheme.	The County Council is still finalising the details of the pilot scheme
21iv	Promotion of EV Charging Network - Nottinghamshire EV charging infrastructure (potentially on and off street)	Promoting Low Emission Transport	Potential residential EV charging infrastructure (on and off street)	2023/24	2024/2025	NCC / districts	OZEV funding (LEVI)	No	Unsecured - the full LEVI fund is currently not available for local authorities to bid for	Costs to be determined	Pending	Reduction in pollutants and emissions due to increased use of low emission vehicles.	Number of EV charging installed and back-office data from EV chargepoint	The County Council are working to determine the Council's long term on-street EV strategy. NCC is looking to develop a bid for the main LEVI funding for 2023/24.	Measure is reliant on a successful LEVI bid

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
22	Promoting travel choices - Consideration of car club into the county	Alternatives to private vehicle use	Car Clubs			NCC	Local Authority	NO	Not Funded		Ongoing	Reduction in N02 and PM.	Restrain average journey times in the morning peak to a 1% increase per year. A reduction in staff business emissions and cost, through both a car club and a wider review of staff travel habits.	Nottm city scheme introduced in 2014 Provider reviewed in 2018. Expansion of scheme into county dependent on its success which is still unclear Work has been undertaken to look at the feasibility of a partnership with a Car Club operator in the county, for both residents and internal use (i.e. staff travel). The work will feed in to a wider fleet review and review of staff business travel, with a few more aspects to be expanded upon. Funding for implementation to be determined. Scheme is dependent on the determination of business case and commercial operator coming forward.	Dependent on the determination of business case and commercial operator coming forward. Barriers include financial risk, organisational culture (i.e. using personal cars less) and specific service needs.
23	Promoting travel choices - The promotion and facilitation of car sharing schemes.	Alternatives to private vehicle use	Car & lift sharing schemes	2010	2024	NCC	NCC	NO	Funded	< £10k	Implementation	2(S)	Restrain average journey times in the morning peak to a 1% increase per year	3,522 members currently registered. Implementation is ongoing Between 01/01/21 - 31/12/21: 1,512,434 miles saved £378,865 money saved 333.49 tonnes CO2 reductions 1.51 tonnes NOx reductions	Annual costs are shown in the Estimated Cost of Measure
24	Promoting travel choices - Residential Travel Packs, to be issued to all new built homes	Promoting Travel Alternatives	Other	2019	2024	GBC/NCC	N/A	NO			Implementation	2(M)	N/A		Planning conditions to ensure travel plans are required where appropriate
25	Public transport - Development of ITSO smartcard ticketing	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2010	2024	NCC/NCiC/PT operators	PT operators	NO			Implementation	2(S)	Increased passenger transport patronage	Implementation ongoing	Integrated ticketing strategy developed in 2014/15. New smartcard platform introduced in 2014. Robin Hood card scheme introduced in 2015. The major bus operators have now all introduced contactless payments for their own ticketing products alongside the Robinhood card and this was completed in around March 2020. The first multi-operator contactless ticketing system in the UK outside London was launched in the Nottingham area in May 2022. Public transport users can now pay a single daily capped fare across the majority of the city's buses and trams using their chosen contactless payment method. The Nottinghamshire Enhanced Partnership is seeking to use indicative BSIP funding to deliver a multi operator ticket (MOT) in Newark & Mansfield, alongside development of an add-on for passengers travelling into the Robinhood network in Greater Nottingham. MOT strategy completed: December 2022 Mansfield scheme to launch: September 2023 Robinhood add-on to launch: March 2024

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
26	Public transport - Deliver the free countywide off-peak concessionary fare scheme for the over 60s and disabled.	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2019	2024	NCC/NCIC/PT operators	NCC	NO	Funded	> £10 million	Implementation	2(S)	Increase passenger transport patronage	Implementation ongoing	Estimated annual cost of measure is shown
27	Public transport - publicise web based journey planners	Public Information	Other	2019	2024	NCC	NCC	NO			Implementation	2(S)	Increased walking/cycling/ passenger transport trips	Implementation ongoing	Available at http://www.nottinghamshire.gov.uk/transport/public-transport/plan-journey
28	Public transport - Consider bus provision on the A60 and surrounding area.	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2019	2024	NCC/PT operators		NO			Completed	2(S)	Increased bus patronage	NCC have developed two Bus Service Improvement Plans (BSIP) for Nottinghamshire; the BSIP for the Greater Nottinghamshire (Robin Hood) area developed in partnership with Nottingham City Council, and the BSIP for Nottinghamshire. The plans, which were approved at the Transport and Environment Committee in November 2021, outline the Council's ambitions for improving bus services within the county.	Bus service provision is provided on a commercial basis with support from NCC where justified; and reviewed periodically
29	Public transport - Consider capacity increases on the GO2 services along the A60 corridor	Transport Planning and Infrastructure	Other	2019	2024	NCC		NO				2(S)	N/A		Capacity increases will be considered by operators should passenger information demonstrate that there is insufficient capacity on existing services
30	To encourage adoption of cycling and walking as alternatives to using private vehicles - Develop and undertake annual cycling promotional marketing	Promoting Travel Alternatives	Promotion of cycling	2019	2024	NCC	NCC	NO	Funded	£50k - £100k	Implementation	2(S)	Increased cycling trips	General promotion (e.g. website and literature) implementation ongoing. In addition to the above, PTP was offered to 4,976 households in Daybrook during 2019 following completion of cycle route improvements NCC's Travel Choice webpages provide information and advice to residents, jobseekers and businesses, on the different sustainable options for travelling around the county	Travel Choice website: https://travelchoice.nottinghamshire.gov.uk/
31	To encourage adoption cycling and walking as alternatives to using private vehicles - Deliver adult and child cycle training	Promoting Travel Alternatives	Promotion of cycling	2019	2024	NCC	DfT Funding	NO	Funded	£10k - 50k	Implementation	1(S)	Increased cycling trips	Across the county, 4,000 people received cycle training during 2020/21 and 6,020 in 2021/22 and in Gedling specifically, the numbers were 1,224 and 1,000 respectively.	The number of people receiving cycle training during 2020/21 and 2021/22 was much less than in 2019/20 due to the Covid-19 pandemic which saw school closures and the introduction of 'bubbles' and consequently restricted the number of schools who participated/were able to receive cycle training.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
32	To encourage adoption cycling and walking as alternatives to using private vehicles - Develop and undertake annual walking promotional marketing	Promoting Travel Alternatives	Promotion of walking	2019	2024	NCC	NCC	NO	Funded		Implementation	1(S)	Increased cycling trips	Greater Nottingham cycling maps produced; to be reviewed as network enhanced NCC's website and Travel Choice webpages provide information on alternatives to using private vehicles, including cycle maps, leisure 'Routes and Rides' and the Right of Way network	Funded within existing resources
33	Promotion of low emission vehicles through taxi licensing.	Promoting Low Emission Transport	Taxi emission incentives	2019	2024	GBC	DEFRA AQ Grant	YES	Funded	£10k - 50k	Completed	3(M)	Review of Taxi Licence criteria		ECOSTars project closed with mixed results. Review of criteria ongoing due to covid impacts
34	Target reductions in emissions from buses - ECOSTars Fleet Recognition Scheme.	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2019	2020	GBC	DEFRA AQ Grant	YES	Funded	£50k - £100k	Completed	4(S)	Scheme membership	7 bus/coach operators members. Operating ~740 vehicles	Project Closed
35	Target reductions in emissions from buses - Ongoing delivery of Quality Bus Partnerships	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2019	2024	NCC/NCiC/PT operators; NCT (operator)	OZEV Funding	NO	Funded	£1 million - £10 million	Implementation	5(M)	Ongoing take-up of cleaner vehicles	Ongoing	SQBP in place affecting all buses travelling through AQMA. Operator NCT secured £4.4m OZEV funding and invested a further £12.4m to upgrade its facilities to enable running of a gas fleet, including two services which travel through the AQMA.
36	Encouragement of low-emission public transport fleets (new vehicles and retro-fitting)	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2019	2022	NCC/PT operators	OZEV Funding	NO	Funded	£1 million - £10 million	Implementation	4(S)	On-going take-up of cleaner vehicles	NCT CBTF investment complete. Trentbarton GBTF investment completed	Operator NCT secured £4.4m OZEV funding and invested a further £12.4m to upgrade its facilities to enable running of a gas fleet, including two services which travel through the AQMA. NCC secured £1.3m; from the Green Bus Technology Fund in Feb 2018 to retrofit older buses, including services 'Threes', 56, 57 and 59 which operate in the AQMA
37	Target reductions in emissions from buses - Encouraging the use of emissions standards when procuring school bus contracts and supported bus services.	Promoting Low Emission Transport	Other	2019	2024	NCC/PT operators		NO				4(S)	On-going take-up of cleaner vehicles	Ongoing	
38	Target reductions in emissions from heavy and light goods vehicles - ECOSTars Fleet Recognition Scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2019	2020	GBC	DEFRA AQ Grant	YES	Funded	£50k - £100k	Completed	4(S)	Scheme membership	132 HGV/LGV Members operating ~7600 vehicles	Project Closed

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
39	Target reductions in emissions from the council fleet and contract vehicles - Gedling Borough membership of ECOSTars scheme.	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2019	2020	GBC	DEFRA AQ Grant	YES	Funded	£10k - 50k	Completed	3(S)	N/A		Project Closed
40	Target reductions in emissions from the council fleet and contract vehicles - Ensuring new vehicles procured are cleanest possible.	Vehicle Fleet Efficiency	Other	2019	2024	GBC		NO			Implementation	3(S)	N/A		GBC works in partnership with other LAs via the Transport Managers Group to procure fleet vehicles. The group continues to look at ways to adopt a joint approach to fleet reviews and options for alternative fuels.
41	Target reductions in emissions from the council fleet and contract vehicles - GBC Green Procurement	Vehicle Fleet Efficiency	Other	2019	2024	GBC		NO			Implementation	2(M)	N/A		The Council continues to work towards delivering on pledges for Carbon Neutrality. Procurement will most likely be one strand.
42	Review of public transport infrastructure along A60 corridor, including the creation of a park and ride scheme at Leapool.	Alternatives to private vehicle use	Bus based Park & Ride, Re-prioritising road space away from cars, Bus priority, high vehicle occupancy lane	2016	2026	NCC/NCIC/GBC	Transforming Cities Fund	NO	Funded	£1 million - £10 million	Planning	4(L)	N/A	<p>£8m has been secured from the TCF to deliver a package of bus priority measures in Arnold and Bestwood which will improve connectivity between and into the two district centres and the potential new Park & Ride site. The bus priority measures will also improve the reliability and punctuality of existing bus services</p> <p>The Park & Ride has become unaffordable within the TCF funding envelope and thus dropped from this delivery programme. The County Council will, however, continue to safeguard the land for a Park & Ride at this location and, the feasibility and design work done to date can be used to assist future funding opportunities. The remaining bus priority proposals are still subject to feasibility, business case, planning, consultation, funding availability and political and public acceptability.</p>	The bus priority proposals are still subject to feasibility, business case, planning, consultation, funding availability and political and public acceptability.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
43	New Trent crossing	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	N/A	TBD	NCC/NCiC/GBC	Transforming Cities Fund	NO	Not Funded	> £10 million		2(L)	N/A	Funding for a new cycle/pedestrian bridge between West Bridgford and the City as part of the Nottingham Transforming Cities Fund Bid. Feasibility work is underway. Construction schedules TBD and is still subject to feasibility, business case, planning, consultation, funding availability and political and public acceptability.	A new road bridge was not prioritised for inclusion in a highway programme following feasibility studies undertaken in 2016. Such a scheme may be reviewed alongside future Local Plan growth strategies (post 2032) but will be subject to political and public approval, feasibility, business case for any proposals, identifying appropriate site, prior to consultation and securing funding. The proposed foot/cycle bridge scheme is still subject to feasibility, business case, planning, consultation, funding availability and political and public acceptability.

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.

This authority does not monitor for PM_{2.5} and so to consider the probable levels across the District, reference can be made to the following information sources:

- Nottingham Centre AURN site – the monitored annual mean concentration for 2021 was 8.36 µm³.
- DEFRA Background Levels – Background maps are available from the DEFRA webpages, 2021 levels for Gedling are predicted as an average of 8.12 µm³ (max 9.11 µm³ – min 7.26 µm³)

The authority is working towards reducing emissions and concentrations of PM_{2.5}; no Air Quality Objective has been set currently (The Environment Act 2021 is due to set this value) but the World Health Organisation guideline value is now 5µm³ which has been halved from a review in 2021.

The Nottingham and Nottinghamshire Air Quality Strategy 2020-2030 aims are:

1. to reduce average concentrations of NO₂ and particulate matter across the County; and
2. to reduce the estimated proportion of disease and deaths attributable to air pollution.

Improving Air Quality is now a priority of the [2022-2026 Nottinghamshire Joint Health and Wellbeing Strategy](#) as part of the ***Ambition to develop Healthy and Sustainable Places.***

Gedling Borough is taking the following measures to address PM_{2.5}:

- Gedling Borough continues to work with our transport partners (Nottinghamshire County Council) and other stakeholders to reduce transport impacts as a whole. This has benefit not only for NO₂ but all emissions from transport sources, including PM_{2.5};
- Construction Emission Management Plans are routinely requested during the planning application stage of any development. To help control dust and other emissions during development.
- Education and enforcement of Clean Air Act and Smoke Control Areas.

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

This section sets out the monitoring undertaken within 2021 by Gedling Borough and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Gedling Borough undertook automatic (continuous) monitoring at one site during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The [Nottingham Air Quality](#) page presents automatic monitoring results for Gedling Borough, with automatic monitoring results also available through the UK-Air website .

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

Gedling Borough undertook non- automatic (i.e. passive) monitoring of NO₂ at 31 sites during 2021. 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.

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.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. 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 2021 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.

Results of automatic monitoring

Table A.1 indicates the results for automatic monitoring for 2021 show no exceedances of the air quality objective for NO₂. The graph below shows a decrease in NO₂ levels over a ten-year period (2012-2021).

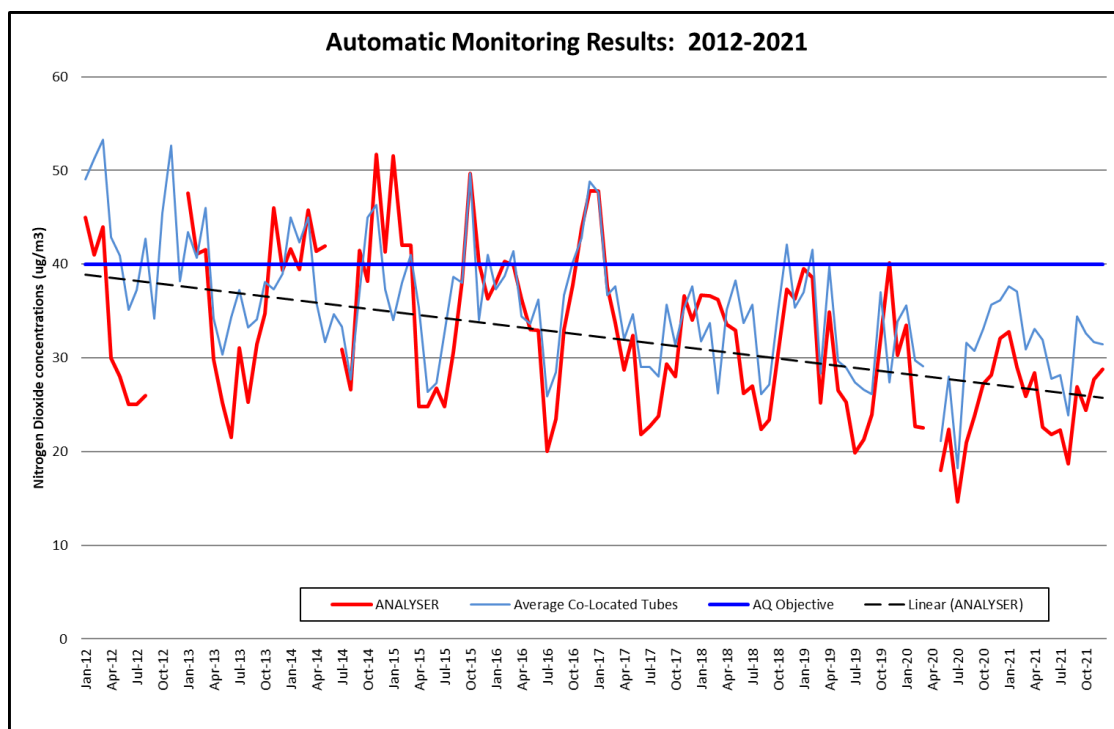


Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

There were no exceedances of this objective in 2021.

Results of non-automatic (passive) monitoring

The results of diffusion tube monitoring for 2021 (Table A3) show no exceedances inside the AQMA; all other monitoring results tend to indicate levels below the objective.

In 2021 the impact of the Covid-19 pandemic was still being felt, in further lockdowns and restrictions on working, schools etc., although not to the extent of 2020. This clearly has had an impact on traffic levels on commuter routes and therefore levels of pollution in 2021. However, it should be noted that levels have increased back toward the pre-pandemic situation.

Appendix A includes a series of graphs plotting diffusion tube results over a 5 year period (2017 – 2021). These graphs all indicate a **declining** trend in NO₂ levels over this period. Full diffusion tube monitoring dataset, including details of bias and location adjustments are available in Appendix B and C.

3.1.4 Particulate Matter (PM₁₀)

Gedling Borough does not monitor for Particulate Matter (PM₁₀).

3.1.5 Particulate Matter (PM_{2.5})

Gedling Borough does not monitor for Particulate Matter (PM_{2.5}). The Borough Council is looking into the feasibility of monitoring for this pollutant.

3.1.6 Sulphur Dioxide (SO₂)

Gedling Borough does not monitor for Sulphur Dioxide

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
GBC1	Daybrook Square	Roadside	457944	344596	NO ₂	Y	Chemiluminescent	75	5	2

Notes:

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

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
82492	Grove PH Daybrook Sq	Roadside	457947	344651	NO2	YES	0.0	3.5	No	3.0
82494	Hastings Street	Urban Background	460391	341413	NO2	NO	n/a	n/a	No	3.0
82495	Marion Murdock Court	Urban Background	461294	342826	NO2	NO	n/a	n/a	No	3.0
82937	47 Plains Road, Mapperley	Roadside	459209	343513	NO2	NO	0.0	7.0	No	3.0
87398	Morley Mills Building	Roadside	457969	344780	NO2	YES	0.0	3.0	No	3.0
87399	Mansfield Road, Redhill	Roadside	457866	345578	NO2	YES	25.0	10.0	No	3.0
87400	Daybrook Dental Surgery	Roadside	457867	345388	NO2	YES	30.0	2.3	No	3.0
87401	19 Victoria Road	Roadside	461995	341175	NO2	NO	0.5	4.0	No	3.0
87402	36 Victoria Road	Roadside	462002	341097	NO2	NO	4.0	1.6	No	3.0
87403, 87404, 87405	Daybrook Analyser	Roadside	457944	344597	NO2	YES	75.0	5.0	Yes	2.0
87406	Burton Rd/Shearing Hill	Roadside	462422	341972	NO2	NO	1.0	16.0	No	3.0
87407	The Vale PH Thackerays Lane	Roadside	457918	344358	NO2	YES	15.0	3.4	No	3.0

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)
87408	Rickets Lane	Rural	456621	355935	NO2	NO	n/a	n/a	No	3.0
88005	Mansfield Road, Redhill North	Roadside	458325	346630	NO2	NO	4.9	2.5	No	3.0
87410	Civic Centre, Arnold	Urban Background	458259	344723	NO2	NO	n/a	n/a	No	3.0
87411	Colwick Park Close	Roadside	461103	340086	NO2	NO	1.0	10.0	No	3.0
87412	Daybrook Fish Bar	Roadside	457947	344713	NO2	YES	0.0	3.0	No	3.0
87413	T&S Heating	Roadside	457950	344748	NO2	YES	0.0	3.0	No	3.0
87414	Frank Keys	Roadside	457969	344827	NO2	YES	25.0	3.0	No	3.0
87415	856 Plains Road, Mapperley	Roadside	458898	343139	NO2	NO	0.0	8.0	No	3.0
87460	Rectory Rd/Vale Rd	Roadside	461161	340122	NO2	NO	19.0	6.5	No	3.0
87461	Mile End Road	Roadside	461196	340108	NO2	NO	0.5	3.0	No	3.0
87821	189 Plains Road	Roadside	459611	343935	NO2	NO	4.9	1.7	No	3.0
87822	Memorial Hall, Gedling	Roadside	461879	342480	NO2	NO	9.5	3.3	No	3.0
87824	Arnold Lane/High Hazels	Roadside	461197	343196	NO2	NO	2.3	1.8	No	3.0

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)
87823	Howieson Court	Roadside	459974	344159	NO2	NO	4.5	1.9	No	3.0
87999	New Works Cottages	Roadside	463150	341842	NO2	NO	14.0	2.0	No	3.0
88000	Colwick Loop Rd /Nether Pasture	Roadside	462615	340837	NO2	NO	3.8	2.4	No	3.0
88001	Nottingham Road, Burton Joyce	Roadside	463226	342668	NO2	NO	13.0	21.5	No	3.0

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2017	2018	2019	2020	2021
GBC1	457944	344596	Roadside	99.6	99.6	31.4	31.6	29.8	24.2	25.8

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

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/m³.

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

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%).

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
82492	457947	344651	Roadside	100	100.0	34.0	29.0	30.0	24.1	26.5
82494	460391	341413	Urban Background	100	100.0	22.0	19.0	20.0	16.6	16.3
82495	461294	342826	Urban Background	100	100.0	16.0	16.0	16.0	11.8	12.6
82937	459209	343513	Roadside	100	100.0	28.0	25.0	24.0	19.0	21.0
87398	457969	344780	Roadside	100	100.0	31.0	30.0	31.0	22.9	24.4
87399	457866	345578	Roadside	100	100.0	23.0	23.0	24.0	17.9	19.6
87400	457867	345388	Roadside	100	100.0	31.0	30.0	28.0	22.9	25.8
87401	461995	341175	Roadside	92.1	92.1	26.0	23.0	24.0	21.1	22.2
87402	462002	341097	Roadside	100	100.0	31.0	28.0	28.0	22.7	24.8
87403, 87404, 87405	457944	344597	Roadside	100	100.0	31.0	31.0	31.0	23.6	26.6
87406	462422	341972	Roadside	73.4	73.4	24.0	23.0	24.0	18.2	20.6
87407	457918	344358	Roadside	100	100.0	35.0	33.0	28.0	25.1	27.4
87408	456621	355935	Rural	100	100.0	15.0	15.0	13.0	10.7	10.4
88005	458325	346630	Roadside	100	100.0			33.0	28.9	32.4
87410	458259	344723	Urban Background	100	100.0	18.0	16.0	16.0	12.0	13.4
87411	461103	340086	Roadside	100	100.0	23.0	23.0	21.0	15.8	18.7
87412	457947	344713	Roadside	100	100.0	43.0	39.0	39.0	28.5	32.4
87413	457950	344748	Roadside	100	100.0	41.0	37.0	36.0	27.0	31.4
87414	457969	344827	Roadside	90.7	90.7	33.0	31.0	30.0	24.3	26.7
87415	458898	343139	Roadside	100	100.0	26.0	23.0	24.0	17.8	21.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
87460	461161	340122	Roadside	100	100.0	27.0	25.0	24.0	18.6	21.0
87461	461196	340108	Roadside	67	66.0	33.0	31.0	31.0	24.7	25.5
87821	459611	343935	Roadside	92.1	92.1		25.0	21.0	17.1	17.8
87822	461879	342480	Roadside	100	100.0		36.0	34.0	28.9	30.8
87824	461197	343196	Roadside	59.7	59.7		20.0	22.0	15.8	16.5
87823	459974	344159	Roadside	100	100.0		32.0	31.0	24.7	28.7
87999	463150	341842	Roadside	100	100.0			22.0	19.6	20.6
88000	462615	340837	Roadside	100	100.0			29.0	22.9	24.9
88001	463226	342668	Roadside	100	100.0			20.0	15.4	17.1

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

Exceedances of the NO₂ annual mean objective of 40 $\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

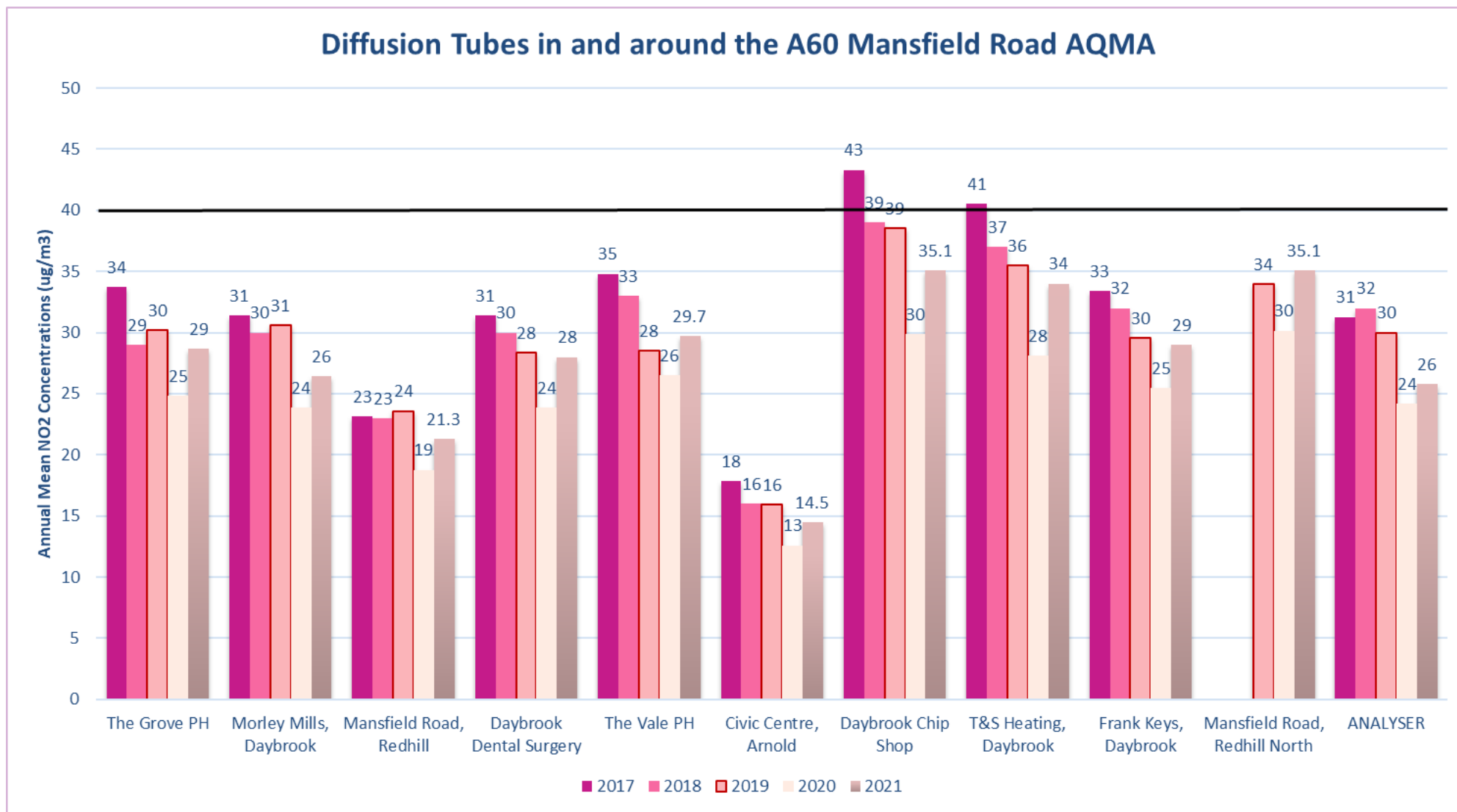
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

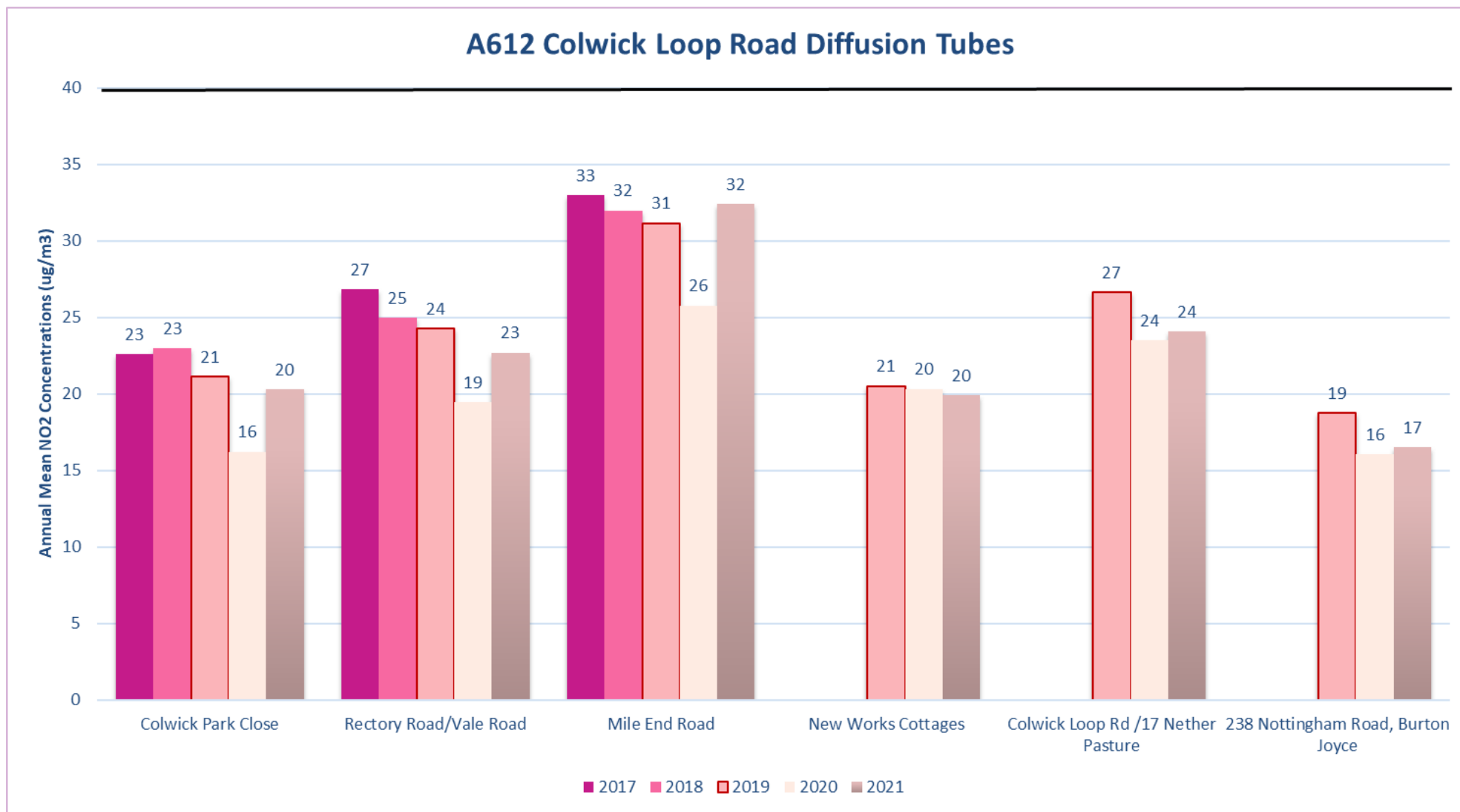
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

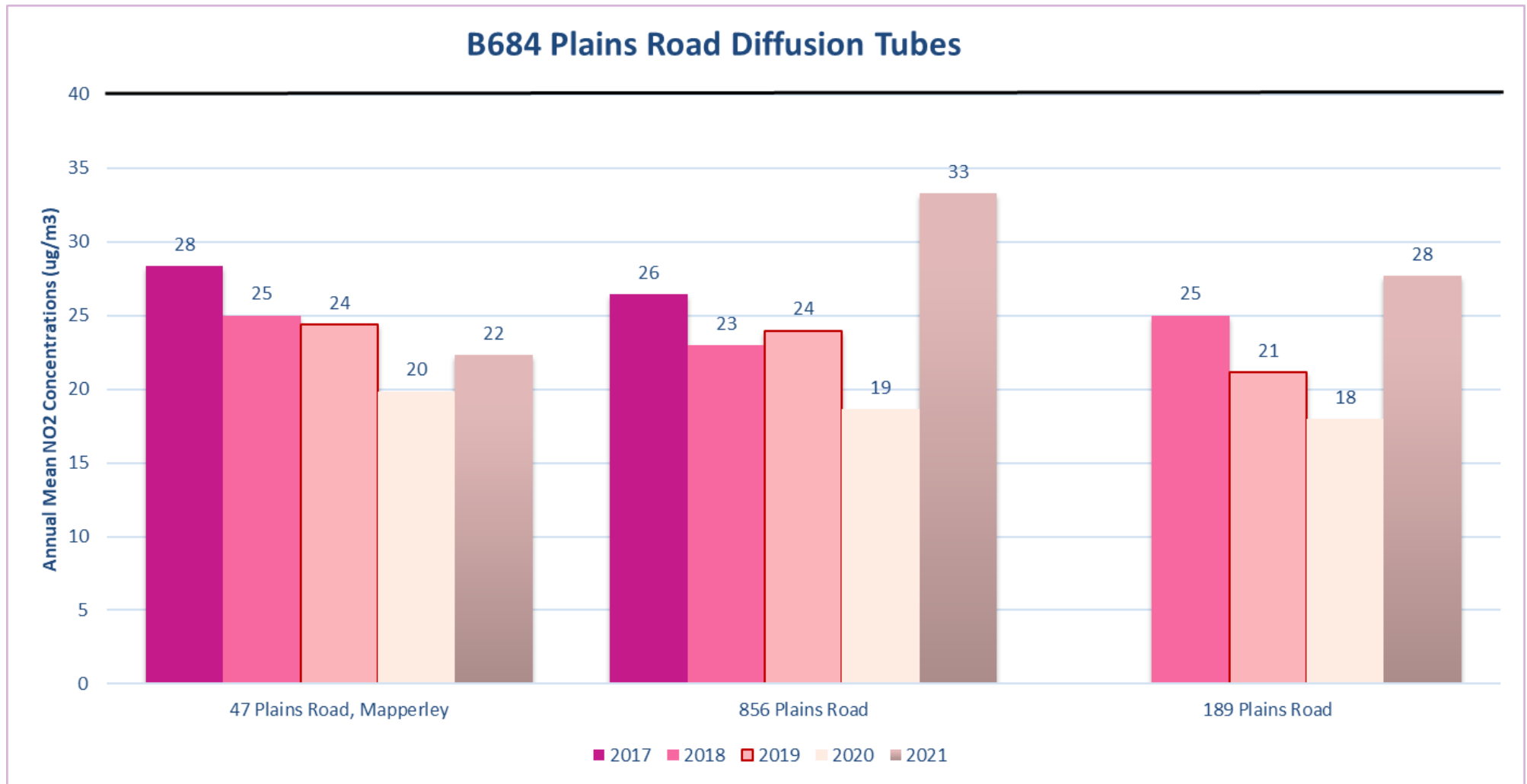
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

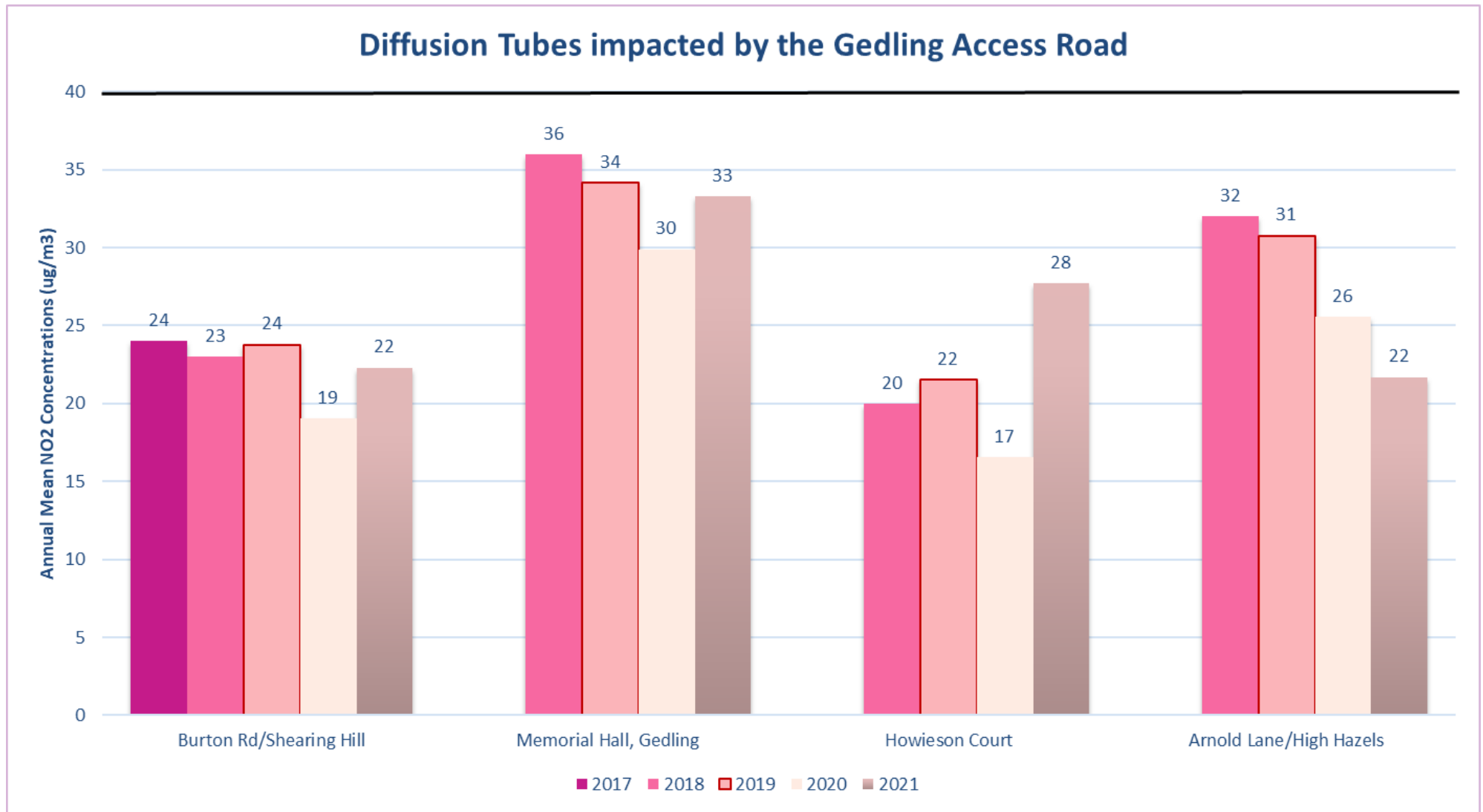
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO₂ Concentrations









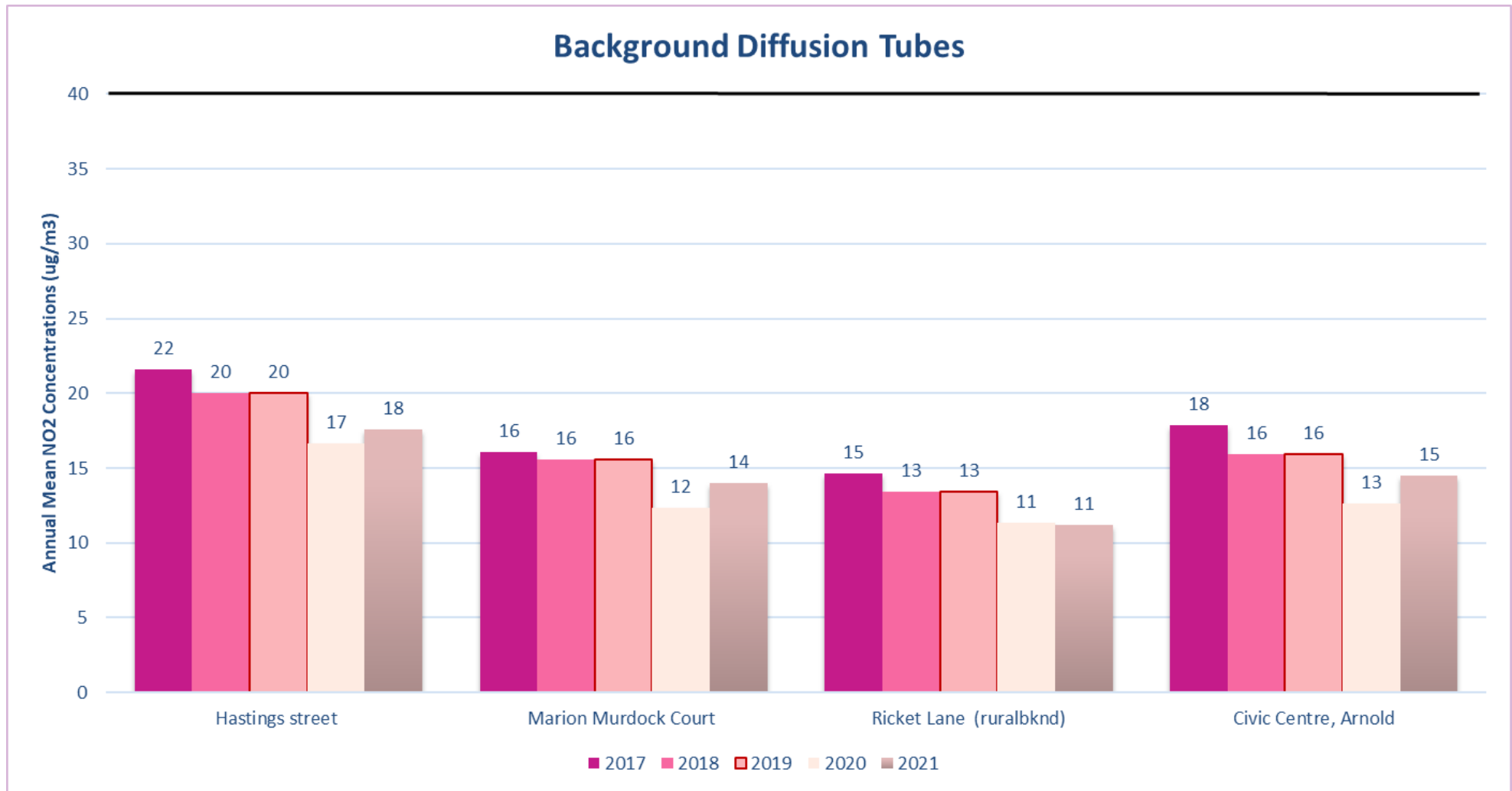


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2017	2018	2019	2020	2021
GBC1	457944	344596	Roadside	99.6	99.6	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ 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%).

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO₂ 2021 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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
82492	457947	344651	39.7	31.4	34.2	26.4	29.2	25.7	27.5	25.7	33.0	33.6	39.4	32.3	31.5	26.5	-	
82494	460391	341413	33.8	22.8	21.3	14.6	14.4	11.6	12.4	12.3	17.1	20.7	26.8	24.5	19.4	16.3	-	
82495	461294	342826	23.5	17.3	15.8	11.4	11.0	10.0	9.3	10.1	13.8	16.7	22.4	18.8	15.0	12.6	-	
82937	459209	343513	30.8	25.4	26.7	20.3	23.2	21.2	20.3	18.6	26.0	28.9	31.5	27.2	25.0	21.0	-	
87398	457969	344780	38.6	34.1	32.1	22.3	26.5	21.5	22.3	21.0	29.3	35.5	32.2	33.0	29.0	24.4	-	
87399	457866	345578	30.7	31.7	23.7	19.7	22.1	18.9	18.2	17.0	23.1	24.2	26.1	24.9	23.4	19.6	-	
87400	457867	345388	41.7	32.8	33.9	24.2	27.6	24.3	23.8	24.7	29.5	33.3	39.5	33.6	30.7	25.8	-	
87401	461995	341175		33.2	25.7	25.9	25.6	21.2	23.5	19.1	28.4	26.0	30.5	31.8	26.5	22.2	-	
87402	462002	341097	37.0	31.5	29.0	24.9	28.6	23.7	23.9	23.5	28.4	32.9	38.5	31.8	29.5	24.8	-	
87403	457944	344597	37.6	34.6	30.4	33.1	32.3	29.3	28.0	23.3	33.8	32.4	31.2	31.5	-	-	-	Triplicate Site with 87403, 87404 and 87405 - Annual data provided for 87405 only
87404	457944	344597	36.8	37.8	30.5	35.0	31.4	27.7	28.0	24.2	34.2	31.9	32.4	31.1	-	-	-	Triplicate Site with 87403, 87404 and 87405 - Annual data provided for 87405 only
87405	457944	344597	38.5	39.0	31.7	31.3	32.1	26.4	28.6	24.0	35.3	33.7	31.4	31.7	31.7	26.6	-	Triplicate Site with 87403, 87404 and 87405 - Annual data provided for 87405 only
87406	462422	341972	32.4	25.0	27.5		20.9	20.3	20.3	22.6	25.8			26.1	24.5	20.6	-	
87407	457918	344358	43.1	34.2	38.7	25.6	29.6	22.9	24.4	25.5	31.8	39.4	39.1	37.3	32.6	27.4	-	
87408	456621	355935	17.4	16.5	13.3	8.1	9.3	8.5	8.1	6.6	10.2	17.4	16.0	16.4	12.3	10.4	-	
88005	458325	346630	44.8	38.7	41.2	35.0	37.2	32.8	35.1	32.1	39.5	42.8	45.6	37.9	38.6	32.4	-	
87410	458259	344723	24.8	17.1	17.5	11.7	13.1	10.3	10.5	10.9	14.1	18.1	22.6	20.7	15.9	13.4	-	
87411	461103	340086	33.0	26.0	23.0	24.0	18.9	17.9	17.8	16.2	22.8	18.3	26.2	23.4	22.3	18.7	-	
87412	457947	344713	37.4	42.5	41.6	32.2	39.2	30.8	35.9	29.2	39.3	43.8	44.7	45.8	38.5	32.4	-	
87413	457950	344748	46.3	38.2	40.7	30.4	36.1	27.8	31.7	30.6	38.6	42.2	47.0	38.6	37.3	31.4	-	
87414	457969	344827	41.0	34.8	34.7		27.4	23.1	23.5	23.8	29.0	36.4	40.6	35.8	31.8	26.7	-	
87415	458898	343139	31.2	26.4	25.5	23.6	23.0	22.2	22.4	20.2	26.9	24.2	31.4	26.6	25.3	21.3	-	
87460	461161	340122	33.9	28.0	27.7	22.1	23.6	18.8	21.3	17.4	25.5	23.7	30.4	27.0	25.0	21.0	-	
87461	461196	340108	42.3	37.0	32.8	32.1		30.7			37.8		39.4	32.4	35.6	25.5	-	
87821	459611	343935		23.5	24.0	18.2	19.9	18.8	18.3	17.8	22.9	19.9	26.7	22.9	21.2	17.8	-	
87822	461879	342480	47.2	36.0	41.9	30.5	38.4	29.1	31.4	30.5	36.3	38.8	42.1	37.5	36.6	30.8	-	

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
87824	461197	343196	28.7	24.7	22.8	21.9					21.4	22.8		24.8	23.9	16.5	-	
87823	459974	344159	40.2	30.0	34.9	38.3	33.2	32.8	30.8	29.0	38.4	30.2	42.9	29.3	34.2	28.7	-	
87999	463150	341842	41.9	27.1	23.2	19.1	20.3	19.4	19.3	20.1	24.1	23.9	28.3	27.6	24.5	20.6	-	
88000	462615	340837	30.1	36.2	29.8	33.3	27.8	24.7	26.7	22.4	31.6	25.6	33.3	34.9	29.7	24.9	-	
88001	463226	342668	28.5	25.0	20.7	16.6	18.5	15.5	17.0	14.0	20.0	22.0	23.9	23.2	20.4	17.1	-	

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.

Gedling Borough Council confirm that all 2021 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**.

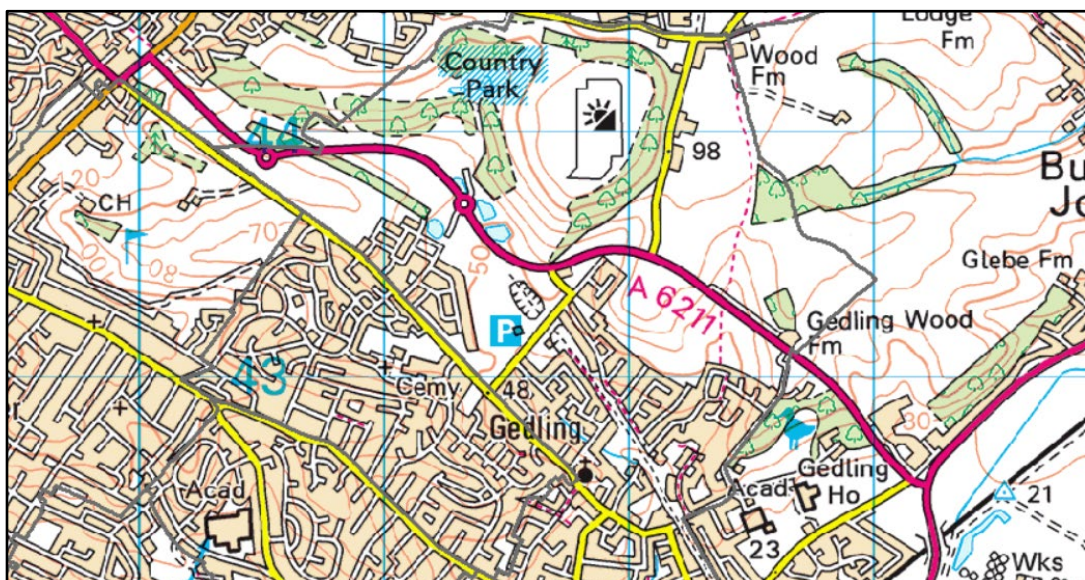
See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Gedling Borough During 2021



The Gedling Access Road, now named Colliery Way, officially opened to traffic on 22 March 2022. The new road links the B684 Mapperley Plains and the A612 Trent Valley Road / Nottingham Road.



Clearly, results presented in this report will not be affected by the roads opening but may have been effected by construction work and road closures. Diffusion tubes which are currently on the 'old' route will stay in place in order to attempt to gauge the impact of the new route.

Additional Air Quality Works Undertaken by Gedling Borough During 2021

Gedling Borough has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes are small clear plastic tubes open at one end with a pollutant-absorbing chemical matrix or gel at the closed end. The tubes are prepared and sealed before being transported to the monitoring site. At site, the tube is exposed, by removal of the end cap, for a period of one month. After the month the tube is resealed and sent to an analytical laboratory.

The laboratory analysis measures the quantity of pollutant absorbed and then calculates an average ambient pollutant concentration over the exposure period.

Diffusion tube results are for NO₂, concentrations measured in parts per billion (ppb) and micrograms per cubic metre (µgm³).

Tubes are exposed on a monthly basis, following the timetable prescribed by the Diffusion Tube Network in which tubes are replaced generally on the first Wednesday of the month.

From April 2008 GBC entered into a countywide contract with Gradko Ltd. for the supply and analysis of NO₂ diffusion tubes. At the same time it was agreed to use the same preparation method (20% solution of TEA in water). This harmonisation of laboratory and method for the county will allow easier comparisons of results across LA boundaries.

QA/QC Procedures

Gradko

The European Union Daughter Directive for NO₂ sets out data quality objectives for overall accuracy. Annual average NO₂ concentration results must comply with the objective of $\pm 25\%$ of the reference concentration therefore; average diffusion tube measurements should comply with this objective. The precision of analytical measurements is also an important consideration, as it is possible to arrive at an average bias of less than $\pm 25\%$ with very imprecise measurements. Following previous inter-comparisons of laboratory results an arbitrary guideline figure of 3ppb for acceptable precision has been adopted.

Gradko's NO₂ diffusion tube procedures follow the Defra guideline document¹¹ related to the preparation, extraction, analysis and calculation procedures for NO₂ passive diffusion tubes. Their internal analysis procedures are assessed by U.K.A.S. on an annual basis for compliance to ISO17025. Results from the Ongoing Workplace Analysis Scheme for Proficiency (WASP) programme for Gradko generally show a "Satisfactory" performance classification.

Gedling Borough Council

Tubes are stored in a refrigerator until the day of exposure. On site, when the tubes are collected the date, site and time are recorded, referenced to the tube numbers assigned by the laboratory. The tubes are then forwarded to Gradko for analysis on the day of collection, along with a 'blank' trip diffusion tube.

Diffusion Tube Annualisation

Two diffusion tube monitoring locations within Gedling Borough recorded data capture below 75% therefore the data required annualisation in line with guidance. See Table C.2 for details.

¹¹ Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users

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 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/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Factor from National Co-location Studies

The Gradko national BAF 2021 for 20% TEA in water is given as **0.84** from 32 studies of various types. (See screen shot overleaf)

Factor from Local Co-location Studies

A co-location study was carried out with the GBC NO_x analyser.

Table C.3 presents the output from the spreadsheet for calculating bias, precision and accuracy of triplicate tubes. The bias factor calculated is also **0.82**.

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/22				
<p>Follow the steps below in the correct order to show the results of relevant co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.</p>										<p>This spreadsheet will be updated at the end of June 2022</p> <p>LAQM Helpdesk Website</p>	
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	<p>Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution.</p> <p>Where there is more than one study, use the overall factor³ shown in blue at the foot of the final column.</p>								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ²	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By ¹	Method To undo your selection, choose (All) from the pop-up list	Year ⁵ To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	20% TEA in water	2021	R	Belfast City Council	12	38	27	39.4%	G	0.72	
Gradko	20% TEA in water	2021	UB	Dudley MBC	12	20	15	36.0%	G	0.74	
Gradko	20% TEA in water	2021	R	Dudley MBC	12	30	29	4.2%	G	0.96	
Gradko	20% TEA in water	2021	R	Dudley MBC	12	42	40	5.5%	G	0.95	
Gradko	20% TEA in Water	2021	R	Lambeth	10	91	62	46.6%	G	0.68	
Gradko	20% TEA in water	2021	R	Lancaster City Council	13	38	32	18.4%	G	0.84	
Gradko	20% TEA in water	2021	R	Lancaster City Council	13	28	27	4.9%	G	0.95	
Gradko	20% TEA in water	2021		Overall Factor ³ (32 studies)				Use		0.84	

Discussion of Choice of Factor to Use

Based on guidance Box 7.13 in LAQM TG(16) [April 21] GBC has used the **national** bias adjustment factor when adjusting diffusion tube results. A summary of bias adjustment factors used by Gedling Borough over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.93
2018	National	03/19	0.93
2017	National	03/18	0.89

NO₂ Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within Gedling Borough required distance correction during 2021.

QA/QC of Automatic Monitoring

The automatic monitoring system used (Monitor Labs ML®9841B) uses gas-phase chemiluminescence detection to perform continuous analysis of nitric oxide (NO), total oxides of nitrogen (NO_x), and nitrogen dioxide (NO₂).

The instrument consists of a pneumatic system, an NO₂-to-NO converter (molycon), a reaction cell, photomultiplier tube (PMT) detector, and processing electronics.

During 2001-2007 the analyser was housed in the basement of the Daybrook Baptist Chapel.

In January of 2008 the analyser was moved to a Casella ROMON enclosure on the opposite side of the A60 Mansfield Road. The analyser has been operational since August 2000; data capture levels are: -

96% 2001	93% 2006	92% 2011	99% 2016	99% 2021
95% 2002	83% 2007	54% 2012*	99% 2017	
97% 2003	81% 2008	91% 2013	99% 2018	
98% 2004	95% 2009	80% 2014**	99% 2019	
96% 2005	95% 2010	81% 2015*	97% 2020	

*data logger failure

** air conditioning unit failure in mid-May

The ML®9841B analyser has a quoted detection of ± 0.5 ppb and a precision of ± 0.5 ppb or 1% of reading, whichever is largest. Accuracy of the analyser is dependent on the calibration and the calibration gases used.

QA/QC Procedures

The analyser is subject to a fortnightly two point manual calibration, by a suitably trained site operative from Gedling Borough, which is conducted in accordance with the manufacturer's quality control procedures. Filters at the sample head are changed concurrently with calibration. The equipment is serviced twice a year by the manufacturer's accredited engineers.

Calibration gases (Air and NO) used during the fortnightly calibration are supplied by BOC, who have demonstrated compliance with relevant quality control procedures in the preparation of gas mixtures. Gas cylinders are replaced before use by dates or when the gas levels fall below 50 bar.

Data Validation and Ratification

Gedling Borough Council employ the services of Air Quality Data Management (AQDM) to collect, ratify and calibrate the data from the Daybrook Station. Officers from Gedling Borough attend site on a fortnightly basis to carry out the manual calibration of the analyser, forwarding the results onto AQDM.

Automatic Monitoring Annualisation

All automatic monitoring locations within Gedling Borough recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO₂ Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No automatic NO₂ monitoring locations within Gedling Borough required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

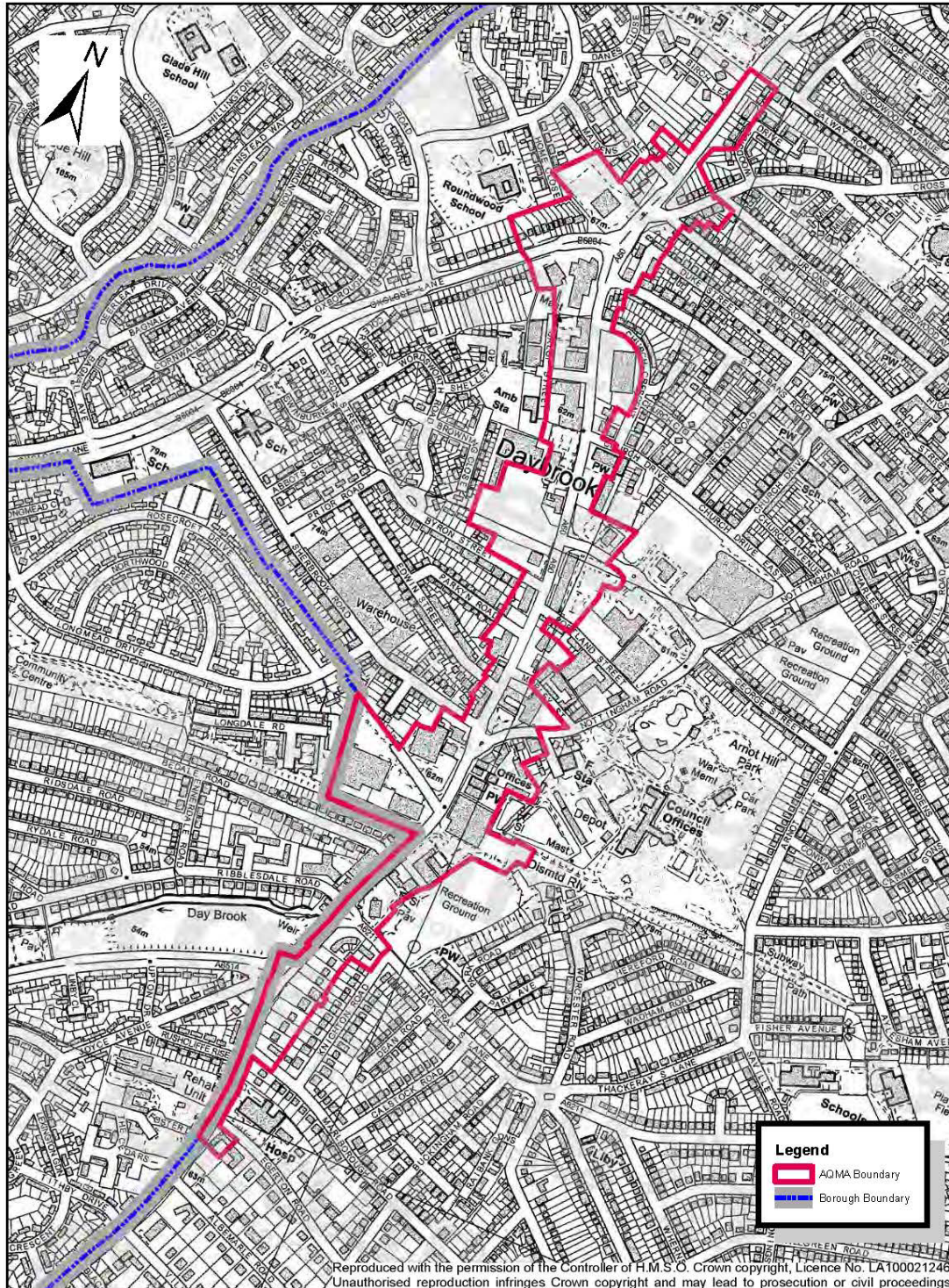
Site ID	Annualisation Factor Nottingham Centre	Annualisation Factor Leicester University	Annualisation Factor Chesterfield Loundsley Green	Annualisation Factor Northampton Spring Park	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
87461	0.8894	0.8483		0.8254	0.8543	35.6	30.4	
87824	0.8947	0.8841	0.6866	0.8185	0.8210	23.9	19.6	

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	12
Bias Factor A	0.82 (0.78 - 0.87)
Bias Factor B	22% (16% - 29%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	31.7
Mean CV (Precision)	2.9%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	26.0
Data Capture	99%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	26 (25 – 28)

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

Figure D.1 – Map of Air Quality Management Area



Map referred to in the
Gedling No: 2 Air Quality Management Order 2011
(Nitrogen Dioxide)

Scale 1:7,500
Date April 2011

Figure D.3 – Sheet 1 - Map of Central and Southern Diffusion Tubes

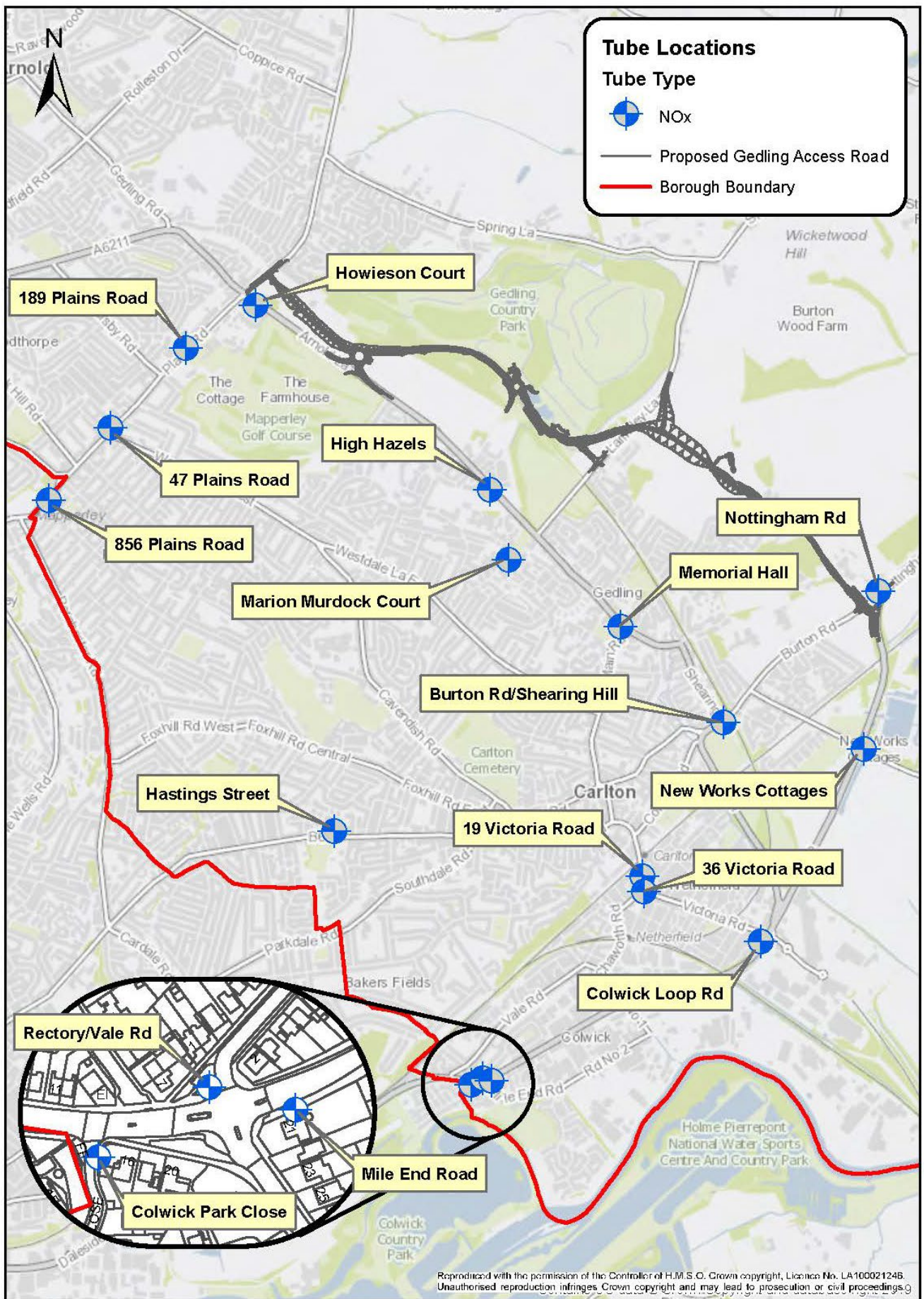


Figure D.4 – Sheet 2 - Map of Air Quality Management Area Diffusion Tubes

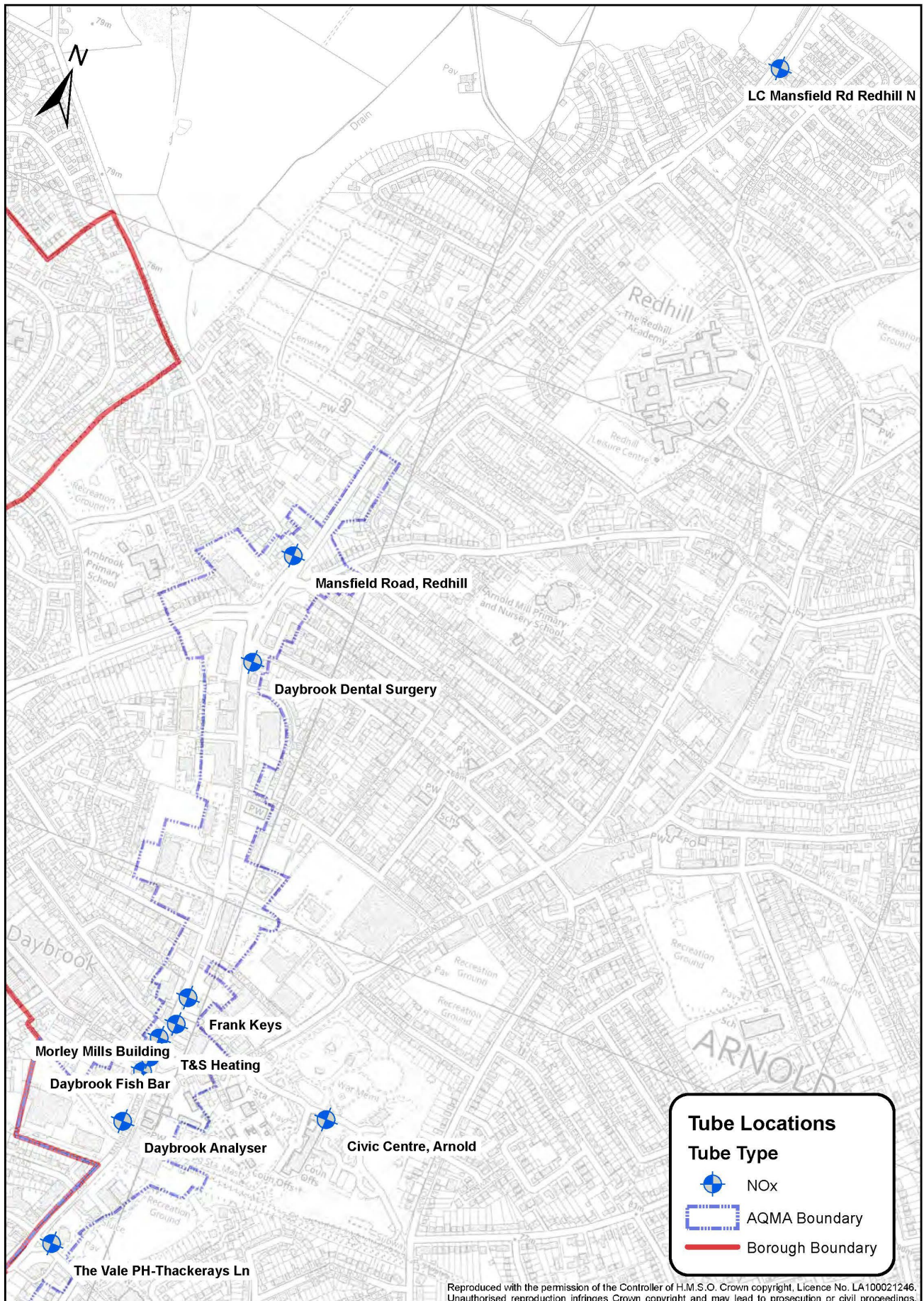
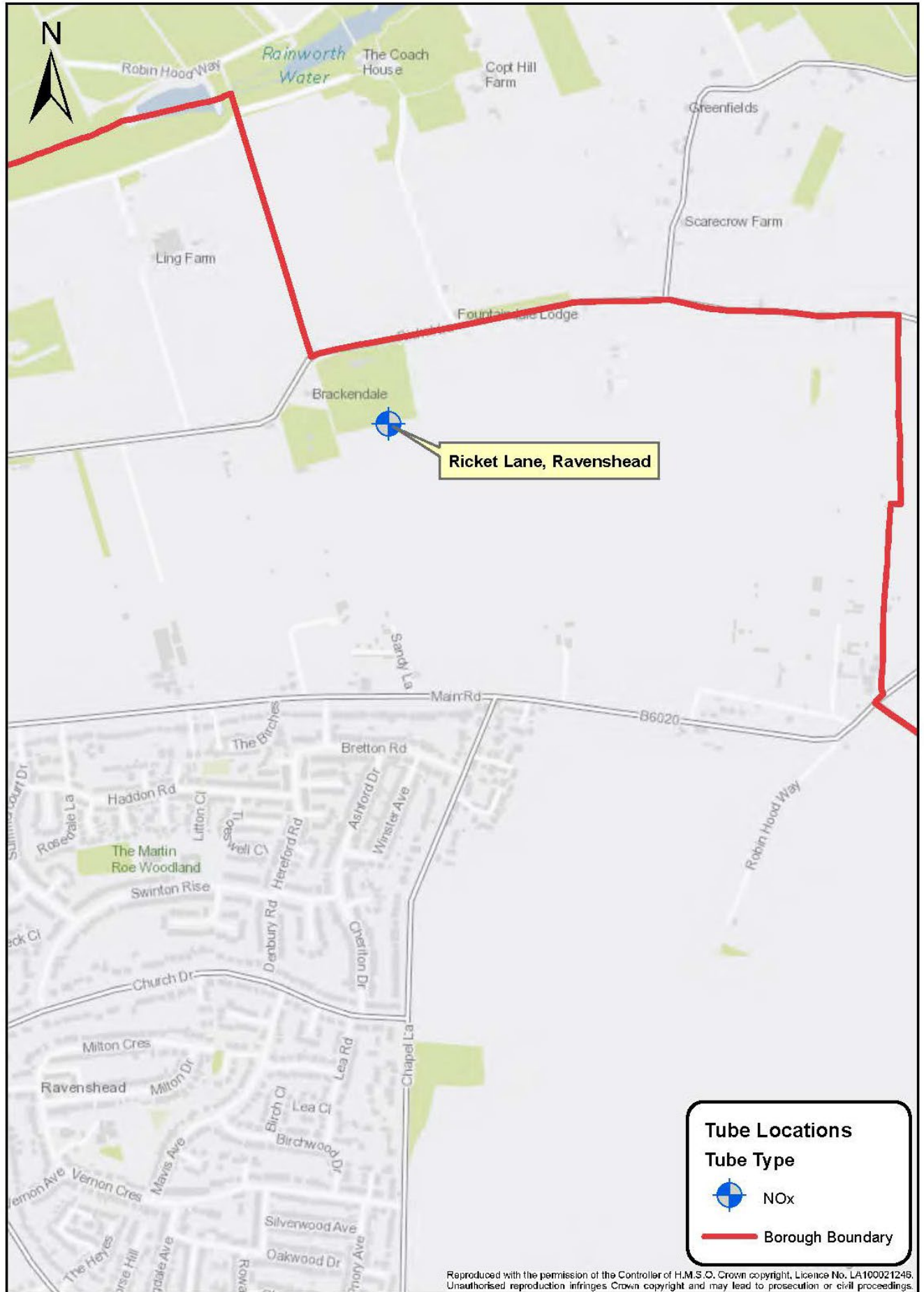


Figure D.5 – Sheet 3 - Map of Rural Background Diffusion Tubes



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England¹²

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

¹² The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. 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.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- *Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users*, 2008. AEA Energy & Environment.
- *Estimating Local Mortality Burdens associated with Particulate Air Pollution*, Gowers, A.M. et al. Public Health England, 2014
- [Joint strategic needs assessment: Air Quality \(2015\)](#), Health Protection Strategy Group
- *LTP3, 3rd Local Transport Plan for Nottingham, 2011-2026*; Nottinghamshire County Council; 2011.
- *ML®9841B Nitrogen Oxides Analyser Operational and Service Manuals*; Monitor Labs; Rev H; October 1998.
- *Royal College of Physicians. Every breath we take: the lifelong impact of air pollution. Report of a working party*. London: RCP, 2016.
- *Air Quality – A Briefing for Directors of Public Health*; Department for Environment and Food and Rural Affairs, Public Health England and Local Government Association; 2017.