



# 2020 Air Quality Annual Status Report (ASR)

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

June 2020

**Rushcliffe Borough Council**

Local Authority Officer	Caroline McCaffrey & Gary Pickering
Department	Environmental Health
Address	Rushcliffe Borough Council Rushcliffe Arena Rugby Road West Bridgford NG2 7YG
Telephone	0115 9819911
E-mail	<a href="mailto:environmentalhealth@rushcliffe.gov.uk">environmentalhealth@rushcliffe.gov.uk</a>
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## Executive Summary: Air Quality in Our Area

Rushcliffe Borough Council has two existing Air Quality Management Areas (AQMAs) for the exceedance of the NO<sub>2</sub> (nitrogen dioxide) annual mean values. These are associated with major traffic routes and junctions into and out of the City of Nottingham and along a small section of the A52 at a busy junction. No other pollutants are now monitored or are above the objectives.

Monitoring in AQMA 1 Trent Bridge indicates that there has been a slight increase in NO<sub>2</sub> levels within the AQMA area however all remain below the Air Quality Standards (AQS).

The AQMA1/2011 at the Stragglethorpe A52 location has also indicated a slight increase in NO<sub>2</sub> levels. The annual mean NO<sub>2</sub> concentration of 41µg m<sup>-3</sup> recorded by the continuous monitor is a slight exceedance of the annual mean AQS of 40µg m<sup>-3</sup>. There is now five years of real time data available for AQMA1/2011 and levels appear stable.

This report contains a full data set of air quality monitoring undertaken in 2019 and trends for the last 5 years.

Table 2.2 in this report outlines the actions the Council (and its partners) has and will be taking in order to achieve continued compliance with the AQS.

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

This report contains a full data set of air quality monitoring undertaken in Rushcliffe Borough Council in 2019 and trends for the last 5 years. Table 2.2 outlines the actions the Council (and its partners) has and will be taking to achieve compliance with the Air Quality Standards (AQS) and improve air quality throughout the Borough.

Road traffic is the main source of air pollution in the Borough and nitrogen dioxide (NO<sub>2</sub>) is the primary pollutant of concern. Nitrogen dioxide is a brown gas with the chemical formula NO<sub>2</sub>. It is chemically related to nitric oxide (NO) and together NO<sub>2</sub> and NO are known as NO<sub>x</sub>. NO<sub>x</sub> 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<sub>2</sub> can affect our health and evidence indicates high levels can inflame the airways in our lungs, and over the longer term can affect how well our lungs work. The concentration of NO<sub>2</sub> is measured as micrograms per cubic metre (µg m<sup>-3</sup>) and to protect our health Government has set air quality standards. The hourly objective, which is the concentration of NO<sub>2</sub> in the air averaged over a period of an 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<sub>2</sub> in air averaged over a year, aims to protect us from being exposed over a long time. A summary of the air quality objectives for England are presented in [Appendix E](#).

Road traffic is the largest source of NO<sub>x</sub> emissions in the UK. NO<sub>x</sub> 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<sub>x</sub> as NO<sub>2</sub> and these primary emissions of NO<sub>2</sub> can lead to high concentrations at the roadside. NO<sub>2</sub> is also formed in the atmosphere when there is a chemical reaction between NO and ozone and this is known as secondary NO<sub>2</sub>.

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

## Rushcliffe Borough Council

Rushcliffe Borough Council currently undertakes air quality monitoring for NO<sub>2</sub> at 38 monitoring sites across the Borough. Thirty-six of these locations are passive sites, monitoring NO<sub>2</sub> using diffusion tubes which take samples over a one month period (approximately) and are useful for assessing the annual objective of 40µg m<sup>-3</sup>. Diffusion tubes provide an inexpensive way of air quality monitoring at multiple sites and provide general indicators of concentrations and trends of pollutants over a period of time. Rushcliffe BC also have two continuous analysers (automatic) where air is continuously pumped into the analyser and the level of NO<sub>2</sub> recorded. These provide more accurate data on NO<sub>2</sub> concentrations however they are a more expensive way of monitoring air quality.

Rushcliffe BC currently has two active Air Quality Management Areas (AQMA) for NO<sub>2</sub>. An AQMA is an area where air pollutant concentrations exceed/are likely to exceed the relevant air quality objectives. AQMA are declared for specific pollutants and objectives and in Rushcliffe both were declared for NO<sub>2</sub> and exceedance of the annual mean concentration objective of 40µg m<sup>-3</sup>. The location of the AQMA can be seen on the [DEFRA website](#). Monitoring is undertaken in each of the AQMA using diffusion tubes (non-automatic) and a continuous monitor (automatic).

The continuous monitoring data for 2019 indicates the NO<sub>2</sub> annual mean concentration in AQMA No 1 Trent Bridge remains constant at 37µg m<sup>-3</sup> which is below the air quality objective. There were also no exceedances of the NO<sub>2</sub> hourly limit of 200µg m<sup>-3</sup> and therefore no exceedance of the 1-hour mean air quality objective.

In relation to AQMA No 1/2011 Stragglethorpe A52 (Holme House) the continuous monitoring data for 2019 indicates the NO<sub>2</sub> annual mean concentration was 41µg m<sup>-3</sup> which exceeds the air quality objective of 40 µg m<sup>-3</sup>. Although an exceedance, it is similar to the annual mean concentration for the previous 5 years which ranged between 38 and 41 µg m<sup>-3</sup>. There were no exceedances of the NO<sub>2</sub> hourly limit of 200µg m<sup>-3</sup> and therefore no exceedance of the 1-hour mean air quality objective.

Data from the diffusion tube network indicates the annual mean NO<sub>2</sub> levels remain fairly constant at the majority of locations. At diffusion tube location NK1 a NO<sub>2</sub> annual mean concentration of 40µg m<sup>-3</sup> was recorded. However, when corrected for distance to nearest exposure this reduced to 33 µg m<sup>-3</sup>.

An increase was observed in the annual mean NO<sub>2</sub> concentration at the location considered to be representative of the urban background. The data across the year for this location is similar in trend to previous years and the increase in the annual mean concentration would appear to be driven by significantly higher concentrations recorded across a small number of months during the winter. Although it is difficult to draw robust conclusions from data for one year this increase in the annual mean NO<sub>2</sub> concentration is not seen at other locations and is likely to have arisen due to very localised influences. It may be necessary to consider in more detail as part of the annual review of the monitoring network whether this location continues to be reflective of the urban background.

Rushcliffe BC are progressing with the update of the Air Quality Action Plan (AQAP) which is currently in draft and should be ready to be issued for consultation by autumn 2020. Whilst the two existing AQAPs will be consolidated into one there will remain measures specific to each of the AQMAs.

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 consultation for new developments where applications that can impact on the meeting of an AQS are assessed. Construction impacts and operational are considered and where appropriate conditions are imposed, or the application is amended to reflect any concerns identified.

During 2019 there were a number of new residential and commercial developments proposed in or within the vicinity of the AQMAs where air quality assessments have been requested and subsequently reviewed. These include:

- the redevelopment of a former car sales site, within AQMA No.1 Trent Bridge, for residential and Class A & Class C uses; and
- a hybrid application for redevelopment at the Nottingham Forest Football Club City Ground, in the vicinity of AQMA No.1 Trent Bridge, which includes a proposal for 250 residential units (application pending).

## Rushcliffe Borough Council

There were also applications received for a number of large housing developments where air quality assessments have been requested and/or reviewed, including the following:

- the reserved matters detail of the outline development at Clifton Pastures for up to 3000 houses together with employment, retail and leisure facilities was approved in 2019. This site is located at the terminus of the existing Nottingham Express Transit (NET) Line 2 tram system which passes through parts of Rushcliffe. The NET as a whole has the benefit of reducing traffic in the wider Nottingham area and will benefit commuter routes through Rushcliffe;
- a full planning application for 167 houses and associated infrastructure at Wilford Road Ruddington; and
- construction continues at the Sharp Hill Wood development with a reserved matters application for the next phase of the development of 600 houses and associated facilities;

The air quality action plans (AQAP) is linked to the Local Transport Plan (LTP) which is implemented by the County Council. Highways England is responsible for traffic management at the Stragglethorpe Road AQMA (No 1 2011).

At a strategic level Rushcliffe Borough Council now includes 'The Environment' as a new corporate priority with a commitment to being carbon neutral by 2030. Rushcliffe BC continue to promote the benefits of reducing transport related impacts among its employees with increased remote worker capacity; and where possible the use of alternatives to the car for getting to work and undertaking their duties. Many of the actions taken/proposed to reduce carbon will also benefit air quality e.g. provision of electric charging points for vehicles at RBC main offices, the design of a low carbon leisure centre and a survey of the condition of Council owned buildings with a view to improving efficiency. Rushcliffe BC promote initiatives relating to the environment at a community level via parish councils and community events.

The Environmental Health Service also works with other local authorities in the area through the Nottinghamshire Pollution Working Group (NPWG) and the East Midlands Air Quality Network (EMAQN), which comprises primarily of local authorities and Public Health England (PHE). The Council 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 Nottingham urban area.

- The EMAQN published guidance for developers on Air Quality and Emissions Mitigation in March 2019<sup>4</sup> which is designed to supplement the National Planning Framework. This guidance deals primarily with the air quality impacts from traffic emissions but also considers potential point source emissions e.g. generators, incinerators and biomass boilers; and the assessment and control of dust emissions during demolition and construction.
- The Nottinghamshire Air Quality Strategy 2019-2028<sup>5</sup> is now in the final draft phase and seeks to further improve air quality in Nottinghamshire. The vision is for all of Nottinghamshire residents and visitors to have clean air that allows them to lead healthy and fulfilling lives. It is envisaged implementation of the strategy will not only lead to improvements in air quality but will have wider co-benefits, such as increased physical activity, traffic noise reduction and carbon reduction. The aims are (1) to reduce average concentrations of NO<sub>2</sub> and particulate matter across the County, and (2) to reduce the estimated proportion of disease and deaths attributable to air pollution. These will be implemented through a range of strategic objectives and cross cutting principles which seek to take a health in all policies approach and delivered by a range of partners, including residents.

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<sup>4</sup> East Midlands Air Quality Network Air Quality and Emissions Mitigation in March 2019

<sup>5</sup> Nottinghamshire Air Quality Strategy 2019-2028 (Draft V4.2 Final Draft).



## **Actions to Improve Air Quality**

As traffic is the main cause of air pollution within the Borough the core actions continue to be the integration of measures with the LTP, which is implemented by Nottinghamshire County Council Transport Planners and Highways England. In addition, Rushcliffe BC will continue to review planning applications for potential adverse impacts on air quality. Air quality improvements continue to be promoted within the Borough boundary and beyond through membership of the NPWG and EMAQN.

As AQMA No.1 Trent Bridge is designated around two major transport routes into Nottingham city centre actions by Nottingham City Council in their action plan will have some impact on traffic related pollution levels within Rushcliffe. The City Council continue to work towards the transition to zero and ultra-low emission vehicles, including public transport which is expected to have beneficial impacts on the Trent Bridge AQMA.

The Nottingham Express Transit (NET) tram system which runs through parts of Rushcliffe is reducing the number of car vehicle journeys through the Borough into the city.

## Conclusions and Priorities

The air quality monitoring data for 2019 indicates levels of NO<sub>2</sub> remain consistent with those measured in previous years. There was one exceedance of the air quality standards across the monitoring network. The continuous monitor located in AQMA No.1/2011 (Stragglethorpe Road) recording a NO<sub>2</sub> annual mean concentration of 41 µg m<sup>-3</sup>. Although an exceedance, it is similar to the annual mean concentration for the previous 5 years which ranged between 38 and 41 µg m<sup>-3</sup>. At diffusion tube location NK1 a NO<sub>2</sub> annual mean concentration of 40 µg m<sup>-3</sup> was recorded.

Rushcliffe BC are currently updating their AQAP and a draft should be ready for consultation by autumn 2020. Although the two existing AQAPs will be consolidated into one document there will remain measures specific to each of the AQMAs.

The location of AQMA 1 (on the approaches to Lady Bay Bridge and Trent Bridge) and the site constraints makes it difficult to remedy the problems with small-scale infrastructure improvements and therefore smarter choices measures (such as travel planning, and marketing and promotion of alternatives to the car) are more likely to provide improvements. Measures that facilitate and encourage walking, cycling and use of public transport will therefore be the priority actions in the foreseeable future.

Monitoring of the Local Transport Plan actions shows that the transport indicators are on target (with minor exceptions) across the county.

The County Council has concerns about potential cumulative impacts of proposed future development on the Trent Bridge AQMA as the Local Development documents have identified areas around the district for significant growth which may potentially impact on the AQMAs, and traffic growth will be above those that are forecast without the development occurring. Objection to such growth may be difficult and Section 38, 278 and 106 planning obligations will all be used to mitigate localised traffic impacts of individual developments as far as is possible and seek to ensure sustainable development takes place.

There is currently only planned mitigation of the cumulative traffic growth from proposed development on the strategic road network and the planning authority also has no plans to undertake air quality modelling of the cumulative impacts (particularly on the AQMAs) of the proposed developments.

## **Rushcliffe Borough Council**

The cumulative impacts of developments will, however, impact on the AQMA on Trent Bridge without significant sustainable transport measures being introduced and maintained at the developments (funded through the development control process); and the planning authority does not currently have any planned mitigation of the traffic growth at AQMA locations as part of the housing development proposals. Without significant mitigation at these locations to specifically address housing proposals (e.g. significant sustainable transport improvements), any measures subsequently included within an AQMA action plan would be very unlikely to mitigate this planned growth.

The top-slicing of 43% of the integrated transport block from 2015/16 onwards by the government and allocating it to the Local Growth Fund means that from 2015/16 the integrated transport funding allocated to Nottinghamshire County Council reduced by approximately £3.5m; significantly reducing the funding available for transport improvements that will deliver air quality improvements.

The cessation of the Local Transport Fund funding in March 2016 and the Department for Transport's decision to not award Sustainable Transport Transition Year Funding 2016/17 to the D2N2 area bid also means that several of the proposed actions in the action plan will be delayed further until such time as funding becomes available from Central Government.

## Local Engagement and How to get Involved

Rushcliffe BC provides residents with information on reducing their impact on the environment and air quality via links from its [cycling webpage](#) where there is signposting to cycling and walking initiatives and information on public transport and greener car travel, including car sharing.

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 comment on the submitted air quality reports assessments.

Under the environmental permitting regime any changes to existing or new permitted processes are subject to public consultation and the department will ensure that public engagement is undertaken as well as statutory consultee engagement.

To get involved in improving air quality within the Borough the public are asked to contact the Environmental Health Service of Rushcliffe Borough Council – contact details are provided at the front of this report.

The LTP is implemented by County Council Local Transport Planners and they can be contacted via the [Nottinghamshire County Council](#) website or Local Transport Plan Manager, Transport Planning and Programme Development, Nottinghamshire County Council, County Hall, West Bridgford Nottingham NG2 7QP; Tel: 0300 500 8080 or Email: [enquiries@nottscc.gov.uk](mailto:enquiries@nottscc.gov.uk)

# Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
Air Quality in Rushcliffe Borough Council.....	ii
Actions to Improve Air Quality.....	vii
Conclusions and Priorities.....	viii
Local Engagement and How to get Involved.....	x
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in Rushcliffe Borough Council.....	4
2.3 PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations.....	16
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>19</b>
3.1 Summary of Monitoring Undertaken.....	19
3.1.1 Automatic Monitoring Sites.....	19
3.1.2 Non-Automatic Monitoring Sites.....	19
3.2 Individual Pollutants.....	21
3.2.1 Nitrogen Dioxide (NO <sub>2</sub> ).....	21
3.2.2 Particulate Matter (PM <sub>10</sub> ).....	23
3.2.3 Particulate Matter (PM <sub>2.5</sub> ).....	23
3.2.4 Sulphur Dioxide (SO <sub>2</sub> ).....	23
<b>Appendix A: Monitoring Results</b> .....	<b>24</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2019</b> .....	<b>35</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> .....	<b>38</b>
<b>Appendix D: Map(s) of Monitoring Locations and AQMAs</b> .....	<b>48</b>
<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>50</b>
<b>Glossary of Terms</b> .....	<b>51</b>
<b>References</b> .....	<b>53</b>

**List of Tables**

Table 2.1 – Declared Air Quality Management Areas.....3  
Table 2.2 – Progress on Measures to Improve Air Quality ..... 10  
  
Table A.1 - Details of Automatic Monitoring Sites.....24  
Table A.2 – Details of Non-Automatic Monitoring Sites .....25  
Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results .....28  
Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results .....34  
  
Table B.1 - NO<sub>2</sub> Monthly Diffusion Tube Results - 2019.....35  
  
Table E.1 – Air Quality Objectives in England .....50

**List of Figures**

Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Continuous (Automatic) Monitoring Sites .....31  
Figure A.2 Trends in Annual Mean NO<sub>2</sub> Concentrations at AQMA 1 2011 (Holme House Stragglethorpe).....32  
Figure A.3 Trends in Annual Mean NO<sub>2</sub> Concentrations at AQMA No 1 (Trent Bridge) .....33

# 1 Local Air Quality Management

This report provides an overview of air quality in Rushcliffe Borough Council during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Rushcliffe Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Rushcliffe Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online on the [DEFRA website](#) and on the [Council's air quality webpages](#).

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMAs.



Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA No 1 Trent Bridge	01/09/2005	NO2 Annual Mean	West Bridgford	An area including Lady Bay Bridge/Radcliffe Road/Trent Bridge/Loughborough Road junctions in West Bridgford.	NO	47	µg/m <sup>3</sup>	37	µg/m <sup>3</sup>	Air Quality Action Plan for Rushcliffe updated 2010	2010	<a href="#">AQAP 2010</a>
AQMA No1 2011 Stragglethorpe Rd	01/10/2011	NO2 Annual Mean	Radcliffe on Trent	Land adjacent to A52 at Stragglethorpe Lane Junction	YES	50.5	µg/m <sup>3</sup>	41	µg/m <sup>3</sup>	Stragglethorpe Road AQAP 2013	2014	<a href="#">AQAP 2013</a>

Rushcliffe Borough Council confirm the information on UK-Air regarding their AQMAs is up to date

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

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

1. The Council provided a detailed outline of progress against AQAP measures, however do not disclose pollution reduction targets for the majority of measures. The Council are therefore advised to develop quantitative pollution reduction targets where appropriate, as these provide a useful means through which success, effectiveness and/or progress against specific measures can be assessed.
2. Distance correction has been carried out for sites not representative of relevant exposure, however example calculations have not been provided. The Council are advised to include supporting evidence in all future reports and provide a brief discussion of the methodology, in order to adhere to good practice.
3. Text in all tables should be black.
4. The Council provide good discussion of PM<sub>2.5</sub>, however the report does not draw links to the fraction of mortality attributable to PM<sub>2.5</sub> emissions. The Council are encouraged to include this in future reports, in addition to a discussion of historical trends, a comparison between Rushcliffe Borough and England as a whole, and a comparison to neighbouring authorities.
5. If budget allows, the Council are encouraged to commence monitoring for PM<sub>10</sub> (and PM<sub>2.5</sub> if able) given the well-documented adverse health impacts of exposure. Monitoring of particulates would raise awareness of exposure and could be used to track progress against AQAP measures.
6. The AQMA boundary and the monitoring locations should be demonstrated on the same maps. It is also unnecessary to include maps of sites which are no longer in use.

With regard to the above points:

1. The AQAPs are currently under review and although it is the intention to consolidate the AQAPs into one plan, measures specific to each of AQMA hotspots will remain. As part of this process, and where appropriate pollution reduction targets will be developed, as a means through which success, effectiveness and/or progress against specific measures can be assessed.
2. Distance correction has been carried out for sites not representative of relevant exposure using the NO<sub>2</sub> Fall Off with Distance from Roads Calculator v4.2. Discussion of the inputs and a screenshot of the calculator are provided in Appendix C. Annualisation of data was required at one location as there was less than 75% data capture. An annualisation factor was calculated using the Annualisation Tool v1.0 and a discussion of the inputs together with screenshots of the tool are provided in Appendix C.
3. Black text is used in all tables.
4. Discussion on the fraction of mortality attributable to PM<sub>2.5</sub> emissions, including a comparison between Rushcliffe Borough and England as a whole, and a comparison to neighbouring authorities has been included in this report.
5. Monitoring for PM<sub>10</sub> is not currently possible due to budgetary constraints.
6. The AQMA boundary and monitoring locations are presented on the same maps in [Appendix D: Map\(s\) of Monitoring Locations and AQMAs](#).

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

More detail on these measures can be found in their respective Action Plans and also within the third Local Transport Plan that consists of the Local Transport Plan Strategy and Implementation Plan. Key completed measures are:

- Awareness and training undertaken by the County Council amongst staff and works promoters to ensure that powers are used effectively and to make works promoters aware of their requirement to reduce traffic disruption and encourage alternative working methods that reduce peak period working/disruption on County Council managed roads;
- Upgrade and optimisation of traffic signals within the AQMA;
- Personalised travel planning undertaken with residents in areas adjoining the AQMA and along the NET route which could impact on people travelling through the AQMA which resulted in a 5% reduction of journeys to work by car amongst participants;
- Personalised travel planning travel clinics undertaken at major workplaces within the AQMA, including at the County Council;
- School travel plans developed by the County Council at schools in the borough;
- Eco-driver training amongst County Council employees;
- The introduction of advisory 20mph speed limits outside all schools in the borough and the introduction of mandatory area-wide 20mph speed limits in two areas of West Bridgford to encourage more people to walk and/or cycle;
- NET tram extensions to the south and west of the city (the line travelling to the south travels through part of West Bridgford which could potentially reduce vehicle journeys through the AQMA);
- The introduction of enhanced rail services which serve populations that may potentially otherwise have to travel through the Trent Bridge and Stragglethorpe AQMAs;
- Eco-Stars programme which ceased to be delivered when the Local Sustainable Transport Fund funding ceased (a total of 51 members had joined the scheme when LSTF funding expired);

- Review and upgrade of County Council fleet vehicles;
- Major transport scheme improvements such as the A453 trunk road and the A6514 ring road improvements.

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

- A review of our Air Quality Action Plans - it is anticipated a consultation draft will be available by Autumn 2020
- The introduction of clean fleet initiatives by Nottingham City Council as part of their air quality plan which will reduce emissions from public transport vehicles passing through the Trent bridge AQMA into the city, encourage the use of cleaner private vehicles and encourage the use of active travel.

Rushcliffe Borough Council's ongoing priorities for the coming year are predominantly through measures to make the best use of the transport networks and through smarter travel measures that will encourage people to travel more sustainably. These include:

- Traffic control and information provision to minimise disruption and delay on County Council managed roads (including the roads within the AQMA) such as contingency planning, the effective co-ordination of works and the provision of real-time travel information;
- Parking enforcement on County Council managed roads to ensure that the traffic keeps moving;
- Further investigation on the optimisation of traffic signals on A60/A6011 junction (south approach) utilising the AQ monitoring data from the permanent monitor installed on Trent Bridge during 2016/17;
- Travel planning such as personalised travel planning undertaken at major workplaces within the AQMA, travel planning at the County Council, and the development of new travel plans at businesses across the county through planning conditions;
- Measures to reduce the need to travel at peak times such as the provision and encouragement of flexible working arrangements;

- The facilitation of smarter travel behaviour such as the provision of a car sharing scheme, small scale sustainable transport improvements (e.g. cycle parking facilities, cycling network enhancements) on County Council managed roads, and integrated and concessionary ticketing schemes;
- The encouragement of smarter travel behaviour such as the marketing and promotion of passenger transport, walking and cycling, provision of cycling and walking route maps, cycle training programmes, web-based journey planners [the Council's cycling webpage](#);
- The encouragement of the uptake of low-emission vehicles through the delivery of the Nottingham Go Ultra Low City bid funding; RBC has installed EV charging points at its main office and submitted bids for funding for further charging points at a number of public parking locations across the Borough.
- Enhancements to the local cycling network to improve links to local employment, training, shops, services and to link to wider cycling networks in Nottingham City.

The principal challenges and barriers to implementation that Rushcliffe Borough Council anticipates facing are:

- The location of AQMA 1 (on the approaches to Lady Bay and Trent bridges) and the site constraints makes it difficult to remedy the problems with small-scale infrastructure improvements and therefore smarter choices measures (such as travel planning, and marketing and promotion of alternatives to the car) are more likely to provide improvements. Measures that facilitate and encourage walking, cycling and bus use will therefore be the priority actions in the foreseeable future.
- The County Council has concerns about potential cumulative impacts of proposed future development on the Trent Bridge AQMA as the Local Development documents have identified areas around the district for significant growth which may potentially impact on the AQMAs, and traffic growth will be above those that are forecast without the development occurring. Objection to such growth may be difficult and section 38, 278 and 106 planning obligations will be used to mitigate localised traffic impacts of individual developments as far as is possible and seek to ensure sustainable development takes place; rather than the impacts further afield.

- There is currently only planned mitigation of the cumulative traffic growth from proposed development on the strategic road network and the planning authority also has no plans to undertake air quality modelling of the cumulative impacts (particularly on the AQMAs) of the proposed developments. Without significant sustainable transport measures being introduced and maintained at the developments (funded through the development control process) the cumulative impacts of developments will, however, impact on the AQMA on Trent Bridge. The planning authority does not currently have any planned mitigation of the traffic growth at AQMA locations as part of the development proposals. Without significant mitigation at development locations to specifically address their impacts on the AQMAs (e.g. significant sustainable transport improvements), any measures subsequently included within an AQMA action plan would be very unlikely to mitigate this planned growth.
- Ensuring funding is allocated to the above measures to continue their delivery. The top-slicing of 43% of the integrated transport block from 2015/16 onwards by the government and allocating it to the Local Growth Fund means that from 2015/16 the integrated transport funding allocated to Nottinghamshire County Council reduced by approximately £3.5m; significantly reducing the funding available for transport improvements that will deliver air quality improvements.

Progress on the following measures has been slower than expected due to:

- Park and ride sites due to the lack of revenue funding available for undertaking the feasibility studies for such measures (and revenue running costs to support their implementation); as well as the lack of major scheme funding available for the delivery of such measures.
- Introduction of a car club in the county as this will only be introduced once the club in the City proves consistently successful/self-sufficient over a period of time (the Nottingham City car club was only introduced in April 2014).
- Expansion of the cycle hire scheme due to the lack of revenue funding available for such schemes. The County Council is currently working with Nottingham City Council to investigate potential methods of delivering a self-sufficient scheme which would not require revenue support by the authorities.

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 No1 2011 Stragglethorpe Road.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Traffic control and information	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	Nottinghamshire County Council (NCC)/Via EM Ltd/Nottingham City Council (NCiC)	NCC and NCiC revenue funding	Restrain average journey times in the morning peak to a 1% increase per year	Reduced vehicle emissions	Implementation ongoing		Potential barrier: Lack of future revenue funding
2	Contingency planning, and effective event and incident management	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	NCC/Via EM/NCiC/Highways England (HE)	NCC, NCiC, HE revenue funding	Restrain average journey times in the morning peak to a 1% increase per year	Reduced vehicle emissions	Implementation ongoing		
3	Co-ordination of streetworks	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	NCC/Via EM/NCiC	NCC and NCiC revenue funding	Restrain average journey times in the morning peak to a 1% increase per year	Reduced vehicle emissions	Implementation ongoing		
4	Traffic signal upgrades	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2012/13	NCC/Via EM	integrated transport block funding	Restrain average journey times in the morning peak to a 1% increase per year	Reduced vehicle emissions	SCOOT/MOVA installed at signals within AQMA. A60/Bridgford Rd signals upgraded	2012/13	
5	Traffic signal re-phasing	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Ongoing	NCC/Via EM	integrated transport block funding	Restrain average journey times in the morning peak to a 1% increase per year	Reduced vehicle emissions	Signals within AQMA rephased. 24hr monitor installed in 2016/17 will be used to further inform signal modifications.	Ongoing	Potential barrier: Lack of future funding
6	Real time travel information	Public Information	Other		NCC/Via EM Ltd	NCC revenue funding	Restrain average journey times in the morning peak	Reduced vehicle emissions	Information conveyed by all forms of media (press, radio,	ongoing	Potential barrier: Lack of future revenue funding



							to a 1% increase per year		website, social media etc.).		
7	Parking strategy delivery • On-street parking management and control • Nottingham city workplace parking levy (WPL)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Pre-2008	NCC	NCC revenue funding	Manage parking to improve journey time reliability		CPR introduced in 2008. Implementation ongoing	Ongoing	
8	Pocket park and ride	Alternatives to private vehicle use	Bus based Park & Ride	2010	NCC	integrated transport block funding	Increased public transport patronage	Reduced vehicle emissions	Scheme introduced 2010; still open		
9	Park and ride site to the east of Nottingham	Alternatives to private vehicle use	Bus based Park & Ride		NCC	no funding source secured	Not known, scheme progress dependent on determining a business case for any proposal, feasibility findings and securing necessary funding		Consultants commissioned to look at potential improvements along A52 including most suitable general locations for a park & ride site		Scheme dependent on business case for any proposals, identifying appropriate site and securing funding
10	East Midlands Parkway station	Alternatives to private vehicle use	Rail based Park & Ride	2007	Network Rail/East Midlands Trains		Restrain average journey times in the morning peak to a 1% increase per year			2009	
11	Nottingham City Workplace Parking Levy (WPL)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2012	NCiC		Restrain average journey times in the morning peak to a 1% increase per year		NCiC introduced WPL within the city in 2012 and have used funding to make passenger transport improvements in the city	Introduced 2012 and ongoing	
12	NCC travel plan	Promoting Travel Alternatives	Workplace Travel Planning		NCC	integrated transport block funding	Restrain average journey times in the morning peak to a 1% increase per year		PTP travel clinics held at NCC buildings within the AQMA during 2016/17	Ongoing - operational for nearly 20 years	
13	Workplace travel plans	Promoting Travel Alternatives	Workplace Travel Planning		Rushcliffe BC planning/NCC	integrated transport block funding	Restrain average journey times in the morning peak to a 1% increase per year		Developed with businesses as part of planning conditions	Ongoing	
14	Personal travel planning (PTP) with residents	Promoting Travel Alternatives	Workplace Travel Planning	2017	NCC/AECOM	integrated transport block/Access Fund funding	Restrain average journey times in the morning peak to a 1% increase per year		PTP undertaken with West Bridgford residents 2016 and 2018	Mar-19	Future PTP will be delivered should revenue funding sources be identified and secured for its delivery

15	School travel plans	Promoting Travel Alternatives	School Travel Plans	2000	NCC	DfT funding	Restrain average journey times in the morning peak to a 1% increase per year		STPs developed with all schools in Rushcliffe	2011	
16	Flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working		NCC/RBC		Restrain average journey times in the morning peak to a 1% increase per year		NCC operates flexible working arrangements for all its staff	Ongoing	
17	Eco-driver training sessions	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2012	NCC	NCC			Eco-driving training sessions held for NCC staff	2012	
18	NCC car pool vehicles	Alternatives to private vehicle use	Car Clubs	2016/17	NCC		Restrain average journey times in the morning peak to a 1% increase per year		NCC upgraded its pool vehicles to lower emission diesel vehicles	2016	
19	Car sharing scheme	Alternatives to private vehicle use	Car & lift sharing schemes	Pre-2006	NCC		Restrain average journey times in the morning peak to a 1% increase per year	621kg of NOx saved during 2018	3,450 members currently registered	Ongoing	
20	Introduction of car club	Alternatives to private vehicle use	Car Clubs	2014	NCC/NCiC		Restrain average journey times in the morning peak to a 1% increase per year		Nottm city scheme introduced in 2014. Expansion of scheme into county dependent on its success	Not known	Funding for implementation to be determined
21	Cycle parking facilities	Transport Planning and Infrastructure	Cycle network	2014	NCC	integrated transport block funding	Increased cycling trips		Cycle hub installed in 2015 to integrate with bus services	2015	
22	Walking and cycling infrastructure improvements	Transport Planning and Infrastructure	Cycle network	2020	NCC	Dependent on DfT funding being made available	Increased cycling trips		NCC secured funding to develop and deliver West Bridgford strategic cycling network during 2017/18. D2N2 LCWIP currently being developed		No further works to be undertaken unless prioritised through LCWIP development and external/additional DfT funding secured for their delivery
23	Cycle maps	Promoting Travel Alternatives	Promotion of cycling		NCC	NCC	Increased cycling trips		Greater Nottingham cycling maps produced	2018	
24	Cycle training	Promoting Travel Alternatives	Promotion of cycling		NCC	DfT funding	Increased cycling trips		7,518 people received cycle training in 2017/18	Ongoing	Cycle training dependent on DfT funding being made available
25	Marketing of cycling	Promoting Travel Alternatives	Promotion of cycling	Ongoing	NCC	DfT funding	Increased cycling trips		Implementation ongoing	Ongoing	Programmes developed annually.
26	Marketing of walking	Promoting Travel Alternatives	Promotion of walking	Ongoing	NCC	DfT funding	Increased walking trips		Implementation ongoing	Ongoing	Programmes developed annually.

27	Web based journey planners	Public Information	Via the Internet	Ongoing	NCC		Increased walking/cycling/passenger transport trips		Implementation ongoing	Ongoing	
28	Cycle hire scheme	Transport Planning and Infrastructure	Public cycle hire scheme	2017/18	NCiC/NCC; cycle hire operator	funding source to be determined - Dependent on operator interest	Increased cycling trips		Feasibility study commissioned by NCiC for a city scheme which potentially could include parts of the county such as WB	2019	Scheme dependent on commercial cycle hire scheme providers committing to, and delivering a scheme
29	20mph speed limits outside schools	Traffic Management	Reduction of speed limits, 20mph zones	2012/13	NCC	integrated transport block funding	Increased walking/cycling trips		Advisory 20mph speed limits installed outside all feasible schools	2016/17	
30	Area-wide mandatory 20mph speed limits	Traffic Management	Reduction of speed limits, 20mph zones	2014	NCC	integrated transport block funding	Increased walking/cycling trips		Two mandatory areawide 20mph limits introduced in WB	2016/17	
31	Bus infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Ongoing	NCC	integrated transport block funding	Increased bus patronage		Annual programme developed/delivered	Ongoing	
32	Light rail tram infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2013	NCiC/NCC	DfT/WPL funding	Increased passenger transport patronage		NET Phase 2 (with route through part of WB) opened 2015	2015	
33	Marketing and promotion of passenger transport	Promoting Travel Alternatives	Other	Ongoing	NCC/NCiC/PT operators		Increased passenger transport patronage		Implementation ongoing		
34	Integrated ticketing	Transport Planning and Infrastructure	Other	Ongoing	NCC/NCiC/PT operators		Increased passenger transport patronage		Integrated ticketing strategy developed in 2014/15. New smartcard platform introduced in 2014. Robin Hood card scheme introduced in 2015	2015	
35	Concessionary fare schemes	Transport Planning and Infrastructure	Other	Ongoing	NCC/NCiC/PT operators		Increase passenger transport patronage		Implementation ongoing	Ongoing	
36	Bus service improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Ongoing	NCC/NCiC/PT operators		Increase passenger transport patronage		Implementation ongoing	Ongoing	

37	Nottingham to Lincoln rail line service improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	pre 2015	NCC/district councils/East Midlands Trains	NCC/district councils/DfT revenue and LGF funding	Increased rail patronage		NCC secured funding from a number of partners to increase services and enable faster peak service. Improvements to be sought permanently as part of refranchise renewal	2019	
38	Encouragement of low-emission public transport fleets	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport		NCC/NCiC/PT operators	NCT (operator) and OLEV funding			SQBP in place affecting all buses travelling through AQMA.	Ongoing	Operator NCT secured £4.4m OLEV funding and invested a further £12.4m to upgrade its facilities to enable running of a gas fleet, including two services which travel through the AQMA. NCC secured £1.3m from the Green Bus Technology Fund in Feb 2018 to retrofit older buses, including 12 services which operate in the AQMA
39	Eco-Stars programme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes		District councils/NCC/NCiC	LSTF			Introduced 2013 but funding (LSTF) expired in 2015. Alternative funding sources being investigated	2015	
40	Nottingham Go-Ultra Low City bid	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016	NCiC/NCC	OLEV funding	Ongoing take-up of cleaner vehicles		£6.1m funding secured for 2016-2021	2021	
41	Nottingham City Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2016	NCiC	DfT funding			NCiC to undertake modelling to help inform extents of proposed scheme. Modelling to take approx. 18 months	2020	
42	Development of a supplementary planning document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		RBC				At present a Guidance Document is available to download from the Rushcliffe Website to assist Developers, but this has not as yet been		

									developed into a SPG document		
43	A6514 Ring Road improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2013	NCiC		Restrain average journey times in the morning peak to a 1% increase per year		£16.2m package of measures completed in 2016	2016	
44	<p>Environmental Strategy</p> <ul style="list-style-type: none"> <li>Development and delivery of NCC Environmental Strategy</li> <li>Conversion of NCC fleet to low emission vehicles</li> <li>Introduction of wider network of EV charging points to encourage the take-up of alternative fuel vehicles</li> </ul>	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020/21	NCC	£6.1m funding secured by NCC and NCiC (Nottm Go Ultra Low) for 2016-2020; Dependent on strategy and available funding	Increase in EV vehicles; No. of EV charge points introduced in the borough		<p>New NCC Environmental Strategy being developed.</p> <p>Review of on-street and rural EV charging infrastructure to be undertaken during 2020/21</p>	Not known	
45	Co-ordination of strategy - environmental, development control and local transport strategy	Transport Planning and Infrastructure	Other		NCC/RBC				Review of Nottinghamshire Clean Air Strategy undertaken during 2019 and revised strategy adopted in June 2019		Ensuring existing strategies and policies complement and enable actions to improve air quality

## 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Public Health England [‘Public Health Outcomes Framework’](#)<sup>6</sup> 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 attributable fraction (i.e. the proportion of deaths estimated as due to long-term exposure to anthropogenic particulate PM<sub>2.5</sub> air pollution) for Rushcliffe for 2018 was 4.8%, compared to 5.7% and 5.3% in 2016 and 2017, respectively. This is similar to the regional and national values - East Midlands Region (4.9%) and England (5.2%).

The Nottinghamshire Air Quality Strategy 2019-2028 aims are (1) to reduce average concentrations of NO<sub>2</sub> and particulate matter across the County, and (2) to reduce the estimated proportion of disease and deaths attributable to air pollution. The strategy provides estimates of the reduction in mortality and morbidity at a local level across the Nottinghamshire area if residents exposed to higher levels of particulate matter were exposed to lower levels over the next decade together with estimates of the costs avoided – see below for tabulated extracts from the strategy.

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6 Public Health Outcomes Framework Available at <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000004/ati/101/are/E07000032/cid/4/page-options/ovw-do-0>



**Table 4 Estimated reduction in mortality and morbidity in Nottingham & Nottinghamshire over 10 years if residents exposed to high levels ( $\geq 12.3 \mu\text{g}/\text{m}^3$ ) of particulate matter ( $\text{PM}_{2.5}$ ) in 2017 were exposed to lower levels ( $< 12.3 \mu\text{g}/\text{m}^3$ )<sup>‡</sup> over the next decade (Source: Local analysis using PHE 2018 air pollution healthcare costs tool)**

Local authority	Adults (aged 19 or older)						Children (age 18 or younger)	
	Coronary heart disease <sup>‡</sup>	COPD	Stroke	Diabetes	Lung cancer	Deaths <sup>‡</sup>	Asthma	Diabetes
Ashfield	367	211	94	374	9	115	112	4
Bassetlaw	406	222	100	437	10	125	97	4
Broxtowe	480	264	124	485	13	151	122	3
Gedling	475	260	129	433	12	144	132	4
Mansfield	309	164	82	316	7	97	78	2
Newark and Sherwood	444	246	126	401	11	123	103	3
Rushcliffe	419	228	112	426	10	113	116	3
<b>Nottinghamshire</b>	<b>2,900</b>	<b>1,595</b>	<b>768</b>	<b>2,871</b>	<b>72</b>	<b>868</b>	<b>759</b>	<b>22</b>
<b>Nottingham</b>	<b>1,796</b>	<b>1,049</b>	<b>480</b>	<b>1,938</b>	<b>47</b>	<b>546</b>	<b>433</b>	<b>11</b>

<sup>‡</sup> For diseases, the numbers represent how many fewer residents would have the disease in 2027 if all residents lived in low  $\text{PM}_{2.5}$  pollution areas - as opposed to the situation in 2017.

<sup>‡</sup> The number of deaths is the average, annual number of deaths avoided between 2017 and 2027 if all residents lived in low  $\text{PM}_{2.5}$  pollution areas - as opposed to the situation in 2017.

<sup>‡</sup> High and low levels are set by the model.

**Table 5 Costs avoided in  $\text{PM}_{2.5}$  scenario-2017 alone**

Local Authority	2027 costs avoided
Ashfield	£ 1,817,085
Bassetlaw	£ 1,966,194
Broxtowe	£ 2,288,375
Gedling	£ 2,241,058
Mansfield	£ 1,477,093
Newark and Sherwood	£ 2,111,683
Rushcliffe	£ 2,043,450
<b>Nottinghamshire</b>	<b>£ 13,944,938</b>
<b>Nottingham</b>	<b>£ 8,850,224</b>

**Table 6 Cumulative costs avoided in  $\text{PM}_{2.5}$  scenario- total over all years, 2017 to 2027**

Local Authority	Cumulative costs avoided, 2017- 2027
Ashfield	£ 11,359,017
Bassetlaw	£ 12,028,504
Broxtowe	£ 13,986,104
Gedling	£ 13,949,322
Mansfield	£ 9,249,141
Newark and Sherwood	£ 12,299,652
Rushcliffe	£ 12,743,424
<b>Nottinghamshire</b>	<b>£ 85,615,165</b>
<b>Nottingham</b>	<b>£ 54,638,311</b>

Rushcliffe Borough Council does not monitor  $\text{PM}_{2.5}$ .

Rushcliffe Borough Council is taking the following measures to address PM<sub>2.5</sub>:

- Rushcliffe Borough Council continues to work with the LTP and other stake holders to reduce transport impacts as a whole. This has a benefit not only for NO<sub>2</sub> but for all emissions from transport sources, including PM<sub>2.5</sub>.
- In addition, any planning applications for commercial wood/biomass burning plants 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.
- Rushcliffe BC continues to work with PHE 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 illness and AQMAs. The principal application to be used will be 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 a health economy. SHAPE is available on the [SHAPE website](#)
- Within the Borough the areas of Edwalton and West Bridgford have been declared as smoke control areas. The Council works to ensure only exempt appliances are used and authorised fuels are burnt in these areas. See information on the air quality webpages [air quality webpages](#)



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

### 3.1 Summary of Monitoring Undertaken

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

#### 3.1.1 Automatic Monitoring Sites

Rushcliffe Borough Council undertook automatic (continuous) monitoring at two sites during 2019. The continuous monitors are both located within AQMAs. Table A.1 in Appendix A shows the details of the sites. In 2017 a new continuous monitor was provided for AQMA No 1 Trent Bridge in a location considered to be representative of the 'worst case' scenario for air quality levels and it continues to be encouraging to see the NO<sub>2</sub> annual mean concentration for the third year remains below the air quality objective.

The 2019 data for the continuous monitor located in AQMA No1 2011 Stragglethorpe indicates the NO<sub>2</sub> annual mean concentration of 41µg/m<sup>3</sup> exceeds the air quality objective which is set at 40µg/m<sup>3</sup>.

National monitoring results are available at [DEFRA 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 (passive) monitoring of NO<sub>2</sub> at 36 sites during 2019. Table A.2 in Appendix A shows the details of the sites.

As part of the ongoing review and management of the air quality monitoring network five monitoring locations were removed from the 2018 network as all had consistently shown annual mean NO<sub>2</sub> concentrations below the air quality objective for a number of years. Following the annual review and in response to public requests for monitoring five new sites were introduced in 2019. These new locations are Mag 1, Mag 2, LR1, WL1 and TSQ – data is only available for 2019 at these locations.

The diffusion tube referred to as NK in previous years had to be repositioned for logistical reasons. The new location referred to as NK1 is approximately 25m from the previous location and remains on the approach to a roundabout. Although it is further from the roundabout it is closer to the receptor. This repositioning is considered unlikely to have a significant impact on the monitoring data therefore the trend data includes previous years data for location NK.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (including “annualisation” and 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<sup>7</sup>, “annualisation” (where the data capture falls below 75%), and distance correction<sup>8</sup>. Further details on adjustments are provided in Appendix C.

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant. There was no monitoring data recorded for November 2019 across the diffusion tube network due to a technical issue in the laboratory with the tube analysis. Annualisation was required at one monitoring site where data capture fell below 75% - full details can be found in Appendix C.

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year. There were no exceedances of the hourly air quality objective of 200µg/m<sup>3</sup> at either continuous monitoring site in the Borough which is consistent with the trend for the past three years.

The data presented in Table A.3 indicates the NO<sub>2</sub> annual mean concentration exceeded the air quality objective of 40µg/m<sup>3</sup> at one location – the continuous monitor site at Holme House with a NO<sub>2</sub> annual mean concentration of 41µg/m<sup>3</sup>. The continuous monitor site at Holme House is located in AQMA No1 2011 and the annual mean concentration for the past five years ranges from 38µg/m<sup>3</sup> to 41µg/m<sup>3</sup> with the last exceedance of the air quality objective occurring in 2016.

The NO<sub>2</sub> annual mean concentration measured by the continuous monitor located in AQMA No 1 Trent Bridge remained consistent with previous years at 37µg/m<sup>3</sup>. A graphical representation of the five-year trend in the annual mean concentration measured by the continuous monitors located in each of the AQMAs can be seen in Figure A.1.

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<sup>7</sup> [Defra bias adjustments](#)

<sup>8</sup> Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

The passive monitoring location NK1 recorded a NO<sub>2</sub> annual mean concentration of 40µg/m<sup>3</sup> which is equal to the air quality objective and remains consistent with that recorded for the previous two years at location NK. It is encouraging to see the continuing down trend at this location. When corrected for distance the annual mean concentration dropped to 33µg/m<sup>3</sup>.

The NO<sub>2</sub> annual mean concentrations at all other passive monitoring locations fell below the air quality objective with the majority of locations producing results comparable with previous years. The NO<sub>2</sub> annual mean concentration at location TBI which is situated within AQMA No 1 Trent Bridge was 39µg/m<sup>3</sup> which continues the downward trend recorded at this location over the past five years. Trend data for the diffusion tubes located in the AQMAs is presented in Figure A.2 and Figure A.3 and shows the annual mean concentrations measured by diffusion tube remain fairly consistent over the past 3 years and continue the downward trend from the peaks measured around 2015-2016.

As indicated previously there was an increase observed in the annual mean NO<sub>2</sub> concentration at the location considered to be representative of the urban background (HR). The data across the year for this location is similar in trend to previous years and the increase in the annual mean concentration would appear to be driven by significantly higher concentrations recorded across a small number of months during the winter. Although it is difficult to draw robust conclusions from data for one year this increase in the annual mean NO<sub>2</sub> concentration is not seen at other locations and is likely to have arisen due to very localised influences. It may be necessary to consider in more detail, as part of the annual review of the monitoring network, whether this location continues to be reflective of the urban background.

There were no annual means greater than 60µg/m<sup>3</sup> recorded at any of the locations across the monitoring network therefore there were no exceedances of the 1-hour mean objective.

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

Rushcliffe BC is not undertaking monitoring.

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

Rushcliffe BC is not undertaking monitoring.

**3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

Rushcliffe BC is not undertaking monitoring.

## Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
Trent Bridge	Loughborough Road/Trent Bridge, West Bridgford AQMA1	Roadside	458256	338156	NO2	YES (AQMA No1 Trent Bridge)	Chemiluminescent	0	3.75	1.5
Holme House	Holme House, A52 Stragglethorpe junction, Radcliffe on Trent	Roadside	463005	338208	NO2	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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
WLR/2	39/41 WILFORD LANE	Kerbside	457873	337426	NO2	NO	0	9	NO	2.2
A52/SA	A52 SOUTH AVE, RADCLIFFE	Kerbside	465929	339543	NO2	NO	0	4.2	NO	2.9
CL	CLOVERLANDS	Kerbside	457223	335033	NO2	NO	0	16.3	NO	2.5
HR	HAMPTON ROAD	Urban Background	458326	336714	NO2	NO	0	5.4	NO	2.1
HH	HICKORY HOUSE	Kerbside	458049	337340	NO2	NO	0	10.5	NO	2
LR	LOUGHBOROUGH ROAD (RES)	Kerbside	458126	337727	NO2	YES AQMA No 1 Trent Bridge	0	8.9	NO	1.9
37RR	RADCLIFFE ROAD	Kerbside	458457	338215	NO2	NO	-3.3	13.8	NO	4
PC	PEVERIL COURT	Kerbside	458399	337172	NO2	NO	0	8	NO	2
A52/RT	RADCLIFFE A52	Kerbside	464644	338730	NO2	NO	6.5	3.3	NO	2
RR	RADCLIFFE ROAD	Kerbside	458284	338150	NO2	YES AQMA No 1 Trent Bridge	0	4	NO	2.3
SH	SWANS HOTEL.	Kerbside	458919	338120	NO2	YES AQMA No 1 Trent Bridge	0	10	NO	2.1
BH	THE BEECHES HOTEL	Kerbside	457701	337342	NO2	NO	0	9.7	NO	2.1
TBLA	TRENT BOULEVARD A	Kerbside	458752	338278	NO2	YES AQMA No 1 Trent Bridge	0	7.1	NO	2

## Rushcliffe Borough Council

TBLB	TRENT BOULEVARD B	Kerbside	458756	338267	NO2	YES AQMA No 1 Trent Bridge	0	3.4	NO	2.4
TBI	TRENT BRIDGE INN	Kerbside	458274	338117	NO2	YES AQMA No 1 Trent Bridge	0	6.6	NO	2.6
WL3	WILFORD LANE 3	Kerbside	458134	337581	NO2	YES AQMA No 1 Trent Bridge	5.2	2.1	NO	2.9
WW	WINDYWAYS	Kerbside	457651	334840	NO2	NO	0	12	NO	1.8
A52/HHF1	A52 HOME HOUSE(çade) STRAGGLETHORPE	Kerbside	463011	338213	NO2	YES AQMA No1 2011 Stragglethorpe Rd	0	6	YES	2.5
A52/HHF2	A52 HOME HOUSE(çade) STRAGGLETHORPE	Kerbside	463011	338213	NO2	YES AQMA No1 2011 Stragglethorpe Rd	0	6	YES	2.5
A52/HHF3	A52 HOME HOUSE(çade) STRAGGLETHORPE	Kerbside	463011	338213	NO2	YES AQMA No1 2011 Stragglethorpe Rd	0	6	YES	2.5
A52/HHF4	A52 HOME HOUSE(çade) STRAGGLETHORPE	Kerbside	463040	338232	NO2	YES AQMA No1 2011 Stragglethorpe Rd	0	6	YES	2.5
15KHG	15 Kirkhill	Kerbside	470202	340092	NO2	NO	2	0.5	NO	2.5
RuRo	Rugby Road	Kerbside	458132	336462	NO2	NO	3.5	2	NO	2.5
Trent B1	trent buildings	Kerbside	458249	338167	NO2	YES AQMA No 1 Trent Bridge	0	3.6	YES	2.5
Trent B2	trent buildings	Kerbside	458249	338167	NO2	YES AQMA No 1 Trent Bridge	0	3.6	YES	2.5



## Rushcliffe Borough Council

Trent B3	trent buildings	Kerbside	458249	338167	NO2	YES AQMA No 1 Trent Bridge	0	3.6	YES	2.5
2LA	2A Long Acre, Bingham	Kerbside	470248	339834	NO2	NO	0	1.2	NO	2.6
Sains	Sainsburys Wilford Road, Rudd	Kerbside	457303	333214	NO2	NO	0	2.2	NO	2.6
1HS	1 High Street, Rudd	Kerbside	457323	333124	NO2	NO	-1.1	2.8	NO	2.6
Mag 1	Magnolia 1, Edwalton	Kerbside	459366	334244	NO2	NO	12.9	0.9	NO	2.6
Mag2	Magnolia 2, Edwalton	Kerbside	459324	334227	NO2	NO	3.9	1.9	NO	2.6
LR1	Centenary House 1	Kerbside	458100	337543	NO2	YES AQMA No 1 Trent Bridge	9	2.4	NO	2.6
WL1	Centenary House 2	Kerbside	458055	337566	NO2	YES AQMA No 1 Trent Bridge	7	2	NO	2.6
Monitor	Centenary House 3	Kerbside	458023	337552	NO2	YES AQMA No 1 Trent Bridge	4.5	1.5	NO	1.8
NK1	Nottingham Knight	Kerbside	457612	334859	NO2	NO	10.8	2.25	NO	2.1
TSQ	Davis Road / Tudor SQ	Kerbside	458977	337434	NO2	NO	11	1.3	NO	2.6

**Notes:**

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
Trent Bridge	458256	338156	Roadside	Automatic		99%			37	36	37
Holme House	463005	338208	Roadside	Automatic		100%	39	<b>41</b>	38	39	<b>41</b>
Loughborough Road	458174	337772	Roadside	Automatic			28	30			
WLR/2	457873	337426	Roadside	Diffusion Tube		83%	24	26	23	26	26.3
A52/SA	465929	339543	Roadside	Diffusion Tube		83%	29	32	29	29	27.6
CL	457223	335033	Roadside	Diffusion Tube		92%	30	29	30	28	28.5
HR	458326	336714	Urban Background	Diffusion Tube		92%	17	19	17	15	21.0
HH	458049	337340	Roadside	Diffusion Tube		92%	25	25	23	26	21.6
LR	458126	337727	Roadside	Diffusion Tube		92%	31	29	26	28	27.0
37RR	458457	338215	Roadside	Diffusion Tube		92%	30	31	27	24	25.7
PC	458399	337172	Roadside	Diffusion Tube		92%	25	26	25	24	22.3
A52/RT	464644	338730	Roadside	Diffusion Tube		92%	29	33	32	28	27.3
RR	458284	338150	Roadside	Diffusion Tube		92%	31	33	30	31	29.8
SH	458919	338120	Roadside	Diffusion Tube		92%	28	29	27	23	24.0

## Rushcliffe Borough Council

BH	457701	337342	Roadside	Diffusion Tube		92%	23	27	24	26	24.7
TBLA	458752	338278	Roadside	Diffusion Tube		75%	31	32	33	31	31.4
TBLB	458756	338267	Roadside	Diffusion Tube		92%	35	37	32	32	32.7
TBI	458274	338117	Roadside	Diffusion Tube		92%	<b>43</b>	<b>42</b>	<b>40</b>	<b>40</b>	39.3
WL3	458134	337581	Roadside	Diffusion Tube		92%	31	37	37	34	33.8
WW	457651	334840	Roadside	Diffusion Tube		67%	34	35	34	31	36.2
A52/HHF1	463011	338213	Roadside	Diffusion Tube		92%	38	38	37	38	37.4
A52/HHF4	463040	338232	Roadside	Diffusion Tube		92%	38	<b>40</b>	<b>41</b>	39	38.1
15KHG	470202	340092	Roadside	Diffusion Tube		75%	26	27	26	25	23.8
RuRo	458132	336462	Roadside	Diffusion Tube		83%	30	30	29	29	28.4
Trent B1	458249	338167	Roadside	Diffusion Tube		83%	36	38	37	36	37.3
2LA	470248	339834	Roadside	Diffusion Tube		92%	37	37	36	31	30.9
sains	457303	333214	Roadside	Diffusion Tube		92%	33	33	30	31	30.4
1HS	457323	333124	Roadside	Diffusion Tube		92%	30	30	28	27	25.9
Mag 1	459366	334244	Kerbside	Diffusion Tube		92%					28.3
Mag2	459324	334227	Kerbside	Diffusion Tube		92%					28.3
LR1	458100	337543	Kerbside	Diffusion Tube		92%					30.3
WL1	458055	337566	Kerbside	Diffusion Tube		83%					32.6

Monitor	458023	337552	Kerbside	Diffusion Tube		92%					25.9
NK1	457612	334859	Kerbside	Diffusion Tube		83%	<b>45</b>	<b>43</b>	<b>41</b>	<b>41</b>	<b>40.1</b>
TSQ	458977	337434	Kerbside	Diffusion Tube		92%					24.1

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

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

**Notes:**

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

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

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

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

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

Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Continuous (Automatic) Monitoring Sites

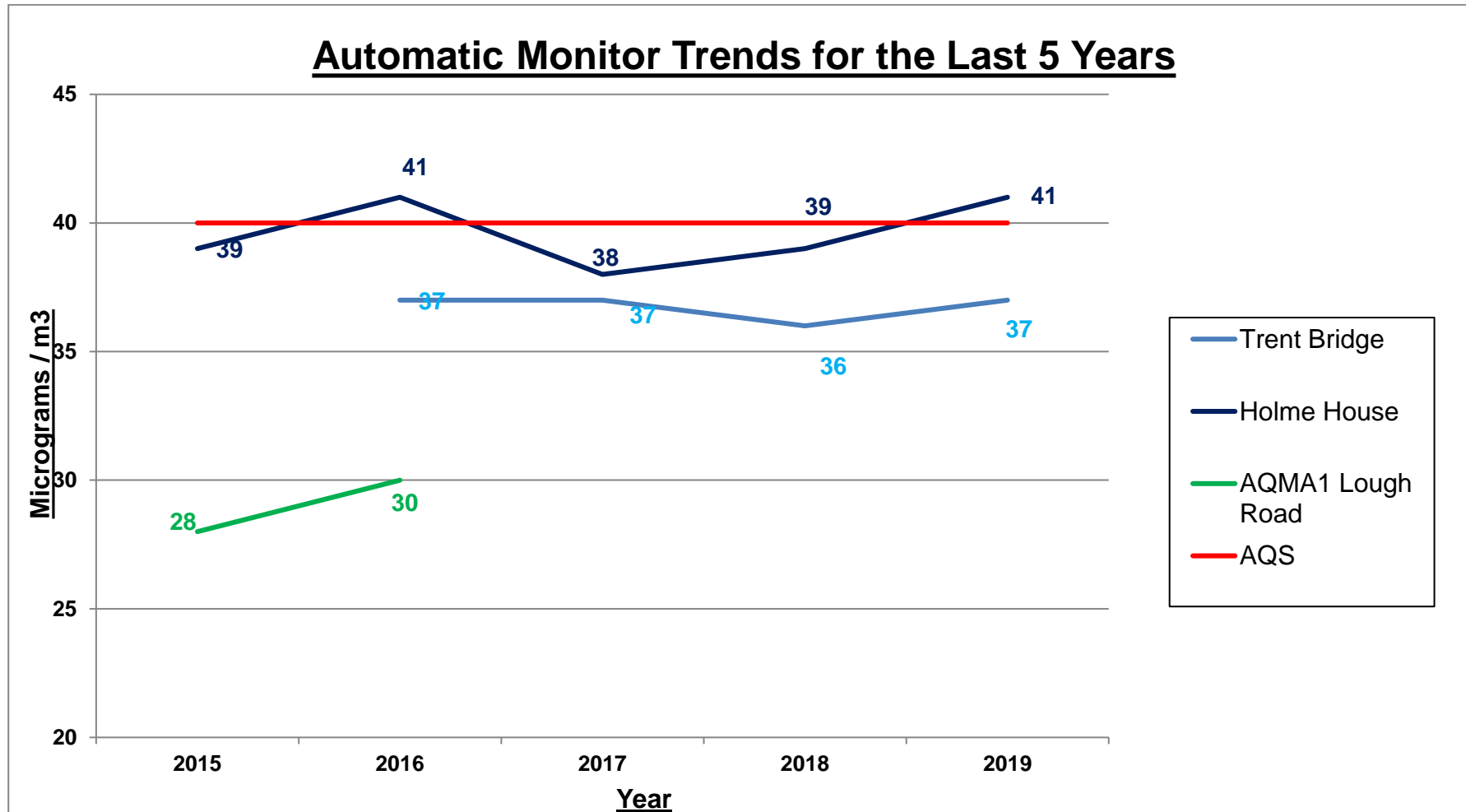


Figure A.2 Trends in Annual Mean NO2 Concentrations at AQMA 1 2011 (Holme House Stragglethorpe)

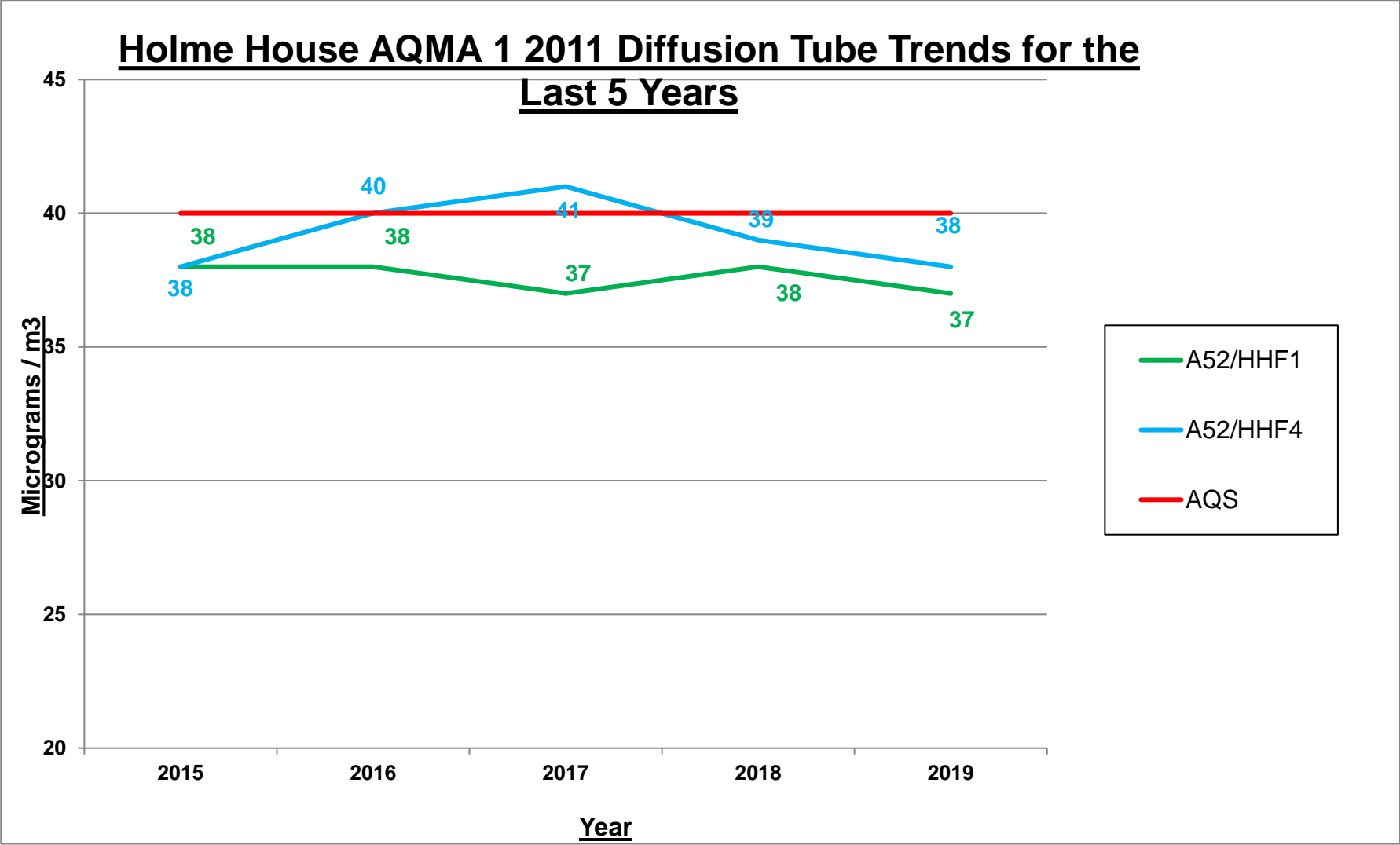


Figure A.3 Trends in Annual Mean NO2 Concentrations at AQMA No 1 (Trent Bridge)

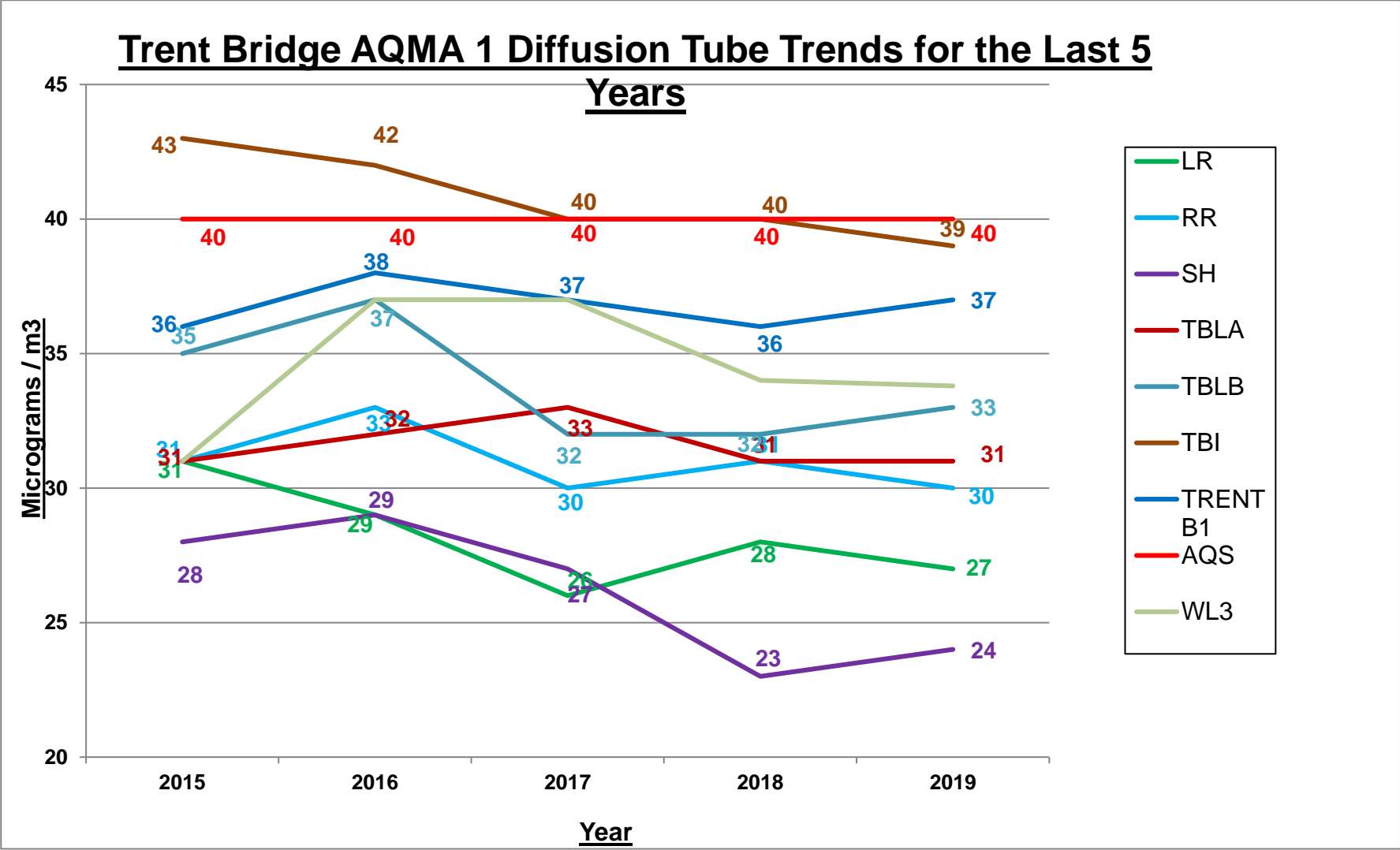


Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
							2015	2016	2017	2018	2019
Trent Bridge	458256	338156	Roadside	Automatic	n/a	99.3			0	0	0
Holme House	463005	338208	Roadside	Automatic	n/a	99.9	1	0	0	0	0
Loughborough Road	458174	337772	Roadside	Automatic	n/a	n/a	0	0			

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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



## Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO<sub>2</sub> Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
WLR/2	457873	337426	32.9	33.7	41.5	22.8	20.7		18.3	17.4	29.8	39.1		26.6	28.3	26.3	26.3
A52/SA	465929	339543	41.7	34.7	26.8	35.0	26.3	25.4	26.3	20.9		29.6		30.1	29.7	27.6	27.6
CL	457223	335033	45.4	45.1	31.8	19.2	23.2	21.7	25.6	26.9	28.7	26.4		43.3	30.7	28.5	28.5
HR	458326	336714	37.3	29.8	23.8	15.2	14.6	12.4	12.9	14.6	19.7	21.7		46.5	22.6	21.0	21.0
HH	458049	337340	35.2	33.4	25.2	16.3	15.7	18.6	16.1	17.1	21.9	24.7		31.0	23.2	21.6	21.6
LR	458126	337727	36.1	41.4	26.8	14.9	25.7	27.5	22.5	22.8	31.9	36.6		32.8	29.0	27.0	27.0
37RR	458457	338215	35.6	40.0	25.4	25.6	20.5	22.2	20.6	19.1	24.4	28.8		35.5	27.1	25.2	26.0
PC	458399	337172	36.5	32.1	26.8	7.8	19.8	21.0	21.4	19.6	24.8	24.8		29.5	24.0	22.3	22.3
A52/RT	464644	338730	41.2	35.0	33.5	30.8	25.7	23.5	28.3	22.4	21.4	32.4		28.3	29.3	27.3	26.0
RR	458284	338150	44.5	39.1	25.5	23.2	31.7	33.2	29.7	24.4	35.1	32.6		33.2	32.0	29.8	29.8
SH	458919	338120	44.1	33.7	27.2	22.2	19.4	18.3	18.6	17.1	24.1	25.4		34.1	25.8	24.0	24.0
BH	457701	337342	36.8	37.6	28.7	21.5	23.1	22.4	20.3	21.1	24.4	25.3		31.5	26.6	24.7	24.7
TBLA	458752	338278	42.1	45.0	40.3	27.6	25.8	27.8		29.5	32.1	33.8			33.8	31.4	31.4
TBLB	458756	338267	45.4	45.2	39.6	22.3	29.5	31.7	32.6	27.7	35.9	38.5		37.8	35.1	32.7	32.7

## Rushcliffe Borough Council

TBI	458274	338117	53.8	55.3	49.9	36.0	36.3	36.4	37.0	35.0	38.1	41.5		45.3	<b>42.2</b>	39.3	39.3
WL3	458134	337581	50.0	51.3	41.4	23.8	28.5	28.1	30.7	30.0	37.3	35.5		42.7	36.3	33.8	30.0
WW	457651	334840	42.7	47.1	33.4				31.3	40.2	44.0	42.7		44.5	<b>41.0</b>	36.0	36.0
A52/HHF1	463011	338213	48.1	43.3	42.8	52.4	31.6	34.1	34.3	29.7	38.7	37.1		38.7	39.0	37.0	37.0
A52/HHF2	463011	338213	50.1	41.5	40.5	46.1	37.0	37.0	36.3	29.0	38.7	37.9		38.5	39.3	37.0	37.0
A52/HHF3	463011	338213	46.6	45.8	44.0	41.8	40.4	39.3	39.2	31.6	40.9	37.9		40.4	<b>40.7</b>	38.1	38.1
A52/HHF4	463040	338232	50.2	47.9	45.3	36.6	34.5	36.3	39.0	35.7	40.9	39.2		45.2	<b>41.0</b>	38.1	38.1
15KHG	470202	340092	37.1	34.9		20.1	18.4	21.8	20.7	20.9		24.1		32.0	25.5	23.8	22.1
RuRo	458132	336462	45.2	37.8	32.6	27.8	25.9	24.7	26.4	23.5		30.1		31.7	30.6	28.4	27.7
Trent B1	458249	338167	47.9	46.0	41.8	50.2	36.7	35.2	33.9	25.1	37.2			34.9	38.9	36.2	36.2
Trent B2	458249	338167	53.6	47.6	41.1	44.9	39.1	40.2	37.3	29.2	42.8	37.9		38.3	<b>41.1</b>	38.2	38.2
Trent B3	458249	338167	51.4	41.4	45.2	44.6	36.1	38.9	35.8	29.2	40.2	41.1		41.2	<b>40.5</b>	37.6	37.6
2LA	470248	339834	42.9	49.3	36.6	24.8	29.8	24.3	29.5	27.5	34.3	29.8		36.9	33.2	30.9	30.9
sains	457303	333214	40.7	39.1	30.9	36.6	31.1	32.9	31.1	24.5	32.5	27.5		32.9	32.7	30.4	30.4
1HS	457323	333124	26.9	37.5	28.0	25.9	24.0	26.0	26.6	22.5	26.2	31.9		30.8	27.9	25.9	26.5
Mag 1	459366	334244	41.5	40.1	31.2	27.3	24.5	21.9	25.9	27.8	30.1	33.1		31.5	30.4	28.3	24.5
Mag2	459324	334227	42.2	44.1	31.4	23.7	25.0	25.6	22.7	25.6	28.9	28.3		37.1	30.4	28.3	27.2
LR1	458100	337543	49.5	37.1	37.9	29.6	28.5	29.9	26.1	22.4	30.5	33.4		33.6	32.6	30.3	26.8
WL1	458055	337566	39.3	44.2	37.0	31.9	29.2		32.6	25.4	33.4	40.3		37.1	35.1	32.6	28.5
Monitor	458023	337552	42.5	38.1	26.8	25.6	23.1	24.6	17.7	21.7	26.3	29.5		30.0	27.8	25.9	24.7
NK1	457612	334859	51.4	60.7	43.5	38.0	34.0		37.2	29.3	43.8	45.5		47.9	<b>43.1</b>	<b>40.1</b>	33.1
TSQ	458977	337434	41.9	35.3	28.2	20.7	18.8	20.5	20.1	19.8	25.8	25.0		28.5	25.9	24.1	22.6

- Local bias adjustment factor used  
 National bias adjustment factor used  
 Annualisation has been conducted where data capture is <75%

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

**Notes:**

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

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

### Air Quality Operators

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.

### Nitrogen Dioxide Diffusion Tube Monitoring

Rushcliffe BC use Gradko diffusion tubes prepared using 20%Triethanolamine (TEA) in water to measure nitrogen dioxide at a number of sites in 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 +/- 1 day of the publicised diffusion tube change over date for the month to allow comparison with other Local Authority studies if necessary. The locations are reviewed periodically and all tubes are mounted using spacer brackets and grommets supplied through 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 spread sheet 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 Ltd Laboratory Quality Control Procedures utilising in-house method GLM7. Gradko is a UKAS accredited laboratory and undertakes diffusion tube monitoring on the same basis for a number of other local authorities and Environmental Consultants and now undertakes the monitoring for all local authorities in the Nottinghamshire Pollution Working Group.

Nitrogen dioxide absorbed as nitrite by triethanolamine (TEA) is determined by spectrophotometric measurement at 540 nanometres. Nitrite reacts with an added reagent to form a reddish purple azo dye and the optical density of this complex is measured using a Camspec UV/Visible Spectrophotometer. The concentrations of nitrogen dioxide are then calculated from a pre-calibrated response factor and exposure times. The values are not blank corrected using the blank “control” diffusion tube provided by Rushcliffe Borough Council.

The accuracy of the measurements made by Gradko are also monitored by participation in an external laboratory measurement proficiency scheme, the ‘Workplace Analysis Scheme for Proficiency’ (WASP), implemented by the Health and Safety Laboratory, Sheffield. The results of the WASP analysis are available via the following link:

[DEFRA performance data](#)

**Data ratification:** 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.

**Annualisation:** Sites with fewer than 9 months’ worth of data require annualisation. Diffusion tube data for one location (Windyways (WW)) was incomplete for 2019, with eight months data. The annual average has been annualised as in Box 7.8 of LAQM TG16. The nearest continuous background sites were Nottingham Centre (UK-AIR ID: UKA00274), Leicester University (UK-AIR ID: UKA00573) and Burton-on-Trent Horninglow (UK-AIR ID: UKA00652) each of which had more than 85% data capture for 2019. The annualisation tool was used to calculate an average annualisation factor of 0.96 from the data for the 3 continuous background sites which was then used to adjust the raw data simple annual mean for location WW. Screen shots of the populated annualisation tool are provided below.

***Bias Adjustment:*** NO<sub>2</sub> diffusion tube data must be corrected for bias. This is because diffusion tubes are not the reference method and passive diffusion typically results in low accuracy therefore it is necessary to bias correct the results based upon local or national colocation studies with chemiluminescent monitors. Whilst we had the option to use either own local factor derived from co-location studies with the NO<sub>x</sub> analyser or the National Bias Adjustment Factor, the national factor has been used for diffusion tube bias adjustment for the following reasons:

- the co-location sites are not typical of the locations in the diffusion tube study; and
- the previous reports have mostly used the national factor. Continuing to use this factor will provide a consistent approach to bias adjustment year on year.

A comparison of the national bias factor with the local bias factor (based on two, triplicate tube, co-location sites) indicated that they were the same.

The bias factor used in this report is 0.93. This is derived from the national bias figure for Gradko tubes, 20% TEA in water as shown in the screen clipping below.

***Distance Correction:*** Monitoring site locations should be representative of relevant public exposure however this is not always possible to achieve. Therefore, if this is not the case and the site is roadside it is necessary to calculate the concentration at the nearest relevant exposure. This can be done using the NO<sub>2</sub> fall-off with distance calculator and example can be seen below. The 2019 measured local annual mean background NO<sub>2</sub> concentration of 21µg m<sup>-3</sup> was used in the calculations.

Diffusion tube monitoring data reported in this document have been ratified and bias adjusted using the correction factor as stated which is derived from the most up to date national bias factor.

## NO<sub>x</sub> Continuous Analysers

### *Description of Analyser*

The NO<sub>x</sub> continuous analyser is located at the junction of Radcliffe Road and Loughborough Road, West Bridgford and is a permanent site. The site is non-residential but provides a good assessment of NO<sub>2</sub>/NO<sub>x</sub> close to the main road along the building line. It is a ML9841B single chamber Chemiluminescence analyser and is approved by TUV, US EPA and NETCEN. A second analyser was installed in a Kaizen enclosure in early 2014 to the AQMA4 location at the A52/Stragglethorpe Road junction.

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

### *Instruments Checks and Calibration of the Analyser*

**Daily automatic calibration:** Zero air is generated by passing air through s27crubbers and passed through 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 as a check on the instrument performance and drift.

**Analyser inspection and manual calibration:** The analysers were covered by an annual service and maintenance contract. The service and maintenance contract covers 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 RBC staff on a fortnightly basis using scrubbed zero air derived from the integrated scrubber column and a certificated NO/NO<sub>x</sub> 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 is changed prior to connecting the calibration gases. The zero air and NO/NO<sub>x</sub> gases are run through the analyser and the responses 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.

**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 are interrogated to see if the readings are consistent with expectations or an equipment error may have occurred. Data, 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 the data is excluded from the data base calculations. Each data set that is excluded must have annotated against it a reason for the data exclusion to allow for traceability of data ratification. The most common reason for data being excluded is monitor breakdown leading to consistently low or very high readings. However, power failure can also be a cause as well as any specific events noted by officers during visits, e.g. trucks being run next to the monitor for maintenance of the building façade or similar.


Information from the 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 data highlighted. This includes the AURN monitors operated by the Nottingham City.



Gradko 20%TEA in Water Bias Adjustment

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/20				
Follow the steps below <b>in the correct order</b> to show the results of <b>relevant</b> co-location studies										This spreadsheet will be updated at the end of June 2020	
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										LAQM Helpdesk Website	
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet											
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:		Step 2:		Step 3:		Step 4:					
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor <sup>3</sup> shown in blue at the foot of the final column.					
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data <sup>2</sup> .		If you have your own co-location study then see footnote <sup>1</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953					
Analysed By <sup>1</sup>	Method <sup>2</sup> <small>To code your selection, please [Alt] from the preparation list</small>	Year <sup>3</sup> <small>To code your selection, please [Alt] from the preparation list</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>4</sup>	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	20% TEA in water	2019	R	Blackburn with darwen Borough Council	10	29	21	36.9%	G	<b>0.73</b>	
Gradko	20% TEA in water	2019	R	Cheshire West and Chester	12	39	38	2.0%	G	<b>0.98</b>	
Gradko	20% TEA in water	2019	R	Cheshire West and Chester	11	34	34	-2.1%	G	<b>1.02</b>	
Gradko	20% TEA in water	2019	R	Gedling Borough Council	12	32	30	7.3%	G	<b>0.93</b>	
Gradko	20% TEA in water	2019	R	NOTTINGHAM CITY COUNCIL	10	37	40	-7.0%	G	<b>1.07</b>	
Gradko	20% TEA in water	2019	R	Bedford Borough Council	11	29	29	-1.0%	G	<b>1.01</b>	
Gradko	20% TEA in water	2019	R	Bedford Borough Council	12	37	32	13.0%	G	<b>0.89</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	<b>0.85</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	<b>1.08</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	<b>0.81</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	<b>1.12</b>	
Gradko	20% TEA in water	2019	KS	Marylebone Road Intercomparison	12	85	65	30.1%	G	<b>0.77</b>	
Gradko	20% TEA in water	2019	R	Borough Council of King's Lynn and West Norfolk	9	27	21	28.4%	G	<b>0.78</b>	
Gradko	20% TEA in water	2019	R	Lancaster City Council	13	40	34	16.4%	G	<b>0.86</b>	
Gradko	20% TEA in water	2019	R	Lancaster City Council	12	31	31	1.6%	G	<b>0.98</b>	
Gradko	20% TEA in water	2019	R	Monmouthshire County Council	12	39	39	1.3%	G	<b>0.99</b>	
Gradko	20% TEA in water	2019	UC	Belfast City Council	10	29	24	21.8%	G	<b>0.82</b>	
Gradko	20% TEA in water	2019	R	Dudley MBC	12	33	32	4.5%	G	<b>0.96</b>	
Gradko	20% TEA in water	2019	R	Dudley MBC	12	44	42	3.9%	G	<b>0.96</b>	
Gradko	20% TEA in water	2019	UB	Dudley MBC	12	23	19	19.8%	G	<b>0.83</b>	
Gradko	20% TEA in water	2019	UB	Eastleigh Borough Council	12	24	26	-7.1%	G	<b>1.08</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	<b>0.81</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	<b>1.12</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	<b>1.08</b>	
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	<b>0.85</b>	
Gradko	20% TEA in water	2019	R	Thurrock Borough Council	12	29	24	21.6%	G	<b>0.82</b>	
Gradko	20% TEA in water	2019	R	Brighton & Hove City Council	11	45	50	-9.3%	G	<b>1.10</b>	
Gradko	20% TEA in water	2019		<b>Overall Factor<sup>3</sup> (27 studies)</b>					<b>Use</b>	<b>0.93</b>	

Annualisation Tool Screenshots



## Diffusion Tube Calendar Inputs

Enter data into the pink cells (if required)

Annualisation year	2019
Annualisation Year Start Date	09/01/2019
Annualisation Year End Date	08/01/2020

Step 1. Select Annualisation Year

Reset Annualisation Tool

Diffusion Tube Deployment Dates			
Period/Month	Tube On	Tube Off	Comments
Jan	09/01/2019	06/02/2019	
Feb	06/02/2019	06/03/2019	
Mar	06/03/2019	03/04/2019	
Apr	03/04/2019	01/05/2019	
May	01/05/2019	05/06/2019	
Jun	05/06/2019	03/07/2019	
Jul	03/07/2019	07/08/2019	
Aug	07/08/2019	04/09/2019	
Sep	04/09/2019	02/10/2019	
Oct	02/10/2019	06/11/2019	
Nov	06/11/2019	04/12/2019	
Dec	04/12/2019	08/01/2020	



## Continuous Monitoring Data Inputs

Enter data into the pink cells

### Step 4 Continuous Background Monitoring Data

Start Date	09/01/2019
Start Time	01:00

Date & Time	NO <sub>2</sub> Hourly Concentrations (µg/m <sup>3</sup> )			Site 4 Name
	Sufficient (>85%) annual data capture	Sufficient (>85%) annual data capture	Sufficient (>85%) annual data capture	
	<i>Nottingham Centre</i>	<i>Leicester University</i>	<i>Burton on Trent Horninglow</i>	
09/01/19 01:00	35.82634	30.78126	22.38142	
09/01/19 02:00	20.9564	27.98778	21.44886	
09/01/19 03:00	16.44854	26.21724	20.53299	
09/01/19 04:00	14.6005	19.34361	19.63375	
09/01/19 05:00	15.52294	11.92131	15.03776	
09/01/19 06:00	24.52834	19.1207	17.48618	
09/01/19 07:00	38.7935	30.8612	26.07998	
09/01/19 08:00	54.57219	47.37792	35.72337	
09/01/19 09:00	63.45042	55.73733	39.62108	
09/01/19 10:00	54.34276	50.51369	34.37507	
09/01/19 11:00	51.14136	43.18018	27.52991	



### Annualisation Summary

Diffusion Tube ID	Annualisation Factor Nottingham	Annualisation Factor Leicester	Annualisation Factor Burton on Trent	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m3)	Annualised Data Simple Annual Mean (µg/m3)	Comments
WW	0.9547	0.9734	0.9544		0.9608	40.7	39.1	
						-	-	
						-	-	



### Annual Report Results Table

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Simple Annual Mean (µg/m3)		Comment	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.93) and Annualised		
			WW	457651	334840	42.7	47.1	33.4					31.3	40.2				44.0
DT 2																		-
DT 3																		-
DT 4																		-
DT 5																		-

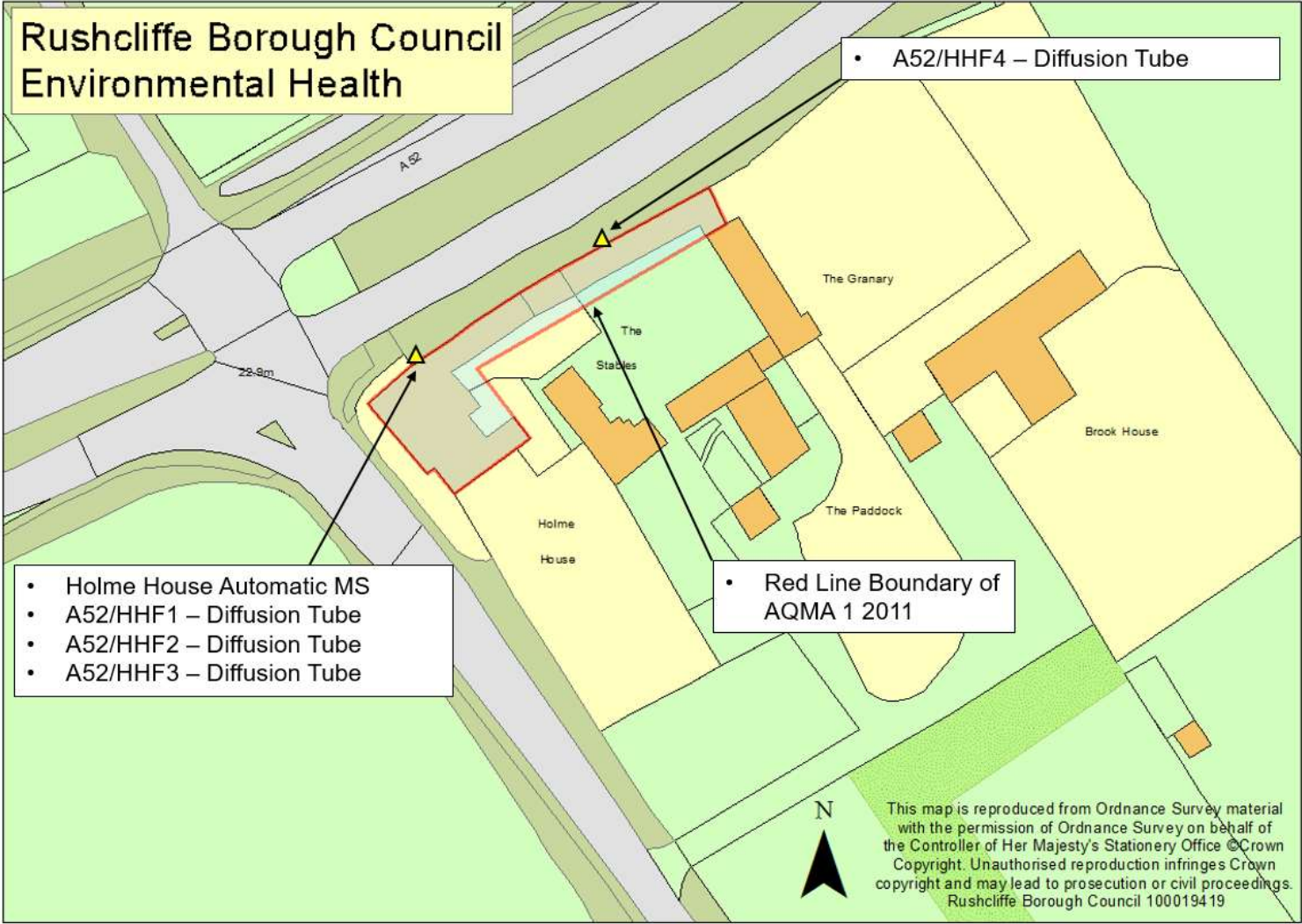
NO<sub>2</sub> Fall Off with Distance Example Calculation – Diffusion Tube Location 37RR



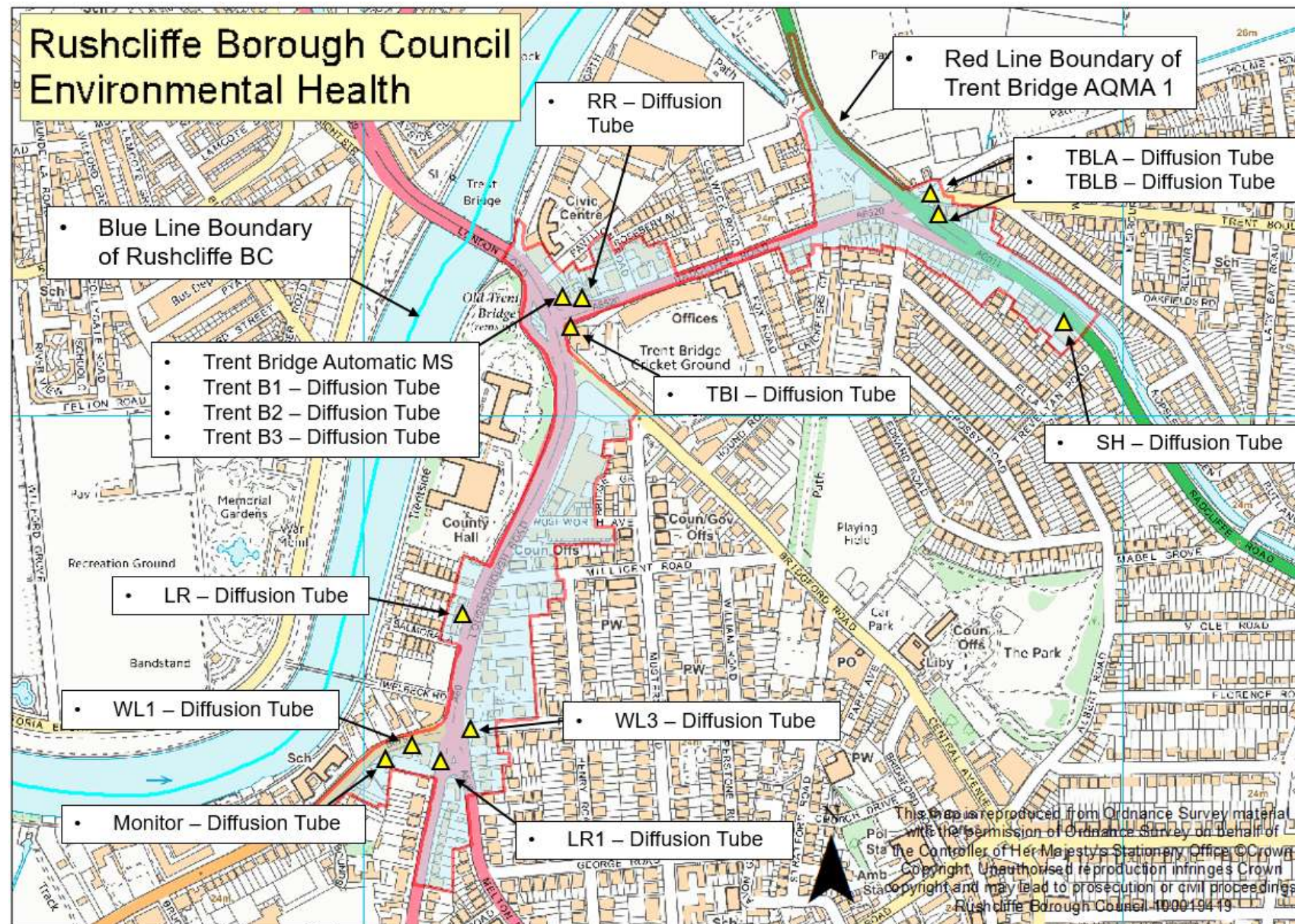
Enter data into the pink cells

Site Name/ID	Distance (m)		NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
WL3	2.1	7.3	21.0	33.8	30.0	
15KH	0.5	15.0	21.0	23.8	22.1	

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







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

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>9</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>9</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).



## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EMAQN	East Midlands Air Quality Network
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LTP	Local Transport Plan
NET	Nottingham Express Transit – Nottingham's tram network which runs through parts of Rushcliffe Borough Council
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PHE	Public Health England
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
NCC	Nottinghamshire County Council

## Rushcliffe Borough Council

NCiC	Nottingham City Council
NPWG	Nottinghamshire Pollution Working Group
QA/QC	Quality Assurance and Quality Control
RBC	Rushcliffe Borough Council
SO <sub>2</sub>	Sulphur Dioxide

## References

East Midlands Air Quality Network (EMAQN) (2019) Air Quality and Emissions Mitigation Guidance for Developers. Accessed via [Nottingham Insight Document-Library](#)

Local Air Quality Management Technical Guidance LAQM.TG(16) (2016) Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and the Department of Environment Northern Ireland. Available at [DEFRA technical guidance](#)

Local Air Quality Management Policy Guidance LAQM.PG(16) (2016) Published by Defra in partnership with The Scottish Government, Welsh Assembly Government and the Department of Environment Northern Ireland. Available at [DEFRA documents](#)

Nottinghamshire Air Quality Strategy 2019-2028 (Draft V4.2 Final Draft). Accessed via [Nottingham Insight Document-Library](#)

Nottinghamshire County Council Local Transport Plan (LTP) [Nottinghamshire Local Transport Plan](#)

Public Health Outcomes Framework Available at [PHE Outcomes Framework](#)