



Report to: Licensing and Environmental Health Committee, 13th June 2022

Report of: Corporate Director – Operations, Homes and Communities

Subject: 2022 Annual Air Quality Update Report

1. Recommendation

That Committee -

1.1 Notes the contents of this report

2. Background

- 2.1 Air pollution is associated with several 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 a strong correlation with deprivation, as issues of poor air quality are commonly associated with less affluent areas.
- 2.2 In Worcester there are monitored breaches of the National Objective for the annual average concentration of Nitrogen Dioxide (NO₂). NO₂ is also considered to be an indicator gas for a range of other pollutants such as fine particles, all of which are associated with the combustion of fossil fuels. Road going vehicles traversing the City are the single greatest contributor to the elevated levels of NO₂ measured in recent years. It is considered that a reduction in the level of road vehicle pollution in central Worcester will contribute significantly to improved public health outcomes.
- 2.3 Monitoring of NO₂ in the City has taken place for over a quarter of a century and in 2021 WRS completed a short and long term (20 year) trend analysis of the data. The report concluded that concentrations of NO₂ can be seen to be decreasing over time due to the introduction of improved engines and vehicle technologies. However due to the volume of traffic and a very traditional road network, it is considered that exceedances of the air quality objective will continue to be recorded across the City's monitoring network in future years.
- 2.4 Under the Environment Act 1995, local authorities have a duty to review and assess air quality within their areas and where breaches of the National Objective for a pollutant exist, work towards improving air quality must be undertaken. National Objectives for pollutants are set by European Directives and translated into UK legislation. Where an objective is consistently breached an Air Quality Management Area (AQMA) must be declared and then the subsequent production of an Air Quality Action Plan (AQAP) that addresses the problem. Since 2021 AQAP's must have defined compliance deadlines and delivery will be overseen by the OEP (see section 2.5)
- 2.5 The assent of the Environment Act 2021 in January also marked the Government's further prioritisation of air quality. The law requires local authorities to commit to statutory delivery deadlines on their annual Air Quality Status Reports (ASR's), Air Quality Detail Assessments, AQMA's and AQAP's. These deadlines also legally oblige two tier authorities to cooperate as 'air quality partners'. Furthermore Part 1 enables

the creation of a new government watchdog called the Office for Environmental Protection (OEP) who will oversee the delivery of environmental regulation by national and local government.

3. Information

3.1 DEFRA Air Quality Status Report (ASR) 2022 & Air Quality results

3.2 The 2022 report is currently being prepared by officers in line with the DEFRA deadline for submission set for the 30th June.

3.3 The body of the report will focus on the emerging strategic transport programme provided by the County Council and a review of air quality results for 2021.

3.4 WRS undertook non-automatic (passive) monitoring of Nitrogen Dioxide (NO₂) at 37 sites during 2021. No exceedance of the long-term objective for NO₂ was recorded in 2021, with all but two locations recording 10% below the air quality objective (40 µg/m³) - the exceptions being the bus station in the Butts (39.1 µg/m³) and Rainbow Hill (38.3 µg/m³).

3.5 Although monitoring data from 2021 shows an overall increase in average recorded annual mean NO₂ concentrations compared to 2020, increasing by 13.2% (3.2 µg/m³), 2020 was not representative of a standard year due to the COVID-19 Pandemic and first lockdown in March 2020 and subsequent lockdowns that followed. It is anticipated that monitoring for the city is likely to report a return to pre-COVID levels of pollution in 2022.

3.6 Graphs detailing the current NO₂ data and monitoring trends across the city are provided at **Appendix 1**.

3.7 Historic Reporting of Air Quality Exceedance (Hotspots) & formulation of Air Quality Management Areas

3.8 Prior to 2019 the Council had several small air quality management areas declared due to successive annual exceedances of the national NO₂ objective (Hotspots). The 2019 ASR reported 3 sites historically declared as AQMA's (Dolday/Bridge Street, Lowesmoor/Rainbow Hill, St Johns) with an additional location of Sidbury/London Road which had recently been studied and considered a hotspot.

3.9 With other sites emerging at the time also showing potential levels of pollution that were likely to exceed the objectives the Council decided that developing solutions to these issues required a holistic approach as treating each hotspot in its own right limited the process of creative transport planning. Hence the decision to declare the City as a single AQMA was approved.

3.10 The declaration of AQMA's led on to the second phase of work – source apportionment which in turn informs the development of the AQAP.

3.11 The untimely arrival of the COVID-19 pandemic prevented the process of source apportionment work from taking place until September 2021 when traffic volumes returned to pre COVID levels. Source apportionment is where the traffic in a particular location is monitored and analysed in terms of volume and vehicle type. The study identifies which form of vehicles contribute to the most pollution in each location. This is not just based on the type of vehicle of highest volume at that location, as some vehicle types such as HGVs provide greater levels of pollution than others so a calculation has to be made. WRS recently completed the first draft of this work which is presently being peer reviewed.

- 3.12 The development of the new AQAP will be undertaken using the information provided by the source apportionment exercise. Previous source apportionment work in the St. Johns Ward has indicated that the reduction in the number of vehicles required to bring pollution levels to acceptable standards is significant and it is anticipated that the development of the city-wide AQAP will need to be challenging and will require the support and buy in of key partners including Worcestershire County Council, particularly in its role as Highways Authority.
- 3.13 Upon finalising the Source Apportionment study WRS intends to assemble an officers' group for the purpose of action planning. The group will consist of WRS, Public Health and Worcestershire Highways. This will be necessary for the next stage of AQAP planning.
- 3.14 It will require the consideration of many options, some of which are likely to be invasive methods of discouragement or reduction in road traffic entering areas identified as having air quality exceedances. With the above in mind the AQMA will also come with a commitment that legally binds all 'air quality partners' to an agreed timeline of delivery that DEFRA consider acceptable.
- 3.15 Air Quality Monitoring Review
- 3.16 There are three main reasons to undertake air monitoring:
- Air quality management (AQM) work as required by law which is overseen by DEFRA
 - To harvest real-time information about air quality for the purposes of informing the public and public health professionals/NHS.
 - To provide additional data and information to supplement a specific air quality study or to assess an air quality improvement scheme
- 3.17 To comply with the Government set air quality management regime, air monitoring in the City is undertaken exclusively with passive diffusion tube monitoring techniques. This method has been robustly tested over many years and is used by all local authorities for the purpose of monitoring NO₂ in the outdoor environment.
- 3.18 The measurement technique has been fine-tuned over time and it provides a level of accuracy that is considered acceptable by DEFRA for the purposes of AQM work. It is also a very cost-effective method at around £7 per location per month (laboratory supply and analysis only). Data using this technique can be harvested over a large geographic area and this method has also proven excellent for the purpose of trending air quality over a long period of time.
- 3.19 There are however limitations to using this technique. Diffusion tubes lack absolute accuracy and can display a +/-10% error rate so locations close to the government objective threshold for action require further study using more sophisticated methods prior to taking action (see para 3.20). Diffusion tubes don't provide instant data as they must be subjected to the national QA/QC process which corrects the 'tube bias' retrospectively following the completion of the national adjustment Study co-ordinated by DEFRA. Hence data collected in a specific year is not available in a reliable format until the following April.
- 3.20 All of the Worcestershire District Councils employ a diffusion tube monitoring programme; however Wyre Forest District Council have implemented enhanced monitoring arrangements at two locations in Kidderminster.

- 3.21 A highly accurate NO₂ gas analyser has been installed in Kidderminster that monitors pollution in real-time. Diffusion tubes are also co-located here. The data harvested from both techniques provide us with a local bias adjustment factor which provides several scientific advantages over that of the slow national scheme. The data collected also allows us to report nationally what the background NO₂ concentrations are in Worcestershire.
- 3.22 The capital cost of such a system would be around £17,000 with annual maintenance costs of £2000. This system demands officer time to be managed and is effectively a laboratory instrument inside a bespoke roadside case.
- 3.23 The second Kidderminster site employs a purpose-built electrochemical gas measuring system purchased by Wyre Forest District Council. This system is not as accurate as the other gas analyser and is not currently approved for AQM work by DEFRA. Nevertheless, it provides real-time information on NO₂ levels, particulate matter (PM₁₀ and PM_{2.5}) and ozone (O₃).
- 3.24 The equipment has been deployed at a location which was subject to significant road junction improvements in 2019. Prior to these changes this area had the poorest air quality in Worcestershire and the equipment is being used to monitor the effectiveness of these improvements. The equipment will also be used to monitor the significant developments planned on the east side of Kidderminster over the forthcoming years and determine whether they have a detrimental effect on air quality at this location. The system has a capital cost of around £4,000 and annual maintenance and data harvesting cost varies between £1000 and £2000 per year.
- 3.25 Moving forward WRS anticipate that this technology will gain approval for AQM work as the government is awaiting the outcome of a scientific study conducted on behalf of DEFRA on this technology. There is great interest in deploying such instruments instead of the present expensive and cumbersome machinery that is presently approved. We have seen networks of these units set up in Wolverhampton, Dudley, Shrewsbury and Nottingham etc.
- 3.26 A third installation is also being commissioned to monitor NO₂ and PM₁₀ in another location within the County which is similar to the system discussed in 3.20. It is expected to have capital and installation cost in excess of £30k. This system is required to accurately measure pollution levels as diffusion tubes are not sufficiently accurate to determine whether air quality is breaching current AQM set thresholds.
- 3.27 Given the likelihood of needing to enhance the air quality monitoring provision within the City, consideration is being given to a future recommendation to this Committee for the implementation of the purpose-built electrochemical gas measuring systems referred to in para 2.22.
- 3.28 These types of monitor are sufficiently accurate to provide the public and the Council with real time information on air quality. They are fairly mobile pieces of kit and easily installed on lamp posts, with the option to power by solar or batteries. Due to the reduced capital cost (compared to other options) the Council could consider investing in a network of these which can provide useful information on locations that should be avoided due to poor air quality. The information collected can also be utilised by the County Highways and incorporated into their roadside information boards or distributed by the NHS/Public Health.
- 3.29 Should the Committee consider this as an appropriate way forward WRS will assess the options available in greater detail and report back (as part of presenting the DEFRA

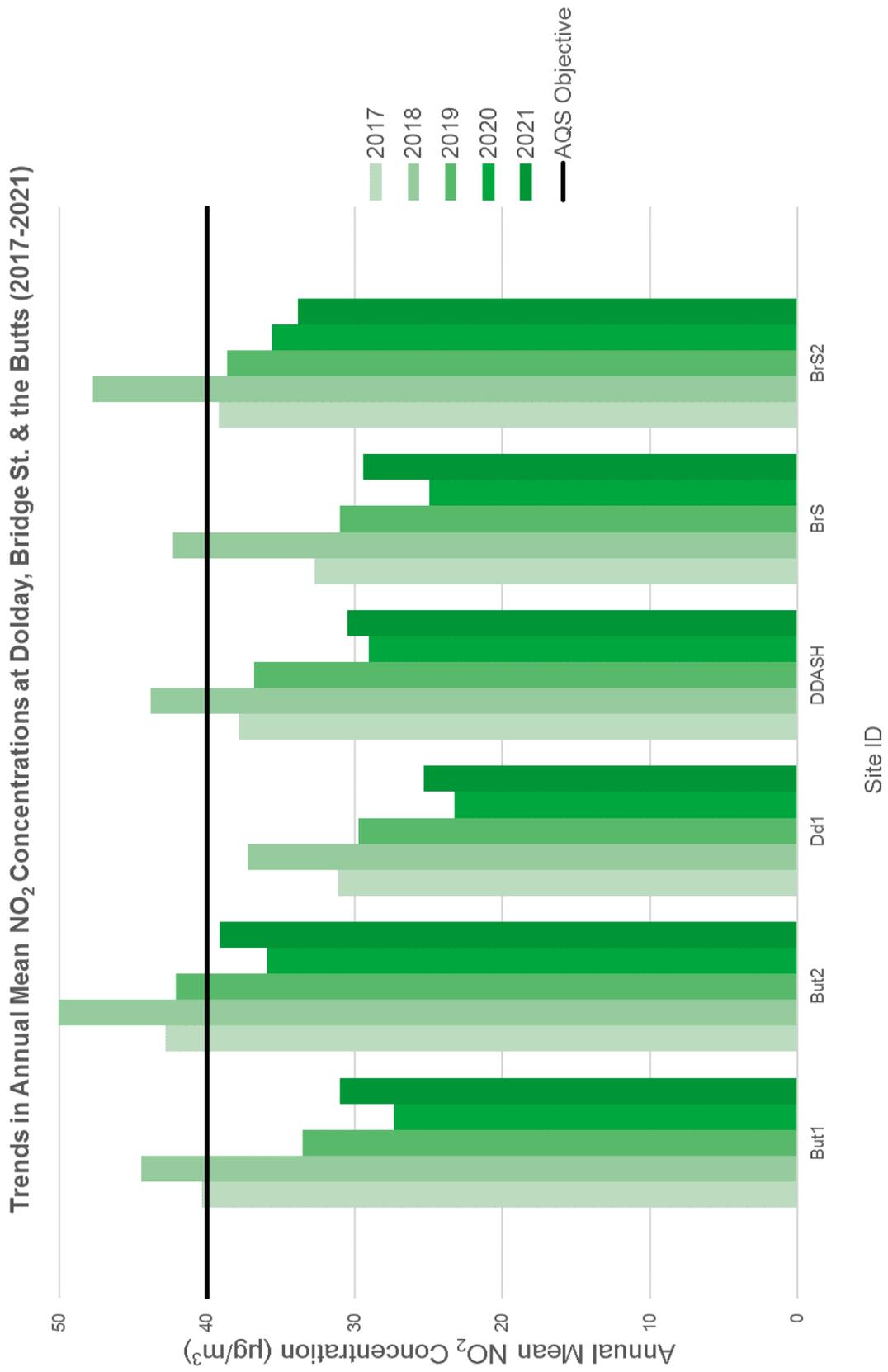
Air Quality Status Report (ASR) 2022) at the 12th September 2022 Committee with a Decision Report that will include more details around options and costings.

Ward(s): All

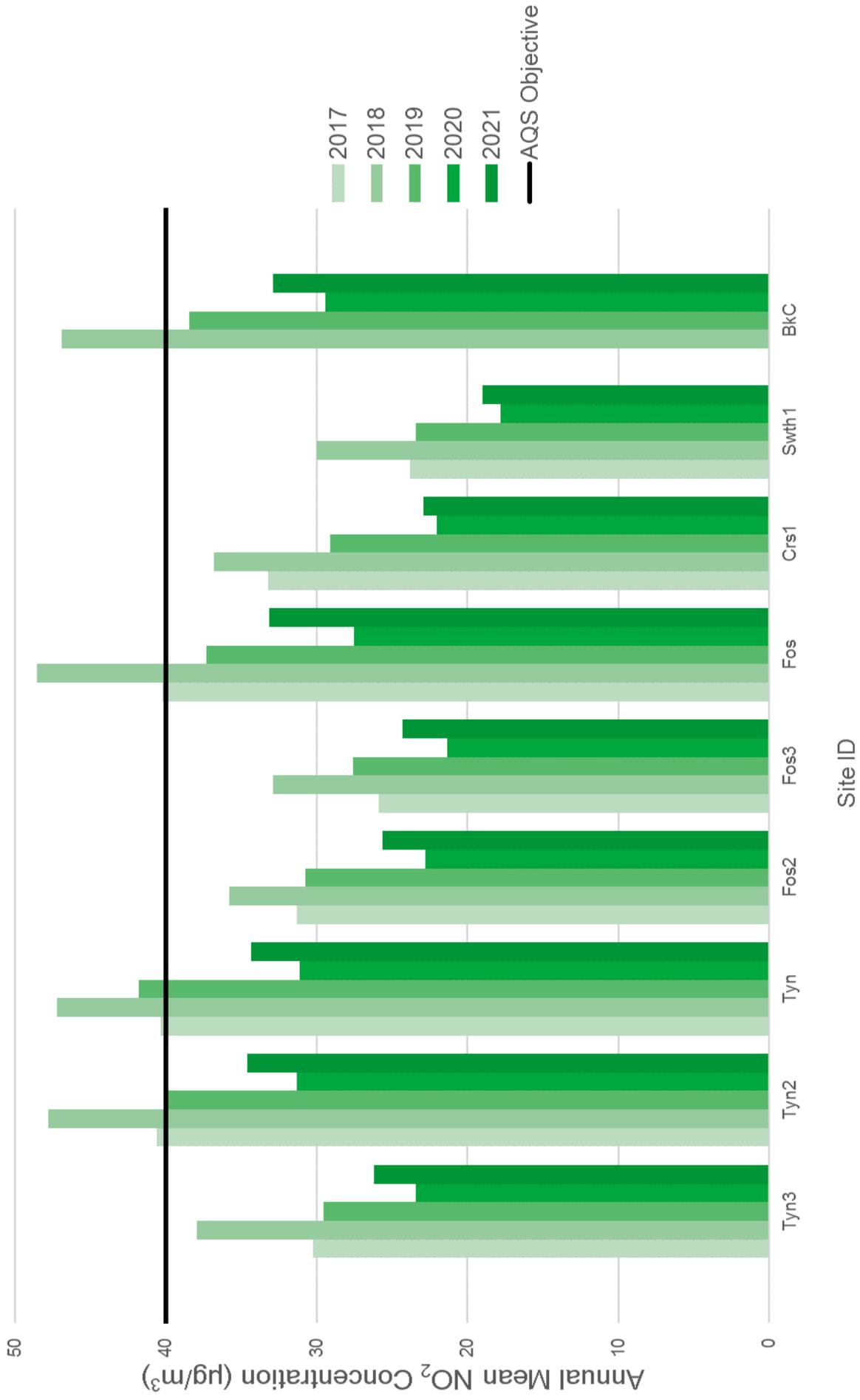
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Background Papers: N/A

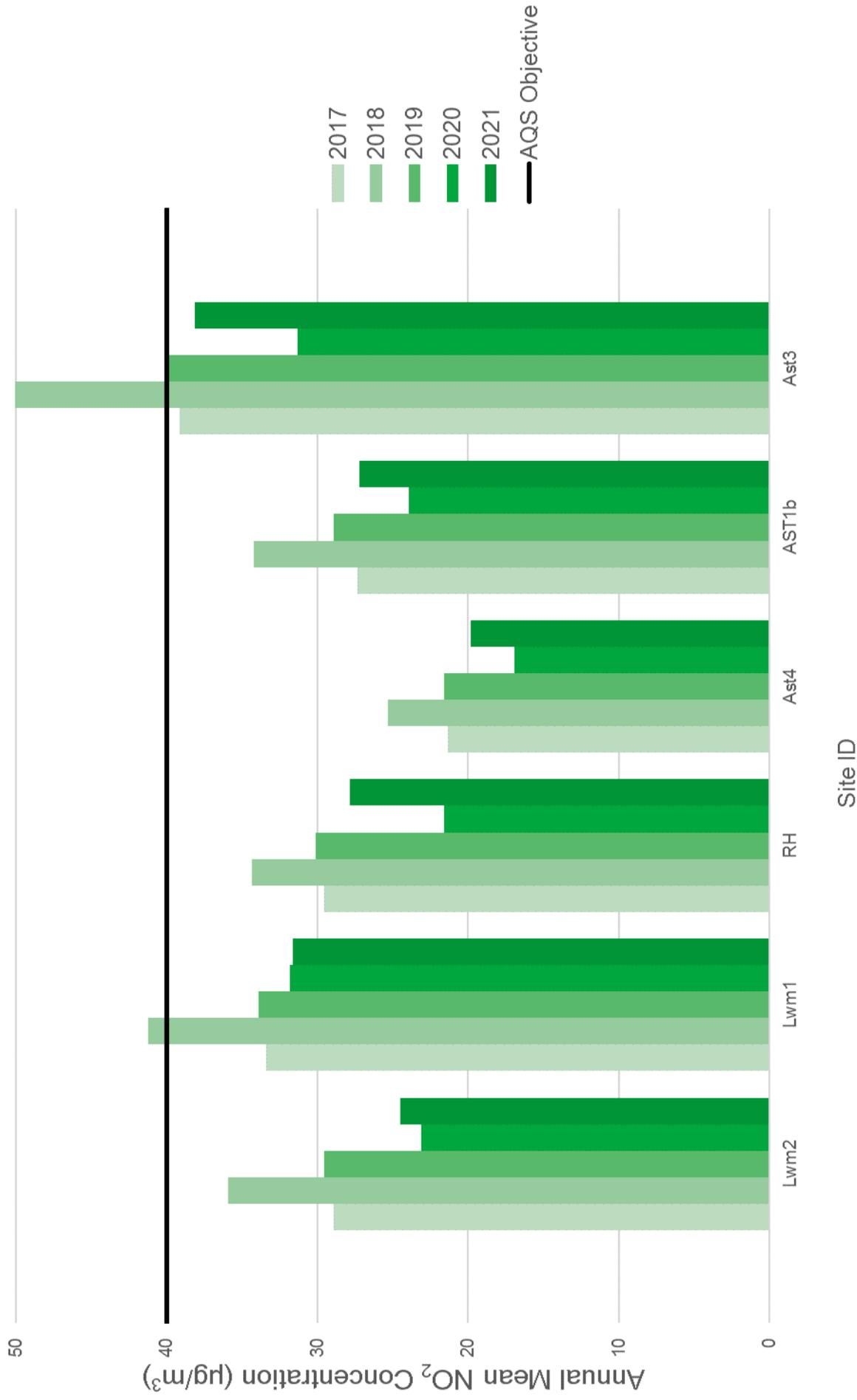
Appendix 1



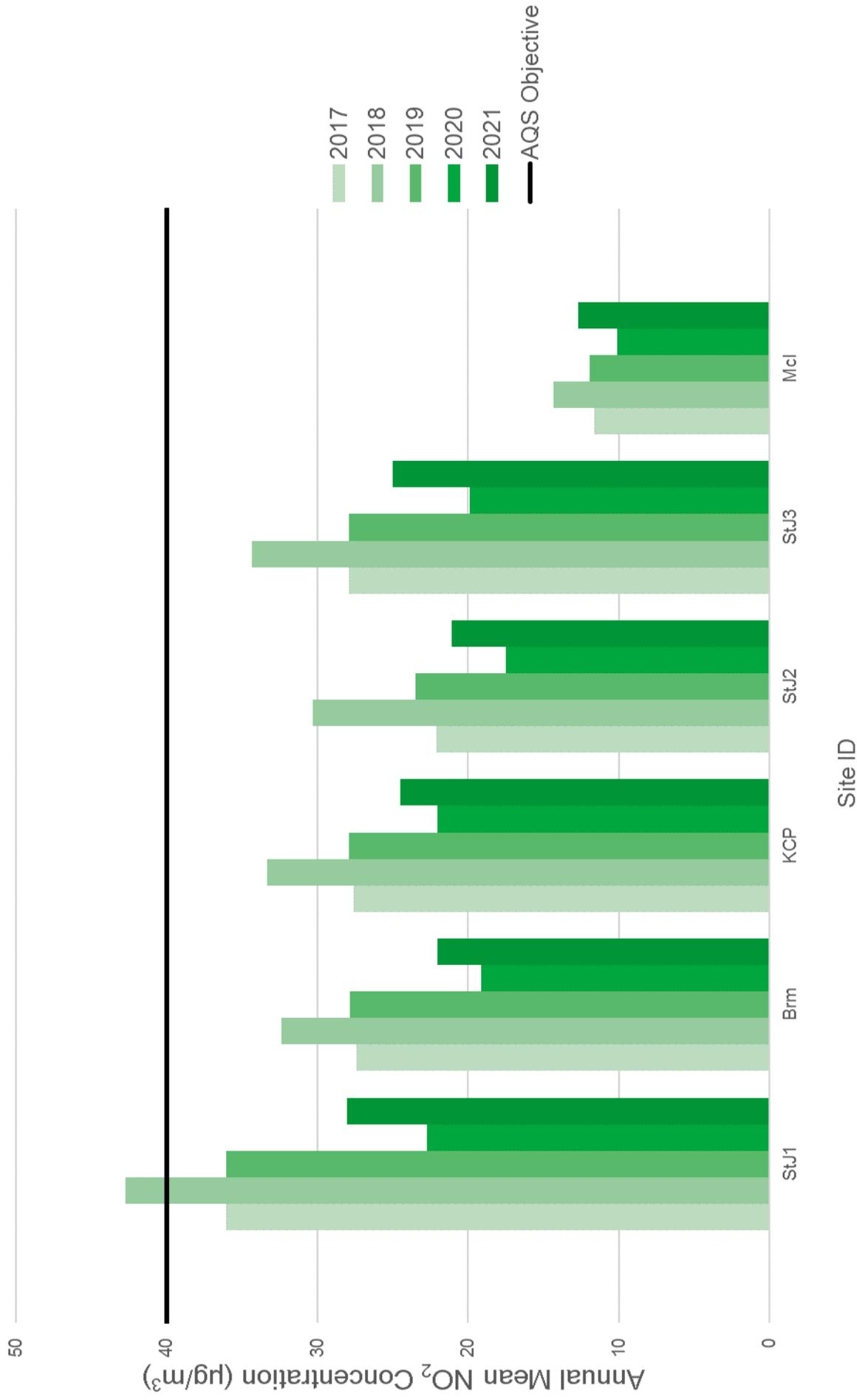
Trends in Annual Mean NO₂ Concentrations at Tything & Foregate St. (2017-2021)



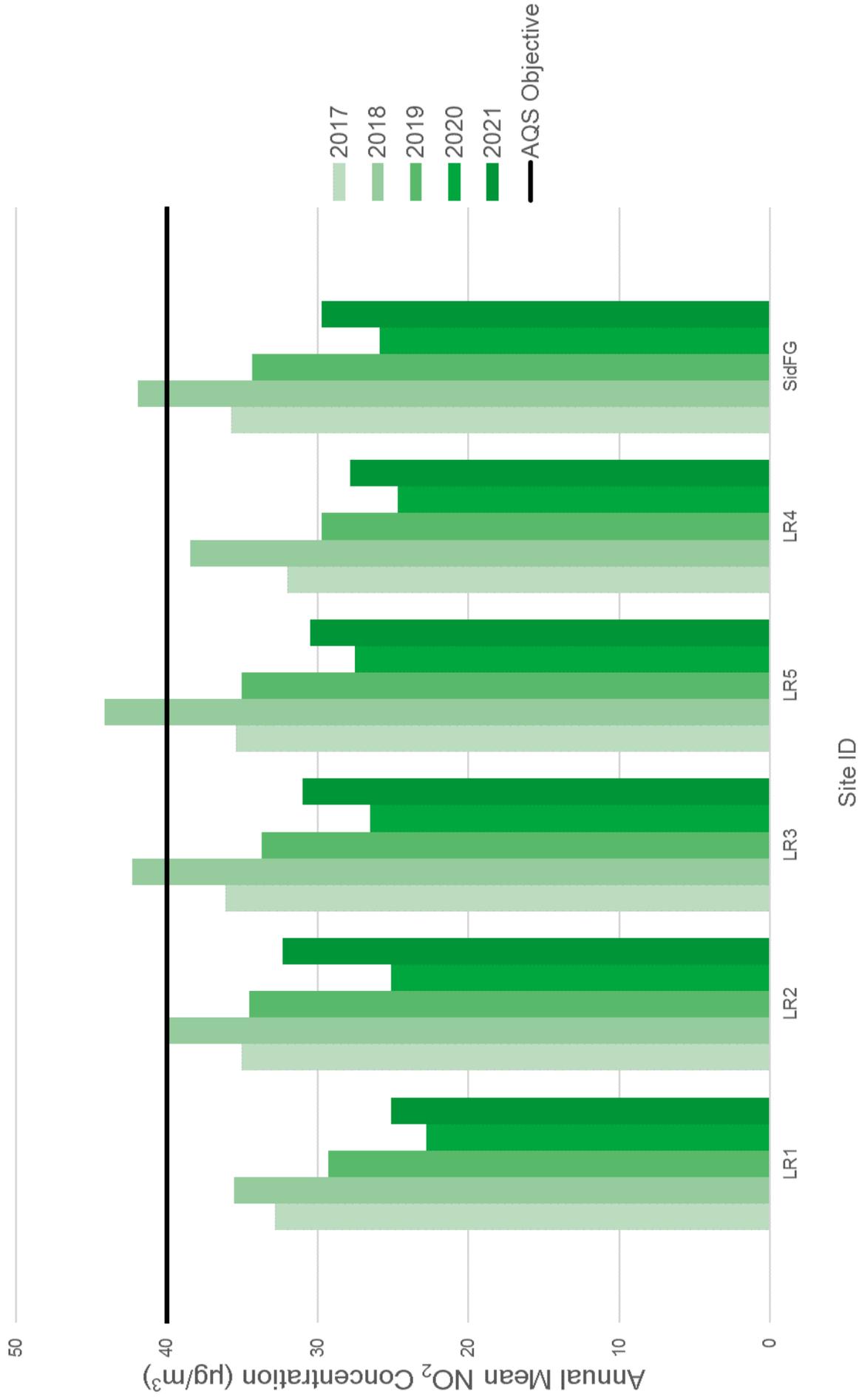
Trends in Annual Mean NO₂ Concentrations at Lowesmoor, Rainbow Hill & Astwood (2017-2021)



Trends in Annual Mean NO₂ Concentrations at St Johns (2017-2021)



Trends in Annual Mean NO₂ Concentrations at London Road & Sidbury (2017-2021)



Trends in Annual Mean NO₂ Concentrations at other locations in Worcester City (2017-2021)

