2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Charnwood

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

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

Following the national impact that Covid-19 had throughout the majority of 2020; 2021 began to see a more representative return towards transport movement and business activities contributing to the underlying air quality concentrations throughout the borough.

As expected, the 2021 annual mean NO_2 concentrations for all monitor locations were up on the recorded levels for 2020, although they remained beneath levels observed for any of previous 3 years. It is encouraging to see the continuation of a downward trend that again shows full compliance with the national Air Quality Objectives. The longer-term impact from the recovery however, both locally and at a national level, is unlikely to be fully reflected until 2022 data is presented at a later date.

Local concerns are still being occasionally raised by the public in respect to levels of ‘dust’ observed around the Mountsorrel Quarry area. We continue to have a close partnership with the operators, their consultants and the County Council to ensure robust monitoring, appraisal and scrutiny of the operation is undertaken. Alongside our own monitoring the

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

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

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

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

quarry has an extensive network of monitors in place and through the sharing of information we can see a high degree of precision between observed results. Those results continue to indicate a continued compliance with the national Air Quality Objectives and a continued reduction in overall mean concentrations. It is acknowledged that a number of daily monitored 'exceedances' are occurring at times when neighbouring (and wider national) authorities are also reporting increased concentrations, the assumption being that local conditions are also being influenced by the transboundary movement of particulates outside of the control of the operator, or indeed Charnwood Borough Council.

Giving consideration to the implications of the Environment Act 2021; an additional analyser capable of measuring both PM_{10} and $PM_{2.5}$ has been co-located alongside the Council's gravimetric PM_{10} unit at Mountsorrel. It is hoped that the data capture rates will be more reliable than the existing unit and that it will also provide a more detailed insight into $PM_{2.5}$ levels within Charnwood at a location considered to be 'worst-case for 'dust' in the borough.

The monitoring of SO_2 concentrations around the Great Central Railway (GCR) engine sheds continues. We have again experienced difficulties with the reliability of the analyser over the past 12 months. Following the outcome of further discussions with the manufacturer in March 2022 we are hoping that a solution now implemented will result in a more stable dataset going forward, leading to better understanding in respect to monitoring this pollutant. From the data obtained during 2021 we believe we have adherence with the NAQO's.

Further information about the work of the Council in respect to Local Air Quality Management can be found on our webpages at:

http://www.charnwood.gov.uk/pages/airpollution

Actions to Improve Air Quality

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

The 2019 Clean Air Strategy[5] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Charnwood Borough Council continues to work with partners across the county to collaborate and deliver actions in relation to air quality and health.

We have an active role in the Leicester, Leicestershire and Rutland Air Quality Forum, and is a member of the East Midlands Air Quality Network. Both bodies improve the sharing of information and aid consistency of approach.

Collaboration work with Public Health colleagues at Leicestershire County Council continues with scheduled meetings held under the '*Air Quality and Health Partnership*' to discuss emerging issues and to provide a formal forum to update Action Plan delivery as part of the Public Health Outcomes Framework

Conclusions and Priorities

2021 monitoring throughout the borough has been fully in compliance with the air quality objectives, both inside and outside of the existing AQMAs.

Concentrations for NO_2 were expectedly up on 2020 levels but remain within a longer-term downward trend.

Whilst previous consideration had been given to the revocation of several AQMAs (particularly the Syston AQMA) the current uncertainty surrounding the future implications

[5] Defra. Clean Air Strategy, 2019

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

of the Environment Act 2021, specifically the potential for revised (i.e. expected lower) NAQOs, makes the undertaking of doing so to be thought of as untimely at this point.

From a practical point of view, by maintaining the AQMAs (which by definition have been declared in areas subject to elevated public exposure to pollutants) they continue to be an additional level of scrutiny in the face of an era of sustained development.

Furthermore, whilst it is acknowledged that Charnwood's 2006 Air Quality Action Plan is "*out of the recommended five-year period*" (Defra appraisal, 2021) the opportunity granted from the awaited conclusions of the Environment Bill consultations will allow us to re-evaluate and refocus on an appropriate AQAP going forward, should one be necessary in view of many years full compliance with all NAQOs, despite the AQMAs remaining in place for the above reasons.

As discussed in our 2021 report and later here; there is considerable public interest in the potential impact from the commissioning and operation of the Newhurst Energy-from-Waste (EfW) facility at Shepshed. As an emerging activity of 'concern' much of our focus during 2022 will be in establishing concentration levels (PM_{10}, $PM_{2.5}$) and supplementing existing NO_2 monitoring to gather a better understanding of exposure concentrations in the locale.

In anticipation of this work a portable 'Zephyr' air quality monitor has been deployed (late 2021) with the first annual set of results expected to be available in the 2023 ASR.

Local Engagement and How to get Involved

In order to help local people and visitors to travel easily in and around Charnwood and Leicestershire as well as to reach places further afield, all whilst reducing the burden on the environment; more information about the local buses, cycling paths, car share schemes, local air travel and road traffic and weather conditions can be found on our public transport and sustainable travel website pages at:

Public transport and sustainable travel.

Alternatively, follow the direct links below for information on:

- Cycling, pedestrian and other pathways located within Charnwood.
- Leicestershire Sustainable Travel
- The 'Chose How You Move' Car share scheme

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Charnwood Borough Council.

If you have any comments on this ASR please send them to Peter Weatherill at:

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Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in Charnwood during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Charnwood Borough Council can be found in Table 2.1. The table presents a description of the 4 AQMAs that are currently designated within Charnwood. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean for Loughborough and Syston;
- PM_{10} 24-hour mean for Mountsorrel;
- SO_2 15 minute mean for Great Central Railway (GCR)

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Loughborough	Declared 2001, Amended 2004	NO2 Annual Mean	An area encompassing a number of properties around the town centre	NO	Unknown (in excess of 40 µg/m3)	28.6 µg/m3 (Leicester Rd)	Charnwood Local Air Quality Management – Final Action Plan 2006 [under review]	Removed due to age.
Syston	Declared 2001, Amended 2004	NO2 Annual Mean	Residential properties along Melton Rd and Sandford Rd	NO	Unknown (in excess of 40 µg/m3)	26.2 µg/m3 (1116 Melton Rd)	Charnwood Local Air Quality Management – Final Action Plan 2006 [under review]	Removed due to age.
Great Central Railway (GCR)	Declared 2001	SO2 15 Minute Mean	An area encompassing residential properties near The Great Central Railway	NO	Unknown (in excess of 266 µg/m3 more than 35 times a year)	No exceedances of any objective level recorded during the 2021 monitoring period	Charnwood Local Air Quality Management – Final Action Plan 2006 [under review]	Removed due to age.

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Mountsorrel	Declared 2011	PM10 Annual Mean	An area encompassing residential properties near Mountsorrel Quarry	NO	60 recorded exceedences (from 313 valid samples) of the 24-hour mean	38.57 (90.4th percentile) of the 24-hour means	Dust Management and Monitoring Plan (Revised 2017) Link: DMMP 2017	

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

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

2.2 Progress and Impact of Measures to address Air Quality in Charnwood

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

1. Trends are presented and discussed and a robust comparison with air quality objectives is provided.

   Response: Comment welcomed

2. The Council have reviewed their AQMAs and have stated they intend to revoke the Syston AQMA. This is largely unchanged from the previous two rounds of ASR appraisal. The Councils decision to revoke the AQMA is supported, and the Council is encouraged to make progress towards this in 2021, providing an update in their next ASR.

   Response: Outcomes from the Environment Act 2021 consultations are anticipated to provide further direction to LAs in respect to a review of revised responsibilities (stricter NAQOs?). At this time, any decision to progress towards the removal of Charnwood's existing AQMAs is felt to be untimely.

3. The Councils other AQMAs have also been compliant for consecutive years, thus the Council should consider revoking these AQMAs as well. If there are reasons for retaining, the Council should discuss this within their ASR.

   Response: As above

4. The Councils AQAP was published in 2006 and is out of the recommended five-year period. Additionally, the Council have not completed Table 2.2 according to the template and have instead reported on their Climate Change Strategy and Action Plan. If the Councils AQMAs are to be retained, the AQAP should be updated to reflect recent actions.

   Response: Table 2.2 per the template is seen as an unsuitable method by which to fully present the wider work the Council is undertaking in respect to the broader definition of 'air quality', which now encompasses climate change and substantiality strategies, Policy and procedure.

   Many of these issues are now considered fundamental to the wider Policies of the Council and apply across numerous service areas as to make a short-form summary within the ASR, which is considered primarily as an NAQO compliance report led by Environmental Health, problematic to accurately

collate accurately, placing strain on EH officer resources when separate dedicated reports are published, and linked to, elsewhere.

As NAQO compliance has been achieved for many years, and accepted by Defra, there has been no specific sources of exceedance requiring a detailed / targeted AQAP (further than the Mountsorrel DMMP). The anticipated review following the outcome of the Environment Act 2021 consultations will inform the need for re-evaluation in this matter.

5. The Council do not monitor $PM_{2.5}$ directly but have mentioned several methods for estimating $PM_{2.5}$ within the Borough. This is welcomed. The Council could consider reporting the estimated PM2.5 concentrations for 2020.

   Response: As noted in the 2021 ASR, due to insufficient data capture from our local PM_{10} monitor during 2020 we were unable to provide a derived estimate of $PM_{2.5}$ concentrations, in-line with the methodology given in LAQM TG.16, Box 7.7

   Since mid-late 2021 the Council now operate 2 x $PM_{2.5\,(+10)}$ analysers within the borough that can supplement the existing PM_{10} monitor in future reporting years.

6. Additionally, the Council should consider including an explicit reference to the Public Health Outcomes Framework indicator D01, which is the fraction of mortality attributable to particulate air pollution. This can be found at: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

   Response: Whilst there has been no specific requirement in the ASR reporting template for this indicator to be included, the latest value available (2020) has been included in this year submission under section 2.3

7. QA/QC procedures are robust, with sufficient discussion and justification provided.

   Response: Comment welcomed

8. The Council have not reported on the Number of PM_{10} 24-Hour Means > 50 µg/m^3 in Table A.7 or number of relevant instances for SO_2 in Table A.8. Whilst the PM_{10} data can be excluded due to very poor data capture (<25%), the number of relevant exceedances should be reported for SO_2 where data capture was 64%.

   Response: This comment is likely due to (mis)interpretation in the '*Instructions for Completion*'. Table A.9 in the accompanying ASR data table (to which Table A.8 in the main ASR refers) is not clear if the number of SO_2

exceedances and their percentile(s) BOTH need to be reported when data capture is less than 85%. The instructions read like 2 separate conditions. For the avoidance of doubt both figures have been reported for 2021 (data capture 83%)

9. A minor mistake was noted in Table B.1: the bias adjusted annual mean for DT40 was reported as 0.615 µg/m^3. This should be corrected.

Response: This typographical error has now been corrected in the published ASR.

10. The Council have mentioned the results of last year's ASR appraisal but have not included or responded to comments. Many comments have not been addressed. Whilst not ground for rejection, the Council is urged to consider the comments and improve the quality of their ASR.

Response: Comment welcomed and responses to the appraisal now provided.

Many measures which Charnwood continue to seek to implement to address air quality/climate change issues are not thought of in isolation at departmental level, for which evidencing within in this document has proven difficult, but rather form an integral but broader strategic approach by both the Council and across the County of Leicestershire. There are several detailed strategic documents that are monitored and reported on elsewhere.

Local Plan (2021-2037). This is a multi-faceted document that has been strategically developed to acknowledge the wider perspective with consideration given to current national and local legislative and economic challenges, simultaneously safeguarding the environment and building healthy communities within Charnwood.

It supports a carbon neutral borough and includes Policies to improve air quality by encouraging sustainable new developments, with extensive tree planting required for public spaces on new developments and providing support for communities to identify opportunity areas for wind and solar energy infrastructure.

There are also proposed measures to minimise need for travel by private car and prioritise public transport, walking and cycling. Improved bus services to offer increased speed and reliability, including for residents with mobility issues. A significant increase in electric vehicle charging points, including at each new home with a parking space

The Charnwood Local Plan 2021-37 was submitted to Government at the end of 2021 and the examination process has now started.

More information on the submitted Local Plan with a summary and details towards its measure of progress can be viewed on the Council website through the following link:

https://www.charnwood.gov.uk/pages/charnwood_local_plan_2021_37

Climate Change Strategy. The Climate Change Strategy 2018-2030 sets out the Council's aim of influencing and empowering residents, community groups, schools and businesses in the borough to help them to mitigate climate change by reducing their carbon emissions and also aims to implement carbon reduction projects to reduce the carbon emissions of its own buildings.

More information on the Strategy can be found at:

https://www.charnwood.gov.uk/pages/climate_change_strategy

With the Action Plan available to download from:

https://www.charnwood.gov.uk/files/documents/climate_change_strategy_and_action_plan/Climate%20change%20strategy%202018-2030.pdf

Work continues with Leicestershire Public Health colleagues and other county-wide partners to address outcomes in respect of the JSNA Action Plan as implemented under the **Leicestershire Joint Strategic Needs Assessment – Air Quality and Health Chapter (May 2019).** This work links back to part of the Public Health Outcomes Framework that examines indicators that help us understand trends in public health.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	To ensure that services are delivered in a way that protects the quality of the environment	Policy Guidance and Development Control	Sustainable Procurement Guidance			CBC & suppliers	Not applicable	NO	Not Funded						The council will consider environmental and broader sustainability issues throughout the procurement process. Where we can we choose to buy local produce which not only supports our local economy it also reduces carbon emissions from freight transport and travel.
2	Encouraging uptake of energy efficiency measures by residents such as solar panels through joint biding contract. Collective Energy Switching; The Council will encourage partners to continually review the current approach and to consider introducing a 'green' category to the suppliers auction	Public Information	Other			CBC	Not applicable	NO	Not Funded						Solar Together Leicestershire helps people looking to make an investment in solar panels on their house and battery storage systems for a reduced rate. Currently ongoing and open for applications. Advice also given on planning applications for air source heat pumps and use of other low carbon alternatives to heating

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3	Increasing the number of electric vehicles charging points in Council car parks	Promoting Low Emission Transport				CBC	CBC	NO	Not Funded		Implementation				Electric vehicles used by Regulatory services staff for Pest Control and Street Management functions. Beehive Lane multi -storey car park, Loughborough fitted with : 1x dual ‘fast’ charger for public use 2 x dual chargers, Sileby car park , King Street fitted with 1 x ‘ultra-fast’ dual charger supplier by Highways Network England. On-Street Residential Charge-point Scheme (ORCS) – awarded government funding for chargers to be installed in Anstey and Sileby but waiting for legal approval to proceed.

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4	Taxi licensing policy	Promoting Low Emission Transport				CBC		NO	Not Funded		Implementation				Taxi Licensing Policy Reviewed in Jan 2022. One of the main aims 'protection of the environment'. Maximum age of vehicle allowed to re-test 6 years. Use of LPG, hybrid and electric vehicles supported.
5	Use of, and exploration of possibilities for increasing use of, Council electric vehicles for journeys within the Borough and supporting electric vehicle use by Council contractors	Promoting Travel Alternatives				CBC		NO	Not Funded		Planning				The Council plans to introduce a small fleet of ultra-low emission pool cars for general staff use as part of review of Essential car user scheme for Council employees. Currently under consultation.
6	Agile/hybrid working for council employees	Promoting Travel Alternatives		2021		CBC		NO	Not Funded		Implementation				Agile Working Policy approved April 2021 which encourages working from home or remote working by Council staff.
7	Car share/pool cars	Alternatives to private vehicle use	Car & lift sharing schemes			CBC		NO	Not Funded		Planning				The Council already operates a car share scheme but is now doing a feasibility study on use of pool cars as part of our Essential Car User Scheme review.

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8	Bike use/e-bikes	Transport Planning and Infrastructure	Other			CBC		NO	Not Funded		Implementation				bike mileage included in Council car mileage scheme for essential users. The Council has adopted an environmental charter which declares a positive attitude towards cycling. It gives positive encouragement to employees to consider whether and how they can use a bicycle in the course of their official business as well as cycling to and from work
9	To significantly increase the number of journeys made in the Borough by walking, cycling and public transport;	Transport Planning and Infrastructure	Other			CBC		NO	Not Funded						Charnwood Sustainability transport study completed in 2020 to encourage increase in walking and cycling and use of public transport across the borough. Draft Local Plan includes proposals for considerable economic and housing growth, and it is essential to achieve a balance between these growth aspirations and the increase in the demand to travel that could

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															have negative environmental and transport consequences
10	use of EV and low emission vehicles by Council employees	Vehicle Fleet Efficiency	Other			CBC		NO	Not Funded		Planning				Under review of car mileage scheme the council are considering a salary sacrifice scheme to allow participating staff to trade in a portion of pre-taxed annual salary in return for a low emission vehicle (i.e.. an electric car). The key advantage is the tax saving that arises from this arrangement, which, combined with the 'buying power' of scheme providers enables access to a new car at advantageous rates. This is subject to

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															Council approval and uptake by staff.

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11	planning policy Implementation of air quality policies in the local plan.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance			CBC		NO	Not Funded						The draft Plan includes strategic and detailed policies and over the plan period makes provision for nearly 20,000 new homes and 77.88 hectares of employment land plus a 77-hectare extension to the Loughborough Science and Enterprise Park. As well as providing housing and jobs, the draft Local Plan considers the quality of design, climate change, renewable energy and improving biodiversity. It also considers how infrastructure will be secured for growing communities, including health services, schools and the transport system and seek to encourage more sustainable development through the implementation of policies regarding matters such as energy usage,

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															sustainable transport modes and electric vehicle charging requirements, etc. Consultation is ongoing before adoption in 2022.

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12	Shepshed energy recovery plant	Environmental Permits	Large Combustion Plant Permits and National Plans going beyond BAT			EA & CBC		NO	Not Funded	< £10k	Implementation		Low Emission Contribution from Chimney		The Shepshed Energy from Waste Incineration Plant remains under construction and commissioning and as such is not yet operational . This will fall under the Industrial Emissions Directive and has an Environmental Permit. The Council's Environmental Protection Team will however continue to monitor air quality in this area to determine any negative impacts using relatively low cost mobile monitoring equipment for PM2.5 in the form of an Earthsense Zephyr.

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13	Domestic Burning/ Encouraging residents to refrain from garden bonfires	Public Information	Via the Internet			CBC		NO	Not Funded				Reduction in the number of complaints received		The Environmental Protection Team continues to investigate and action complaints about burning. This is limited by officer time for visits at times of bonfires and competing priorities. Advice and information given on alternatives to burning, use of wood burning stoves and external fire pits and chimineas. Reasonably frequent updates required to Council website and social media to promote changes in behaviour to move away from burning with no Smoke Control Areas within the borough.
14	Promoting approved wood-burning stoves and burning of approved products and encouraging recycling of waste	Public Information	Via the Internet			CBC		NO	Not Funded						Promotion of DEFRA Burn Right campaign and Dealing with Unauthorised Fuels following changes to the Clean Air Act 1993 by the Environment Act 2021. Investigation of complaints

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															about smoke from such units with advice given on operation and location.
15	Air Quality Monitoring Data	Public Information	Via the Internet			CBC	CBC	NO	Not Funded						Requires continuation of Funding and Quality Assurance to maintain
16	Construction Plans required for large scale development to minimise off-site dust and smoke	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance			CBC		NO	Not Funded						The Environmental Protection Team continue to provide advice to the Planning Team regarding proposed developments in an attempt to minimise air pollution impacts, even if there is no risk that air quality objectives will be breached. Therefore, even if the effect is judged to be insignificant, consideration of the application of good design and good practice measures, including electric vehicle rapid charge points is advised. Construction

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															Environmental Management Plans are also advised for certain developments in order to control and minimise the impact of pollution, especially particulate matter, during construction activities. Such advice has been provided to large housing development sites in Shepshed, Broadnook Development at Birstall and Gladmans Development at East Goscote.

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17	Working with Schools	Public Information	Other			CBC & Public Health		NO	Not Funded						Long term air quality is clean around all Charnwood schools but LCC Public Health study identified Syston East as area for further monitoring due to Childhood wheeze and asthma patients attending emergency hospitals. We will consider improved air quality monitoring in this area subject to appropriate funding and resources being available and encourage all schools in these areas are signed up to the active travel programme and anti-idling campaign

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18	Work towards fulfilling the Council's pledge to be carbon neutral by 2030	Promoting Low Emission Plant				CBC		NO	Not Funded						The Climate Change Strategy 2018-2030 contains actions aimed at fulfilling the Council's Carbon neutral pledge. Such actions that will also be beneficial to air quality include: - Seeking strategic direction on enabling remote working for Council staff. - ensure council buildings and operations use low carbon energy supplies, Improve energy efficiency of Council IT equipment, Provide top-up roofing insulation, cavity wall and boiler upgrade programme for Council housing stock, encourage environmental education and promote climate action through a proactive communication campaign and phase out use of single-use plastics within Council offices and buildings

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
19	Ensure appropriate and effective monitoring is undertaken across Borough to meet statutory review and assessment duties	Other	Other			CBC		NO	Not Funded						The Council seeks to maintain and run and efficient monitoring network. Review of diffusion tube location to be undertaken in 2022 once requirements of Environment Act 2021 has been published. Following the purchase of 2 Zephyr units the council will consider developing monitoring plan for use of mobile monitoring equipment. Review of monitoring network is undertaken inline with new developments but any extension to monitoring provision will require additional funding and quality assurance
20	Investigate options for the installation of a PM10/PM2.5 monitor in Shepshed	Other	Other			CBC		NO	Not Funded						Consideration to be given to apply for DEFRA funding to allow particulate monitor in the Shepshed area to assess impact on PM2.5 levels from Shepshed waste

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															incineration plant. Completion date is subject to appropriate funding.
21	Control over emissions from Part B and A2 processes, and act as consultees for Part A1 processes	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT			CBC		NO	Not Funded						Reviewed permit following publication of revised Best Available Techniques (BAT) Reference Document for Surface treatment using organic solvents. A2 STS operator currently upgrading incinerator to ensure BAT-EALs cam be achieved by 2024. We also await the Environmental Act 2021 requirements for any potential impacts on this action.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
22	Enforcement of Clean Air Act with regards to industrial smoke	Other	Other			CBC		NO	Not Funded						We investigate complaints of burning and emission of dark/black smoke and take enforcement action as necessary, approx. 173 complaints investigated in 2021. We await the Environmental Act 2021 requirements for any potential impacts on this action
23	Use of the CBC website to promote public awareness of the borough's AQMAs and air quality in general	Public Information	Via the Internet			CBC		NO	Not Funded						The Councils website publishes the ASR's back to 2003, provides a link to the AQMAs and the Mountsorrel Quarry Dust Monitoring and Management Plan and dust monitoring results.
24	Continue consultation between Regulatory Services and Development Control on all relevant planning applications and policy documents likely to impact air quality.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance			CBC		NO	Not Funded						Local Air Quality study confirmed no areas of proposed housing in AQMAs but request for air quality assessments requested for all developments over 10 properties. Provision of EV charging, walk and cycle routes also included in sustainable

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															development requirements. Unlikely to provide improvements to air quality but will limit potential negative impacts
25	Provide guidance and Training to members on air quality and the impact and significance when considering planning applications	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2022	CBC		NO	Not Funded		Planning				Briefing presentation to be given to councillors as part of ongoing training and update reports taken to Scrutiny Committee. Ongoing.
26	Air Quality Forum	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality			Regional LAs		NO	Not Funded						AQ Forum to discuss issues of pollution across Leicestershire attended by districts, county and city representatives. Exchange of knowledge and adoption of best practices
27	East Midlands Air Quality network	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality			Regional LAs		NO	Not Funded						A network of air quality specialists and public health officials. Initial drafts of guidance documents

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

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

Charnwood Borough Council considers some of the following measures (either independently or in combination) when assessing $PM_{2.5}$ levels within the borough:

Local Monitoring. 2 portable 'Zephyr' analyser units, capable of measuring $PM_{2.5}$, were acquired during 2021. The units are currently deployed in relation to potential sensitive areas of concern within the borough with a view to establish a 'baseline' of what could be considered worst case levels of exposure:

Unit 1: Co-located with an established Partisol monitor to supplement existing PM_{10} data in relation to the Mountsorrel AQMA.

Third-party data is also collated in connection with monitoring under the Mountsorrel Quarry DMMP through our collaboration with Tarmac Trading Ltd and their consultants, DustScanAQ

Unit 2 [to be reported on in 2023]: Deployed in late 2021 on an arterial route into Loughborough from the M1 J23. The unit has been sited with specific consideration being given to establishing PM concentrations in the area which is near to the commissioning and operation of the Newhurst Energy-from-Waste (EfW) facility at Shepshed. The 42MW operation will be able to process up to 350,000 tonnes of non-recyclable waste annually and expected to generate enough electricity to power around 80,000 homes a year. Whilst plant discharges for the facility itself will fall under the remit of the Environment Agency as part of separate Environmental Permitting regulations, any wider impact on ambient air quality is the responsibility of CBC to monitor.

The monitoring of any potential impact from the facility, primarily from particulate matter, has been made at the request of the Leicestershire Incinerator Scrutiny Group (LISG) and local MPs / Councillors.

***National $PM_{2.5}$ Monitoring*.** There are approximately eighty $PM_{2.5}$ monitoring stations within the AURN. Monitoring data from sites located either close to, or within the local authority area, these will provide a good indicator as to likely $PM_{2.5}$ concentrations within the Council area.

***National $PM_{2.5}$ Modelling*.** Defra maintains national background maps, which are provided for each 1km × 1km grid square across the UK. By plotting the $PM_{2.5}$ mapped data for the appropriate base year, $PM_{2.5}$ concentrations can be identified within the local authority area. Although considered quite coarse resolution, such information may prove useful to local authorities in directing actions to areas that are most in need of reductions in $PM_{2.5}$ levels.

Public Health Outcomes Framework

Beneath is a summary relating to the Public Health Outcomes Framework indicator D01 which measures the fraction of morality attributable to particulate air pollution.

Further information on the PHOF can be found at: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework .

Data for Charnwood can be found at: https://fingertips.phe.org.uk/static-reports/public-health-outcomes-framework/at-a-glance/E07000130.html?area-name=Charnwood

Public Health Outcomes Framework - at a glance summary

Charnwood

Key

Significance compared to goal / England average:

Significantly worse	Significantly lower	Increasing / Getting worse	Increasing / Getting better
Not significantly different	Significantly higher	Decreasing / Getting worse	Decreasing / Getting better
Significantly better	Significance not tested	Increasing	Decreasing
		No significant change	Could not be calculated

Indicator	Age	Sex	Period	Value	Value (England)	Unit	Recent trend	Change from previous
D01 - Fraction of mortality attributable to particulate air pollution (old method)	30+ yrs	Persons	2019	5.46	5.13	%	-	-
D01 - Fraction of mortality attributable to particulate air pollution (new method)	30+ yrs	Persons	2020	5.44	5.64	%	-	-

Notes

- Indicators that are shaded blue rather than red/amber/green are presented in this way because it is not straightforward to determine for these indicators whether a high value is good or bad.
- The Change from previous column shows whether there has been a change in value compared to the previous data point. Statistically significant changes highlighted in this column have been calculated by comparing the confidence intervals for the respective time points. If the confidence intervals do not overlap, the change has been flagged as significant.
- Recent trend refers to the analysis done in the Fingertips tool which tests for a statistical trend. Changes in this column are calculated using a chi-squared statistical test for trend. This is currently only available for certain indicator types; full details are available in the tool.
- Increases or decreases are only shown if they are statistically significant. Where no arrow is shown, no comparison has been made. This may be due to the fact that the required data to make the comparison is not available for the time point, or that no confidence interval values are available for the indicator.

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

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Charnwood Borough Council undertook automatic (continuous) monitoring at 3 sites during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites.

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

Charnwood Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 48 sites (54 tubes) during 2021 Table A.2 in Appendix A presents the details of the non-automatic sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

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

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

There were no exceedances of the annual air quality objectives in 2021.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

For site CM1; as the data capture rate was beneath 75% due to the fragmented nature of data capture which was obtained over the FULL Jan-Dec period, the value has been expressed as a mean average following discussion/advise with the LAQM Helpdesk.

For site CM5; monitoring was initiated during the second half of 2021. Presented concentrations have been annualised as per TG16 Box 7.9

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

There were no exceedances if the air quality objectives in 2021.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

Monitoring was initiated during the second half of 2021. Presented concentrations have been annualised as per TG16 Box 7.9

3.2.4 Sulphur Dioxide (SO_2)

Table A.9 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2021 with the air quality objectives for SO_2.

There were no exceedances if the air quality objectives in 2021

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Mountsorrel	Industrial	457355	315396	PM_{10}	YES (Mountsorrel)	Volumetric Gravimetric	~34	N/A	~1.5
CM2	Great Central Railway	Industrial	454380	319768	SO_2	YES (GCR)	Electrochemical Sensor	0	N/A	~1.5
CM5	Mountsorrel	Industrial	457355	315396	PM_{10}, $PM_{2.5}$	YES (Mountsorrel)	Electrochemical Sensor	~34	N/A	~1.5

Notes:

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

(2) N/A if not applicable

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT1	Ratcliffe Rd (L'boro)	Roadside	454087	320392	NO2	YES. Loughborough AQMA	0.0	3.0	No	0.7
DT2	Shelthorpe Rd (L'boro)	Roadside	454234	318657	NO2	NO	8.0	3.0	No	2.3
DT3	Forest Rd (L'boro)	Roadside	452833	318776	NO2	NO	0.0	6.0	No	1.8
DT4	Haydon Rd (L'boro)	Roadside	452314	319620	NO2	YES. Loughborough AQMA	8.0	6.0	No	2.0
DT5	Alan Moss Rd / Epinal Way (L'boro)	Roadside	452173	319924	NO2	YES. Loughborough AQMA	0.0	15.0	No	1.8
DT6	Epinal Way / Ling Rd (L'boro)	Roadside	453678	318678	NO2	NO	0.0	9.0	No	2.3
DT7	Leicester Rd (L'boro)	Roadside	454002	319253	NO2	YES. Loughborough AQMA	0.0	3.0	No	2.3
DT8	Derby Rd (L'boro)	Roadside	453231	320028	NO2	YES. Loughborough AQMA	3.0	3.0	No	2.3
DT9	Derby Rd / Briscoe Avn (L'boro)	Roadside	452670	320527	NO2	YES. Loughborough AQMA	3.0	4.0	No	2.3
DT10, DT11, DT12	Durham Rd 3 (L'boro)	Urban Background	452352	320697	NO2	NO			No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT13	Alan Moss Rd / A6 Derby Rd (L'boro)	Roadside	452903	320212	NO2	YES. Loughborough AQMA	0.0	8.0	No	1.8
DT14	High St (L'boro)	Roadside	453730	319596	NO2	YES. Loughborough AQMA	0.0	3.0	No	2.3
DT15	Market Place (L'boro)	Urban Centre	453611	319540	NO2	YES. Loughborough AQMA			No	2.3
DT16	Ashby Rd (L'boro)	Roadside	453189	319709	NO2	YES. Loughborough AQMA	0.0	4.0	No	2.3
DT17	Cow Hill Lodge (Shepshed)	Roadside	448876	318307	NO2	NO	0.0	10.0	No	1.8
DT18	Roseberry St (L'boro)	Roadside	452697	319921	NO2	NO	3.0	3.0	No	2.3
DT19	Melton Rd Town Centre (Syston)	Roadside	462777	311692	NO2	YES. Syston AQMA	3.0	3.0	No	2.3
DT20	1123 Melton Rd (Syston)	Roadside	46235	311213	NO2	YES. Syston AQMA	0.0	6.0	No	1.8
DT21	1116 Melton Rd (Syston)	Roadside	462373	311254	NO2	Yes. Syston AQMA	0.0	6.0	No	2.0
DT22	Loughborough Rd (Birstall)	Roadside	459233	309233	NO2	NO	0.0	15.0	No	1.8
DT23	A6 (Birstall)	Roadside	459178	309890	NO2	NO	2.0	5.0	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT24	21 Humberstone Lane (Thurmaston)	Roadside	460821	308757	NO2	NO	0.0	6.0	No	1.8
DT25	43 Humberstone Lane (Thurmaston)	Roadside	460861	308824	NO2	NO	0.0	5.0	No	1.8
DT26	22 Humberstone Lane (Thurmaston)	Roadside	460835	308784	NO2	NO	0.0	5.0	No	1.8
DT27	Ashby Rd Central (Shepshed)	Roadside	448121	318257	NO2	NO	12.0	2.0	No	2.3
DT28	Loughborough Rd (Hathern)	Roadside	450260	321922	NO2	NO	30.0	3.0	No	2.3
DT29	Barrow Street (L'boro)	Roadside	453901	319488	NO2	NO	0.0	10.0	No	2.0
DT30	School Street (L'boro)	Urban Background	453946	319619	NO2	NO	5.0	3.0	No	2.3
DT31	Fennel Street (L'boro)	Roadside	453694	319890	NO2	NO	0.0	3.0	No	2.3
DT32	High Street (Syston)	Roadside	462369	311809	NO2	YES. Syston AQMA	0.0	4.0	No	2.3
DT33, DT34, DT35	Syston AQMS 3	Roadside	462540	311428	NO2	YES. Syston AQMA	10.0	3.0	No	1.8
DT36, DT37, DT38	Baxter Gate AQMS 3	Kerbside	453687	319672	NO2	YES. Loughborough AQMA		1.0	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT39	Nottingham Rd (L'boro)	Roadside	454154	320116	NO2	NO	0.0	3.0	No	2.3
DT40	156 Ratcliffe Rd (L'boro)	Roadside	454285	320294	NO2	NO	0.0	6.0	No	1.8
DT41	156 Meadow Lane (L'boro)	Roadside	453933	320663	NO2	NO	0.0	8.0	No	1.8
DT42	31 Station Boulevard (L'boro)	Roadside	454142	320593	NO2	NO	0.0	9.0	No	1.8
DT43	91 Wharncliffe Rd (L'boro)	Roadside	454250	319682	NO2	NO	0.0	4.0	No	1.8
DT44	3 Simpson Cl (Syston)	Suburban	461499	310459	NO2	NO	0.0	30.0	No	1.8
DT45	1 Brackenfield Way (Thurmaston)	Suburban	461994	309975	NO2	NO	0.0	8.0	No	1.8
DT46	74 Hathern Rd (Shepshed)	Roadside	448311	320511	NO2	NO	0.0	8.0	No	1.8
DT47	7 Shepshed Rd (Hathern)	Roadside	449935	322227	NO2	NO	0.0	11.0	No	1.8
DT48	37 Darwin Crescent (L'boro)	Suburban	450942	321076	NO2	NO	0.0	15.0	No	1.8
DT49	Far Street (Wymeswold)	Roadside	460313	323521	NO2	NO	1.0	2.0	No	2.3
DT50	Cropston Rd (Anstey)	Roadside	455141	308686	NO2	NO	1.0	3.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT51	15 Leicester Rd (Anstey)	Roadside	455167	308549	NO2	NO	0.0	4.0	No	2.3
DT52	22 Main Street (Barkby)	Rural	463483	309880	NO2	NO	0.0	4.0	No	2.3
DT53	Frederick Street (L'boro)	Roadside	453277	319248	NO2	NO	0.0	4.0	No	2.3
DT60	Nanpantan Rd (L'boro)	Roadside	451629	317677	NO2	NO	9.0	3.0	No	2.3

Notes:

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

(2) N/A if not applicable.

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

No automatic monitoring in respect of NO2 was undertaken in 2021. Historic data/IDs for 2 sites (analysers now removed / site details in previous reports) is presented for information purposes only

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
[CM3]	453687	319672	Kerbside	N/A	N/A	29.5	29.0	-	-	-
[CM4]	462540	311428	Roadside	N/A	N/A	34.9	27.6	-	-	-

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

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

Notes:

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

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

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

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

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

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT1	454087	320392	Roadside	100	100.0	24.3	20.9	21.8	16.0	18.2
DT2	454234	318657	Roadside	92.3	92.3	21.0	20.0	20.7	14.2	17.1
DT3	452833	318776	Roadside	100	100.0	26.7	24.1	25.7	18.3	22.1
DT4	452314	319620	Roadside	100	100.0	30.0	23.1	25.7	18.4	20.9
DT5	452173	319924	Roadside	100	100.0	24.8	20.4	21.4	14.9	17.1
DT6	453678	318678	Roadside	100	100.0	29.1	26.0	27.7	19.0	22.9
DT7	454002	319253	Roadside	100	100.0	36.0	33.5	33.0	23.2	28.6
DT8	453231	320028	Roadside	90.4	90.4	33.3	28.8	27.0	16.7	20.0
DT9	452670	320527	Roadside	100	100.0	27.0	22.5	23.3	16.2	18.3
DT10, DT11, DT12	452352	320697	Urban Background	100	100.0	19.9	17.2	18.1	12.4	14.0
DT13	452903	320212	Roadside	100	100.0	27.5	24.9	25.3	17.8	21.3
DT14	453730	319596	Roadside	90.4	90.4	33.0	28.4	30.8	20.1	24.7
DT15	453611	319540	Urban Centre	100	100.0	21.3	17.3	19.1	12.4	14.4

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT16	453189	319709	Roadside	100	100.0	31.6	28.0	30.2	20.0	24.9
DT17	448876	318307	Roadside	100	100.0	25.4	23.3	26.6	17.8	18.5
DT18	452697	319921	Roadside	100	100.0	19.4	17.0	17.6	12.4	13.8
DT19	462777	311692	Roadside	100	100.0	33.2	26.1	27.0	19.1	23.1
DT20	46235	311213	Roadside	100	100.0	29.8	24.1	24.1	17.5	19.9
DT21	462373	311254	Roadside	100	100.0	37.2	32.1	34.2	23.7	26.2
DT22	459233	309233	Roadside	100	100.0	33.7	26.3	27.1	19.5	22.7
DT23	459178	309890	Roadside	100	100.0	35.6	29.4	26.0	17.1	25.1
DT24	460821	308757	Roadside	100	100.0	35.3	28.3	30.6	21.0	26.5
DT25	460861	308824	Roadside	100	100.0	34.2	29.7	30.4	20.5	24.6
DT26	460835	308784	Roadside	100	100.0	30.9	24.1	24.1	16.0	19.7
DT27	448121	318257	Roadside	100	100.0	34.9	33.9	22.2	21.2	23.8
DT28	450260	321922	Roadside	100	100.0	28.3	25.0	20.3	16.9	20.1
DT29	453901	319488	Roadside	90.4	90.4	26.0	23.3	25.2	18.5	22.6

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
DT30	453946	319619	Urban Background	84.6	84.6	22.4	19.6	20.6	14.5	15.9
DT31	453694	319890	Roadside	100	100.0	30.5	28.9	28.3	19.8	23.0
DT32	462369	311809	Roadside	92.3	92.3	32.2	26.0	25.7	18.3	24.6
DT33, DT34, DT35	462540	311428	Roadside	100	100.0	34.1	26.8	28.1	21.1	23.4
DT36, DT37, DT38	453687	319672	Kerbside	100	100.0	28.8	28.8	28.1	19.1	23.6
DT39	454154	320116	Roadside	100	100.0	32.6	32.6	29.7	20.3	23.8
DT40	454285	320294	Roadside	100	100.0	22.9	22.2	22.0	15.6	18.1
DT41	453933	320663	Roadside	100	100.0	23.6	22.8	21.7	15.4	18.0
DT42	454142	320593	Roadside	100	100.0	25.8	22.5	23.4	16.1	18.7
DT43	454250	319682	Roadside	92.3	92.3	25.7	24.0	28.3	18.0	20.9
DT44	461499	310459	Suburban	100	100.0	28.0	20.8	21.5	15.2	17.8
DT45	461994	309975	Suburban	92.3	92.3	24.5	19.6	19.2	14.9	19.0
DT46	448311	320511	Roadside	100	100.0	21.5	20.4	19.8	13.9	15.8
DT47	449935	322227	Roadside	100	100.0	24.2	21.9	22.6	15.7	18.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
DT48	450942	321076	Suburban	92.3	92.3	15.8	14.3	13.9	8.6	10.4
DT49	460313	323521	Roadside	100	100.0	29.4	27.7	25.7	17.3	20.7
DT50	455141	308686	Roadside	92.3	92.3			31.3	24.1	28.0
DT51	455167	308549	Roadside	100	100.0	27.5	23.6	22.8	14.8	16.8
DT52	463483	309880	Rural	100	100.0	23.1	17.7	17.7	12.5	14.4
DT53	453277	319248	Roadside	100	100.0			26.2	17.3	21.4
DT60	451629	317677	Roadside	100	100.0					12.1

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

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

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

Notes:

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

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

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

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

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

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

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

Figure A.1 – A.11 Trends in Annual Mean NO_2 Concentrations

The following plots show the trends in Annual Mean concentrations measured at selected diffusion tube (DT) monitoring sites

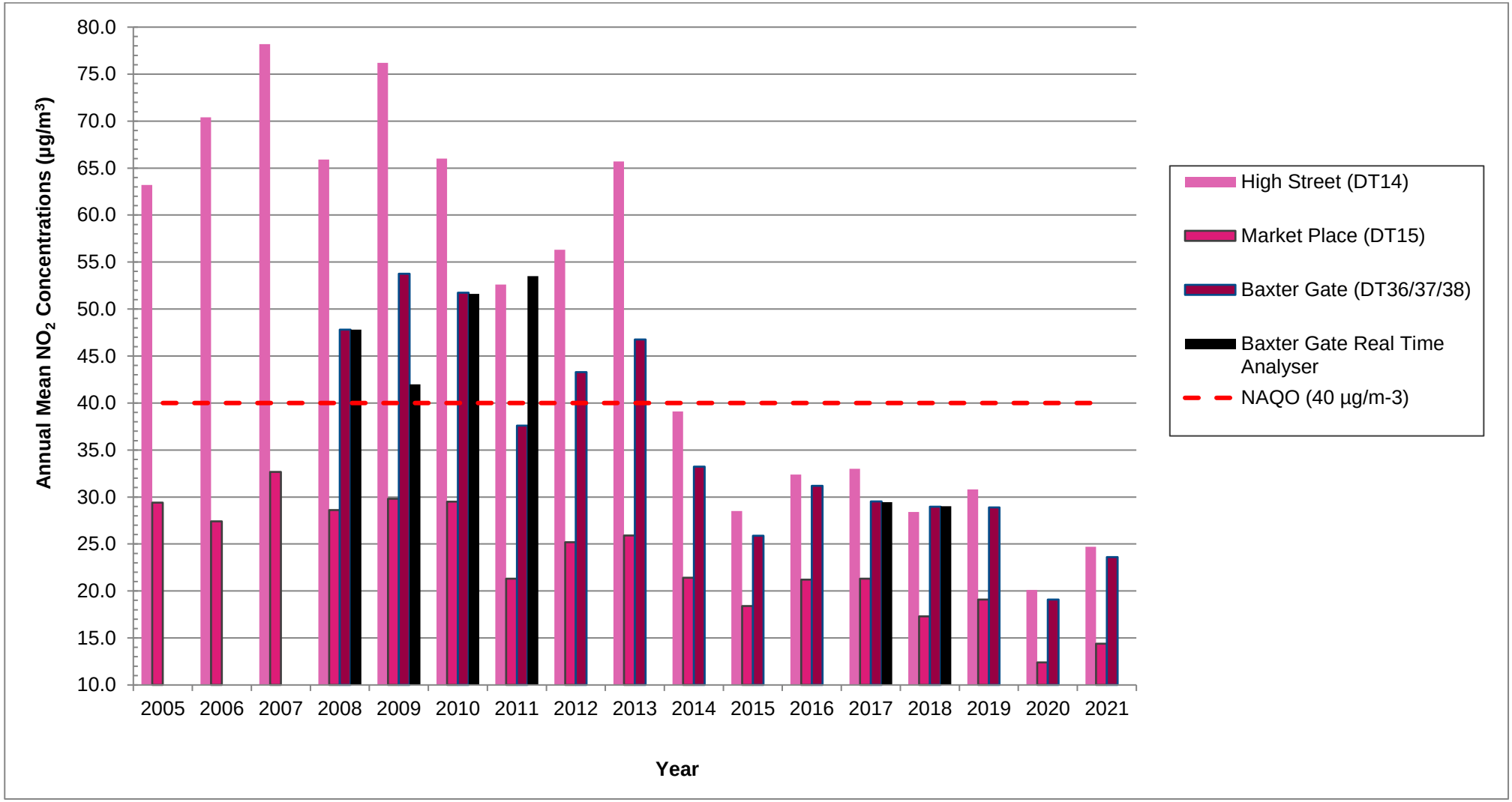


Figure A.1 Plot of NO_2 Concentration against Year for Loughborough Town Centre (i) sites

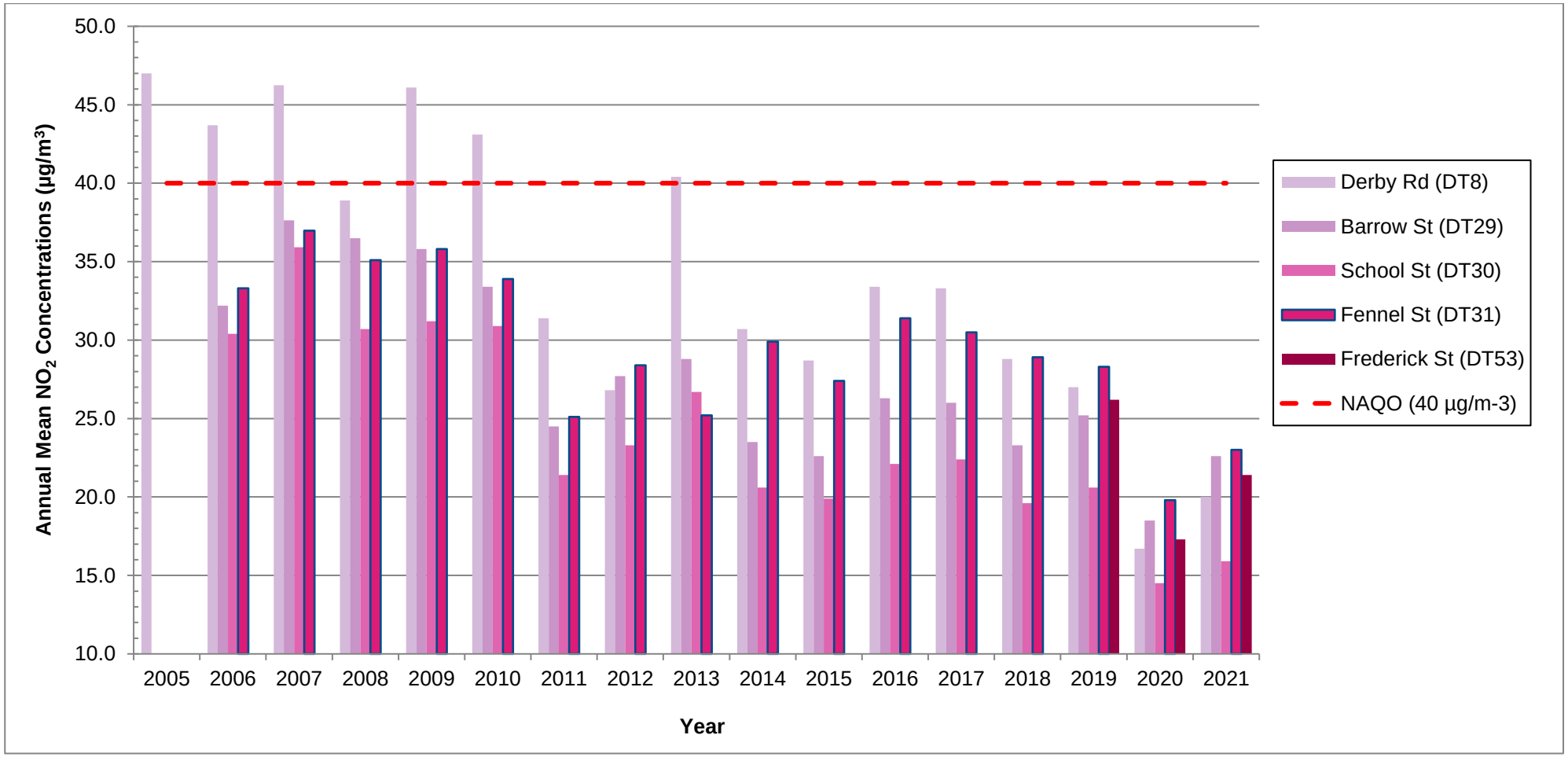


Figure A.2 Plot of NO_2 Concentration against Year for Loughborough Town Centre (ii) sites

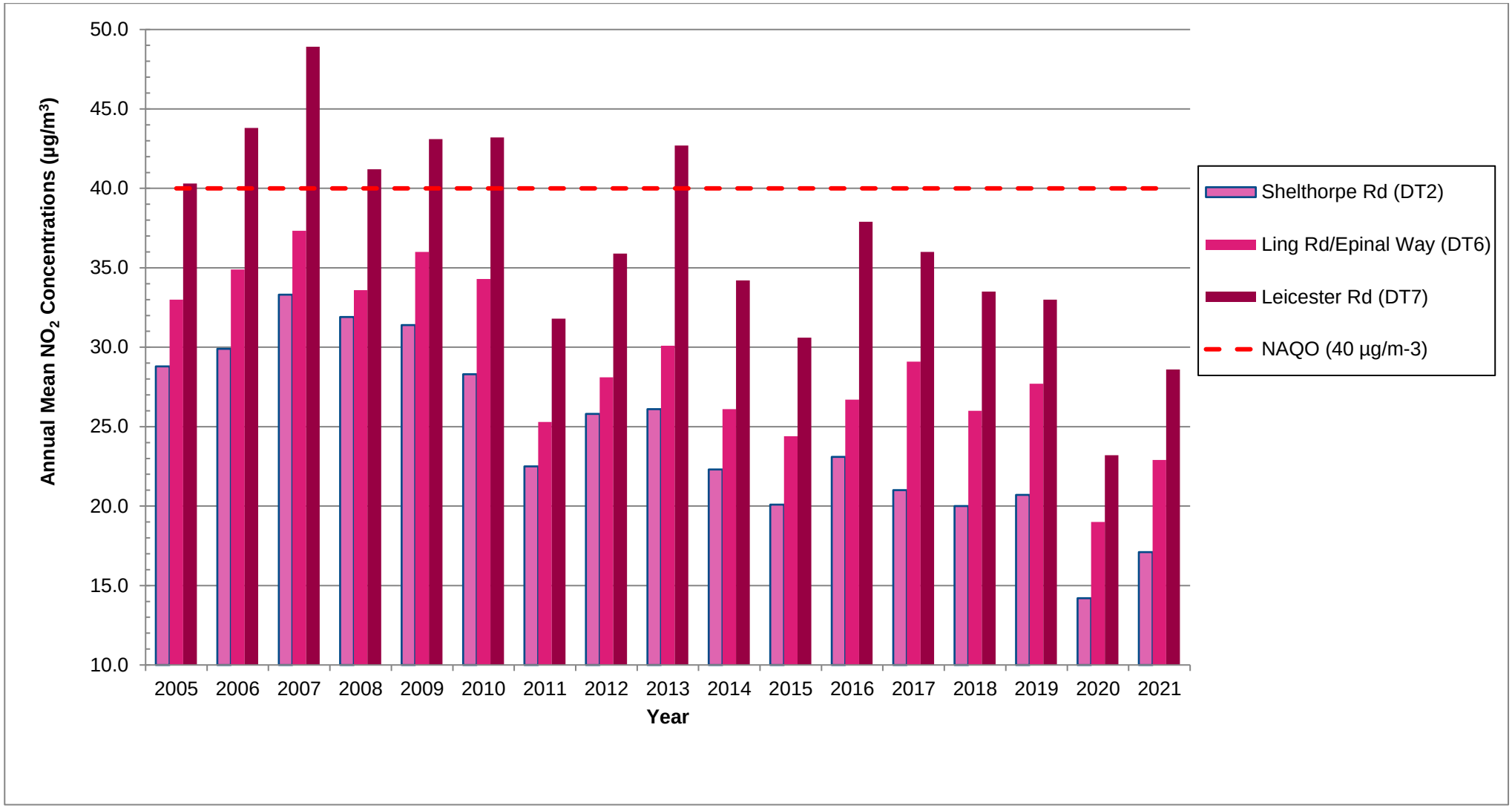


Figure A.3 Plot of NO_2 Concentration against Year for Loughborough South sites

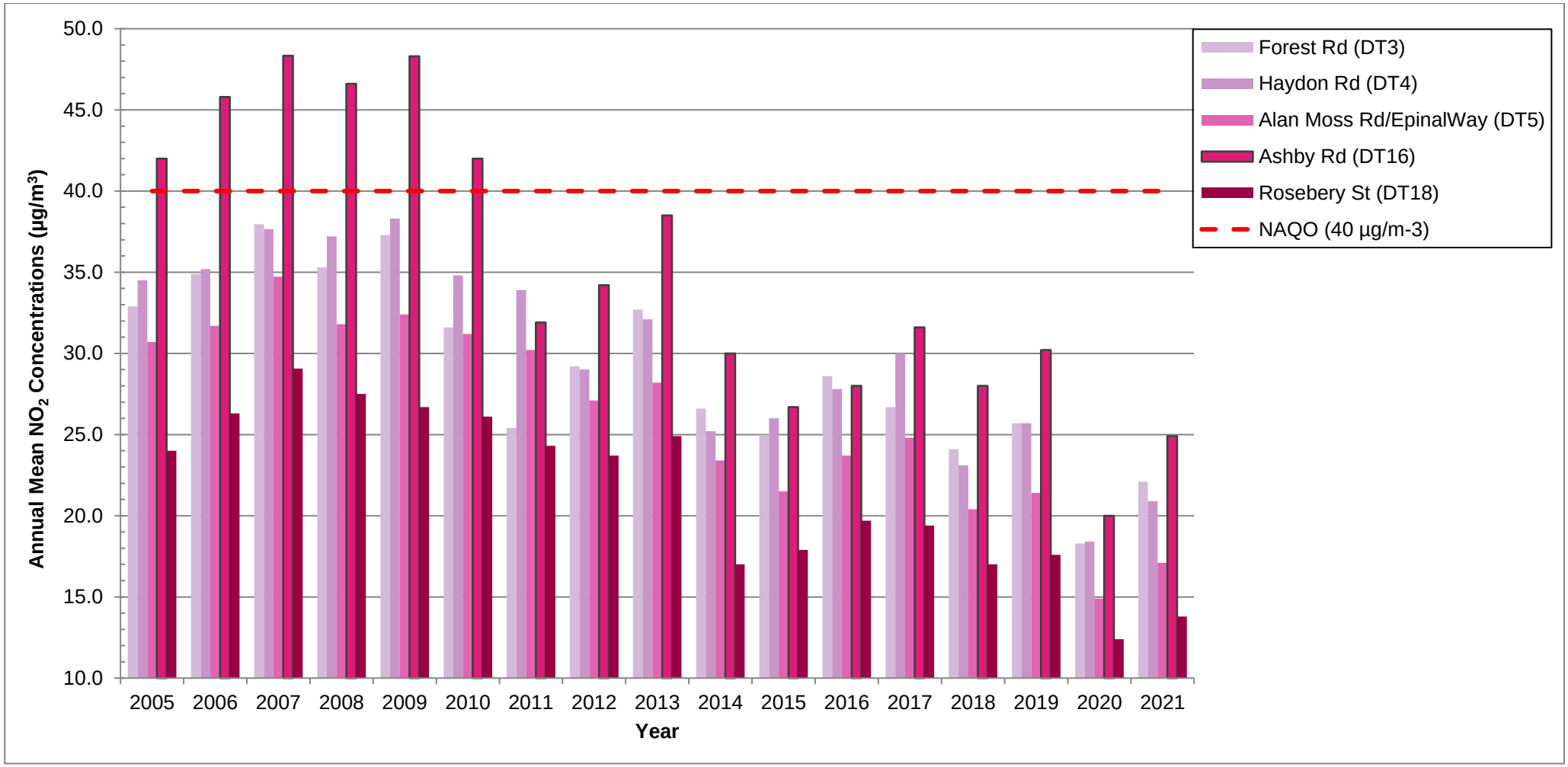


Figure A.4 Plot of NO_2 Concentration against Year for Loughborough West sites

Figure A.5 Plot of NO_2 Concentration against Year for Loughborough North sites

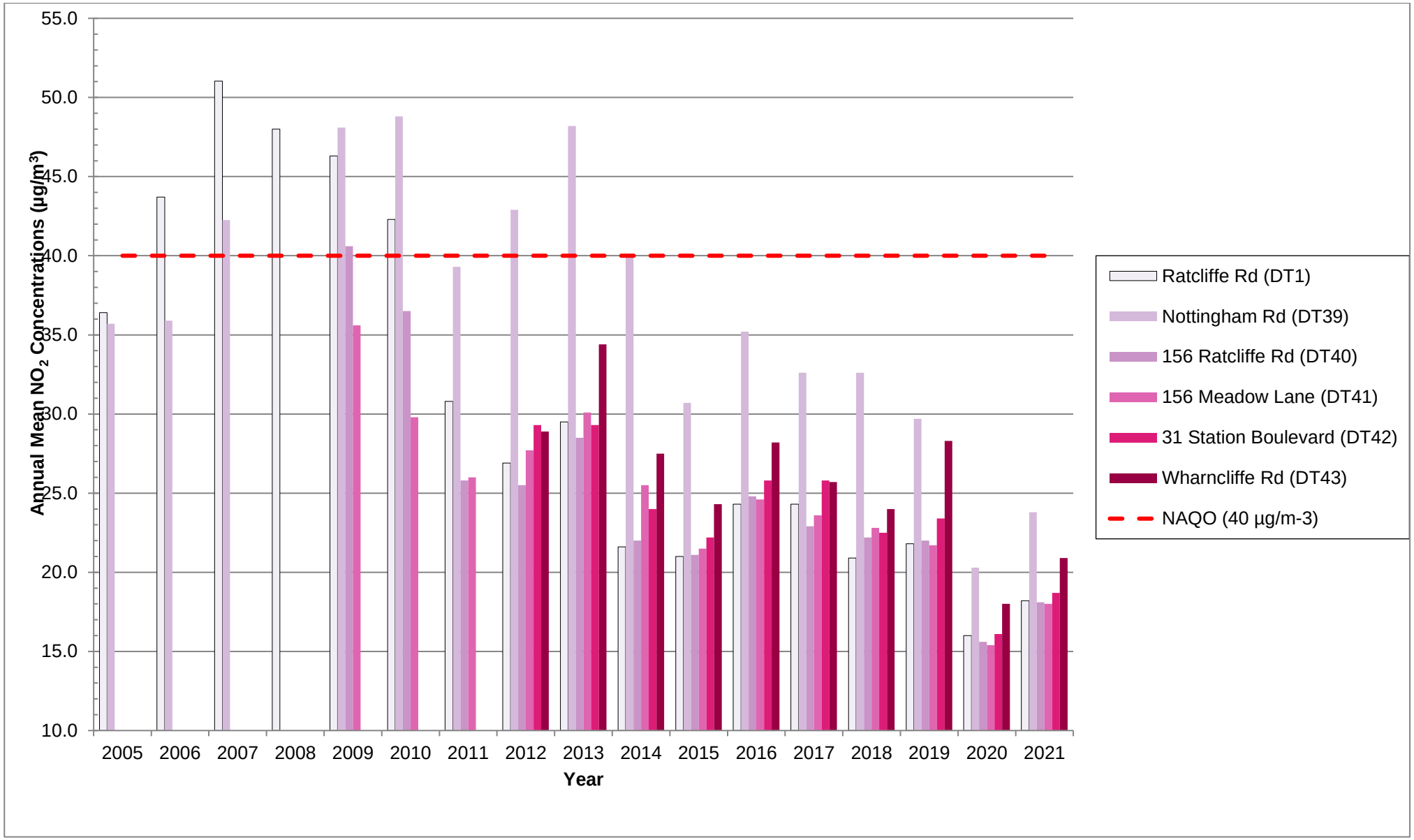


Figure A.6 Plot of NO_2 Concentration against Year for Loughborough East sites

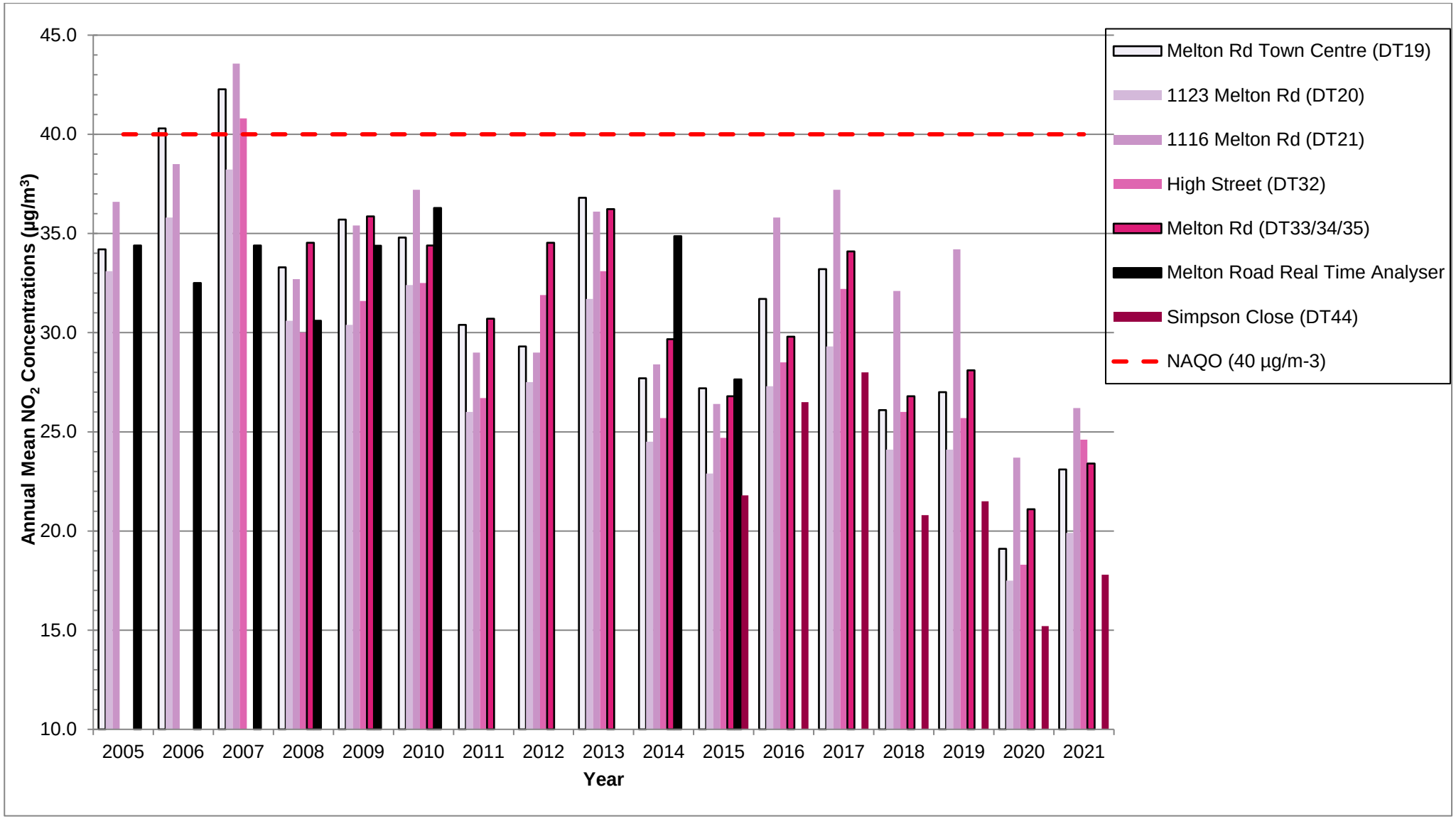


Figure A.7 Plot of NO_2 Concentration against Year for Syston sites

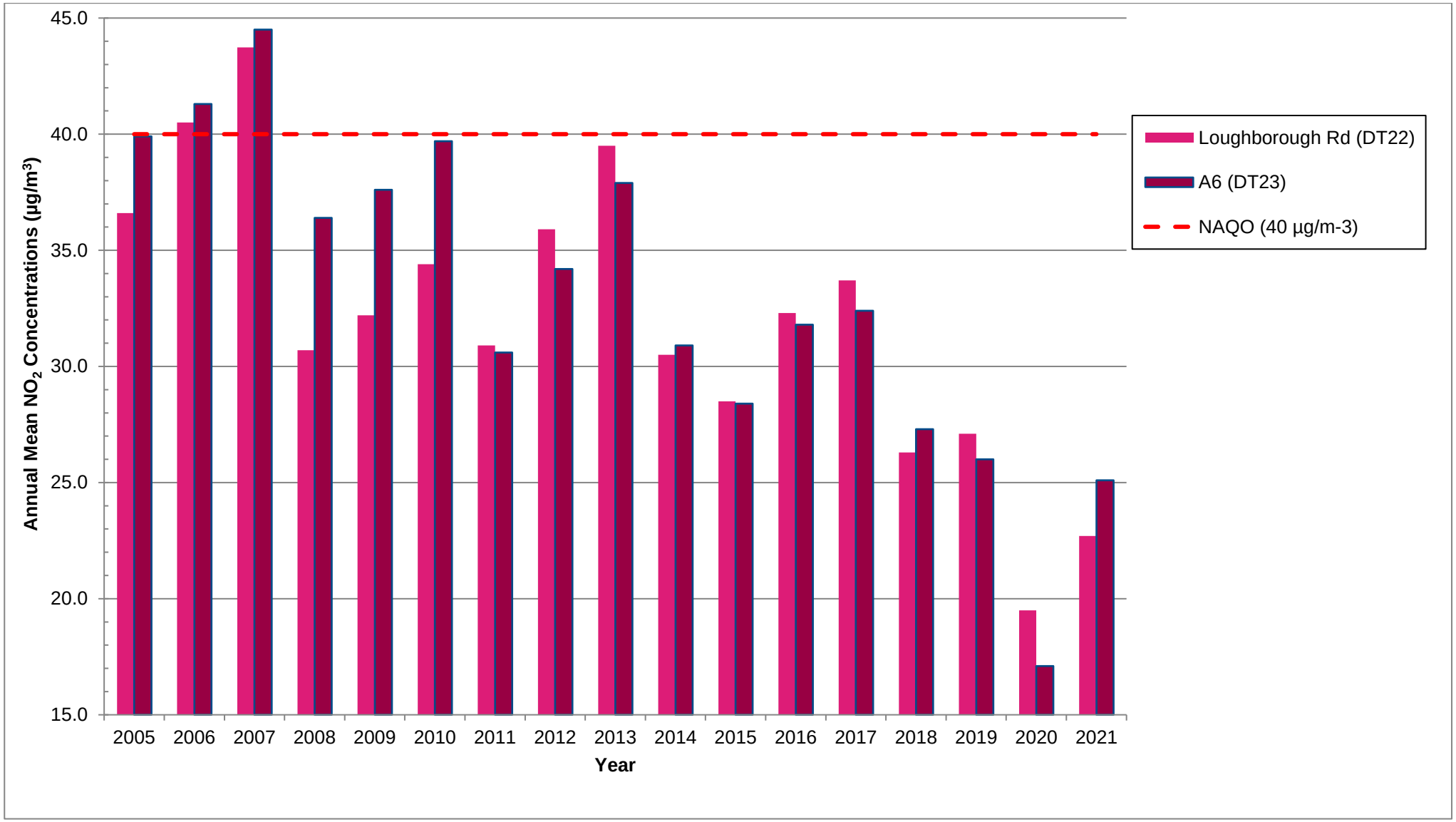


Figure A.8 Plot of NO_2 Concentration against Year for Birstall sites

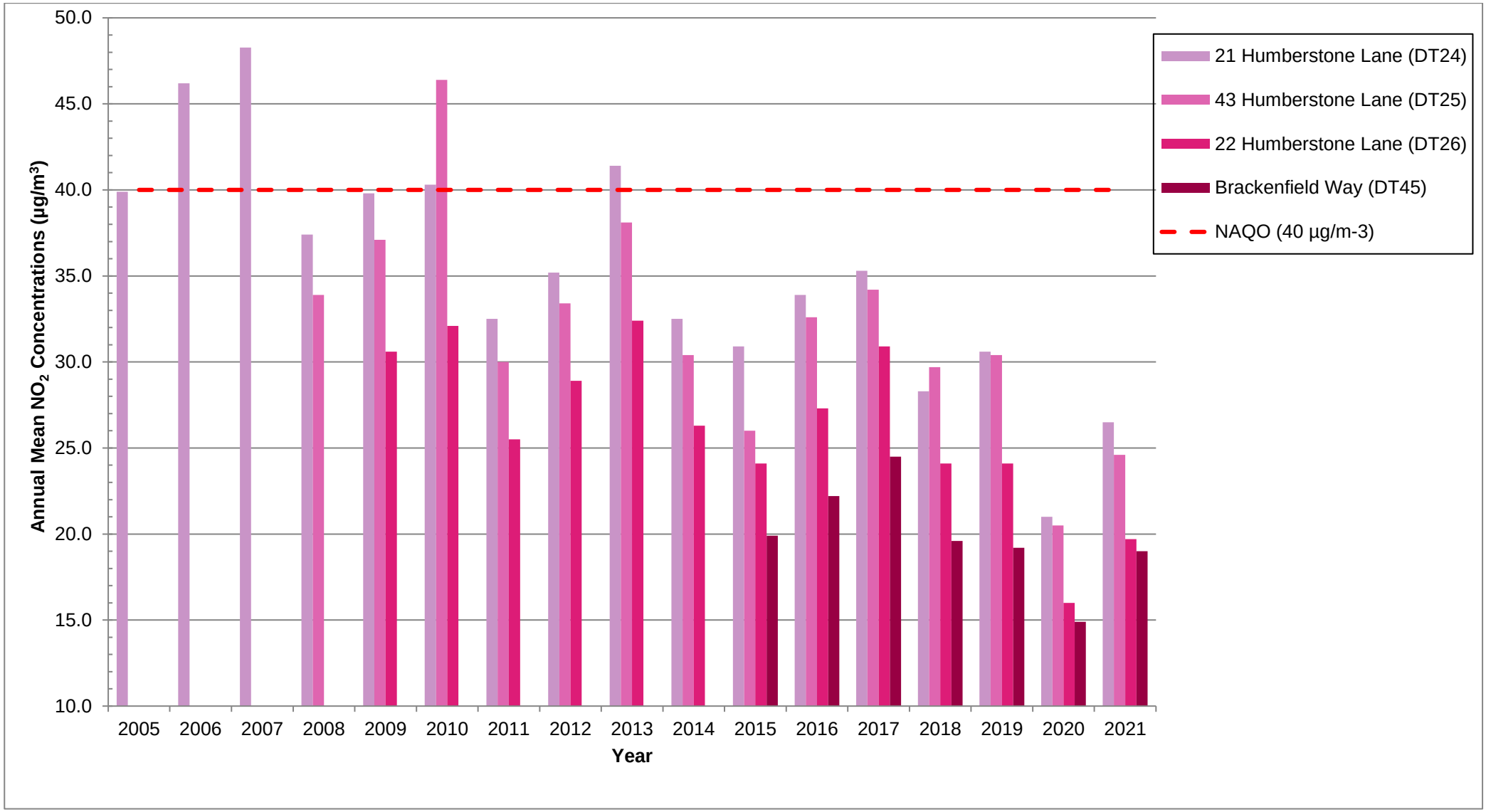


Figure A.9 Plot of NO_2 Concentration against Year for Thurmaston sites

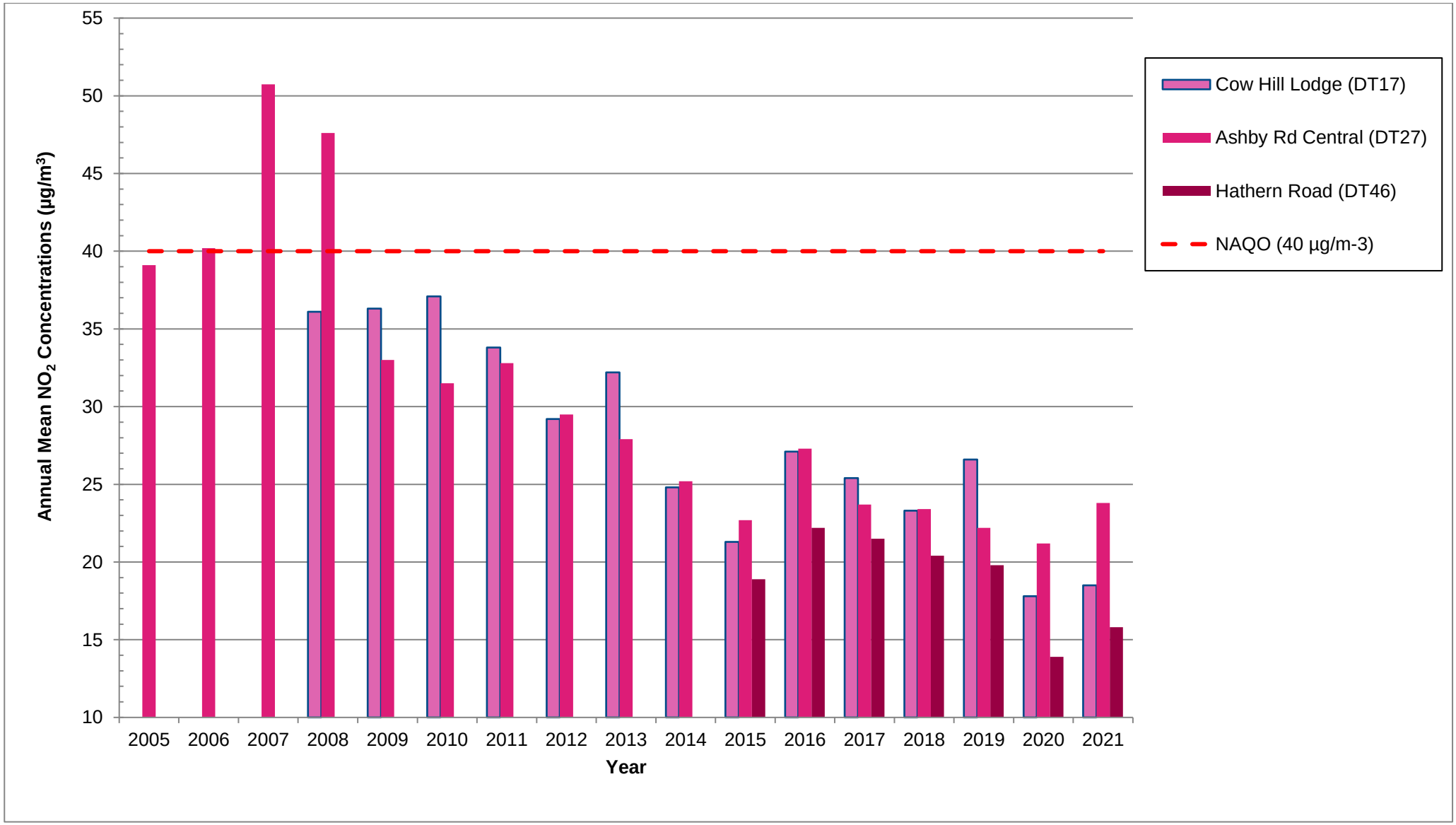


Figure A.10 Plot of NO_2 Concentration against Year for Shepshed sites

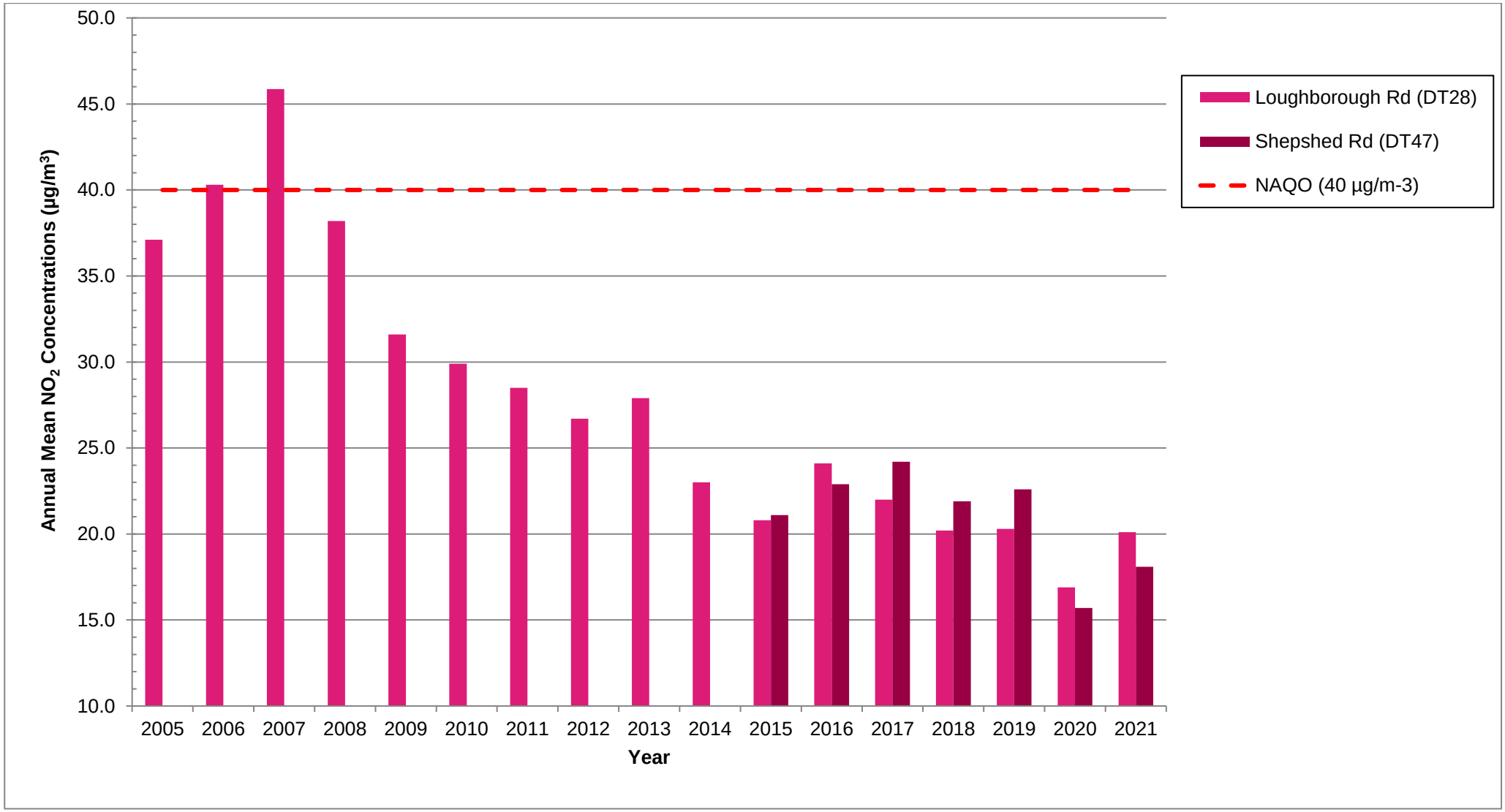


Figure A.11 Plot of NO_2 Concentration against Year for Hathern sites

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
[CM3]	453687	319672	Kerbside	N/A	N/A	0	**[95.9]**	-	-	-
[CM4]	462540	311428	Roadside	N/A	N/A	**[11.5]**	0	-	-	-

Notes:

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

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

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

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

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

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3

Not applicable

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	457355	315396	Industrial	67	67	24.8	24.7	22.6	-	20
CM5	457355	315396	Industrial	100	56%	-	-	-	-	14.9

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

CM1 - Value is expressed as a mean average following discussion/advise with the LAQM Helpdesk on 08/06/22, due to the fragmented nature of data capture which was obtained over the FULL Jan-Dec period.
CM5 - Data Annualised for CM5 as per TG16 Box 7.9

Notes:

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

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

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

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

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

Figure A.3 – Trends in Annual Mean PM_{10} Concentrations

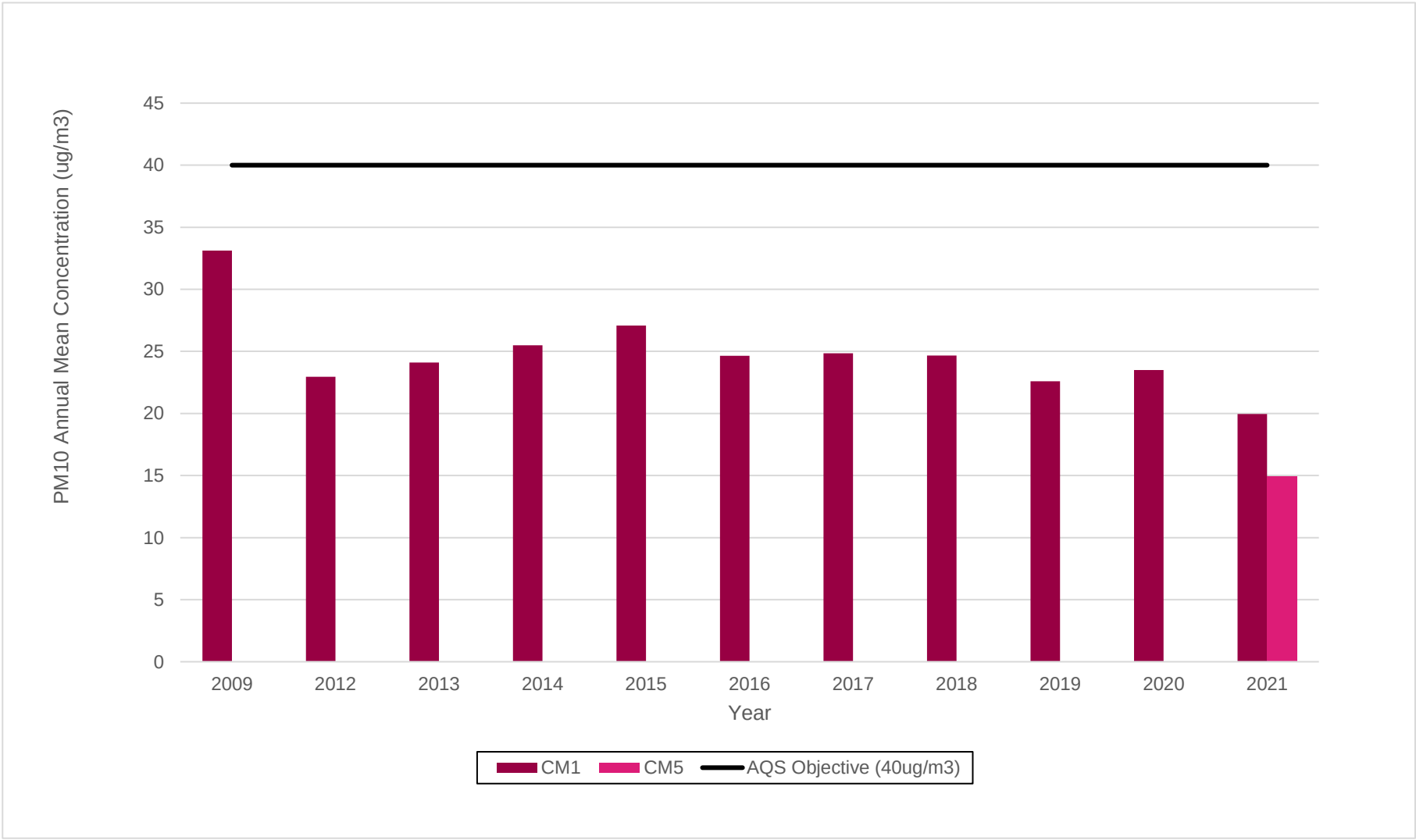


Figure A.3 Plot of PM_{10} Annual Mean Concentrations against Year for the Mountsorrel Quarry monitoring sites

Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	457355	315396	Industrial	67	67	[46.9]	[46.3]	[43.1]	[40.7]	[38.6]
CM5	457355	315396	Industrial	100	56%	-	-	-	-	[23.9]

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

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

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

Figure A.4 – Trends in 90.4th Percentile of 24-Hour Mean PM_{10} Results > 50µg/m^3

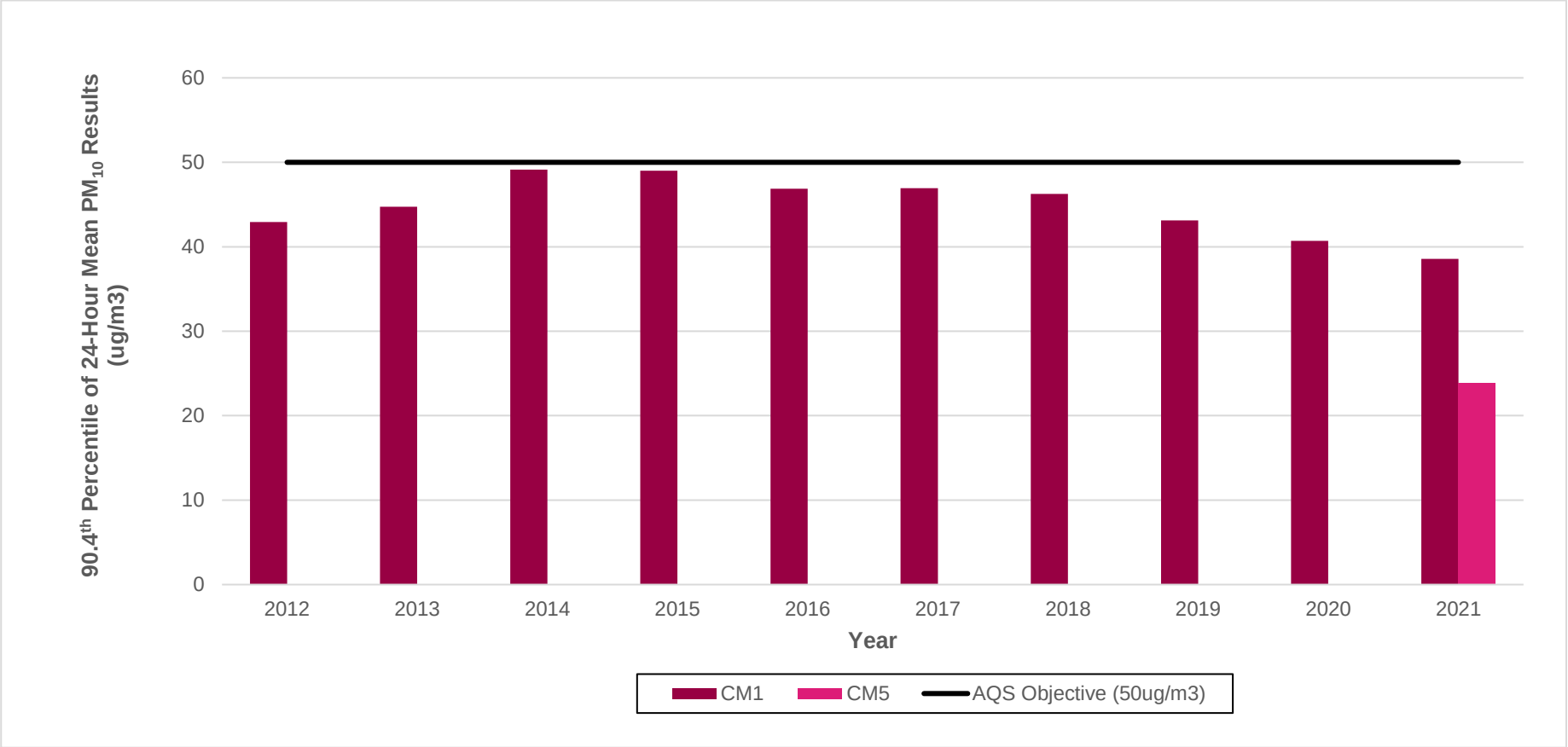


Figure A.4 Plot of the 90.4th Percentile of 24-Hour Mean Concentration against Year for the Mountsorrel Quarry monitoring sites

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM5	457355	315396	Industrial	100	56%	-	-	-	-	12.3

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

Notes:

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

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

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

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

Figure A.5 – Trends in Annual Mean $PM_{2.5}$ Concentrations

Insufficient data at this time.

Table A.9 – SO_2 2021 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	Number of 15-minute Means > 266µg/m³	Number of 1-hour Means > 350µg/m³	Number of 24-hour Means > 125µg/m³
CM2	454380	319768	Industrial	83	83	0 [23.4]	0 [16.6]	0 [11.4]

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT1	454087	320392	30.9	23.6	24.1	19.2	19.6	16.3	17.2	15.6	21.6	21.7	25.9	23.9	21.6	18.2	-	
DT2	454234	318657	25.5	21.5	21.1	20.4		16.5	17.4	15.0	21.3	18.0	24.8	22.3	20.3	17.1	-	
DT3	452833	318776	33.8	26.3	26.8	23.6	24.2	23.5	24.5	22.2	28.5	25.0	28.4	28.3	26.3	22.1	-	
DT4	452314	319620	32.9	25.0	26.9	20.2	24.6	20.1	19.4	20.6	26.2	26.2	30.9	25.0	24.8	20.9	-	
DT5	452173	319924	26.5	22.7	22.0	17.5	18.1	16.0	16.0	15.6	20.9	20.1	25.4	24.0	20.4	17.1	-	
DT6	453678	318678	31.7	26.5	27.2	24.8	25.9	23.2	25.1	20.6	30.3	27.3	29.2	35.1	27.2	22.9	-	
DT7	454002	319253	37.5	37.2	33.0	37.6	36.5	32.3	34.1	28.7	40.9	29.6	32.4	28.1	34.0	28.6	-	
DT8	453231	320028	30.6	27.2	23.2	22.9	20.8	20.1	20.4	18.9	26.9		26.1	24.7	23.8	20.0	-	
DT9	452670	320527	30.3	23.1	23.8	19.8	19.0	17.3	17.4	17.2	23.3	20.3	25.3	24.2	21.7	18.3	-	
DT10	452352	320697		19.8	18.5	16.6	13.4	13.0	8.8	12.7	16.6	15.4	20.3	20.3	-	-	-	Triplicate Site with DT10, DT11 and DT12 - Annual data provided for DT12 only
DT11	452352	320697	24.6	18.7	19.0	17.0	13.3	13.1	12.9	12.6	16.7	12.0	19.7	19.8	-	-	-	Triplicate Site with DT10, DT11 and DT12 - Annual data provided for DT12 only
DT12	452352	320697	24.6	19.8	18.1	17.1	13.6	12.9	13.1	12.1	15.9	15.5	20.3	19.5	16.7	14.0	-	Triplicate Site with DT10, DT11 and DT12 - Annual data provided for DT12 only
DT13	452903	320212	33.8	26.6	24.7	26.1	23.0	23.7	21.8	21.8	27.6	22.7	25.7	26.5	25.3	21.3	-	
DT14	453730	319596	38.8	32.6	28.8		27.8	24.7	25.0	25.8	29.8	30.0	30.7	29.9	29.5	24.7	-	
DT15	453611	319540	24.6	19.9	16.6	14.5	13.2	12.4	12.3	12.0	16.9	17.2	26.2	19.9	17.1	14.4	-	
DT16	453189	319709	38.1	31.5	28.9	25.3	27.7	26.3	27.6	24.1	32.9	30.2	32.3	30.3	29.6	24.9	-	
DT17	448876	318307	28.2	25.5	22.1	20.4	18.9	20.0	20.5	17.8	23.8	21.3	24.0	21.8	22.0	18.5	-	
DT18	452697	319921	25.3	18.6	18.4	15.8	11.9	11.8	12.0	12.2	15.8	16.0	21.0	18.3	16.4	13.8	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT19	462777	311692	35.7	25.9	27.6	25.1	24.1	22.6	23.1	21.2	30.1	27.6	35.1	32.0	27.5	23.1	-	
DT20	46235	311213	33.7	24.4	24.4	22.9	18.9	18.7	20.4	19.3	24.9	23.7	28.7	23.6	23.6	19.9	-	
DT21	462373	311254	41.6	29.0	34.0	26.2	25.5	28.1	23.7	27.6	29.5	32.9	43.9	32.9	31.2	26.2	-	
DT22	459233	309233	36.1	27.6	28.1	20.7	24.1	22.9	23.2	22.1	29.1	29.3	32.9	28.7	27.1	22.7	-	
DT23	459178	309890	40.4	34.0	26.7	30.7	25.1	26.3	26.9	27.1	32.9	28.6	31.3	29.0	29.9	25.1	-	
DT24	460821	308757	38.2	32.5	33.0	27.1	30.4	28.2	24.6	27.0	34.2	34.8	38.7	29.9	31.5	26.5	-	
DT25	460861	308824	36.5	30.1	30.4	23.2	27.9	23.2	24.3	25.9	32.8	32.5	33.5	31.5	29.3	24.6	-	
DT26	460835	308784	32.1	24.9	25.1	19.9	20.0	19.1	18.5	18.4	25.1	25.9	28.0	24.6	23.5	19.7	-	
DT27	448121	318257	34.5	29.8	26.4	27.7	26.6	27.5	28.3	27.4	33.2	25.7	29.8	23.6	28.4	23.8	-	
DT28	450260	321922	34.4	24.8	26.5	23.3	20.8	17.0	21.0	19.9	23.8	22.0	29.8	24.1	23.9	20.1	-	
DT29	453901	319488	35.7	32.1	25.8	30.6	23.8	21.5	21.2	20.4	28.0		30.9	26.1	26.9	22.6	-	
DT30	453946	319619	27.2	19.9	20.7	16.7	16.1	16.1	15.5	14.9		20.7		21.0	18.9	15.9	-	
DT31	453694	319890	17.2	32.5	26.8	28.9	25.9	25.1	26.9	24.2	33.1	26.2	30.2	31.6	27.4	23.0	-	
DT32	462369	311809		27.4	33.0	29.6	26.7	26.0	24.9	25.3	31.3	25.7	41.0	31.7	29.3	24.6	-	
DT33	462540	311428	38.8	27.3	32.9	21.6	22.7	23.1	22.0	23.5	30.2	30.8	37.1	32.5	-	-	-	Triplicate Site with DT33, DT34 and DT35 - Annual data provided for DT35 only
DT34	462540	311428	37.5	25.2	31.6	22.6	24.3	23.0	20.6	23.8	29.9	30.3	37.6	30.9	-	-	-	Triplicate Site with DT33, DT34 and DT35 - Annual data provided for DT35 only
DT35	462540	311428	36.2	25.6	29.9	20.6	22.5	21.1	21.8	22.9	28.9	30.0	34.6	30.3	27.9	23.4	-	Triplicate Site with DT33, DT34 and DT35 - Annual data provided for DT35 only
DT36	453687	319672	33.2	36.2	25.6	30.8	23.4	25.8	25.1	25.0	32.4	25.8	30.5	27.5	-	-	-	Triplicate Site with DT36, DT37 and DT38 - Annual data provided for DT38 only
DT37	453687	319672	35.7	38.8	25.4	31.6	23.6	26.3	24.4	24.1	31.8	24.7	27.3	26.1	-	-	-	Triplicate Site with DT36, DT37 and DT38 - Annual data provided for DT38 only
DT38	453687	319672	35.6	33.8	24.3	29.4	23.3	25.8	23.9	24.2	31.1	23.9	28.9	25.2	28.1	23.6	-	Triplicate Site with DT36, DT37 and DT38 - Annual data provided for DT38 only
DT39	454154	320116	33.8	29.1	28.1	26.0	24.0	27.2	23.9	25.4	34.0	28.7	32.9	27.3	28.4	23.8	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT40	454285	320294	28.3	22.5	21.3	18.1	18.3	18.9	18.2	18.6	23.2	22.1	27.1	22.1	21.5	18.1	-	
DT41	453933	320663	30.7	23.8	22.4	19.8	17.8	15.8	17.2	15.9	22.0	21.4	27.1	24.0	21.5	18.0	-	
DT42	454142	320593	30.6	20.6	21.4	21.2	19.0	19.1	19.5	17.3	24.1	21.2	29.4	23.2	22.2	18.7	-	
DT43	454250	319682	32.7	29.1	25.1	25.3	22.7		23.8	19.9	26.6	24.4	26.3	18.0	24.9	20.9	-	
DT44	461499	310459	31.0	23.0	23.0	18.8	18.7	13.8	15.1	14.1	19.5	24.7	27.4	25.9	21.2	17.8	-	
DT45	461994	309975	29.7	18.9	21.0	18.2	15.0		20.1	19.6	24.1	24.5	31.0	26.2	22.6	19.0	-	
DT46	448311	320511	24.5	19.3	16.4	19.3	16.2	17.7	18.1	15.1	22.1	18.1	19.1	20.0	18.8	15.8	-	
DT47	449935	322227	25.5	22.5	21.8	21.3	19.7	19.4	18.6	17.5	23.6	20.8	25.9	22.5	21.6	18.1	-	
DT48	450942	321076	20.2	14.1	12.9	11.3	8.7		8.0	8.3	9.9	11.1	16.1	15.5	12.4	10.4	-	
DT49	460313	323521	29.4	24.6	25.5	26.2	22.6	24.1	22.6	23.1	26.3	22.5	28.9	20.3	24.7	20.7	-	
DT50	455141	308686	38.5	34.0	35.9	33.8		28.2	26.8	27.4	35.0	34.0	40.4	32.4	33.3	28.0	-	
DT51	455167	308549	24.5	21.7	21.3	22.0	19.3	17.6	17.8	15.6	19.9	19.6	18.4	22.5	20.0	16.8	-	
DT52	463483	309880	25.9	16.0	18.2	15.0	13.4	12.2	12.7	12.1	17.9	17.6	25.5	19.1	17.1	14.4	-	
DT53	453277	319248	31.9	25.9	22.6	26.3	20.5	23.1	22.6	21.4	30.5	24.7	30.3	25.8	25.5	21.4	-	
DT60	451629	317677	20.8	14.7	16.4	13.6	11.4	11.3	11.9	11.9	13.6	14.2	17.8	16.0	14.5	12.1	-	

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

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

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

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Charnwood During 2021

Charnwood Borough Council has not identified any new sources relating to air quality within the reporting year of 2021. However, we will continue to review our monitoring programme within the borough to consider any arising issues, or concerns from Members / the public.

Additional Air Quality Works Undertaken by Charnwood Borough Council During 2021

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

QA/QC of Diffusion Tube Monitoring

All NO_2 diffusion tubes for 2021 were supplied and analysed by Gradko using 20% TEA in water preparation.

As part of their provision of support to Local Authorities for air quality management, Defra and the Devolved Administrations provide a set of centralised QA/QC services, to assist Local Authorities using diffusive samplers for monitoring of ambient nitrogen dioxide (NO_2) concentration, as part of their Local Air Quality Management process.

This is aimed at the analytical laboratories that supply and analyse the diffusion tubes, and currently comprises:

Promotion of the independent AIR-PT scheme, operated by LGC Standards and supported by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria. AIR-PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme. For more information the AIR-PT scheme, please click **here**.

Performance summaries in the AIR-PT scheme for the laboratory chosen to prepare and analyse diffusion tubes on behalf of Charnwood Borough Council (Gradko), prepared by AEA, are as per the following link:

AIR-PT-Rounds 30 to 42 (Jan 2019 to Mar 2021)

Released: March 2021 (PDF, 163 KB, 5 pages)

Results submitted were determined to be **satisfactory**

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Charnwood recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Charnwood Borough Council have applied a national bias adjustment factor of 0.84 to the 2021 monitoring data. A summary of bias adjustment factors used by Charnwood over the past five years is presented in Table C.1

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.84 (from 32 studies)
2020	National	03/21	0.81 (from 18 studies)
2019	National	03/20	0.93 (from 27 studies)

2018	Local	-	0.93 (northern sites) 0.91 (southern sites)
2017	Local	-	0.96 (northern sites) 1.06 (southern sites)

NO_2 Fall-off with Distance from the Road

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

No diffusion tube NO_2 monitoring locations within Charnwood required distance correction during 2021.

QA/QC of Automatic Monitoring

Our Partisol PM_{10} analyser is serviced under schedule by 'Matt's Monitors'. Where necessary any servicing/calibration/support in respect of our AQMesh SO2 analyser is via the supplier i.e. Acoem UK (previously Air Monitors Ltd.) and similarly through *EarthSense* in respect of the 'Zephyr' portable analyser(s).

Any validation and ratification procedures follow Technical Guidance LAQM.TG(16)

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10}/$PM_{2.5}$ monitor(s) utilised within Charnwood do not require the application of a correction factor.

Automatic Monitoring Annualisation

As data capture for the PM_{10}/$PM_{2.5}$ annual means fell beneath 75% for CM1 (repeatedly blocked Partisol mechanism) and CM5 (part year deployment) then an annualisation correction of the data needs to be considered.

Relevant calculations in respect of CM5 are shown below in Appendix C.2

However due to the ‘fragmented’ / ‘spotty’ nature of the output obtained from the CM1 during 2021, which was in-situ for the ***full*** annual period, then the annualisation calculation approach which considers the ratio between the period mean (Jan-Dec) vs. annual mean would effectively cancel each other out and become meaningless.

This approach was raised and later discussed with the LAQM Helpdesk on 8th June 2022. It was accepted that on this occasion that presenting the observed ‘raw’ average annual mean would be acceptable in this case.

NO_2 Fall-off with Distance from the Road

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

Charnwood no longer operate any NO_2 automatic monitors, therefore there is no requirement for distance correction during 2021.

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

Annualisation of site CM5 Mean PM_{10} Monitoring Results (µg/m^3):

Background Site	Annual Mean 2021 (Am)	Period Mean (Pm) 9th Jun - Dec	Ratio (Pm/ Am)	Average Annualisation Factor (Ra)	Measured Period Mean site at CM5 (M)	Annualised Annual Mean (M x Ra)
Leicester University	12.21	11.5	1.062	1.070	13.94	14.92
Nottingham Centre	13.87	13.09	1.060			
Coventry Allesley	11.82	10.85	1.089			

Annualisation of site CM5 Mean $PM_{2.5}$ Monitoring Results (µg/m^3):

Background Site	Annual Mean 2021 (Am)	Period Mean (Pm) 9th Jun - Dec	Ratio (Pm/ Am)	Average Annualisation Factor (Ra)	Measured Period Mean site at CM5 (M)	Annualised Annual Mean (M x Ra)
Leicester University	7.51	6.84	1.098	1.100	11.19	12.31
Nottingham Centre	8.36	7.76	1.077			
Leamington Spa	7.16	6.37	1.124			

Table C.3 – Local Bias Adjustment Calculation

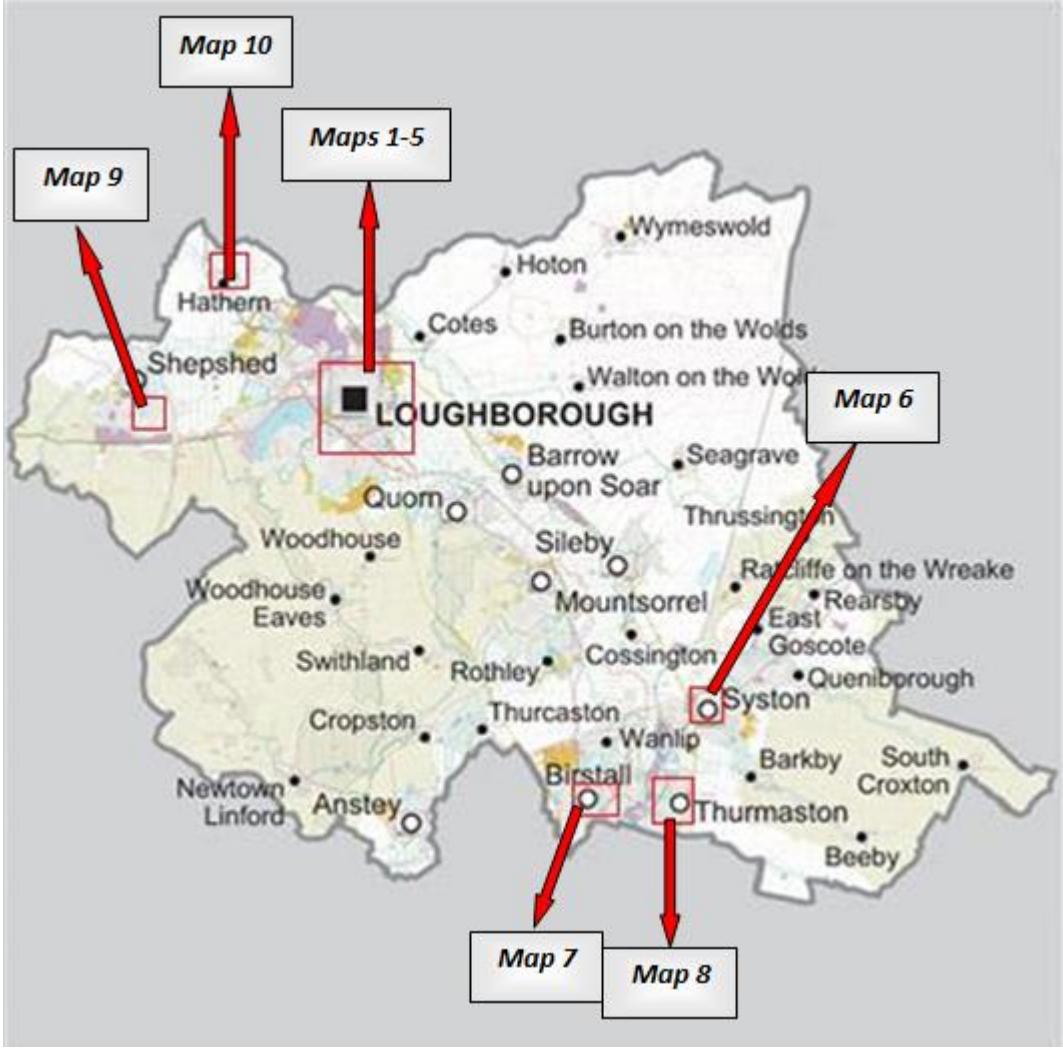
No local bias was applied to the 2021 data.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

No distance correction was made at any site for 2021

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

The Borough of Charnwood



Loughborough Area Overview (Maps 1-5)

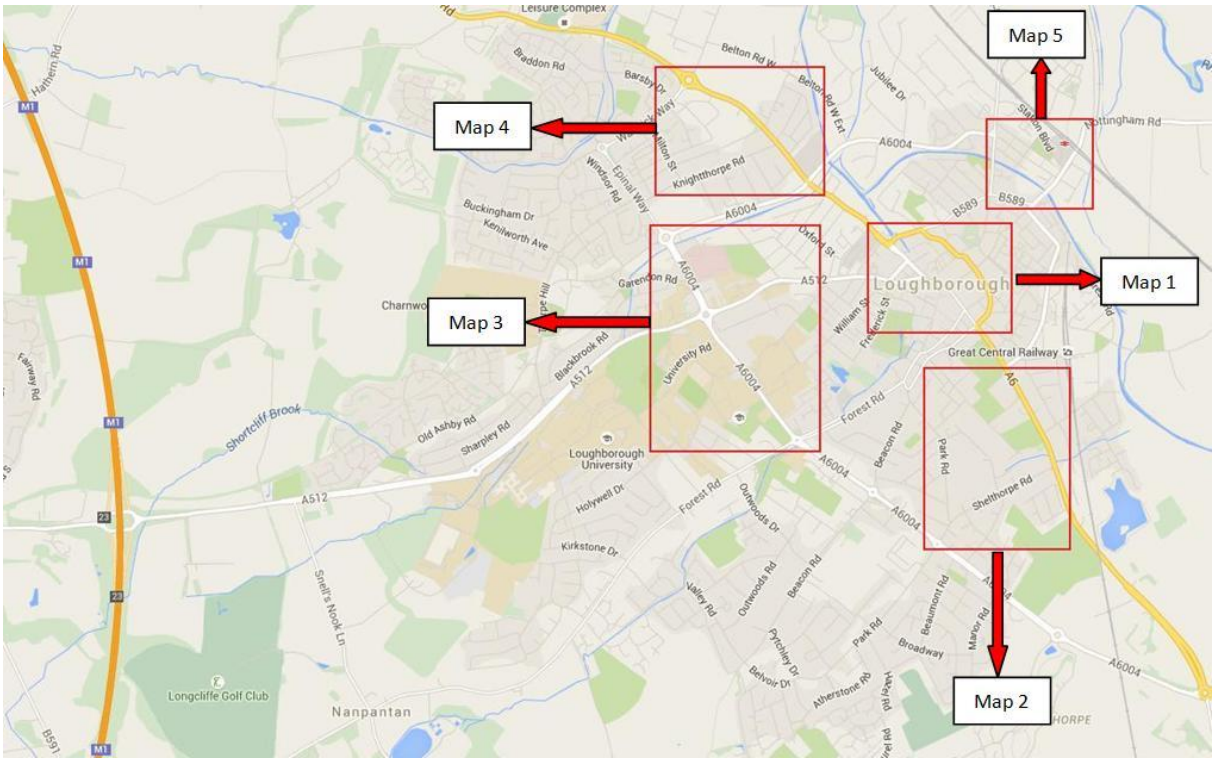
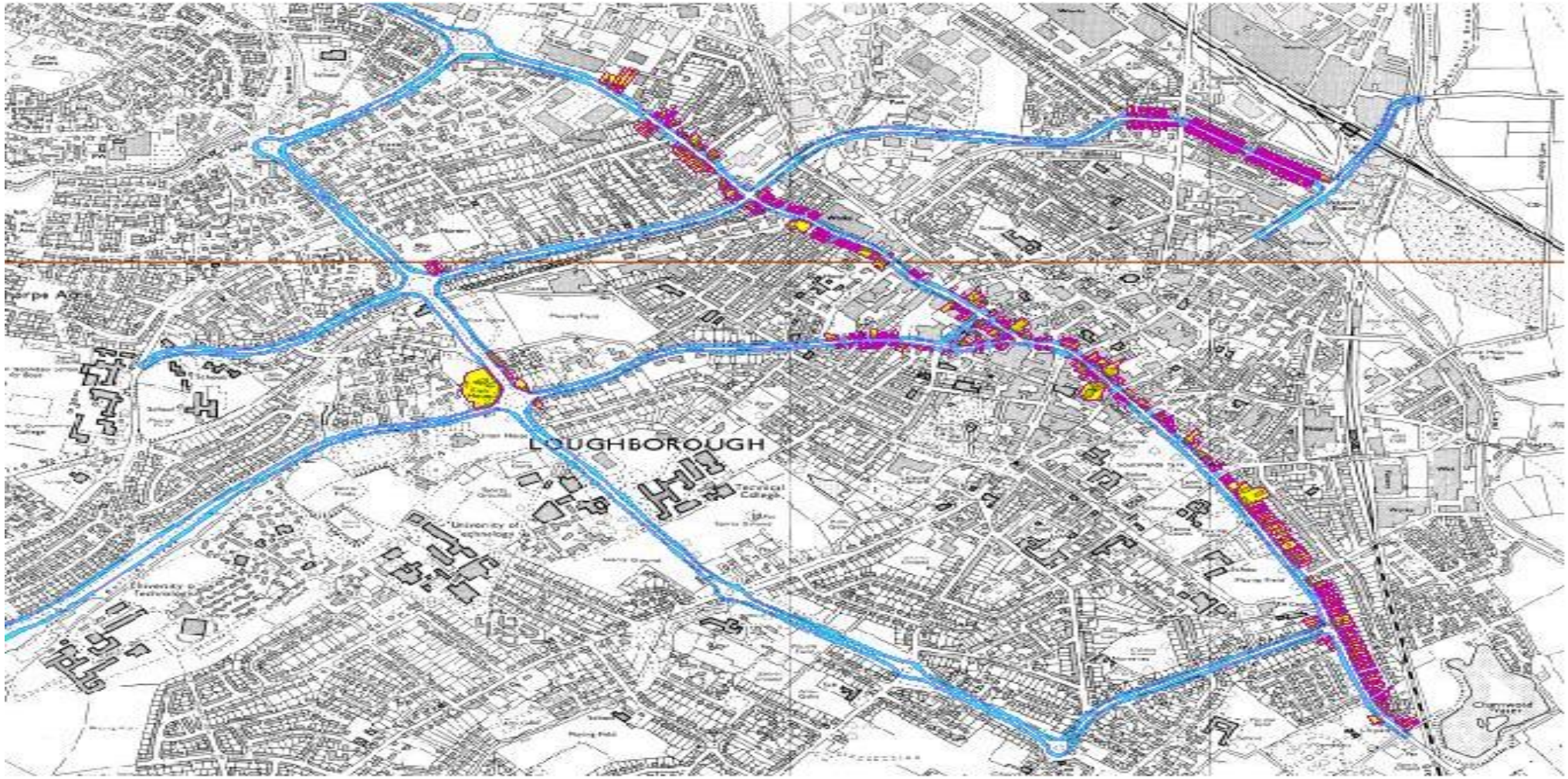


Figure D.1 – Map of the Loughborough AQMA



The area is designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000.

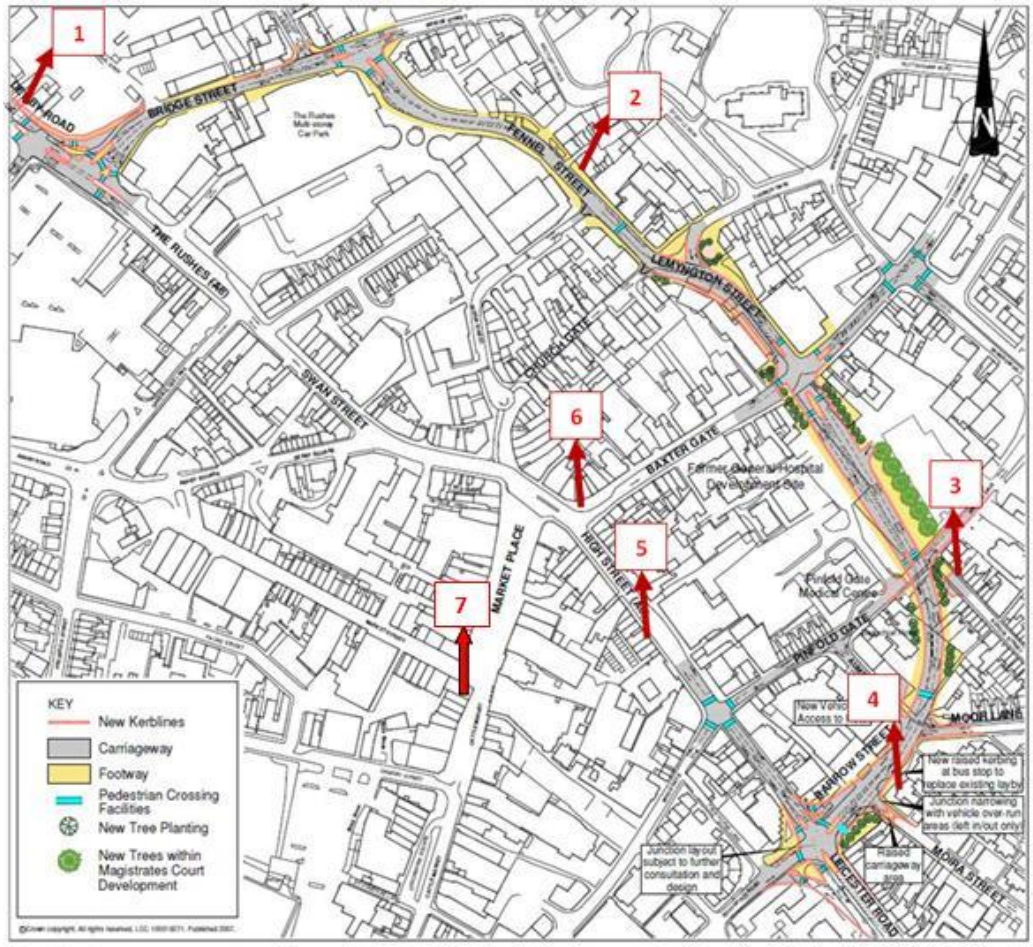
The land of the following highways and all publicly owned land within 10 meters of the kerbside of each highway:

- Leicester Road, High Street, Swan Street, The Rushes, Derby Road (From The Rushes to Warwick Way), Warwick Way, Epinal Way (From Warwick Way to Shelthorpe Road), Epinal Way Extension, Ashby Road (From Greenclose Lane to Epinal Way), Alan Moss Road (From Epinal Way to Derby Road), Greenclose Lane, Belton Road, Ratcliffe Road, Nottingham Road (From Brush Works entrance to Queens Road).

The following privately owned properties are included because we understand they are used for residential purposes and have a building facade less than 10 meters from the kerbside of the roads listed above:

- Leicester Road 2, 5a, 36-44, 58-94, 166
- High Street 3, 35
- Burton Walks The Lodge
- The Rushes 4-21, 41
- Ashby Road 31-59, 67-75, 85-95, 99-115, 119-125, 219, 20-46, 62a-92, 96-108, 142, 148, 150-172, 176, 190-192
- Ratcliffe Road 8-154, 3-141
- Glebe Street 32-36
- Storer Road 1
- Haydon Road 1&2
- Brisco Avenue 1&3
- Derby Road Station Hotel, 25a, 35, 107-151, 187, 191-209, 215-219, 223-225, 46-114, 120-124, 130-142, 156-162
- Cliffe Avenue 12b, 12d

Map 1: Loughborough Town Centre

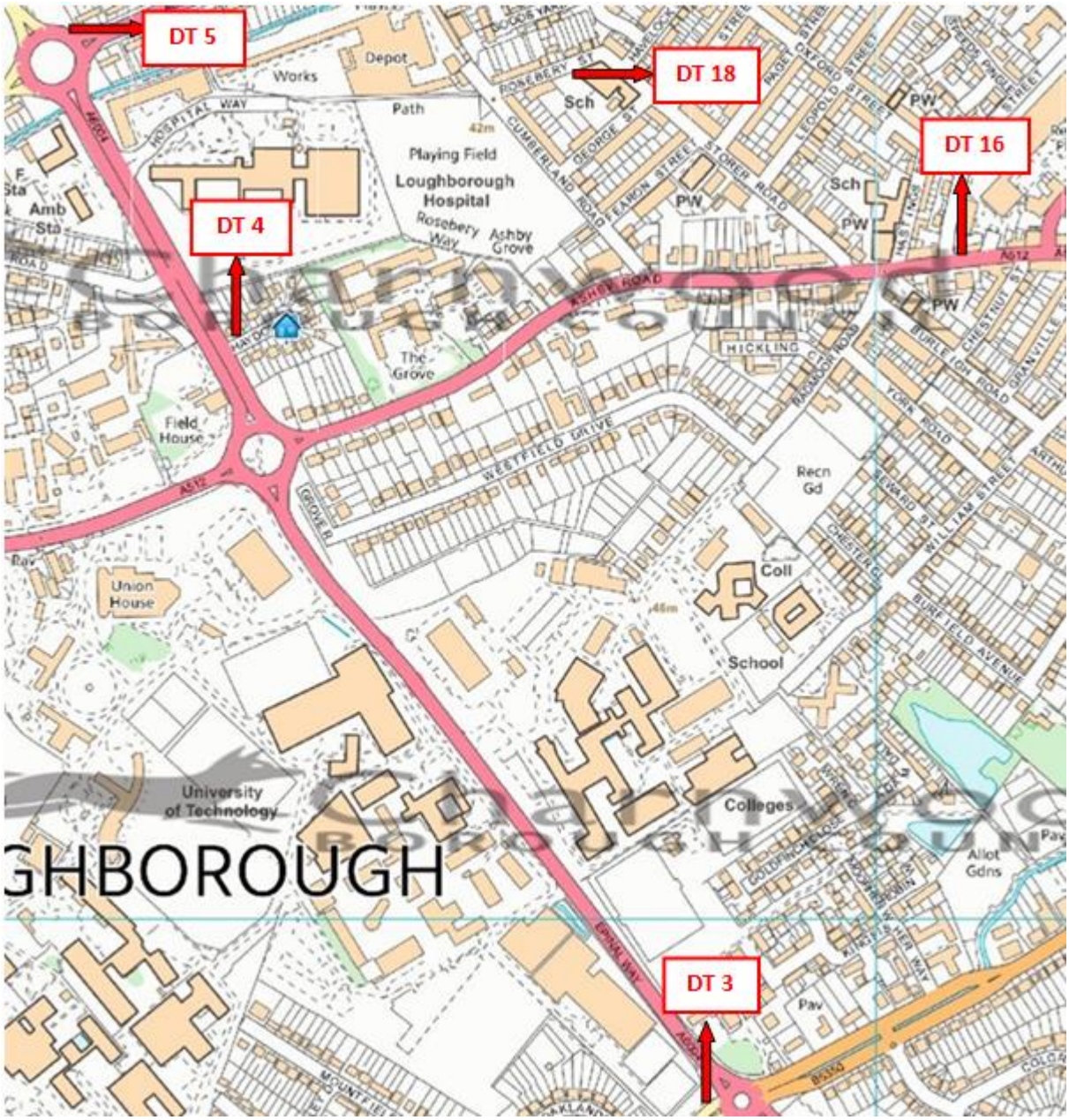


Map Position	Site ID	Site Name	Pollutant
1	DT8	Derby Road	NO_2
2	DT31	Fennel Street	NO_2
3	DT30	School Street	NO_2
4	DT29	Barrow Street	NO_2
5	DT14	High Street	NO_2
6	DT36, DT37, DT38	Baxter Gate AQMS 1, 2, and 3	NO_2
7	DT15	Market Place	NO_2

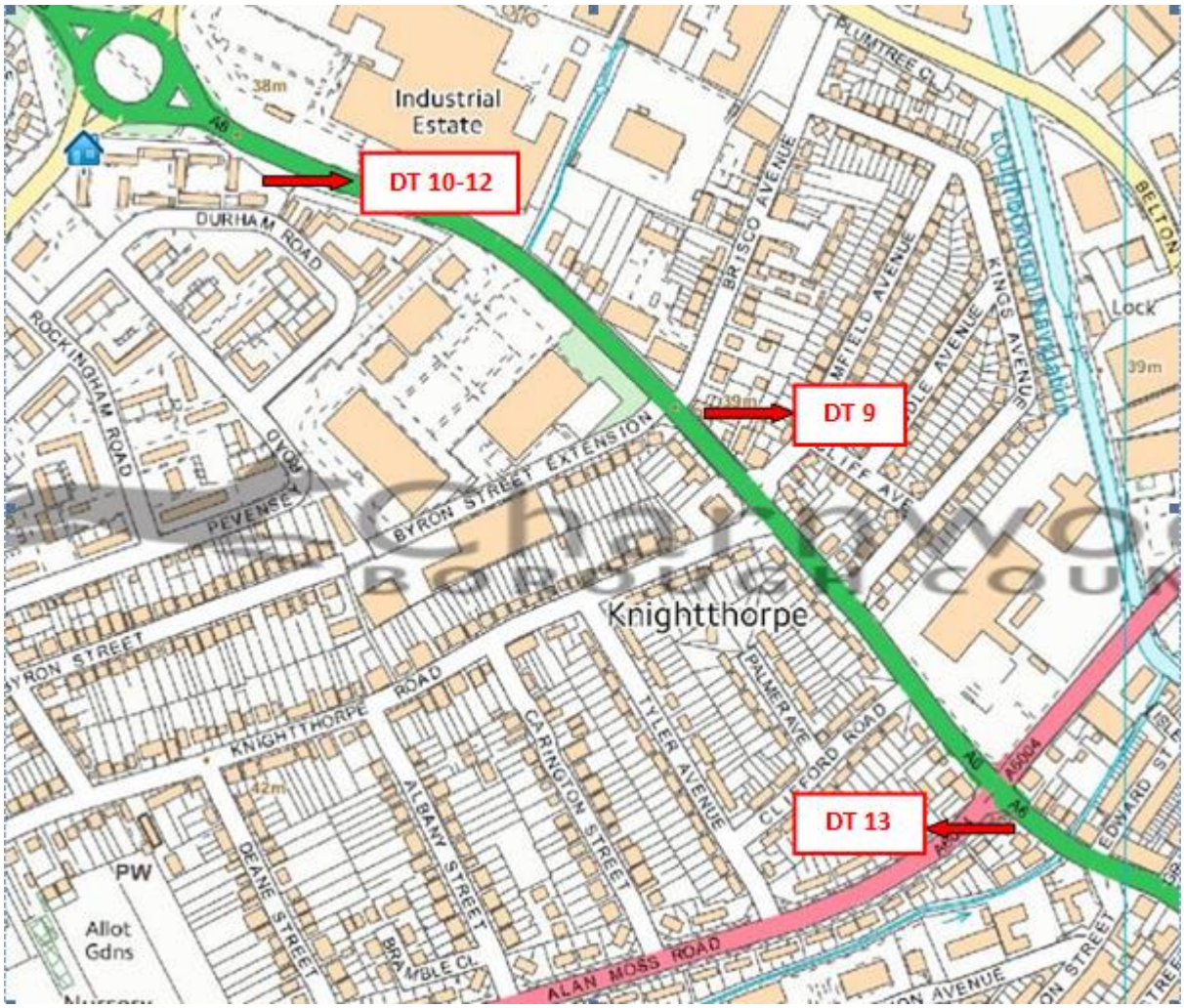
The above map shows the route of the Inner Relief Road which opened in November 2014. Traffic is now routed away from the town centre.

Map 2: Loughborough South

Map 3: Loughborough West



Map 4: Loughborough North



Map 5: Loughborough East

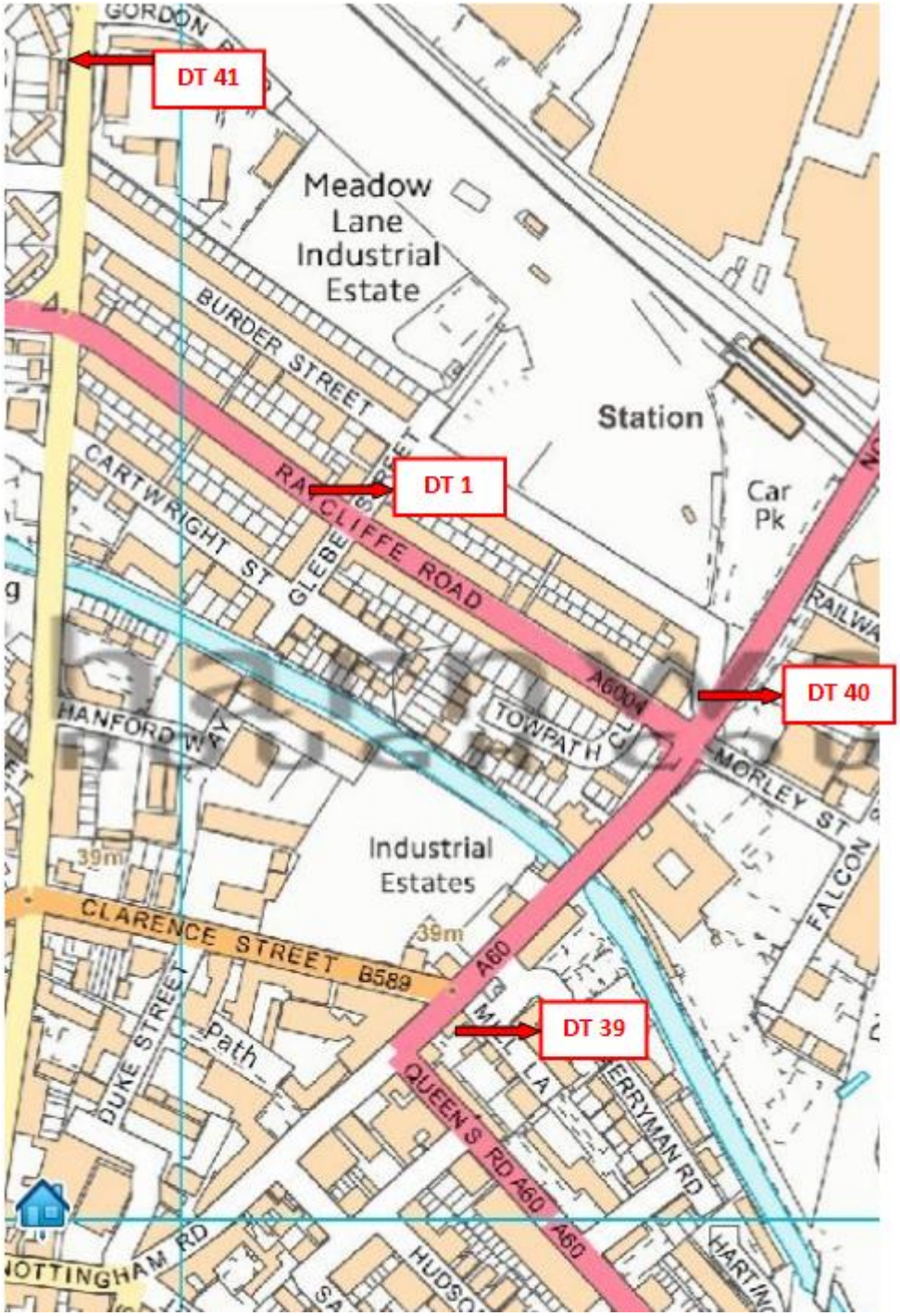


Figure D.2 – Map of the Syston AQMA

The location of monitoring sites are represented as follows:

- **DT33-35 (+ historically CM4)**
- **DT21**
- **DT20**
- **DT19**

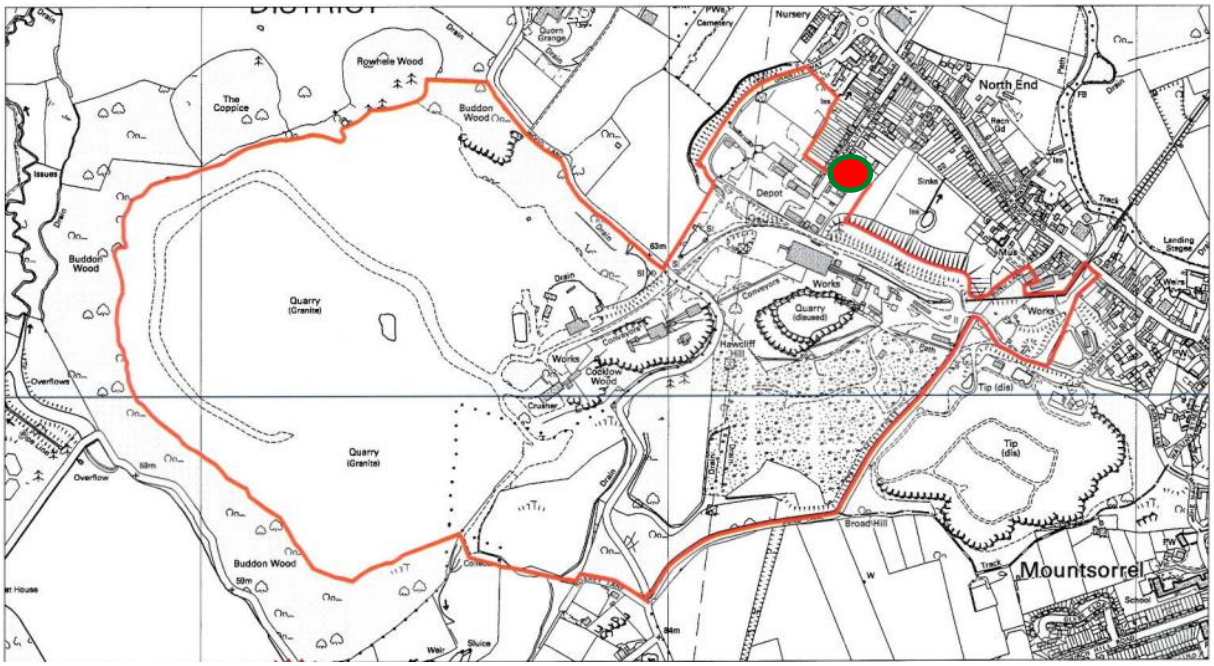
This area is designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Regulations (England & Wales) 2000.

The land of the A607 highway between the junctions with Wanlip Road and High Street, Syston and all publicly owned land within 10 meters of the kerbside of the highway.

The following privately owned properties are included because we understand they are used for residential purposes and have a building facade less than 10 meters from the kerbside of the roads listed above:

- Melton Road 1108-1126, 1182-1190, 1238-1260, 1091-1109, 1121-1141, 1163
- Midland Railway Hotel and Sandford Road number 2A

Figure D.3 – Map of the Mountsorrel AQMA



The properties and area declared in the Mountsorrel AQMA are bounded by the red border.

The location of automatic monitoring sites CM1 & CM5 is represented by the

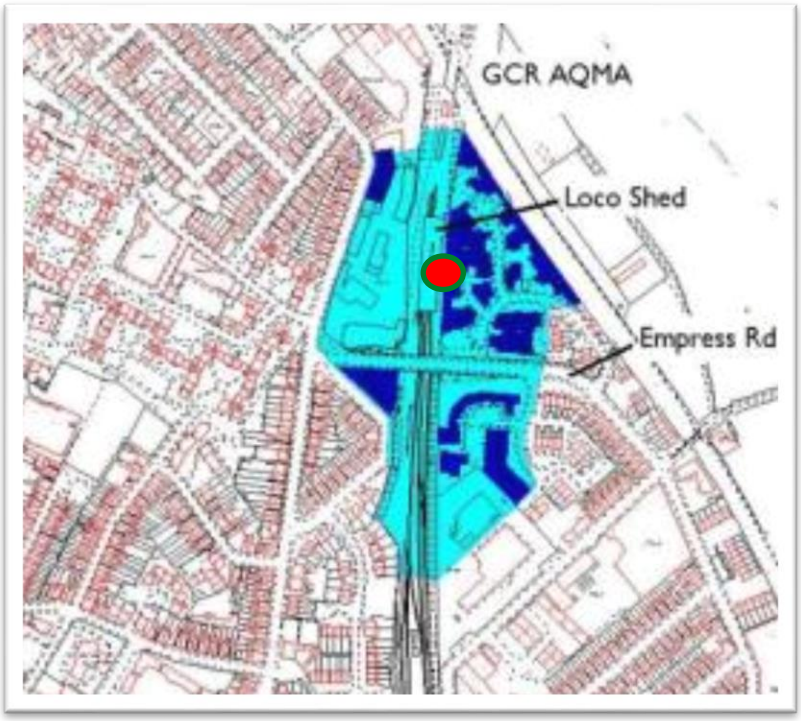
This area is designated in relation to a likely breach of the particulate matter (PM10) 24 hour mean National Air Quality Objective as specified in the Air Quality Regulations (England)(Wales) 2000.

- Hawcliffe Road 49-55 (odd) and 84 & 86 (even)
- Farnham Court, Bond Lane: 13-24

The designated area also incorporates sections of highways including all publicly owned land within 10 meters of the kerbside of each;

- Granite Way, Wood Lane, Rushey Lane, Bond Lane

Figure D.4 – Map of the Great Central Railway AQMA



The location of automatic monitoring site CM2 is represented by the

This area is designated in relation to a likely breach of the sulphur dioxide (fifteen minute mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000.

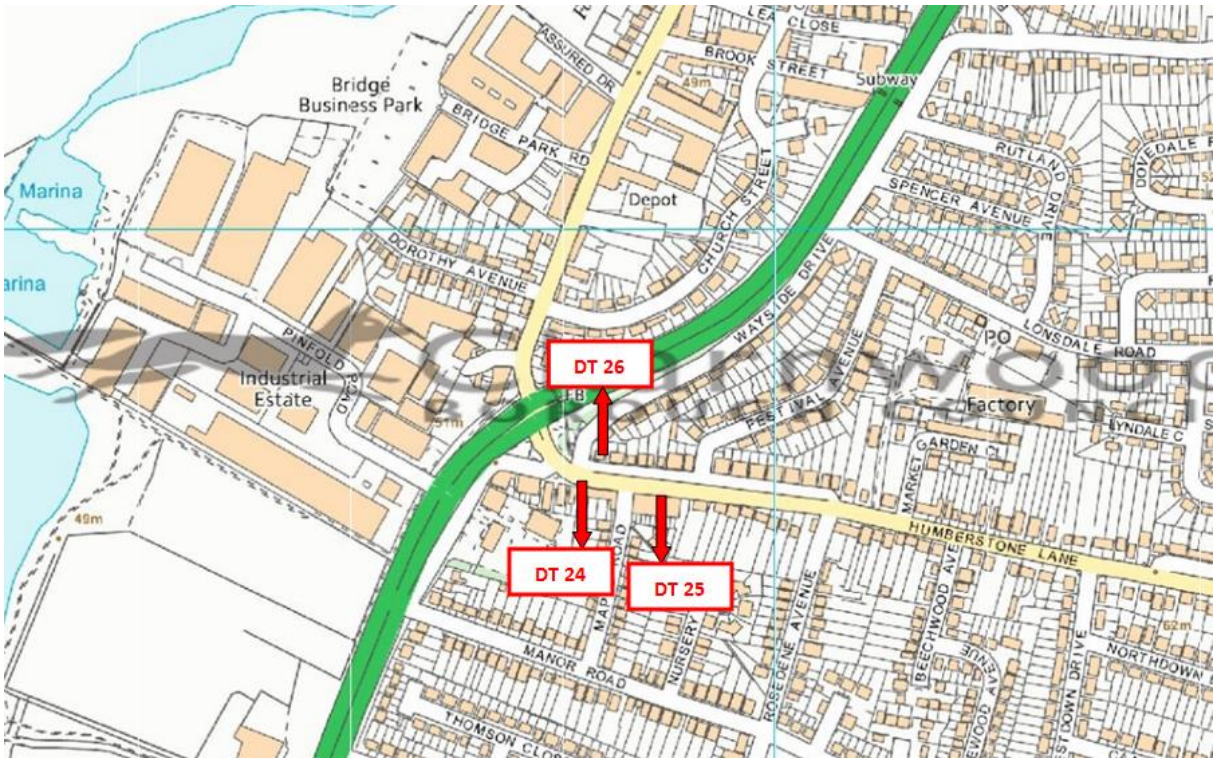
The area around the Great Central Railway that has been declared is based on computer modelling of the emissions from the railway locomotives at the engine sheds.

The private residential properties contained within the Area are:

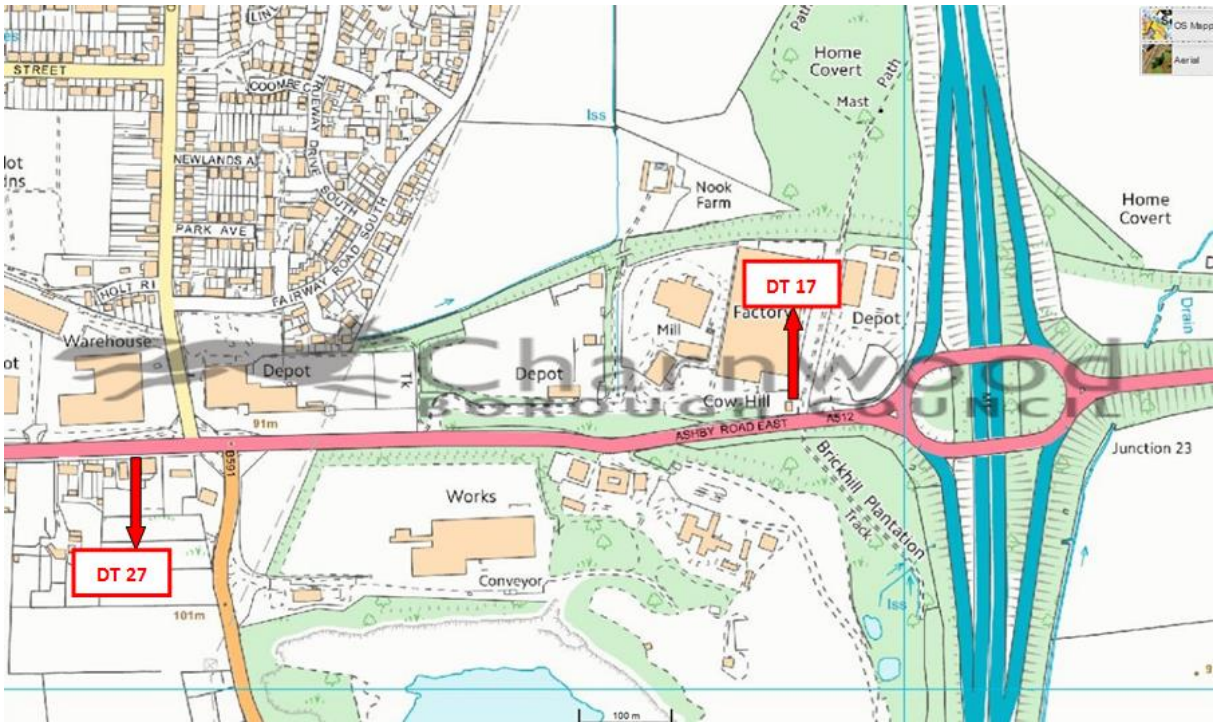
- Queens Road 62-74
- Warner Place 33-39
- Morris Close 5-65, Taylor House
- Holbein Close 2-18, 1-39
- Wolsey Way 19-45, 18-40

Map 7: Birstall

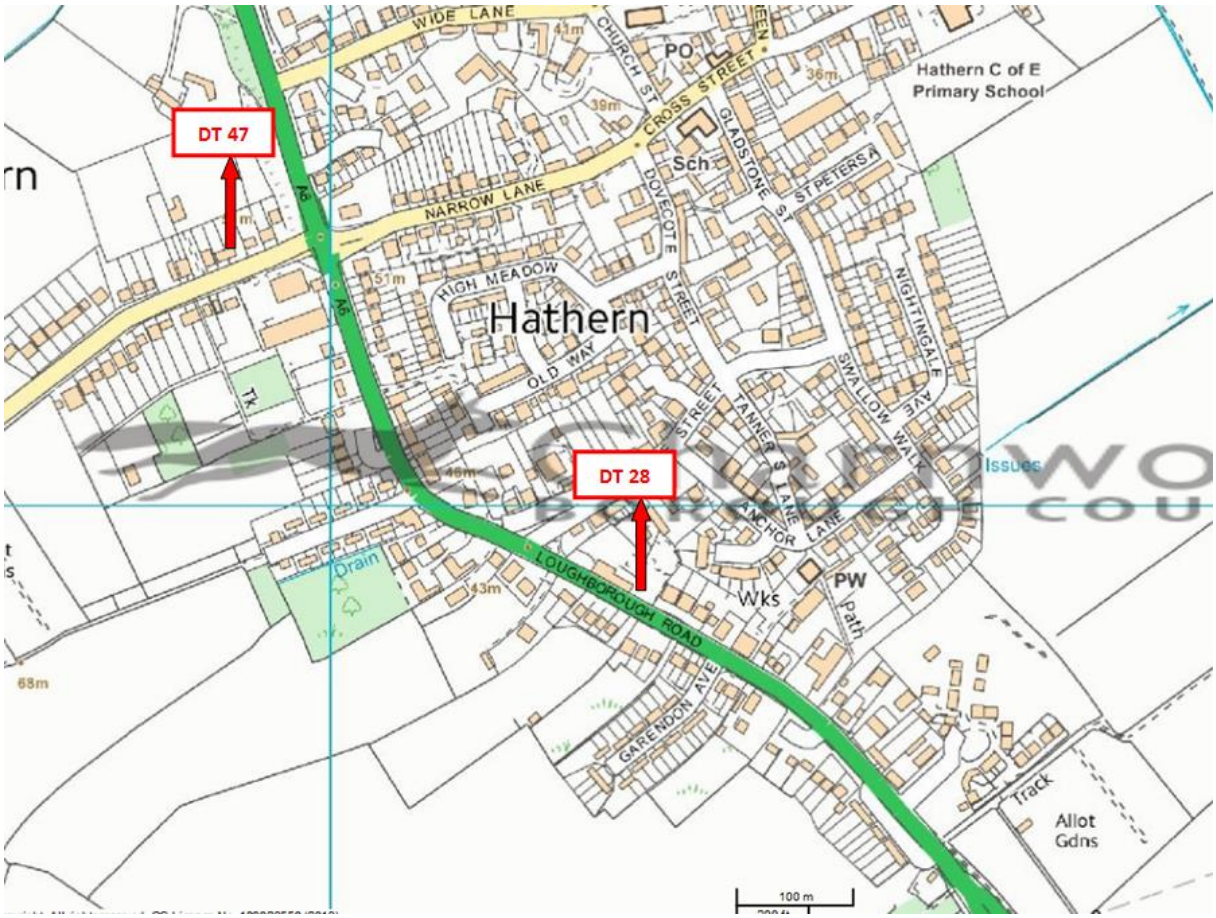
Map 8: Thurmaston



Map 9: Shepshed



Map 10: Hathern



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
CBC	Charnwood Borough Council
Defra	Department for Environment, Food and Rural Affairs
DMMP	Dust Management and Monitoring Plan
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
GCR	Great Central Railway
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.