Rushcliffe Borough Council

2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Rushcliffe Borough Council

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

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

Road traffic is the main source of air pollution within the Borough and nitrogen dioxide (NO_2) is the primary pollutant of concern. Nitrogen dioxide is a brown gas with the chemical formula NO_2. It is chemically related to nitric oxide and together NO and NO_2 are known as 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. NO_2 can affect our health and evidence indicates high levels can inflame the airways of our lungs, and over the long term can affect how well our lungs work. The concentration of NO_2 is measured as micrograms per cubic metre of air ($\mu g\ m^{-3}$) and to protect health the Government has set air quality standards. The hourly objective which is the concentration of NO_2 in the air averaged over a period of one hour, aims to ensure we are not exposed to high concentrations for short periods of time. The annual objective which is the concentration of NO_2 in the air averaged over a period of one year, aims to protect us over the longer term. Further details on the air quality standards can be found in Appendix E: Summary of Air Quality Objectives in England.

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

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2021

[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

Road traffic is the largest source of NO_x emissions in the UK. NO_x emissions from burning fossil fuels are mainly as NO. However, some sources including diesel vehicles (particularly when moving slowly) can emit a lot of NO_x as NO_2 and these primary emissions of NO_2 can lead to high concentrations at the roadside. NO_2 is also formed in the atmosphere when there is a chemical reaction between NO and ozone, and this is known as secondary NO_2.

Rushcliffe Borough Council currently undertakes air quality monitoring for NO_2 at 32 monitoring sites across the Borough. Thirty of these locations are passive sites, monitoring NO_2 using diffusion tubes which take samples over a one-month period (approximately) and are useful for assessing the annual objective of 40µg m^{-3}. Diffusion tubes provide an inexpensive way of monitoring air quality at multiple sites and provide general indicators of concentrations and trends of pollutants over a period of time.

Rushcliffe Borough Council also have two continuous analysers (automatic) where air is continuously pumped into the analyser and the level of NO_2 recorded. These provide more accurate data on NO_2 concentrations however they are a more expensive way of monitoring air quality.

Rushcliffe Borough Council currently have two active Air Quality Management Areas (AQMAs) for NO_2. An AQMA is an area where air pollutant concentrations exceed or are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives and within Rushcliffe both were declared for NO_2 and exceedance of the annual mean concentration objective of 40µg m^{-3}. The location of the AQMAs can be seen at Defra UK Air website. Monitoring is undertaken in both AQMAs using both diffusion tubes (non-automatic or passive) and a continuous analyser (automatic).

Within AQMA No 1 Trent Bridge the highest NO_2 annual mean concentration recorded in 2021 across all locations was 30µg m^{-3} at the diffusion tube location TBI. The continuous monitoring data for 2021 recorded a NO_2 annual mean concentration of 29µg m^{-3}. Therefore, the NO_2 annual mean concentrations were all well below the air quality objective. There were also no exceedances of the NO_2 hourly limit of 200µg m^{-3} and therefore no exceedance of the 1-hour mean air quality objective. The data continue the downward trend in the NO_2 annual mean concentration evident over the past five years although there was a slight increase at all 8 monitoring locations (ranging from 0.5 to 10%) in 2021 in comparison to 2020. During 2020, NO_2 annual concentration in AQMA No 1 Trent Bridge was significantly reduced (by up to 27%) in comparison to previous year due

to the COVID-19 pandemic national and regional lockdowns and the associated impact on traffic levels. The lockdowns and restrictions continued into 2021 with a third national lockdown from January until March 2021 when England began a phased exit from lockdown. The increase in the NO_2 annual mean concentrations in 2021 when compared with 2020 is most likely due to the easing of lockdown restrictions and the associated impact on traffic flow.

In AQMA No 1/2011 Stragglethorpe Road a maximum NO_2 annual mean concentration of 33µg m^{-3} was recorded by the continuous monitor. This is well below the air quality objective. Similar to AQMA No 1 Trent Bridge there was a slight increase (ranging from 6 to 12%) in the measured NO_2 annual mean concentrations recorded across the 3 monitoring locations in 2021 when compared with 2020 although the data continues the downward trend when viewed over the past five years. Again, this is most likely attributable to the impact of the COVID-19 national and regional lockdowns on traffic levels during 2020 and 2021.There were no exceedances of the NO_2 hourly limit of 200µg m^{-3} and therefore no exceedance of the 1-hour mean air quality objective.

In general, over the last five year period monitoring data shows a decline in the NO_2 concentrations across the Borough. Across the monitoring network the NO_2 annual mean concentrations recorded in 2021 remain well below the levels recorded prior to the pandemic and it remains to be seen if lifestyle changes required to deal with the pandemic will have a long-term impact on population behaviour e.g. if significant numbers of people continue to work from home this may reduce traffic congestion at peak times. It is reasonable to assume the NO_2 annual mean concentrations recorded in 2021 continued to be impacted by the COVID-19 pandemic and it is therefore difficult to draw robust conclusions from the dataset for this year.

In 2021 Rushcliffe Borough Council published an updated Air Quality Action Plan (AQAP) which outlines the action we (Rushcliffe Borough Council and our partners) will take to improve air quality in the Borough over the next five years. Prior to 2021 there were two AQAPs – one specific to each of our AQMAs - and whilst the two have now been consolidated into one AQAP, there remains (where appropriate) measures specific to each of the AQMAs. In the AQAP actions have been developed under nine broad topics:

- Traffic management;
- Transport planning and infrastructure;
- Policy guidance and development control;
- Alternatives to private vehicle use;
- Promoting low emission transport;

- Promoting travel alternatives;
- Public information; and
- Vehicle fleet efficiency.

The AQAP priorities are:

- To continue to monitor nitrogen dioxide levels at AQMA No1 Trent Bridge and at AQMA No1/2011 Stragglethorpe Road and to revoke the AQMAs (in consultation with Defra) if and when there is sufficient robust data to demonstrate concentrations are well below the air quality standard objectives[5] for a period of four to five years;
- To work with Nottinghamshire County Council, as the highway authority at the location of AQMA No 1 Trent Bridge, to implement the relevant actions set out within the AQAP to manage traffic volume and flow and enable residents to make smarter travel choices;
- To work with National Highways, as the highway authority at the location of AQMA No 1/2011 Stragglethorpe Road to implement the relevant actions set out within the AQAP to manage traffic volume and flow; and
- Rushcliffe Borough Council will continue to work with partners to actively promote policies to encourage an increased use of low emission travel options in the Borough; and to secure funding for the installation of a publicly accessible vehicle charging network infrastructure across our estate.

The aim of these priorities is to maintain sustained compliance with the air quality standards, to encourage a shift to low emission transport options and smarter travel choices to facilitate and encourage walking, cycling and public transport use, all of which have co-benefits on health and well-being.

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.

[5] Air Quality Standards 2010

The 2019 Clean Air Strategy[6] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[7] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

As traffic is the main cause of the air pollution within the Borough the core actions continue to be the integration of measures within the Local Transport Plan (LTP) which is implemented by Nottinghamshire County Council Transport Planners and National Highways. In addition, Rushcliffe Borough Council will continue to review planning applications for potential adverse impacts on air quality and continue to promote air quality issues through our membership of NPWG and EMAQN.

In addition to developing and implementing the AQAP the Environmental Health Service continues to work with colleagues in the Planning Service to ensure air quality issues are considered as part of the policy and forward planning process, as well as during the development control process. Policy 41 of the Local Plan Part 2: Land and Planning Policies (adopted in October 2019) explicitly addresses air quality and development proposals that have the potential to adversely impact on air quality or are sensitive to poor air quality. Details of the Local Plan can be found on our webpages RBC Local Plan. During the development process both construction and operational impacts are considered and where appropriate conditions imposed, or the application is amended to reflect any concerns identified.

During 2021 there were a number of applications relating to proposed residential and commercial developments within or in the vicinity of the AQMAs where air quality assessments were required. These include

- Construction of mixed-use development comprising a ground floor unit (Use Class E) with one-bed and two-bed apartments on floors above;
- Discharge of air quality related planning condition associated with the redevelopment of a former car sales garage to retirement living apartments at a site on Loughborough Road within AQMA No 1 Trent Bridge; and

[6] Defra. Clean Air Strategy, 2019

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

- Outline planning application for sustainable urban extension at land east of Gamston and North of Tollerton comprising 2250 dwellings, primary school and a local centre.

Works are also progressing on a number of previously permitted housing developments at various locations across the Borough, including Ruddington, Edwalton, Keyworth, Radcliffe on Trent, Newton, Clifton and East Leake. In addition to considering potential air quality impacts as part of the development process the Environmental Health Service are involved in ensuring effective measures to manage any fugitive dust emissions are in place during the construction works.

Although not located in or close to an AQMA there is significant development planned for the site of the Ratcliffe on Soar Power Station (located in the South of the Borough) with a vision to transform one of the UK's last coal-fired power stations into a technology, advanced manufacturing and energy hub. The power station is due to cease electricity generation by September 2024 and works are ongoing to facilitate redevelopment of the wider power station site. Stakeholders were consulted between November 2021 and January 2022 on plans for a Local Development Order (LDO) that could assist with propelling any plans for the site in line with independent planning processes. It is anticipated detailed planning documents including an Environment Impact Assessment will be submitted over the coming months.

Rushcliffe Borough Council has a requirement for electric vehicle charging points (EVCP) to be installed on all residential and commercial developments (where possible) as part of any planning approval.

The road network within AQMA No 1 Trent Bridge is managed by Nottinghamshire County Council and the core actions continue to be the integration of measures within the Local Transport Plan (LTP) which is implemented by Nottinghamshire County Council and include

- Continued traffic control and management in the area to optimise traffic flow and minimise congestion;
- Cycling and walking infrastructure improvements;
- Public transport improvements, including the introduction of a low emission bus fleet; and
- Promotion of active travel alternatives.

The A52, the road associated with AQMA No 1/2011 Stragglethorpe Road is managed by National Highways. As part of the government's road investment strategy several junctions along the A52, including the Stragglethorpe Road junction were identified for improvement to reduce congestion and provide capacity for more traffic from local developments. During 2020 National Highways (formerly Highways England) determined the most appropriate solution to help reduce queuing and delays at the Stragglethorpe Road junction is to implement a U-turn ban. A notice of intention to make an order to stop the U-turn movement was made in November 2020 and the subsequent order to remove the U-turn movement was brought into force in May 2022. Improvement work at the nearby Gamston roundabout commenced in 2021 and continue into 2022. These works are to widen all approaches to the roundabout, install new traffic lights and traffic light controlled pedestrian crossing and a dedicated bus lane to reduce traffic congestion and queuing and improve safety. As the Gamston roundabout and Stragglethorpe junction are in relatively close proximity the timing of the traffic signals at the Stragglethorpe junction following the removal of the U-turn movement will remain unchanged until the Gamston roundabout works are completed which is expected to be early 2023.

At a strategic level the Rushcliffe Borough Council Corporate Strategy (2019-2023) includes 'The Environment' as one of the four priorities. In March 2020 the Council made a commitment to work towards being carbon neutral for its own operations by 2030. The Council continues to work to implement the Carbon Management Plan 2020 which sets out the measures to be taken across key areas, including property assets, fleet, and policy & regulation. The implementation of some of these proposed changes will have a co-benefit of improving air quality across the Borough e.g. measures to accelerate the shift to low carbon transport across the Council fleet, promotion of active travel and the promotion of carbon reduction policies and guidance to developers.

Rushcliffe Borough Council seeks to reduce impacts on air quality and the environment in their ongoing capital projects. During 2021 works started on the construction of Rushcliffe Oaks which is a new crematorium facility and community space located in Stragglethrope near Cotgrave. The modern contemporary building will provide an environmentally conscious building and memorial gardens that are sensitive to its surroundings. To ensure the facility is as energy efficient as possible and to help meet the Council's target to be carbon neutral in its operations by 2030 an electric cremator will be installed. Recent research undertaken by Coventry University provides a comparison of gas and electric cremator emissions in the UK. The study undertaken as part of degree level thesis focuses

on carbon dioxide (CO_2) and NO_x emissions and concludes an electric cremator produces 50-80% less CO_2 emissions and 33% less NO_x emissions[8]. Rushcliffe Oaks will be operated by the Council and is due to open in Autumn 2022.

Work has also continued on the Bingham Arena and Enterprise Centre which is a £16m leisure centre and office development project partly funded by the European Regional Development Fund (ERDF) and D2N2 Local Enterprise Partnership. The build will be 80% lower carbon than standard new build leisure centres /offices due to the installation of a range of design parameters and equipment choices which will have a co-benefit of reducing the impact on air quality. These include combined heat and power units in the leisure centre, air source heat pumps and photovoltaic solar panels on the office roof. The development is set to open in 2022.

To encourage an increased use of low emission travel options Rushcliffe Borough Council using investment secured via the Transforming Cities Fund installed Electric Vehicle Charging Points in 2021 at two locations in Keyworth (1 rapid & 4 fast chargers); Cotgrave (2 rapid chargers) and at two locations in Radcliffe on Trent (2 rapid & 4 fast chargers).

The Environmental Health service also continues to work with other local authorities in the area through the Nottinghamshire Environmental Protection Working Group (NEPWG) and the East Midlands Air Quality Network (EMAQN) which comprises local authorities and UK Health Security Agency (UKHSA). We will continue to promote air quality issues in emerging work via the NPWG and EMAQN.

In addition, work is undertaken with other organisations to promote greener transport measures and better air quality in the Nottinghamshire area. For example, Rushcliffe Borough Council are working with GP surgeries to encourage sign-up to the Active Practice Charter which seeks to encourage staff and patients to be more physically active and use their car less. Further detail on this initiative is provided in Section 2 Actions to Improve Air Quality.

[8] Copeland B (2021) A comparison of gas and electric cremator emissions in the UK. A dissertation submitted to the School of Energy, Construction and Environment, Faculty of Engineering, Environment and Computing, Coventry University in partial fulfilment of the requirements for the degree of Geography BSc (Hons)

In 2019 the Air Quality Strategy for Nottingham and Nottinghamshire 2020-2030[9] was launched with an overall strategic vision for all of Nottinghamshire residents and visitors to have clean air that allows them to lead healthy and fulfilling lives. The strategy was prepared via a collaborative effort between Nottinghamshire County Council, Nottingham City Council and the Nottinghamshire Borough/District Authorities, including Rushcliffe Borough Council. The Strategy can be accessed via our webpage Air quality - Rushcliffe Borough Council.

This vision aligns with the ambition in the National Clean Air Strategy[10] to protect the nation's health and the government's plans for reducing vehicle emissions. It also recognises that implementation of the strategy will have local system-wide co-benefits such as increased physical activity through active travel, reduced congestion, connecting people in their communities through better design of place, improvements in environmental quality and climate change mitigation.

The Air Quality Strategy for Nottingham and Nottinghamshire 2020-2030 recognises the importance of the local Air Quality Action Plans, developed for the AQMAs across the City and County, as a key component in the delivery of the strategy in terms of reducing health risk and impacts in the most polluted areas.

Conclusions and Priorities

The air quality monitoring data for 2021 shows there were no exceedances of the NO_2 annual mean concentration air quality objective at any of the monitoring locations across the Borough.

Although data indicates a slight increase in NO_2 annual mean concentrations when compared with 2020 this is likely to be a result of the easing of COVID-19 lockdown restrictions during 2021. NO_2 annual mean concentrations remain below the levels recorded prior to the COVID-19 pandemic. Although the 2021 data follows the general downward trend observed over the past five years the scale of the decline continues to be influenced by the impact of the COVID-19 pandemic lockdowns on roadside emissions. In AQMA No 1 Trent Bridge and AQMA No 1/2011 Stragglethorpe Road the increase in NO_2 annual mean

[9] Air Quality Strategy for Nottingham and Nottinghamshire 2020-2030 (2020)

[10] Defra, Clean Air Strategy (2019)

concentrations increase when compared to 2020 ranged from 2-14% and 6-13%, respectively. This data needs to be considered in the context of the COVID-19 pandemic and the decrease in NO_2 annual mean concentrations in AQMA No 1 Trent Bridge of 17-29% in 2020; and 24-35% in AQMA No 1/2011 Stragglethorpe Road.

Over the past five years the NO_2 annual mean concentration in AQMA No 1 Trent Bridge has been in the region of 36-37µg m^{-3} i.e. below the air quality objective of 40µg m^{-3}. In 2020 there was a sharp decline to 27µg m^{-3} at the location of the continuous monitor and a slight increase to 29µg m^{-3} at the same location in 2021. If the consistent downward trend continues and concentrations remain in the region of 10% below the air quality objective we will seek to revoke the AQMA within the next year.

In AQMA No 1/2011 the NO_2 annual mean concentration has been hovering around the air quality objective of 40µg m^{-3} for the past five years when it has ranged between 38µg m^{-3} in 2017 and 41µg m^{-3} in 2019. In 2020 there was a decline in the NO_2 annual mean concentration to 31µg m^{-3} with a slight increase to 33µg m^{-3} at the same location in 2021. As the long-term impact (if any) of the COVID-19 pandemic on traffic levels and associated roadside emissions remains to be seen we will continue to monitor in the AQMA and review its status annually.

During 2021 we published an updated AQAP which sets out how Rushcliffe Borough Council and its partners will seek to improve air quality over the next five years. To achieve this the revised AQAP consolidates the previous two AQAPs and sets out a comprehensive range of measures to be implemented by ourselves and our partners – Nottinghamshire County Council Transport Planners and National Highways.

Over the coming year we will continue to monitor NO_2 annual mean concentrations across the Borough and work towards the implementation of the measures contained in the AQAP.

Local Engagement and How to get Involved

As indicated above, during 2021 Rushcliffe Borough Council published an updated AQAP which was developed in conjunction with our partners (Nottinghamshire County Council Transport Planners and National Highways). As part of this process, we engaged with a range of bodies, including the Environment Agency, neighbouring authorities, Parish Councils and Nottinghamshire County Council Public Health. A public consultation exercise was undertaken and it was encouraging to see a high level of engagement with 63 residents responding either via the public consultation survey or via email.

Rushcliffe Borough Council provides residents with information on reducing their impact on the environment and air quality via links from its website Transport - Rushcliffe Borough Council where there is signposting to cycling and walking initiatives and information on public transport and greener car travel, including car sharing. There is also information available on cycling and walking initiatives via the Nottinghamshire County Council webpage NCC - cycling and walking.

Any new planning proposals where consideration of potential air quality impacts may be required are available for consultation through the planning process. The public can view and provide comments on submitted air quality assessments.

Likewise, under the environmental permitting regime changes to existing or new permitted processes are subject to public consultation and we will ensure public engagement as well as statutory consultee engagement.

To get involved in improving air quality within the Borough the public can contact the Environmental Health Service – details are available at the front of this report.

The Local Transport Plan (LTP) is implemented by County Council Local Transport Planners who can be contacted via the Nottinghamshire County Council website or Local Transport Plans and Development Team, Nottinghamshire County Council, County Hall, West Bridgford Nottingham NG2 7QP; Tel: 0300 500 8080.

Further information on the A52 junction improvements can be obtained from National Highways A52 Nottingham Junctions; Tel: 0300 123 5000. The 2022 Spring newsletter was published at the end of May 2022.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Rushcliffe Borough Council with the support and agreement of the following departments:

- Development Control;
- Communities;
- Human Resources; and
- The Contract Hub.

This ASR has been approved by:

David Banks

Director - Neighbourhoods and Deputy Chief Executive

If you have any comments on this ASR please send them to the Environmental Health Department at:

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1 Local Air Quality Management

This report provides an overview of air quality in Rushcliffe Borough Council 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 Rushcliffe Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Rushcliffe Borough Council can be found in Table 2.1. The table presents a description of the two AQMAs that are currently designated within Rushcliffe Borough Council.

AQMA No 1 Trent Bridge covers an area of West Bridgford, including Lady Bay Bridge, Radcliffe Road, Trent Bridge and Loughborough Road junctions. This AQMA was declared in 2005 due to a NO_2 annual mean concentration of 47µg m^{-3} which is an exceedance of the Air Quality Standard objective (AQS) of 40µg m^{-3}. Air quality monitoring is undertaken at a number of locations within the AQMA via a continuous monitor (active monitoring) and a series of diffusion tubes (passive monitoring).

AQMA No 1/2011 Stragglethorpe Road at Radcliffe on Trent is located at the Stragglethorpe junction of the A52 dual carriageway which is one of the main easterly routes into/out of Nottingham. The general aspect is open with a small group of residential properties in one area adjacent to the junction. This AQMA was declared in 2011 due to a NO_2 annual mean concentration of 50.5µg m^{-3}.

Appendix D: Maps of Monitoring Locations and AQMAs provides maps of AQMAs and the monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean.

We propose to explore the revocation of AQMA No 1 Trent Bridge over the coming year.

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 National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
AQMA No 1 Trent Bridge	Declared 01/09/2005	NO2 Annual Mean	An area including Lady Bay Bridge/Radcliffe Road/Trent Bridge/Loughborough Road junctions in West Bridgford.	NO	47µg m-3	30 µg m-3	Air Quality Action Plan for Rushcliffe dated December 2021	Visit the AQAP for AQMA Name 1
AQMA No1 2011 Stragglethorpe Rd	Declared 01/10/2011	NO2 Annual Mean	Land adjacent to A52 at Stragglethorpe Lane Junction	YES	50.5µg m-3	33 µg m-3	Air Quality Action Plan for Rushcliffe dated December 2021	Visit the AQAP for AQMA Name 2

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

☒ **Rushcliffe Borough Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Rushcliffe Borough Council

Defra's appraisal of last year's ASR concluded the report was detailed, concise and satisfied the criteria of relevant standards. Specific comments made by Defra are provided below and where required, details given on how the matters raised have been addressed in the 2021 report:

- It is encouraging to see the Council responding to and actioning comments made during the 2020 ASR appraisal. This highlights their commitment to improving air quality within their jurisdiction and adheres with good practice. No comment required.
- As part of the ongoing review and management of the local air quality monitoring network nine locations (HH, PC, SH, BH, A52 HHF2, A52 HHF3, Trent B2, Trent B3 and Monitor) were removed from the 2019 network. Several locations (HH, PC, SH and BH) had consistently reported NO_2 annual mean concentrations below the air quality objective. Other locations (A52 HHF2, A52 HHF3, Trent B2, Trent B3 and Monitor) were duplicate or triplicate tubes located alongside a continuous monitor. The report states that these were originally installed with a view to engaging in co-location studies but as this had not happened the duplicate and triplicate tubes were no longer deemed necessary. However, keeping the co-location tubes would allow for a comparison with the national bias even if not retained and would be encouraged for future years. Comment is noted and Rushcliffe Borough Council will consider the re-introduction of duplicate or triplicate tubes at key locations on the monitoring network.
- Some columns in table 2.2 have only been partially filled, the "Estimated Cost of Measure" in particular has not been filled for most measures. However, the list of measures completed in the last year as well as those that will completed be next year is well detailed, this is appreciated. Comment noted although it is not always possible to obtain estimated costs particularly for the measures under the control of our partners.
- The Public Health Outcomes Frameworks was mentioned and this is encouraged. No comment required.

- The Council has provided a clear map of the diffusion tube monitoring network; trends are displayed and discussed in the report, this is welcomed. No comment required.

Rushcliffe Borough Council and its partners have 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. Fifty-one measures are included within Table 2.2, with the type of measure and the progress Rushcliffe Borough Council and its partners 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.

Rushcliffe Borough Council published an updated Air Quality Action Plan (AQAP) in 2021 and the measures presented in Table 2.2 are aligned with this updated plan (2021 Air Quality Action Plan. The 2021 AQAP replaces the two previous plans which were specific to each of the AQMAs. Whilst the two have been consolidated into one AQAP, there remains (where appropriate) measures specific to each of the AQMAs. As part of the development of the updated AQAP the action measures in the previous AQAPs were refined to include new or revised measures and out-of-date measures removed. In Table 2.2 – Progress on Measures to Improve Air Quality the 'Measure No' reflects the numbering system used in the AQAP – NC 01-22 are the Nottinghamshire County Council measures which relate predominantly to AQMA No 1 Trent Bridge; the NH 01-05 are the National Highways measures which relate predominantly to AQMA No 1/2011 Stragglethorpe Road; and the RB 01-23 are the Rushcliffe Borough Council measures which are generally applicable across the Borough. The expected efficacy of the measures is provided by a traffic light colour coded system with measures highlighted in green as the most effective and red as least effective.

The primary required outcomes of the measures contained in the AQAP are to ensure

- the downward trend in NO_2 levels continues in both AQMAs to a point where there is sustained compliance with the AQS which will enable the revocation of the AQMA; and
- we strive for continued improvements in air quality, to encourage a shift to low emission transport options and smarter choices to facilitate and encourage walking, cycling and public transport use, all of which have co-benefits on health and well-being.

In addition to the publication of the AQAP 2021 other key completed measures included:

- 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.
- 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.
- 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.
- Implementation of the Order to remove the U-turn movement at the Stragglethorpe junction and progression of the works at the Gamston roundabout to improve traffic flow and ease congestion.
- Rushcliffe Borough Council, working together with Nottingham City Council secured investment via the Transforming Cities Fund to increase the provision of electric vehicle charging points in the D2N2 area with the following provision across the Borough:
    - Bunny Lane, Keyworth March 2021 1x rapid charger
    - Church drive, Keyworth April 2021 4x fast chargers
    - Cotgrave Hub, Cotgrave May 2021 2x rapid chargers
    - Health centre car park, RoT May 2021 2x rapid chargers
    - Walkers Yard, RoT May 2021 4x fast chargers
- Working with the relevant organisations/bodies to try to resolve infrastructure constraints (for example electricity supply capacity) that may be limiting the ability to expand the charging point network to other locations.
- Introduction of the Green Rewards scheme which is a joint initiative with other Nottinghamshire Local Authorities to help and encourage residents make more

sustainable choices and lower their carbon footprint. The Green Rewards app and web platform enables residents to accumulate points and earn the prizes for many activities they do every day at home or out and about. The scheme encourages active travel by rewarding activities such as walking/cycling to work/school and using public transport. The scheme was introduced in October 2020 and by the end of the year 500 residents had already signed up. Further details of the Green Rewards Scheme can be found on their webpage.

- Publication of the new Rushcliffe Borough Council Climate Change Strategy for 2021 – 2030 which sets out how the Council seeks to reduce its own emissions; and help support local residents and businesses to do the same. Several partners and enterprises across the Borough (including the University of Nottingham, British Geological Survey, Artex, Belvoir Health Group) share learning, views and skills on carbon reduction through the Rushcliffe Borough Council Big Business Carbon Club.
- The RBC private hire and hackney vehicles policy refers to the increased use of Ultra Low Emission Vehicles (ULEV) and is likely to be enhanced further in the near future.
- Securing via planning condition the provision of electric vehicle charging points in new build residential and commercial developments.
- Requiring the submission of air quality assessments for developments in or close to the AQMAs prior to determination of a planning application;
- Increasing residents' awareness of changes in legislation that seek to improve air quality e.g. the phasing out of the sale of wet wood and coal for domestic burning between 2021 and 2023; and taking enforcement action, where necessary.
- Rushcliffe Borough Council has been working with GP practices across the Borough on the Green Impact for Health Scheme which is designed to encourage practices to take steps to become more environmentally friendly and all Rushcliffe practices are now accredited. The scheme provides a free online toolkit with over 100 actions to improve environmental sustainability including strategies such as active travel which will improve air quality. More info can be found here: Green Impact for Health | Green Impact | Students Organising for Sustainability (nus.org.uk)

- Rushcliffe Borough Council is also working with GPs on the Active Practice Charter looking to encourage staff and patients to be more physically active and less sedentary. Six of the eleven practices now accredited. This has seen the adoption of cycle to work schemes and team virtual race competitions leading to more people being active and using their car less. More info can be found here: Physical Activity Hub: Active Practice Charter (rcgp.org.uk)
- Integration of design parameters and plant/equipment in Rushcliffe Borough Council capital projects to help achieve carbon neutral status in its operations by 2030 with a co-benefit of improving air quality:
    - This includes the installation of an electric cremator in the new Rushcliffe Oaks, a new crematorium facility and community space in Stragglethorpe. Recent research undertaken by Coventry University provides a comparison of gas and electric cremator emissions in the UK. The study undertaken as part of degree level thesis focuses on carbon dioxide (CO_2) and NO_x emissions and concludes an electric cremator produces 50-80% less CO_2 emissions and 33% less NO_x emissions[11]. Rushcliffe Oaks will be operated by the Council and is due to open in Autumn 2022.
    - Work continues on the Bingham Arena and Enterprise Centre which is a £16m leisure centre and office development project partly funded by the European Regional Development Fund (ERDF) and D2N2 Local Enterprise Partnership. The build will be 80% lower carbon than standard new build leisure centres /offices due to the installation of a range of design parameters and equipment choices which will have a co-benefit of reducing the impact on air quality. These include combined heat and power units in the leisure centre, air source heat pumps and photovoltaic solar panels on the office roof. The development is set to open in 2022.
- In December 2021, the Nottingham City Council's Executive Board gave approval to progress a scheme for a new bridge over the River Trent to be located at Trent Basin. The City Council has secured funding (£9.25m) for the Waterside Bridge from the Government's Transforming Cities fund. The project is being led by

[11] Copeland B A comparison of gas and electric cremator emissions in the UK. A dissertation submitted to the School of Energy, Construction and Environment, Faculty of Engineering, Environment and Computing, Coventry University in partial fulfilment of the requirements for the degree of Geography BSc (Hons)

Nottingham City Council, working in partnership with Rushcliffe Borough Council and in consultation with Nottinghamshire County Council.

Rushcliffe Borough Council expects the following measures to be completed over the course of the next reporting year:

- 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.
- Regatta Way Active Travel Fund (ATF) Scheme – The County Council secured funding from Tranche 2 of the ATF to deliver segregated cycleway/footway improvements along Regatta Way, West Bridgford. Works are due to be completed summer 2022.
- The U-turn ban at the Stragglethorpe junction will come into force. This ban prevents vehicles travelling on the A52 east (towards Radcliffe on Trent and Bingham) from making a U-turn at Stragglethorpe junction to travel west towards Nottingham. Banning this U-turn movement will improve the flow of traffic and reduce congestion at the Stragglethorpe junction, the location of AQMA No 1/2011 Stragglethorpe Road.
- Expansion of the EV CP network across the Borough with a solar hub installation in Gamston and installations at Rushcliffe Country Park, Gresham and Bingham Arena.
- Works to assess the feasibility of other sites, including working with other bodies e.g. Western Power to increase infrastructure capacity to enable further installations;
- Identification of further funding streams to support the development of the charging network e.g. the Government local electric vehicle infrastructure (LEVI) scheme is intended to encourage large scale, ambitious and commercially sustainable projects that leverage significant private sector investment. It is the intention that the LEVI will support a transition towards local chargepoint provision secured on a commercial basis without public funding;

- Works to source and fund a fuel facility at the Council depot to support the transition of the vehicle fleet to biofuel;
- Publication of the Rushcliffe Borough Council cycling strategy which aims to (1) increase awareness through the publication of a cycle map for the Borough; (2) improve infrastructure to facilitate cycling and walking; (3) work with partners, including the Big Business Carbon Club and schools to promote cycling; and (4)
- Construction of the new cycleway and footway on Regatta Way in West Bridgford to link the residential areas to facilities at Holme Pierrepont Country Park and promote active travel;

Rushcliffe Borough Council's priorities for the coming year are to continue to work with our partners to:

- implement the relevant actions set out within the AQAP 2021 to manage traffic volume and flow and enable residents to make smarter travel choices; and
- actively promote policies to encourage an increased use of low emission travel options in the Borough; and to secure funding for the installation of a publicly accessible vehicle charging network infrastructure across our estate.

Rushcliffe Borough Council worked to implement these measures in partnership with the following stakeholders during 2021:

- Nottinghamshire County Council; and
- National Highways.

Rushcliffe Borough Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in AQMA No 1 Trent Bridge and AQMA No 1/2011 Stragglethorpe Road.

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
NC01	Optimisation of traffic signals	Traffic Management	UTC, Congestion management, traffic reduction			Nottinghamshire County Council (NCC)/Via EM Ltd: integrated transport block funding		NO			Implementation	Reduced vehicle emissions	Restrain average journey times in the morning peak to a 1% increase per year	Implementation ongoing	SCOOT and MOVA equipped signals are relayed back to the Traffic Control Centre so that they can be altered in real time as required.
NC02	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		Nottinghamshire County Council (NCC)/Via EM Ltd/Nottingham City Council (NCiC)	NCC and NCiC revenue funding	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Restrain average journey times in the morning peak to a 1% increase per year	Implementation on-going	The UTCC is a shared facility between Nottinghamshire County Council and the City Council. Estimated cost shown is the County Council's annual contribution. Potential barrier: Lack of future revenue funding
NC03	Co-ordination of street works to minimise traffic disruption and unnecessary congestion	Traffic Management	UTC, Congestion management, traffic reduction	2019		NCC/Via EM/NCiC/Highways England (HE)	NCC, NCiC, HE revenue funding	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Restrain average journey times in the morning peak to a 1% increase per year	Implementation on-going	Regular coordination meetings held between all works promoters and regional partners in additional to regular meetings between National Highways 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
NC04	Incident management and effective contingency planning to minimise traffic disruption and unnecessary congestion	Traffic Management	UTC, congestion management, traffic reduction	2019		NCC/Via EM Ltd	NCC/Via EM/NCiC/National Highways: NCC, NCiC, National Highways revenue funding	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions		Implementation on-going	Information conveyed by all forms of media (press, radio, website, social media etc.).
NC05	Bus stop clearways	Traffic Management	UTC, congestion management, traffic reduction	2016		NCC/Via EM Ltd:	NCC revenue funding	NO	Funded		Completed	Reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Complete. Bus stop clearways introduced in and on approaches to the AQMA. CCTV enforcement car introduced in 2016, second vehicle purchased in 2018; and third vehicle introduced in 2019.	Further clearways will only be considered should vehicles parking in bus stops be identified as impeding traffic flows
NC06	Real time travel information	Public Information	Other			NCC	NCC revenue funding	NO	Funded		Implementation	Reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation on-going	Information conveyed by all forms of media (press, radio, website, social media etc.).
NC07	On-street parking management and control	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2012		NCC	NCC revenue funding	NO	Funded		Implementation	Reduced vehicle emissions	Manage parking to improve journey time reliability	Implementation on-going	Parking restrictions already in place within AQMA. No additional side-road/off-line locations currently identified as requiring restrictions to aid traffic flow
NC08	Nottingham city workplace parking levy (WPL)	Traffic Management	Workplace Parking Levy, Parking	2012		NCiC	WPL funding	NO	Funded		Implementation	Reduced vehicle emissions	Restrain average journey times in the morning	Implementation on-going	Whilst not within the county remit the scheme may reduce the number of vehicles travelling through the AQMA en-route to the City

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
			Enforcement on highway										peak to a 1% increase per year		
NC09	NCC travel plan	Promoting Travel Alternatives	Workplace Travel Planning	2012		NCC	NCC revenue funding	NO	Funded		Implementation	Reduced vehicle emissions	Restrain average journey times in the morning peak to a 1% increase per year	Implementation on-going	NCC travel plan in operation for over 20 years
NC10	Personal travel planning (PTP) with residents	Promoting Travel Alternatives	Personalised Travel Planning	2017	2018	NCC/AECOM; integrated transport block	Access Fund funding	NO	Funded		Completed	Reduced vehicle emissions	Restrain average journey times in the morning peak to a 1% increase per year	PTP undertaken with West Bridgford residents in 2016. Further Access Fund funded travel planning undertaken in West Bridgford during 2018	Future PTP will be delivered should revenue funding sources be identified and secured for its delivery
NC11	Car sharing scheme	Alternatives to private vehicle use	Car & lift sharing schemes	2012		NCC	NCC	NO	Funded	<£10k	Implementation	Reduced vehicle emissions	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	Costs shown are annual. 1077kg (1.06t) of NOx reductions during 2020
NC12	Development of ITSO public transport smartcard ticketing	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2012		NCC/NCiC/PT operators		NO	Funded	Ongoing	Implementation	Increased passenger transport patronage	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	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 Robinhood add-on to launch: March 2024
NC13	Countywide off-peak concessionary public transport fare scheme for the over 60s and disabled.	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2019		NCC/NCiC/PT operators	NCC	NO	Funded	>£10 million	Implementation	Increase passenger transport patronage	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation on-going	Estimated annual cost of measure shown
NC14	Web based journey planners	Public Information	Other	2019		NCC	NCC	NO	Funded		Implementation	Increased walking/cycling/ passenger transport trips	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation on-going	Web based tools included on NCC Travel Choice website https://travelchoice.nottinghamshire.gov.uk/journey-planner/ And on NCC's website: http://www.nottinghamshire.gov.uk/transport/public-transport/plan-journey
NC15	Enhancements to bus services operating within the AQMA	Transport Planning and Infrastructure	Other			NCC/PT operators		NO	Funded		Implementation	Increased passenger transport patronage, reduced	Sustain compliance & reduce NO2 concentratio	Implementation on-going	Capacity increases will be considered should passenger information demonstrate that there is insufficient capacity on existing services

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												vehicle emissions	ns to well below the AQS objective (in the region of 10%)		
NC16	Park and ride site to the east of Nottingham	Alternatives to private vehicle use	Bus based Park & Ride		2026	NCC	No funding source identified	NO	Not Funded		Aborted	Reduced vehicle emissions	Restrain average journey times in the morning peak to a 1% increase per year	No site currently identified. No funding source identified	Scheme dependent on identifying appropriate site, business case for any proposals and securing funding for its delivery
NC17	Annual cycling promotional marketing	Promoting Travel Alternatives	Promotion of cycling	2019		NCC	NCC revenue funding	NO	Funded	£50k - £100k	Implementation	Increased cycling trips	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	General promotion (e.g. website and literature) ongoing. PTP delivered during 2018 following completion of cycle route improvements. Greater Nottingham cycling maps published NCC's website and Travel Choice webpages provide information on alternatives to using private vehicles, including cycle maps, leisure 'Routes and Rides' and the Rights of Way network	Travel Choice website: https://travelchoice.nottinghamshire.gov.uk/
NC18	Annual walking promotional marketing	Promoting Travel Alternatives	Promotion of walking	2019		NCC	NCC revenue funding	NO	Funded	£50k - £100k	Implementation	Increased walking trips	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	General promotion (e.g. website and literature) ongoing. PTP delivered during 2018 following completion of cycle route improvements. Greater Nottingham cycling maps published NCC's website and Travel Choice webpages provide information on alternatives to using private vehicles, including cycle maps, leisure 'Routes and Rides' and the Rights of Way network	Funded within existing resources Travel Choice website: https://travelchoice.nottinghamshire.gov.uk/
NC19	Adult and child cycle training	Promoting Travel Alternatives	Promotion of cycling			NCC	DfT funding	NO	Funded		Implementation	Increased cycling trips	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	739 children received cycle training in 2020/21 and 1280 in 2021/22. Implementation is ongoing	Cycle training during 2020/21 and 2021/22 was impacted by the Covid-19 pandemic which saw school closures and the introduction of 'bubbles' Consequently, this restricted the number of schools who participated/were able to receive cycle training.
NC20	Walking and cycling infrastructure improvements	Transport Planning and Infrastructure	Cycle network	2017		NCC	DfT funding and Active Travel Fund	NO	Funded		Completed	Increased cycling trips	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	NCC secured funding to develop and deliver West Bridgford strategic cycling network during 2017/18. NCC secure funding from Tranche 2 of the Active Travel Fund (ATF) to deliver segregated cycleway/footway improvements along Regatta Way, West Bridgford. Works are due to be completed summer 2022. Funding secured to develop D2N2 wide LCWIP. Data collected; three stakeholder events held to date Further public engagement on the D2N2 LCWIP is due to be undertaken in the summer of 2022. Future countywide priorities will be identified through technical analysis undertaken as part of the LCWIP development and will be subject to feasibility, consultation, and County Council Cabinet approval.	Potential new Trent walking/cycling bridge and improvements to it (subject to feasibility, consultation and Cabinet approvals). No further works to be undertaken unless prioritised through the technical analysis assessment and external/additional DfT funding secured for their delivery. Dependant on outcome of technical analysis prioritisation
NC21	Bus fleet low emission vehicles	Promoting Low Emission Transport	Promoting Low Emission Public Transport	2018	2021	NCC/NCiC/PT operators; NCT (operator)	OLEV funding	NO	Funded	£500k - £1 million	Implementation	Ongoing take-up of cleaner vehicles	Sustain compliance & reduce NO2 concentratio	Implementation ongoing. SQBP in place affecting all buses travelling through AQMA	All local buses operating into Nottingham City Centre and through the AQMA will meet Euro VI standards by the end of 2021. Operator NCT has invested £4.7m of OLEV funding to operate gas buses along two routes through

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													ns to well below the AQS objective (in the region of 10%)		the AQMA and invested a further £12.4m to upgrade its facilities to enable running of a gas fleet. In addition, NCT has invested £1.5m in 10 new Euro VI midibuses operating on four routes through the AQMA. Operator trentbarton has invested just over £2m in 12 new euro VI buses operating on three routes in the AQMA. NCC has invested £0.9m from the Clean Bus Technology Fund in 2018 to retrofit older buses to achieve Euro VI equivalent. This includes routes operated by several operators in the AQMA
NC22	Introduction of wider network of EV charging points to encourage the take-up of alternative fuel vehicles	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging	2022		NCC	Privately funded by resident and OLEV funding (LEVI)	NO	Partially Funded		Planning	No. of EV charge points introduced in the Borough	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	County Council approved the trialling of on-street EV charging cable channels at Transport & Environment Committee in February 2022. All delivery processes, design specifications, and internal approvals being finalised Nottinghamshire County Council submitted a bid for OZEV's Local Electric Vehicle Infrastructure (LEVI) pilot funding in June 2022. If successful, the LEVI funding will help extend the pilot. The County Council is 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.	The County Council is still finalising the details of the pilot scheme Measure is reliant on a successful LEVI bid
NH01	Using new traffic light control technology to minimise the frequency of stops for large vehicles (lorries & buses predominantly). It is hoped that reducing stops for these vehicles it will reduce their emissions; further benefits may accrue by reducing their idle time and the capacity implications of larger, slower, vehicles pulling off at the front of a traffic queue.	Traffic management	Strategic highway improvements			NH		NO	Funded		Implementation	Improved traffic flow	Reduction in NO2 annual mean concentration of 1µg m-3 required to achieve the AQS – further reduction (in the region of 10%) required to demonstrate well below the AQS and sustained compliance.		Technology is effective at detecting large vehicles and influencing signal control. Control set up used showed benefits in some cases but in others proved detrimental by overriding the well developed adaptive control system (MOVA). The net effect was shown to be negative on stops and delays however this did not translate into a material change in air quality readings; it is assumed therefore that even focussing on the positive elements the level of impact from this system is too small to have a meaningful impact on emissions at a single junction. NH have reverted out those changes shown to be detrimental but left in those they are confident were beneficial. As part of the proposed upcoming changes as part of the A52 Nottingham Junctions project NH are hoping to further review and see if some softer priority measures can be re-introduced for HGVs.
NH02	Proposals to ban the U-turn east to west and reconfigure the signals to improve efficiency, have been developed further and initial consultation with local stakeholders has been undertaken.	Traffic management	Strategic highway improvements	2016	2023	NH		NO	Funded			Improved traffic flow	Reduction in NO2 annual mean concentration of 1µg m-3 required to achieve the AQS – further reduction (in the region of 10%) required to demonstrate well below the AQS and sustained compliance.	Implementation ongoing. The order to remove the U-turn movement at Stragglethorpe will be brought into force on Friday 27 May 2022	If the Traffic Regulation Order (TRO) is approved and the order is made this will facilitate a reconfirmation of the signal control which will reduce the signal cycle time (and hence shorter red periods, queues and idling) and improve capacity. It is these further changes that will bring about any change in emissions and air quality.
NH03	Introduction of wider network of EV charging points to encourage the take-	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure	2020		NH (EV infrastructure on the trunk road network)					Implementation	No. of EV charge points introduced in the Borough	Reduction in NO2 annual mean concentratio		Implementation ongoing. Review of on-street and rural EV charging infrastructure to be undertaken during 2020/21

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
	up of alternative fuel vehicles		to promote Low Emission Vehicles, EV recharging										n of 1µg m-3 required to achieve the AQS – further reduction (in the region of 10%) required to demonstrate well below the AQS and sustained compliance.		
NH04	Co-ordination of street works to minimise traffic disruption and unnecessary congestion	Traffic Management	UTC, congestion management, traffic reduction			NH		NO	Funded		Implementation	Improved traffic flow, reduced vehicle emissions	Reduction in NO2 annual mean concentration of 1µg m-3 required to achieve the AQS – further reduction (in the region of 10%) required to demonstrate well below the AQS and sustained compliance.	Implementation ongoing.	
NH05	Walking and cycling infrastructure improvements	Transport Planning and Infrastructure	Cycle Network	2020		NH		NO	Not Funded		Planning	Walking and cycling infrastructure improvements	Reduction in NO2 annual mean concentration of 1µg m-3 required to achieve the AQS – further reduction (in the region of 10%) required to demonstrate well below the AQS and sustained compliance.	NH seeking funding for a strategic study to identify further options and explore potential routes to funding and delivery	The A52 corridor from Bingham to Gamston (and further into Nottingham City) has been identified as having potential for wider walking, cycling and public transport improvements and NH are seeking funding for a strategic study to identify further options and explore potential routes to funding and delivery.
RB01	Off-street parking management and control (including review of car parking offer/charging)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway			RBC	LA funded	NO	Funded	< £10k	Implementation	Improved traffic flow, reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)		Not relevant within AQMA No 1/2011 Stragglethorpe Road
RB02	Ensure sustainable development on sites within Borough that may impact on AQMA	Policy Guidance and Development Control	Other policy	2012	2032	RBC	LA funded	NO	Funded		Implementation	Developments within and potentially impacting on an AQMA supported by AQ assessments. No. of AQ impact assessments	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation ongoing - Ensuring AQ is at the heart of planning decision.	Propose to adapt and introduce EMAQN Air Quality and Emissions Mitigation – Guidance for Developers for RBC to ensure consistency of approach

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												related to AQMA			
RB03	Co-ordination of land-use planning and transport infrastructure	Policy Guidance and Development Control	Other policy	2012	2032	RBC/NCC/NH		NO			Implementation	No. of impact assessments	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation ongoing - Ensuring AQ is at the heart of planning decision.	
RB04	Use of planning conditions for mitigation; inc. travel plans etc. and to ensure for planning applications within AQMAs that are introducing sensitive receptors to the area that air quality assessments are required, and developments with vulnerable end users that the assessment takes account of WHO guidelines on air quality and PM2.5	Policy Guidance and Development Control	Other policy	2012	2031	RBC		NO			Implementation	No. of travel plans required as planning conditions and number of AQ assessments submitted with mitigation measures put in place	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Ongoing as part of the development control process - Development specific requirement	
RB05	Secure appropriate levels of developer contributions (Section 106 and/or CIL) for use on sustainable transport and air quality improvement projects	Policy Guidance and Development Control	Other policy	2012	2032	RBC/NCC		NO			Implementation	Sums collected for such infrastructure projects	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Ongoing as part of the development control process - Development specific requirement	
RB06	Promote carbon reduction policies and guidance to developers working within Rushcliffe with a co-benefit of improving air quality	Policy Guidance and Development Control	Other policy	2019	2030	RBC		NO	Funded		Implementation	No. of EV charge points introduced in the Borough through planning conditions.	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Ongoing - driven by the policies in the Local Plan adopted in 2019	Provision of/for EV charging points in new residential and commercial developments.
RB07	Workplace travel plans	Promoting Travel Alternatives	Workplace Travel Planning	2016		RBC planning/NCC		NO			Implementation	Restrain average journey times in the morning peak to a 1% increase per year	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Developed with businesses as part of planning conditions when secured by RBC. Targeted travel planning (funded by the County Council) was held at workplaces within the AQMA during 2014/15	
RB08	RBC travel plan	Promoting Travel Alternatives	Workplace Travel Planning	2019		RBC/ RBC planning/NCC		NO			Implementation	Restrain average journey times in the morning peak to a 1% increase per year	Sustain compliance & reduce NO2 concentrations to well below the AQS		RBC developed travel plan as a planning condition for occupation of new premises

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													objective (in the region of 10%)		
RB09	Flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working	2020		RBC		NO			Implementation	Restrain average journey times in the morning peak to a 1% increase per year	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	RBC operate flexible working arrangements for appropriate staff	Flexible/remote working arrangements have been updated/revised as part of the smarter ways of working framework in new People Strategy which was adopted in 2021
RB10	Travel planning with residents at new developments	Promoting Travel Alternatives	Personalised Travel Planning	2016		RBC		NO			Implementation	Restrain average journey times in the morning peak to a 1% increase per year	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation ongoing. Planning conditions secured by RBC to ensure residential travel planning is undertaken where appropriate	
RB11	Introduction of wider network of off-street EV charging points to encourage take up of alternative fuel vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019		RBC/NCiC;		NO	Funded	£500k - £1 million	Implementation	Reduced vehicle emissions. No. of EV charge points introduced across the Borough	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Successful in funding bid to OZEV – residents off street charging provision in Keyworth and Radcliffe on Trent. 20 charging points installed as part of Go Ultra Low Project. Other sites identified and due to come on board imminently; Site investigation ongoing to determine feasibility of other sites. Currently assessing other potential funding schemes.	RBC working in partnership with NCiC to develop the CP infrastructure along the D2N2 corridor –funding via Transforming Cities Fund. Implementation ongoing. Constraints identified in some locations due to power supply issues. Working with electricity distributor to improve supply provision.
RB12	Develop a strategy for further EV provision across the Borough	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020		RBC		NO	Funded		Implementation	Reduced vehicle emissions. No. of EV charge points introduced across the Borough	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Installation of one solar canopy hub – others under consideration	Constraints identified around power supply in some locations. Partnering with City under Transforming Cities Fund to increase D2N2 offering across the Borough; exploring wider options. Assessing other potential funding sources e.g. LEVI
RB13	Promotion of low emission vehicles through taxi licensing	Promoting Low Emission Transport	Taxi emission incentives	2021		RBC		NO	Not Funded		Planning	Reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Review of taxi licence criteria/incentives for use of electric vehicles. Under consideration – exploring possible options	Currently reviewing case studies
RB14	Procurement of new RBC vehicles	Vehicle Fleet Efficiency	Other	2020		RBC		NO	Not Funded		Planning	Reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	No. of electric and/or other low emission vehicles within RBC fleet. Replace Rushcliffe Country Park diesel buggies with electric buggies.	Applicable to RBC operations - link with Carbon Management Plan
RB15	Investigate potential replacement/upgrading of RBC refuse	Vehicle Fleet Efficiency	Other	2021		RBC		NO	Not Funded		Planning	Reduced vehicle emissions.	Sustain compliance & reduce	Successful trial undertaken in 2020/21 working with a partner organisation providing biofuel; going forward	Applicable to RBC operations - link with Carbon Management Plan and accelerating shift to low carbon transport.

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
	trucks & vans with ULEV, Biogas, hydrogen fuelled vehicles											No. of electric and/or other low emission vehicles within RBC fleet	NO2 concentrations to well below the AQS objective (in the region of 10%)	sourcing fuel facility for Borough Council depot	
RB16	Integrate RBC driver training with annual certification and investigate in-cab monitoring and route optimisation	Vehicle Fleet Efficiency	Other	2021		RBC			Not Funded		Planning	Reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)		Applicable to RBC operations - link with Carbon Management Plan and accelerating shift to low carbon transport.
RB17	Widen access to staff cycle purchase scheme	Promoting Travel Alternatives	Promotion of cycling and walking	2015	2025	RBC		NO	Funded	£10k - 50k	Implementation	Increase in cycle purchases via staff scheme	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	RBC staff initiative. 35 people have availed of the scheme since it was introduced in 2015	Scheme open to all staff
RB18	Work with partners to promote active travel to the public - (e.g. school travel plans including accreditation (stars) and walking bus; travel choice programme including active travel; well-being at work scheme / work place health; business e-bike scheme; healthy futures fund – cycling on prescription; community cycling groups; Ridewise training	Promoting Travel Alternatives	Promotion of cycling and walking	2016		NCC/RBC		NO			Implementation	Increase cycling and walking	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Implementation ongoing. Further bike repair and learn to cycle sessions made available in 2022. Green Rewards scheme introduced in 2020 - encouraging active travel where residents who sign up to the scheme can earn points which give discounts in local shops and entry into prize draws.	52 people got their bikes fixed across 7 events which took place in Keyworth, Bingham, Cotgrave and West Bridgford. 500 people signed up to Green Rewards scheme by end of 2021 - scheme opened in October 2021
RB19	Development of RBC cycling strategy	Promoting Travel Alternatives	Promotion of cycling and walking	2021		RBC		NO	Not Funded		Implementation	Increased cycling trips; reduced vehicle emissions	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	new cycling strategy to be published in 2022 - increase awareness through publication of Borough wide cycling map; improvements to infrastructure; working with partners including Big Business Carbon Club partners and schools to promote cycling; development of policy to ensure Section 106 agreements are realised.	Development of RBC cycling strategy to identify RBC priorities and help residents make smarter travel choices. The strategy will complement and support the NCC cycling strategy with RBC working in collaboration with NCC to develop the cycling infrastructure.
RB20	Raise awareness of the wider government initiatives to reduce air emissions e.g. ban on the sale of house coal and wet wood	Policy guidance and development control	Low emissions strategy	2021		RBC		NO	Not Funded		Implementation	Reduction in complaints relating to domestic burning	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Environment Bill 2021 has improved and streamlined enforcement powers in Smoke Control Areas	Working with Nottinghamshire County Council Trading Standards to ensure appropriate fuel is sold in the Borough

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
RB21	Work with partners to encourage more sustainable travel	Promoting Travel Alternatives	Promotion of cycling and walking	2020		NCC/RBC		NO	Not Funded		Implementation	reduced vehicle emissions, increased cycling/walking, wider benefit to public health	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Linking with public health to promote the health benefits of walking and cycling. Link with NCC Travel Choice programme https://travelchoice.nottinghamshire.gov.uk/	RBC working with GPs - Active Practice Charter looking to encourage staff and patients to be more physically active and less sedentary. Six of eleven practices now accredited. Adoption of cycle to work schemes and team virtual race competitions leading to more people being active and using their car less
RB22	Working on a regional basis with other Local Authorities & partners to develop area-wide strategies and guidance as required	Policy Guidance and Development	Air Quality Planning and Policy Guidance			NCC/UKHSA/RBC & other district/Borough councils		NO	Not Funded			Development of regional strategies, policies and guidance as required	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	RBC will continue to work with other authorities and relevant partners on a regional basis. RBC are a member of the East Midlands Air Quality Network	Nottinghamshire Air Quality Strategy published 2020
RB23	Regulation of Permitted Activities	Environmental permits	Introduction /increase of environmental funding through permit systems and economic instruments	2012	2032	Environment Agency and RBC		NO			Implementation	Conditions applied in line with Defra guidance and support best practice	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Ongoing programme for inspection of permitted activities	
RB24	New Trent Crossing	Promoting Travel Alternatives	Promotion of cycling and walking	2020	2024	NCiC working in partnership with RBC & NCC	Transforming Cities Fund	NO	Funded	£1 million - £10 million	Implementation	Increase cycling and walking; reduction in number of car journeys	Sustain compliance & reduce NO2 concentrations to well below the AQS objective (in the region of 10%)	Options appraisal and public consultation ongoing; planning application due to be submitted in early 2022.	The City Council secured £9.25m in 2020 from the Government's Transforming Cities programme to deliver this scheme as part of a programme to invest in local transport infrastructure that will improve sustainable transport, support growth, and encourage more low carbon journeys.

Note: Measure No in the above table reflects the numbering system used in the 2021 AQAP – measures NC 01-22 are the Nottinghamshire County Council measures which relate predominantly to AQMA No 1 Trent Bridge; NH 01-05 are the National Highways measures which relate predominantly to AQMA No 1/2011 Stragglethorpe Road; and RB 01-23 are the Rushcliffe Borough Council measures which are generally applicable across the Borough.

The expected efficacy of the measures is provided by a traffic light colour coded system with measures highlighted in green as the most effective and red as least effective.

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

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

Rushcliffe Borough Council is taking the following measures to address $PM_{2.5}$:

Within towns and cities, road traffic is an important source of $PM_{2.5}$ emissions and consequently roadside levels tend to be much higher than those in background locations. Industrial emissions are also a source as is domestic burning which can also significantly increase levels of indoor air pollution.

Rushcliffe Borough Council does not undertake monitoring for particulate matter however an indication of the background concentrations of $PM_{2.5}$ can be obtained from the current Defra background mapping resource available via UK-AIR. The background data provides estimated concentrations of $PM_{2.5}$ across the Borough for 2021 (base year 2018) and indicates concentrations range from 7.5µg m^{-3} to 9.9µg m^{-3}. Across the wider Midlands region estimated concentrations of $PM_{2.5}$ range from 5.1µg m^{-3} to 12.1µg m^{-3}.

The Environment Act 2021 establishes a legally binding duty on government to bring forward at least two new air quality targets in secondary legislation by 31 October 2022. This duty sits within the environmental targets framework outlined in the Environment Act (Part 1).

The proposed air quality targets are currently out to consultation as part of the first suite of Environment Act 2021 targets. The consultation closes at the end of June 2022.

The proposed air quality targets are:

- Annual Mean Concentration Target ('concentration target') - a maximum concentration of 10µg/m^3 to be met across England by 2040
- Population Exposure Reduction Target ('exposure target') - a 35% reduction in population exposure by 2040 (compared to a base year of 2018).

The UK Health Security Agency (UKHSA) Public Health Outcomes Framework (PHOF) indicator D01 provides estimates of local mortality burdens associated with particulate air

pollution. This data, presented for each local authority, is based on the research evidence of mortality risk and modelled levels of background air pollution to which populations are exposed at a local level. The most recent update of the PHOF utilises a new method for the calculation of the local mortality burdens and as a result there is new data for Rushcliffe Borough Council. The attributable fraction (i.e. the proportion of deaths estimated as due to long-term exposure to anthropogenic particulate $PM_{2.5}$ air pollution) for Rushcliffe for 2021[12] was 5.1% which is in line with the regional level of 5.2% and the national level of 5.6%.

The Nottingham and Nottinghamshire Air Quality Strategy 2020-2030 aims are (1) to reduce average concentrations of NO_2 and particulate matter across the County; and (2) to reduce the estimated proportion of disease and deaths attributable to air pollution.

Rushcliffe Borough Council is taking the following measures to address $PM_{2.5}$:

- Rushcliffe Borough Council continues to work with our transport partners (Nottinghamshire County Council and National Highways) and other stakeholders to reduce transport impacts as a whole. This has benefit not only for NO_2 but all emissions from transport sources, including $PM_{2.5}$;
- Planning applications for commercial wood/biomass burning plants (and similar) are screened to determine whether an air quality assessment is required. One of the key considerations within an assessment will be emissions of particulate matter;
- We will continue to work with UKHSA in considering the data on the Rushcliffe population in relation to respiratory illness in order to determine whether there is a correlation between the areas of high prevalence respiratory illnesses and the AQMAs. The principal application used is the Strategic Health Asset Planning and Evaluation (SHAPE) tool which is a web-enabled evidence-based application which informs and supports strategic planning of services and physical assets across the health economy;
- Within the Borough parts of Edwalton and West Bridgford were historically declared Smoke Control Areas. The Council works to ensure only exempt appliances are used and authorised fuels are burnt in these areas;
- Rushcliffe Borough Council is exploring the possibility of making adjustments to the Smoke Control Area coverage across the Borough. This work is at a preliminary

[12] Public Health Outcomes Framework– Rushcliffe (2021) Public Health Outcomes Framework - Rushcliffe

stage and no decisions have yet been made. We will provide updates on this issue in future ASRs;

- As awareness of the health effects of exposure to particulate matter increases within the population, we anticipate an increase in enquiries/complaints in relation to local air quality, including domestic burning and bonfires. We will consider running focussed campaigns to increase awareness and help residents to make informed choices;
- We will utilise the recently published amendments to Smoke Control Area enforcement under the Environment Act 2021 which came into effect on 1st May 2022, and the statutory guidance on enforcement to take action as necessary. We will work with Nottinghamshire County Council Trading Standards to ensure fuel retailers supplying properties in the Borough with authorised fuels only;
- We will continue to work and share knowledge with our neighbouring authorities as part of the Nottinghamshire Environmental Protection Working Group (NEPWG). The consideration of the extent of existing Smoke Control Areas and the impact of the recently published statutory guidance on enforcement are issues that have been raised at our most recent meeting (June 2022) and will be carried forward to future meetings.

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

This section sets out the monitoring undertaken within 2021 by Rushcliffe Borough Council 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.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Rushcliffe Borough Council undertook automatic (continuous) monitoring at 2 sites 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 Rushcliffe Borough Council, 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

Rushcliffe Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 30 sites during 2021. Table A.2 in Appendix A presents the details of the non-automatic sites.

As part of our ongoing review and management of the local air quality monitoring network two locations (37RR and 1HS) were removed from the 2020 network. These locations had consistently reported NO_2 annual mean concentrations below the air quality objective. Five additional monitoring locations were added to the network – DS1 and The Green were included to consider potential impacts from increased traffic movement and congestion in Ruddington village; Fern Road is located at a village junction where congestion has been noted; A52/Bass was added to address concerns from members of the public regarding the National Highways alterations to the Stragglethorpe junction and Gamston roundabout and any potential associated impact on traffic queuing; and Rempston was added in

response from a request from the Parish Council about air quality impacts at the junction with the A60 in Rempstone village.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 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. It was not necessary to undertake distance correction for any of the diffusion tube locations across the Rushcliffe Borough Council monitoring network. The diffusion tubes were installed in accordance with the 2021 diffusion tube calendar. Annualisation was required at two locations, A52/Bass and Rempstone as monitoring was commenced at these locations in May 2021 and Oct 2021, respectively and therefore data capture fell below 75%.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. There were no exceedances of the hourly air quality objective at either continuous monitoring site which is consistent with the trend for the past five years. The maximum hourly mean recorded by the continuous monitors was

103µg/m^3 in AQMA No1/2011 Stragglethorpe Road and 140µg/m^3 in AQMA No 1 Trent Bridge.

The data presented in Table A3 and Table A4 shows the NO_2 annual mean concentration did not exceed the air quality objective at any location during 2021. It can be seen from Figure A.1 the NO_2 annual mean concentration recorded at all locations across the network continues the downward trend identified over the past five years. With the exception of one location (NK1) the NO_2 annual mean concentrations recorded in 2021 were slightly higher (between 1 and 14%) than in 2020. However, the 2021 concentrations remain below the levels recorded prior to 2020.

In AQMA No 1 Trent Bridge the highest measured NO_2 annual mean concentration was 30µg m^{-3}, an increase of 11% when compared to 2020 data. The maximum hourly mean was 140µg m^{-3} therefore there were no exceedances of the NO_2 hourly limit of 200µg m^{-3}. The data (continuous and passive) for AQMA No 1 Trent Bridge for the period from 2017 to 2021 is presented in Figure A.2. There were no exceedances of the annual mean objective and the concentrations at all locations were lower than pre-2020 levels. There was a slight increase in the 2021 levels when compared to the 2020 levels.

In AQMA No 1/2011 Stragglethorpe Road the highest measured NO_2 annual mean concentration was 33µg m^{-3}, an increase of 6% when compared to 2020 data. The maximum hourly mean was 103µg m^{-3} therefore there were no exceedances of the NO_2 hourly limit of 200µg m^{-3}. Figure A.3 shows the trends in annual mean NO_2 concentrations across all locations (Continuous & Passive) in AQMA No 1/2011 Stragglethorpe Road between 2017 and 2021. There were no exceedances of the annual mean objective and the concentrations at all locations were lower than pre-2020 levels. There was a slight increase in the 2021 levels at 2 of the 3 locations when compared to the 2020 levels.

Figure A.4 shows a similar pattern in the NO_2 annual mean concentrations across the monitoring network for 2017 – 2021 at sites not located in an AQMA. There are 4 monitoring sites with no historic data as these are new monitoring locations added in 2021.

Both of the AQMAs are associated with traffic impacts therefore as with the 2020 data, the 2021 data should be considered in the context of the COVID-19 pandemic. During 2020 the measured concentrations in AQMA No 1 Trent Bridge and AQMA No 1/2011 Stragglethorpe Road were significantly reduced (27% and 24% respectively) in comparison to previous years due to the COVID-19 pandemic national and regional lockdowns and the associated impact on traffic levels. The lockdowns and restrictions continued into 2021 with a third national lockdown from January until March 2021 when

England began a phased exit from lockdown. The roadmap out of lockdown eased restrictions until all were removed by July 2021[13,14]. The increase in the NO_2 annual mean concentration between 2020 and 2021 should be viewed in this context. The 2021 levels remain well below the levels recorded prior to the pandemic and it remains to be seen if lifestyle changes required to deal with the pandemic will have a long-term impact on population behaviour e.g. if significant numbers of people continue to work from home this may reduce traffic congestion at peak times. It is reasonable to assume the NO_2 annual mean concentrations recorded in 2021 continue to be impacted by the COVID-19 pandemic and it is therefore difficult to draw robust conclusions from the dataset for this year.

Rushcliffe Borough Council will continue to monitor in both AQMAs. In AQMA No 1 Trent Bridge the NO_2 annual mean concentration has been below the air quality objective for a number of years, including pre pandemic. We will consider revocation of the AQMA within the next year should monitoring results demonstrate continued compliance and achieve concentrations in the region of 10% below the objective.

In AQMA No 1/2011 Stragglethorpe Road NO_2 annual mean concentrations have decreased significantly since declaration and have been at or close to the objective over the past few years. We will continue to monitor within the AQMA and review the data annually.

3.2.2 Particulate Matter (PM_{10})

Rushcliffe Borough Council does not monitor Particulate Matter (PM_{10}).

3.2.3 Particulate Matter ($PM_{2.5}$)

Rushcliffe Borough Council does not monitor Particulate Matter ($PM_{2.5}$).

3.2.4 Sulphur Dioxide (SO_2)

Rushcliffe Borough Council does not monitor sulphur dioxide (SO_2).

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[13] UK Parliament House Of Commons Library Coronavirus: A history of English lockdown laws - House of Commons Library (parliament.uk)

[14] Cabinet Office COVID-19 Response COVID-19 Response - Spring 2021 (Summary) - GOV.UK (www.gov.uk)

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)
Trent Bridge	Loughborough Road/Trent Bridge, West Bridgford	Roadside	458256	338156	NO_2	YES (AQMA No1 Trent Bridge)	Chemiluminescent	0	3.75	1.5
Holme House	Holme House, A52 Stragglethorpe junction, Radcliffe on Trent	Roadside	463005	338208	NO_2	YES (AQMA No1/2011 Stragglethorpe Road)	Chemiluminescent	0	7.5	1.5

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)
WLR/2	39/41 WILFORD LANE	Roadside	457873	337426	NO2	NO	0.0	9.0	No	2.2
A52/SA	A52 SOUTH AVE, RADCLIFFE	Roadside	465929	339543	NO2	NO	0.0	4.2	No	2.9
CL	CLOVERLANDS	Roadside	457223	335033	NO2	NO	0.0	16.3	No	2.5
HR	HAMPTON ROAD	Urban Background	458326	336714	NO2	NO	0.0	5.4	No	2.1
LR	LOUGHBOROUGH ROAD (RES)	Roadside	458126	337727	NO2	YES (AQMA No 1 Trent Bridge)	0.0	8.9	No	1.9
Fern Road	Fern Road, Cropwell Bishop	Roadside	468413	335505	NO2	NO	2.4	1.2	No	2.6
A52/RT	A52/RT	Roadside	464644	338730	NO2	NO	6.5	3.3	No	2.0
RR	Radcliffe Road	Roadside	458284	338150	NO2	YES (AQMA No 1 Trent Bridge)	0.0	4.0	No	2.3
TBLA	TRENT BOULEVARD A	Roadside	458752	338278	NO2	YES (AQMA No 1 Trent Bridge)	0.0	7.1	No	2.0
TBLB	TRENT BOULEVARD B	Roadside	458756	338267	NO2	YES (AQMA No 1 Trent Bridge)	0.0	3.4	No	2.4
TBI	Trent Bridge Inn	Roadside	458274	338117	NO2	YES (AQMA No 1 Trent Bridge)	0.0	6.6	No	2.6
WL3	Wilford Lane 3	Roadside	458134	337581	NO2	YES (AQMA No 1 Trent Bridge)	5.2	2.1	No	2.9
WW	Windy Ways	Roadside	457651	334840	NO2	NO	0.0	12.0	No	1.8

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)
A52/HHF1	A52 HOME HOUSE 1	Roadside	463011	338213	NO2	YES (AQMA No1/2011 Stragglethorpe Road)	0.0	6.0	Yes	2.5
A52/HHF4	A52 HOLME HOUSE 2	Roadside	463040	338232	NO2	YES (AQMA No1/2011 Stragglethorpe Road)	0.0	6.0	Yes	2.5
15 KHG	15 Kirk Hill	Roadside	470202	340092	NO2	NO	2.0	0.5	No	2.5
RuRo	Rugby Road	Roadside	458132	336462	NO2	NO	3.5	2.0	No	2.5
2LA	2A Long Acre, Bingham	Roadside	470248	339834	NO2	NO	0.0	1.2	No	2.6
Trent B1	Trent Buildings	Roadside	458249	338167	NO2	YES (AQMA No 1 Trent Bridge)	0.0	3.6	Yes	2.5
DS 1	Distillery Street, Ruddington	Kerbside	457228	332891	NO2	NO	2.6	0.8	No	2.4
Mag 1	Magnolia 1, Edwalton	Kerbside	459366	334244	NO2	NO	12.9	0.9	No	2.6
Mag 2	Magnolia 2, Edwalton	Kerbside	459324	334227	NO2	NO	3.9	1.9	No	2.6
LR 1	Loughborough Road 1	Roadside	458100	337543	NO2	YES (AQMA No 1 Trent Bridge)	9.0	2.4	No	2.6
WL 1	Wilford Lane 1(Centenary)	Kerbside	458055	337566	NO2	YES (AQMA No 1 Trent Bridge)	7.0	2.0	No	2.6
NK 1	Nottingham Knight	Kerbside	457612	334859	NO2	NO	10.8	2.3	No	2.1
TSQ	Davis Road/Tudor SQ	Kerbside	458977	337434	NO2	NO	11.0	1.3	No	2.6

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)
Sains	Sainsbury Ruddington	Kerbside	457303	333214	NO2	NO	0.0	2.2	No	2.6
Rempston	Main street Rempston3	Roadside	457621	324386	NO2	NO	8.5	1.6	No	2.6
The Green	The Green Ruddington	Kerbside	457339	332944	NO2	NO	15.6	0.9	No	2.4
A52 Bass	A52 Bassingfield	Roadside	461816	337855	NO2	NO	30.0	10.0	No	2.5

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Trent Bridge	458256	338156	Roadside		98.9	37	36	37	27	29
A52 Holme House	463005	338208	Roadside		93.5	38	39	**41**	31	33

☒ **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/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.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 NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^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
WLR/2	457873	337426	Roadside		100.0	23.0	26.0	26.3	17.3	18.8
A52/SA	465929	339543	Roadside		100.0	29.0	29.0	27.6	19.8	21.3
CL	457223	335033	Roadside		100.0	30.0	28.0	28.5	20.5	20.8
HR	458326	336714	Urban Background		100.0	17.0	15.0	21.0	14.2	14.4
LR	458126	337727	Roadside		100.0	26.0	28.0	27.0	21.4	23.3
Fern Road	468413	335505	Roadside		100.0					14.5
A52/RT	464644	338730	Roadside		100.0	32.0	28.0	27.3	21.5	21.7
RR	458284	338150	Roadside		92.3	30.0	31.0	29.8	23.9	24.5
TBLA	458752	338278	Roadside		100.0	33.0	31.0	31.4	23.4	24.8
TBLB	458756	338267	Roadside		100.0	32.0	32.0	32.7	23.2	26.5
TBI	458274	338117	Roadside		100.0	**40.0**	**40.0**	39.3	28.1	30.3
WL3	458134	337581	Roadside		100.0	37.0	34.0	33.8	25.4	25.5
WW	457651	334840	Roadside		100.0	34.0	31.0	36.2	27.6	30.7
A52/HHF1	463011	338213	Roadside		100.0	37.0	38.0	37.4	24.3	27.4
A52/HHF4	463040	338232	Roadside		100.0	**41.0**	39.0	38.1	26.9	29.1
15 KHG	470202	340092	Roadside		90.4	26.0	25.0	23.8	17.8	19.2
RuRo	458132	336462	Roadside		92.3	29.0	29.0	28.4	19.3	20.8
2LA	470248	339834	Roadside		100.0	36.0	31.0	30.9	23.3	23.6
Trent B1	458249	338167	Roadside		82.7	37.0	36.0	37.3	26.6	29.3
DS 1	457228	332891	Kerbside		100.0					14.2
Mag 1	459366	334244	Kerbside		100.0			28.3	20.3	21.0
Mag 2	459324	334227	Kerbside		100.0			28.3	19.0	20.1
LR 1	458100	337543	Roadside		100.0			30.3	25.2	25.7
WL 1	458055	337566	Kerbside		90.4			32.6	25.5	28.4
NK 1	457612	334859	Kerbside		100.0			**40.1**	28.1	27.2
TSQ	458977	337434	Kerbside		92.3			24.1	15.6	17.4
Sains	457303	333214	Kerbside		92.3	30.0	31.0	30.4	21.1	24.2
Rempston	457621	324386	Roadside		26.9					16.4
The Green	457339	332944	Kerbside		90.4					13.2
A52 Bass	461816	337855	Roadside		57.7					14.6

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

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

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

Notes:

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

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations Across All Diffusion Tube Locations between 2017 and 2021

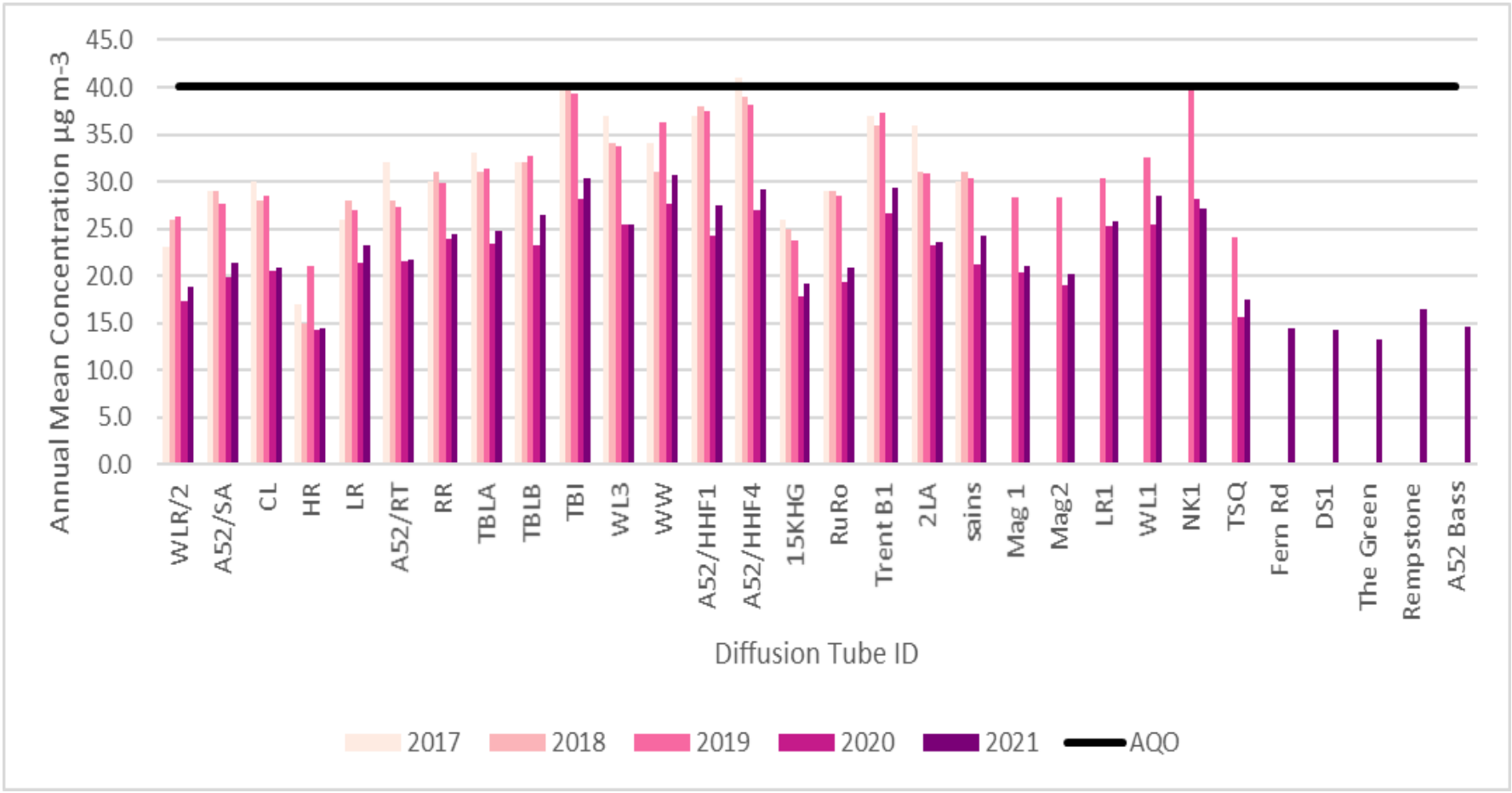


Figure A.2 – Trends in Annual Mean NO_2 Concentrations Across All Locations (Continuous & Passive) in AQMA No 1 Trent Bridge between 2017 and 2021

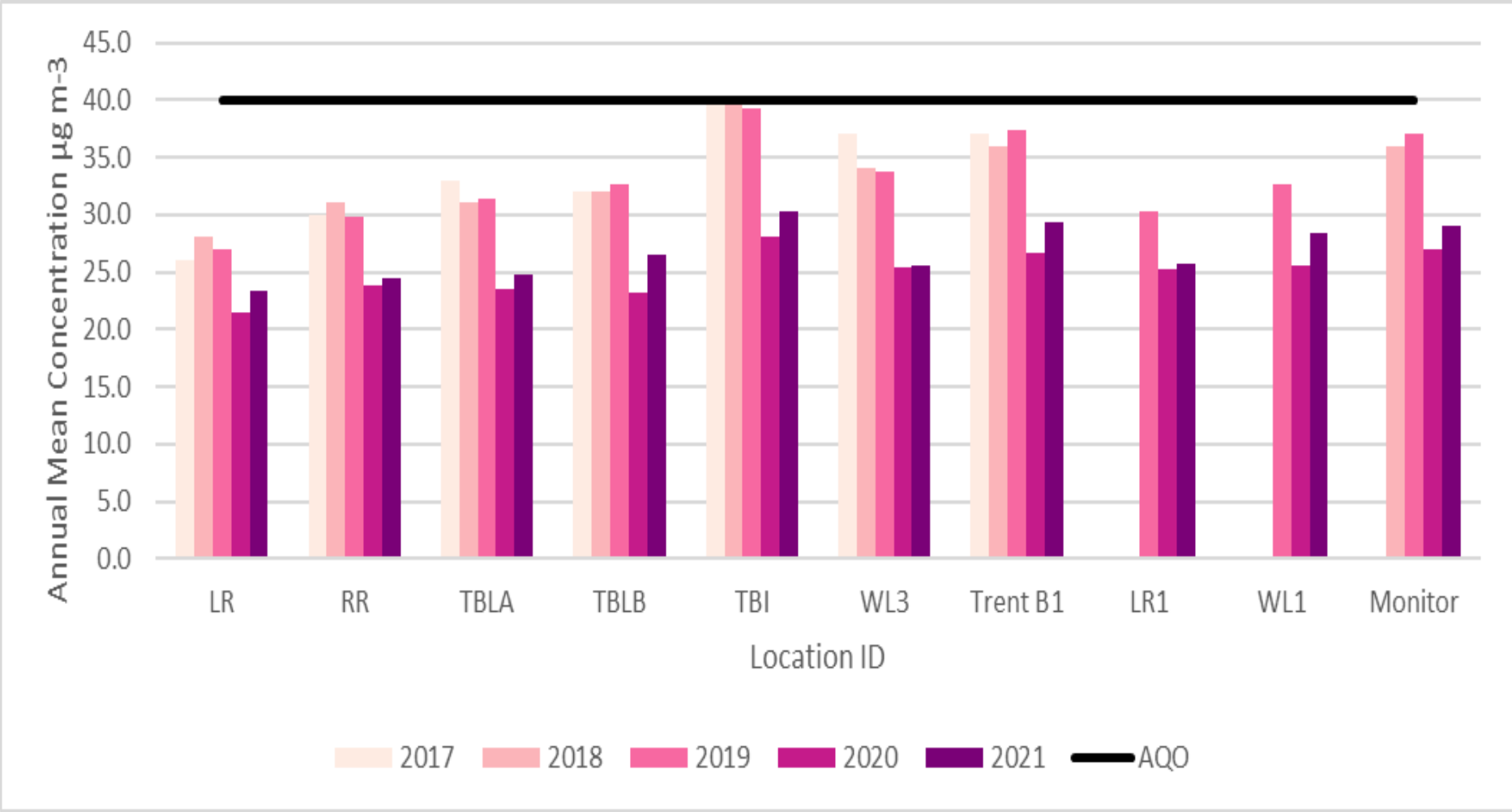


Figure A.3 – Trends in Annual Mean NO_2 Concentrations Across All Locations (Continuous & Passive) in AQMA No 1/2011 Stragglethorpe Road between 2017 and 2021

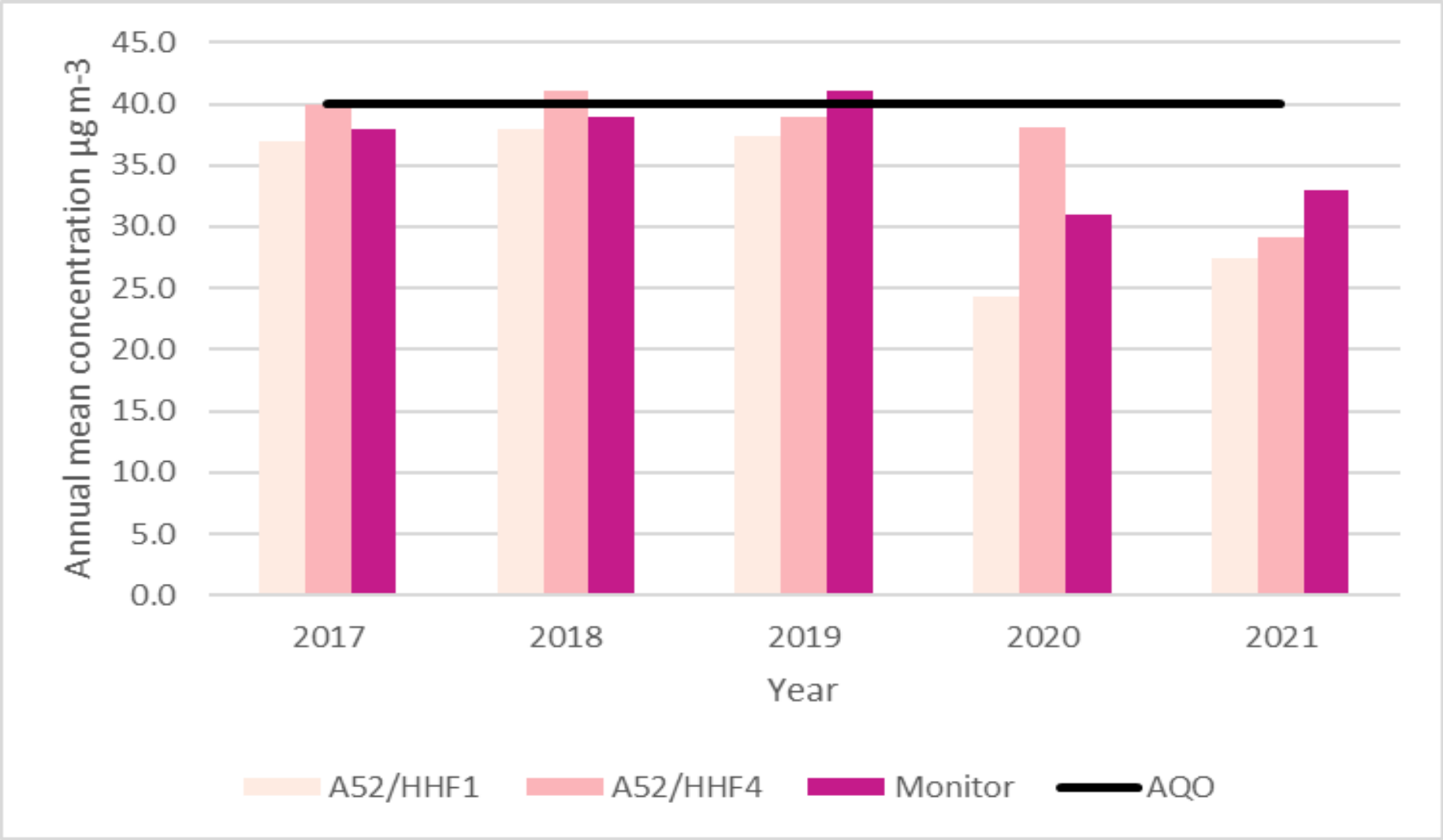


Figure A.4 – Trends in Annual Mean NO_2 Concentrations Across All Diffusion Tube Locations not in an AQMAs between 2017 and 2021

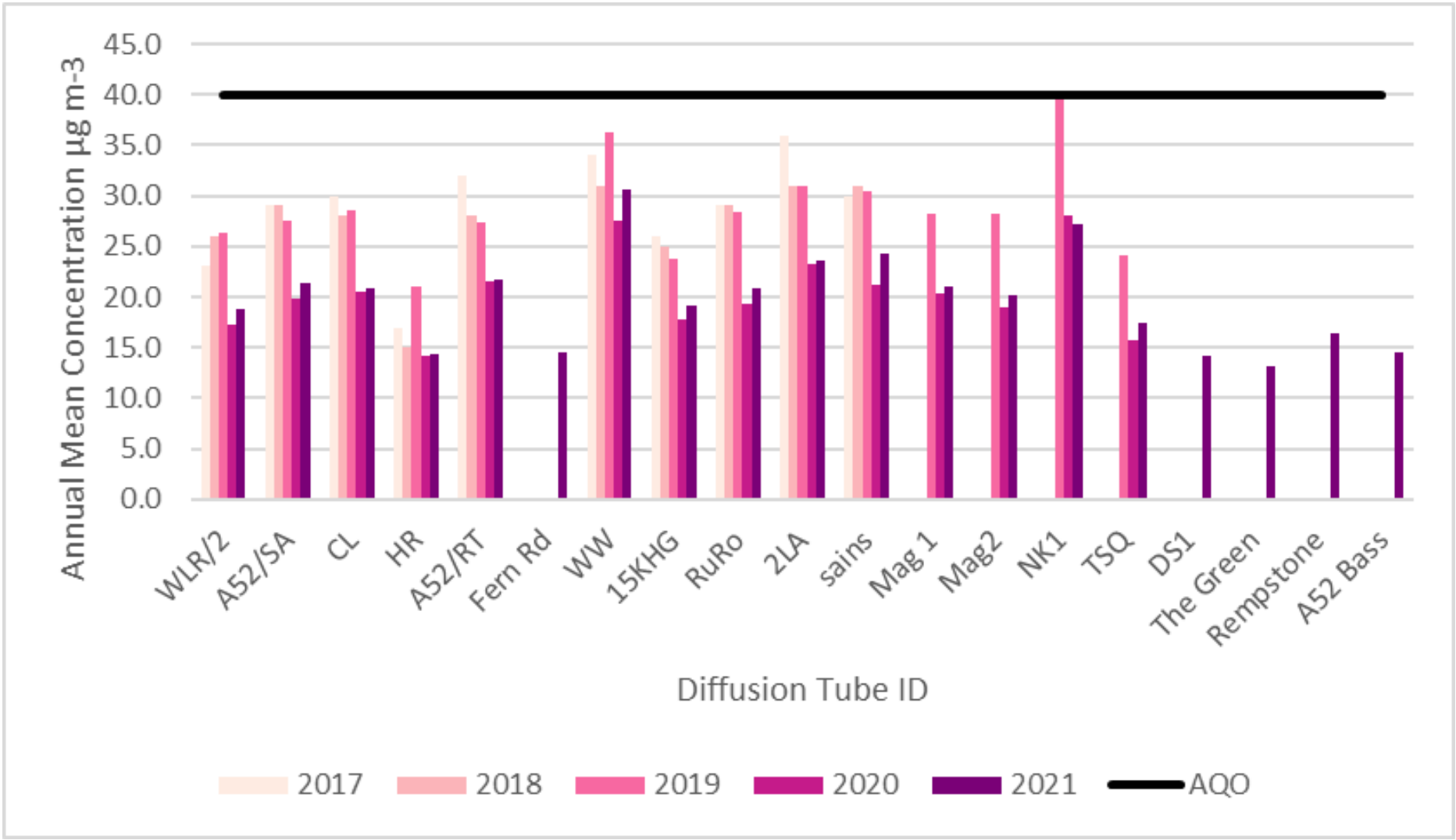


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Trent Bridge	458256	338156	Roadside		98.9	0	0	0	0	0
A52 Holme House	463005	338208	Roadside		93.5	0	0	0	0	0

Notes:

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

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results ($\mu g/m^3$)

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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WLR/2	457873	337426	30.5	24.7	22.7	20.6	18.9	19.5	18.4	17.5	23.1	21.1	26.7	25.3	22.4	18.8	-	
A52/SA	465929	339543	32.2	27.5	24.8	26.6	23.8	21.9	22.7	20.2	27.4	21.9	29.0	27.0	25.4	21.3	-	
CL	457223	335033	31.5	29.0	27.2	18.1	22.1	18.2	18.3	17.3	23.0	28.8	35.0	29.4	24.8	20.8	-	
HR	458326	336714	26.7	18.9	19.9	14.8	12.0	9.4	11.1	11.3	16.5	16.8	26.3	22.2	17.1	14.4	-	
LR	458126	337727	32.3	27.3	29.6	25.4	25.9	24.9	25.7	23.5	32.5	28.8	30.2	27.0	27.8	23.3	-	
Fern Road	468413	335505	21.7	16.9	16.9	13.9	14.8	14.4	15.4	13.8	18.0	18.0	23.0	20.5	17.3	14.5	-	
A52/RT	464644	338730	31.7	27.5	27.6	28.4	20.6	25.2	20.9	20.5	26.7	24.3	28.7	27.5	25.8	21.7	-	
RR	458284	338150	36.0	30.8		27.1	23.3	27.0	27.6	24.8	32.5	27.4	35.9	28.9	29.2	24.5	-	
TBLA	458752	338278	35.4	27.9	32.3	22.4	28.3	26.0	27.0	23.7	31.3	32.8	35.8	30.7	29.5	24.8	-	
TBLB	458756	338267	35.9	31.3	32.4	29.7	27.8	30.8	31.7	29.7	33.3	29.1	36.3	31.3	31.6	26.5	-	
TBI	458274	338117	39.7	38.6	37.9	29.4	38.0	30.7	32.1	30.0	42.0	38.4	39.5	37.1	36.1	30.3	-	
WL3	458134	337581	40.9	30.0	32.4	23.5	27.0	26.1	24.6	24.8	31.6	32.5	39.3	31.7	30.4	25.5	-	
WW	457651	334840	33.9	39.4	38.9	32.0	32.4	33.9	35.8	31.1	39.3	41.4	44.3	35.8	36.5	30.7	-	
A52/HHF1	463011	338213	26.4	29.9	36.4	29.3	30.6	35.3	31.0	32.8	36.7	35.4	37.2	30.2	32.6	27.4	-	
A52/HHF4	463040	338232	36.4	37.8	33.2	30.6	34.0	33.6	32.7	33.1	41.8	37.6	35.5	29.9	34.7	29.1	-	
15 KHG	470202	340092	28.7	23.7	23.9	18.5	19.8	18.7		17.2	24.5	23.1	29.8	23.3	22.8	19.2	-	
RuRo	458132	336462	32.0	23.4	25.6	21.9		21.4	23.5	14.6	25.6	24.7	33.3	26.4	24.8	20.8	-	
2LA	470248	339834	33.8	27.9	30.6	22.0	26.3	24.9	24.6	22.3	30.4	30.6	33.7	30.8	28.1	23.6	-	
Trent B1	458249	338167	39.6	33.1	32.4			29.6	34.1	28.5	41.9	34.7	41.0	33.6	34.8	29.3	-	
DS 1	457228	332891	25.3	17.4	17.6	17.1	13.6	12.4	13.6	13.4	14.5	16.7	21.8	19.0	16.9	14.2	-	
Mag 1	459366	334244	31.5	26.1	23.7	20.9	23.4	21.4	21.1	19.3	26.7	29.2	29.9	26.8	25.0	21.0	-	
Mag 2	459324	334227	29.9	26.0	25.2	19.9	23.2	19.8	18.6	17.8	25.3	26.5	29.7	25.9	24.0	20.1	-	
LR 1	458100	337543	37.5	30.6	35.1	28.4	25.2	27.8	27.5	26.9	33.6	26.4	35.3	32.4	30.6	25.7	-	
WL 1	458055	337566	36.0	34.6	33.6	25.8	31.2	30.3	33.7	30.3	41.1	35.9	39.2		33.8	28.4	-	
NK 1	457612	334859	36.4	13.1	34.9	24.8	35.2	31.0	31.7	29.2	37.9	38.8	41.7	34.1	32.4	27.2	-	
TSQ	458977	337434	28.1	21.8	22.6	16.4	17.3	16.1	16.4	15.4		21.6	29.3	23.5	20.8	17.4	-	
Sains	457303	333214		31.5	25.8	29.2	28.4	26.9	31.2	22.5	34.0	28.5	29.9	28.6	28.8	24.2	-	
Rempston	457621	324386										24.9	25.7	21.8	24.1	16.4	-	
The Green	457339	332944	22.3	13.6	17.2		11.9	15.3	12.2	11.0	13.8	14.6	23.0	17.5	15.7	13.2	-	
A52 Bass	461816	337855					16.3	14.8	13.7	13.5	16.2		27.3	20.0	17.4	14.6	-	

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

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

☒ **Rushcliffe Borough Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Rushcliffe Borough Council During 2021

Rushcliffe Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Rushcliffe Borough Council During 2021

During 2021 Rushcliffe Borough Council published an updated Air Quality Action Plan which outlines the actions Rushcliffe Borough Council, and its partners will take to improve air quality in Rushcliffe Borough between December 2021 and December 2026. The 2021 Air Quality Action Plan can be viewed on our air quality webpages Air Quality Action Plan December 2021.

The 2021 AQAP replaces the previous two AQAPs (specific to each Air Quality Management Area) and whilst the two have been consolidated into one AQAP, there remains (where appropriate) measures specific to each of the AQMAs.

QA/QC of Diffusion Tube Monitoring

All monitoring and data management is undertaken by fully trained in-house employees who have several years' experience in air quality monitoring and data management. Any new personnel undertake appropriate supervised training in line with the Service's competency scheme prior to any unsupervised monitoring, calibration or data management. Currently two personnel are trained and competent to undertake such work.

The location of the diffusion tube monitoring sites is reviewed periodically (at least annually). Locations may be removed where for example data indicates annual mean concentrations are consistently well below the Air Quality Objective; and new locations may be added where potential new sources have been identified or concerns have been raised by the public.

Nitrogen Dioxide Diffusion Tube Monitoring

Rushcliffe Borough Council use Gradko diffusion tubes prepared using 20% Triethanolamine (TEA) in water to measure nitrogen dioxide at a number of sites across the Borough. The diffusion tubes are stored in an airtight bag in a refrigerator upon receipt in the post and are used within 6 weeks of the preparation date displayed on the label.

Tube batches are exposed at selected sites to the atmosphere for approximately 4 weeks with the changeover date aiming to be +/-one day of the published diffusion tube change over date for the month to allow comparison with other Local Authority studies if necessary. All tubes are mounted using spacer brackets and grommets supplied by Gradko.

Each tube is labelled with a bar code and unique identification number. Each batch is supplied with a data collection form to record the location, date and time each tube is exposed in that period. The exposure period is calculated using an Excel spreadsheet and in addition Gradko recheck the calculated exposure period for each tube on receipt at the laboratory.

On the day of collection, the tubes are sent in an airtight bag to Gradko International Limited for analysis, together with a control blank that is stored unexposed in the sample fridge. The diffusion tubes are analysed within the scope of Gradko International Limited Laboratory Quality Procedures utilising in-house Laboratory Method GLM7. Gradko is a UKAS accredited laboratory and undertakes diffusion tube monitoring and analyses on the same basis for a number of other local authorities and environmental consultants. All local authorities in the Nottinghamshire Pollution Working Group use Gradko for their diffusion tube monitoring and analyses.

Nitrogen dioxide absorbed as nitrite by TEA is determined by spectrophotometric measurement at 540nanometres. Nitrite reacts with the added reagent to form a reddish-purple azo dye and the optical density of this complex is measured using Camspec UV/Visible Spectrophotmeter. The concentrations of nitrogen dioxide are then calculated from a pre-calibrated response factor and exposure times. The values are blank corrected using the blank ‘control’ diffusion tube provided by Rushcliffe Borough Council.

The accuracy of the measurements made by Gradko are monitored by participation in an external laboratory measurement proficiency scheme, the Workplace Analysis Scheme for Proficiency (WASP), implemented by the Health and Safety Laboratory in Sheffield. The

results of the most recent WASP analysis are available LAQM - Diffusion Tube QA/QC Framework.

All diffusion tube data is checked on a monthly basis to identify any spurious data and compared with other local monitoring sites to further identify any suspect data.

The 2021 monitoring was completed in accordance with the 2021 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Therefore, based on this criteria annualisation was required for the two diffusion tube locations where monitoring commenced part way through 2021 - Rempston which had 3 months of data (25% data capture) for 2021; and A52 Bass which had 7 months of data (58% data capture) for 2021. Annualisation was undertaken using the Diffusion Tube Data Processing Tool. The nearest continuous background sites were Nottingham Centre (Defra UK-AIR ID: UKA00274), Leicester University (Defra UK-AIR ID: UKA00573) and Burton-on-Trent Horninglow (Defra UK-AIR ID: UKA00652) each of which had data capture greater than 85% for 2021. The annualisation tool calculated average annualisation factors of 0.81 (Rempstone) and 1.00 (A52 Bass) which were used to adjust the raw data simple annual mean for the respective locations.

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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Rushcliffe Borough Council have applied a national bias adjustment factor of **0.84** to the 2021 monitoring data. This was derived from the national database of bias factors (Database_Diffusion_Tube_Bias_Factors_v03_22-FINAL) for Gradko tubes, 20% TEA in water and based on 32 studies. A summary of bias adjustment factors used by Rushcliffe Borough Council over the past five years is presented in Table C.1. Rushcliffe Borough

Council does not currently have any co-location sites and therefore a local factor could not be calculated.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.84
2020	National	03/21 v2	0.81
2019	National	03/20	0.93
2018	National	03/19	0.93
2017	National	03/18	0.89

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Rushcliffe Borough Council required distance correction during 2021.

QA/QC of Automatic Monitoring

The NO_2 continuous monitor within AQMA No 1 Trent Bridge is located at the junction of Radcliffe Road and Loughborough Road, West Bridgford and is a permanent site. It was installed at this location in 2017 and is a ML9841B single chamber chemiluminescence analyser and is approved by TUV, USEPA and NETCEN. Within AQMA No 1/2011 Stragglethorpe Road a chemiluminescence analyser was installed adjacent to the dwelling façade in a Kaizen enclosure in early 2014.

The analysers have a resolution of 0.001ppm and a reported lower detection limit of <0.5ppb. The linearity error of the analyser is +/-1% of the full scale (from best line fit), and the precision is 0.5ppb or 1% of concentration reading (whichever is greater).

Instrument Checks and Calibration

Daily automated calibration: Zero air is generated by passing air through the scrubbers and the reaction cell. Span gas is generated by a permeation tube and passed to the reaction chamber to give the span calibration response. The daily automatic calibrations are used to check the instrument performance and drift.

Analyser Inspection and Manual Calibration: The analysers are covered by an annual service and maintenance contract to include calibration checks, flow and leak checks, cleaning of components, analyser diagnostic checks, replacement of faulty components and consumables and fault call-out.

Manual calibration checks are carried out by Rushcliffe Borough Council staff on a fortnightly basis using scrubbed zero air derived from the integrated scrubber column and a certified NO/NO_X calibration gas is supplied by BOC gases. The BOC gas is changed when the certification expires. The analyser is taken out of service and the inlet filter changed prior to connecting the calibration gases. The zero air and NO/NO_X gases are run through the analyser and the response times noted together with the instrument gain factor. The output of the analyser (e.g. the gain) is only reset or altered following equipment service or repair or if drift occurs necessitating a change of the gain setting. The calibration zero values, span values and gas certified values are used to rescale the raw data received from the analyser.

Validation: all data are continuously screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within large datasets. These anomalies may be due to equipment failure, power failure, human error, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments are scaled into concentrations using the latest values derived from the automatic and manual calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift.

Data Ratification

All raw data is examined for consistency and the existence of any spurious results. Negative values are examined and either removed or rescaled further and high values interrogated to see if the readings are consistent with expectations or an equipment error

may have occurred. Data obtained during calibration checks is automatically excluded from the database by a software service switch on the instrument panel which is used during calibration checks.

If any doubts exist as to the satisfactory status of any data it is excluded from the database calculations. The reason for exclusion of a dataset is annotated against it to allow for traceability and data ratification. The most common reason for exclusion is monitor breakdown leading to consistently high or low readings. However, a power failure can also be a cause as can specific events noted by Officers during visits e.g. trucks/equipment in operation next to the monitor for building façade maintenance or similar.

Information from other analysers on the system can also be accessed to compare any data that may be experiencing high or low readings to enable a decision to be made on the status of any highlighted data. This includes the Automatic Urban and Rural Network (AURN) monitors operated by Nottingham City Council.

Air Quality Data Management (AQDM) prepare a monthly monitoring report of provisional measurements for the Rushcliffe and Nottingham network and every quarter the available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Although this quarterly data processing helps build a reliable dataset as unexpected faults can be identified during the routine servicing or independent audits the data can only be fully ratified in 12 month or annual periods. Data ratification is undertaken by AQDM to LAQM (TG16) standards using the AURN methodology and reported for each of the two continuous monitors. The data presented in this ASR has been ratified.

Historic and live data for Rushcliffe Borough Council is available to view via the UK AIR website.

Automatic Monitoring Annualisation

All automatic monitoring locations within Rushcliffe Borough Council 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.

The NO_2 annual data capture for the continuous monitor located in AQMA No 1 Trent Bridge was 98.9% and 93.5% for the continuous monitor located in AQMA No 1/2011 Stragglethorpe Road.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within Rushcliffe Borough Council required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Nottingham Centre	Annualisation Factor Leicester University	Annualisation Factor Burton on Trent Horninglow	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
Rempton	0.8036	0.7772	0.8521	-	0.8110	24.1	19.5	
A52 Bass	0.9773	0.9222	1.1023	-	1.0006	17.4	17.4	

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map Showing the Borough wide diffusion tube network

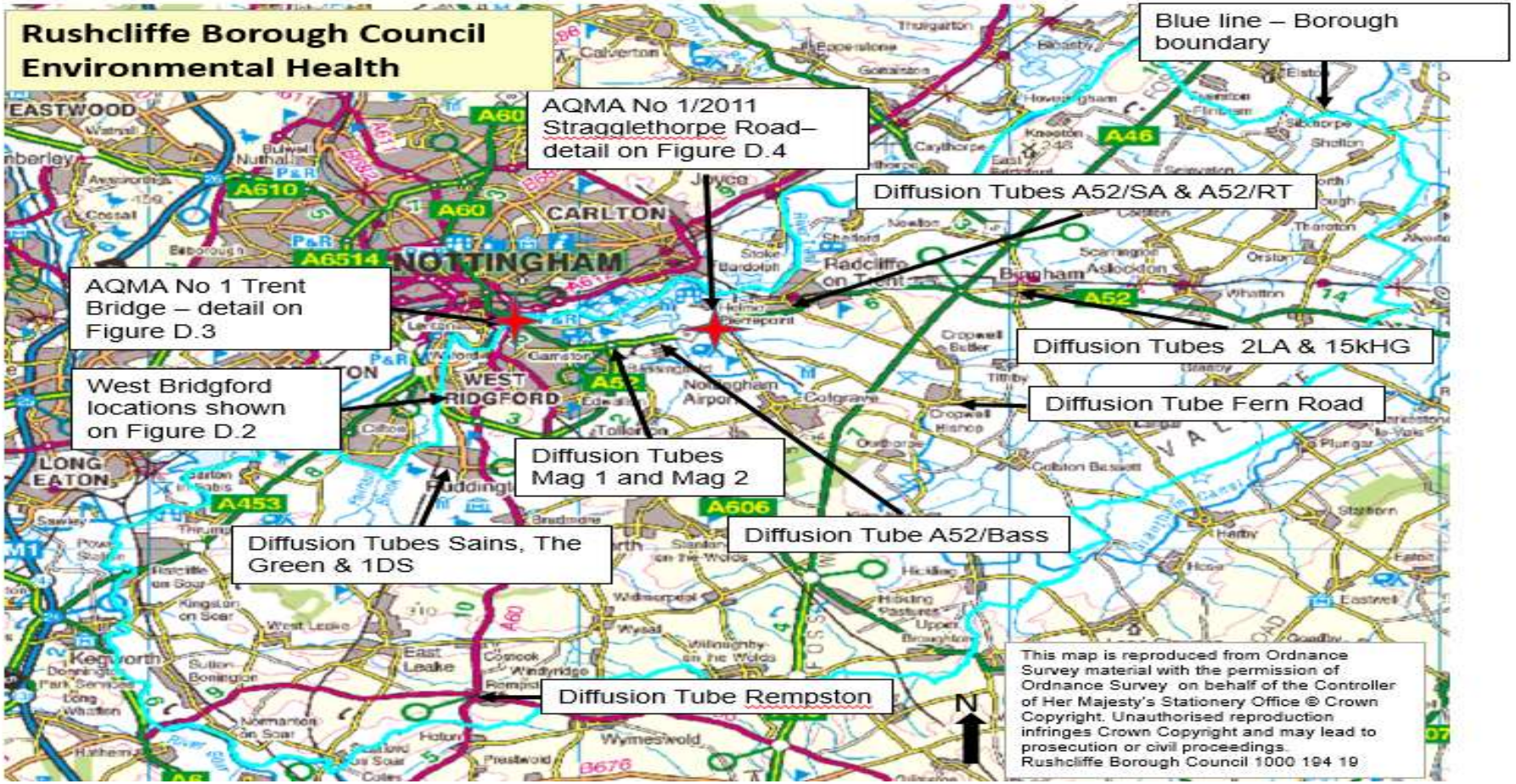


Figure D.2 – Map Showing the diffusion tube network across West Bridgford

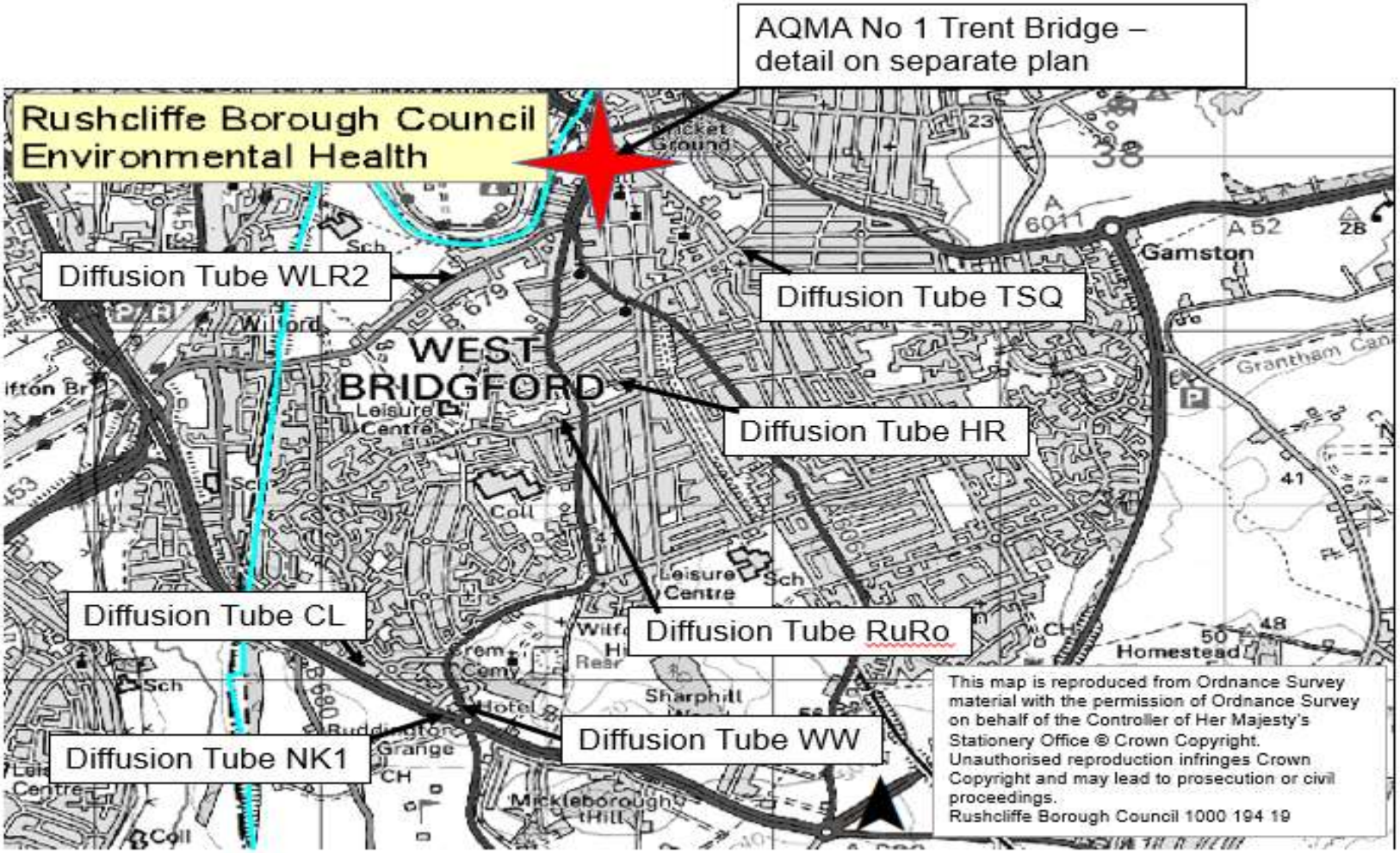


Figure D.3 – Map Showing Location of AQMA No 1 Trent Bridge and continuous monitor and diffusion tube locations

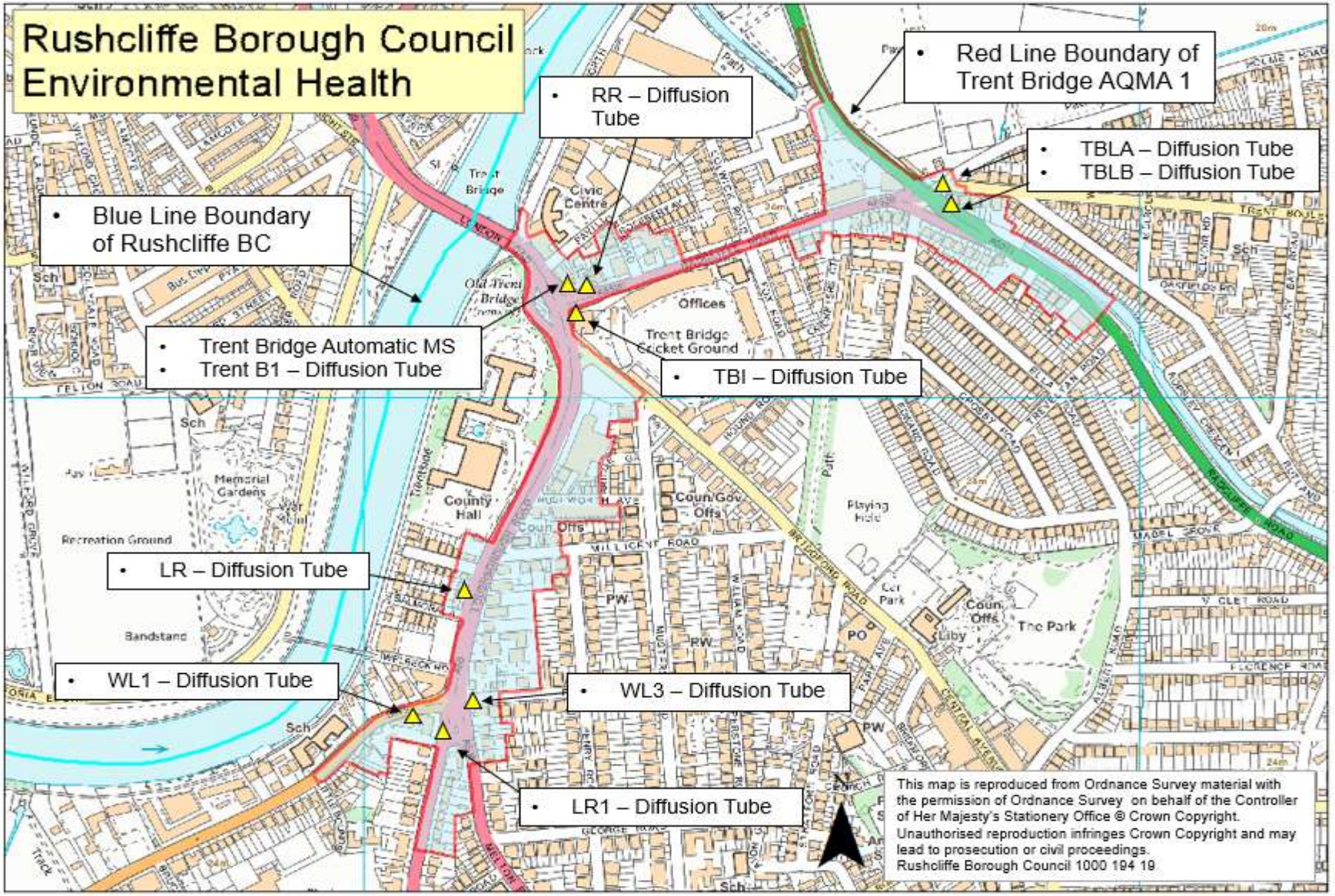
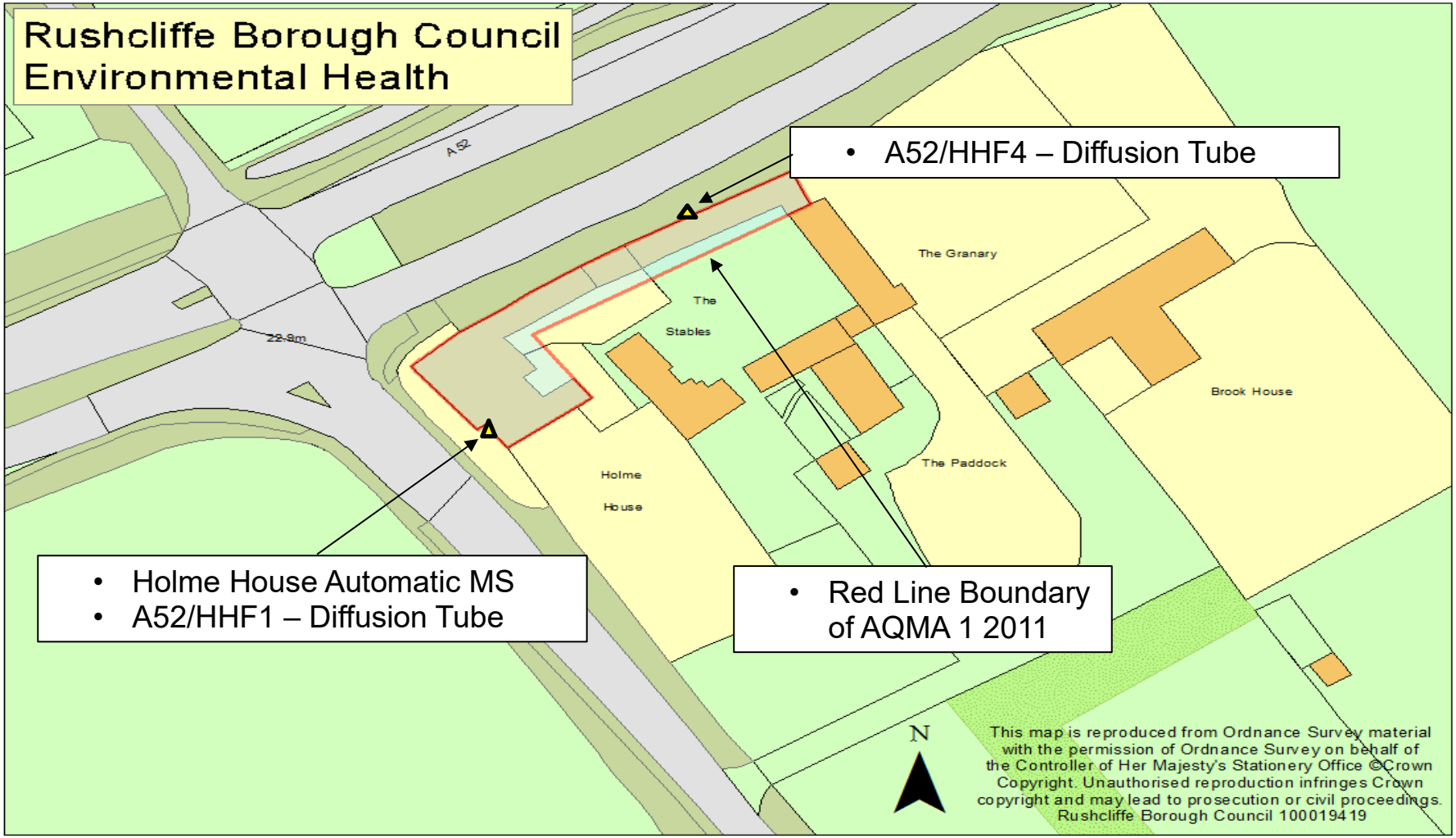


Figure D.4 – Map of AQMA No 1/2011 Stragglethorpe Road showing continuous monitor and diffusion tube locations



Appendix E: Summary of Air Quality Objectives in England

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

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

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

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
ATF	Active Travel Fund
AURN	Automatic Urban and Rural Network (Defra) - UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives. It includes automatic air quality monitoring stations measuring oxides of nitrogen (NOx), sulphur dioxide (SO2), ozone (O3), carbon monoxide (CO) and particles (PM10, PM2.5).
BSIP	Bus Service Implementation Plans
D2N2	Local Enterprise Network area covering Derby, Derbyshire, Nottingham and Nottinghamshire
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EMAQN	East Midlands Air Quality Network
ERDF	European Regional Development Fund
EU	European Union
EVCP	Electric Vehicle Charging Points
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LCWIP	Local Cycling & Walking Infrastructure Plan
LEVI	Local Electric Vehicle Infrastructure (Department for Transport funding)
LTP	Local Transport Plan
NCC	Nottinghamshire County Council
NCiC	Nottingham City Council
NEPWG	Nottinghamshire Environmental Protection Working Group

Abbreviation	Description
NH	National Highways (previously known as Highways England)
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles (now known as OZEV Office for Zero Emission Vehicles)
OZEV	Office for Zero Emission Vehicles
PHE	Public Health England (now known as UK Health Security Agency)
PHOF	Public Health Outcomes Framework
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
RBC	Rushcliffe Borough Council
SO_2	Sulphur Dioxide
UKHSA	United Kingdom Health Security Agency (formerly known as Public Health England)

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.
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- Copeland B (2021) A comparison of gas and electric cremator emissions in the UK. A dissertation submitted to the School of Energy, Construction and Environment, Faculty of Engineering, Environment and Computing, Coventry University in partial fulfilment of the requirements for the degree of Geography BSc (Hons)